

The impact of stock splits and reverse stock splits on stock returns in the Indonesian market



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ABSTRACT

This study examines the impact of stock splits and reverse stock splits on stock returns around their effective dates in the Indonesia Stock Exchange during the 2022–2023 period. The research applies an event study method and uses the cumulative abnormal return (CAR) approach to measure the difference between actual and expected returns within a 10-day window before and after the corporate action. The results show that stock splits generally have a positive effect on stock returns. CAR increases significantly before the effective date, suggesting a favorable reaction from investors. In contrast, reverse stock splits have a negative effect, as CAR declines sharply on and after the effective date. These findings indicate that stock splits are viewed as positive signals about a company's future performance, while reverse stock splits are often interpreted as signs of potential financial or operational problems. This study contributes to the literature on financial markets in emerging economies and provides practical implications for managers, investors, and regulators. A better understanding of market reactions to share restructuring can support more informed decision-making, especially in dynamic capital markets such as Indonesia.

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1. Introduction

A stock split is a corporate strategy to increase the number of outstanding shares by dividing existing shares so that the price per share becomes more affordable for investors (Dudycz and Brycz, 2021; Tabibian et al., 2020). Conversely, a reverse stock split reduces the number of outstanding shares by consolidating several shares into one, typically conducted to increase the price per share and attract investors' attention (Lobanova and Aidov, 2023). Both actions are often perceived as management signals regarding a company's prospects, making it important to understand how these actions affect stock performance (Meza et al., 2020). Stock return is one of the key indicators in assessing investment performance in the stock market (Handayani and Rahayu, 2019). High stock returns reflect investor confidence in the company's prospects (Ding et al., 2021). This study employs an event study approach

to measure cumulative abnormal returns, isolating the effects of stock splits and reverse stock splits on stock returns by comparing expected returns and actual returns within a specific period (Almeida et al., 2024; Cowan, 1993). Stock splits and reverse stock splits can influence cumulative abnormal returns, thereby investors enabling investors to make more informed investment decisions (Almeida et al., 2024).

The Indonesian Stock Exchange (IDX), as one of the leading capital markets in Southeast Asia, provides a dynamic environment for such research (Anhar et al., 2024). The IDX hosts a diverse range of companies from various sectors that frequently engage in corporate actions such as stock splits and reverse stock splits (Titman et al., 2022). This research provides insight into how the stock market in Indonesia responds to these actions and whether significant differences exist in stock return patterns before and after their effective date (Almeida et al., 2024).

This research provides a significant contribution to financial literature, particularly in the context of capital markets in developing countries such as Indonesia (Song, 2020). The findings offer practical implications for companies planning to conduct stock splits or reverse stock splits, as well as for regulators overseeing activity in capital markets.

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Using the latest data from 2022-2023, this research presents an up-to-date overview of market dynamics and the effectiveness of both corporate actions (Burkart and Zhong, 2023). Through in-depth analysis and comprehensive methods, this research aims to help investors, fund managers, and academics better understand the short- and long-term impacts of stock splits and reverse stock splits. Thus, this research not only serves as a scientific reference but also as a practical guide in decision-making in the capital market.

The structure of this paper is systematically arranged to facilitate reader comprehension. Following the introduction, the second section presents a literature review summarizing previous research findings related to the impact of stock splits and reverse stock splits on stock returns. The third section explains the research methodology, including the event study approach, calculation of expected returns, and analysis of abnormal returns. Subsequently, the fourth section provides detailed results and discussion regarding stock return patterns before and after the effective date of corporate actions. The final section concludes the summary of key findings and practical implications for investors, company managers, and capital market regulators in Indonesia.

2. Literature review

Stock splits and reverse stock splits are important corporate actions framed by signaling theory and empirically tested through event study methodologies. Signaling theory, pioneered by Spence in the context of the job market, where an informed agent emits expensive signals under asymmetric information to reveal quality (Sunardi et al., 2023).

Signaling theory explains that managerial actions such as stock splits or reverse stock splits can serve as signals to investors regarding the company's prospects (Iannino et al., 2024). In the context of the capital market, a stock split decision is often interpreted as a signal of management's optimism about future performance, while a reverse stock split may indicate a negative signal about a company's financial condition.

Previous research by Tse et al. (2024) supported the event study approach to assess how the market reacts to the announcement of an event by calculating abnormal returns around the event date. Further research indicates that market reactions to stock splits tend to be positive, although the results are not always consistent across markets and time periods.

Stock splits and reverse stock splits, along with their effect on stock returns, have been the focus of extensive research in finance over the past few decades. Numerous studies have been conducted to analyse the impact of these corporate actions across different capital markets. Prominent studies (Liu and Haw, 2022; Ohlson and Penman, 1985) found that stock splits are generally followed by an increase in

stock price. They argue that a stock split can be considered a signal indicating a positive outlook for the company's future performance.

Other studies also support the finding that stock splits have a positive impact on stock returns, suggesting that they reflect management's optimism about the company's performance and growth prospects.

However, some researchers have reported different results. For example, certain studies show that abnormally positive returns occur only in the short term after the stock split, with no significant long-term effects. Regarding reverse stock splits, studies indicate that a reverse stock split is usually followed by a negative stock return, as reverse stock splits are often perceived as bad signals about the company's condition.

Recent studies conducted on emerging market capitals, such as those by West et al. (2020), also reveal similar findings. They found that stock splits tend to have a positive impact, while reverse stock splits negatively impact stock returns. Stock splits often produce abnormally positive returns, reflecting investors' positive view of the company's prospects. Conversely, reverse stock splits tend to produce abnormally negative returns, reflecting investors' negative outlook (Lobanova and Aidov, 2023).

Despite the abundance of previous research, most studies have focused on capital markets in developed countries. Meanwhile, studies examining the impact of stock splits and reverse stock splits on capital markets in developing countries, especially Indonesia, remain limited. Therefore, this study aims to fill the gap by analyzing this phenomenon on the Indonesian Stock Exchange during 2022-2023.

Using an event study approach, this research is expected to provide new insights into how the Indonesian stock market responds to these corporate actions. The findings are also expected to have practical implications for companies, investors, and regulators in the Indonesian capital market.

3. Methodology

This study aims to analyze the impact of stock splits and reverse stock splits on stock returns in Indonesia in 2022 and 2023. The method used in this study is the event study methodology, which allows researchers to measure the reaction of stock returns to specific events over a defined period. The data used in this study were obtained from the Indonesia Stock Exchange website (idx.co.id). The data includes information on companies conducting stock splits and reverse stock splits in 2022 and 2023. This study utilized an event window period that includes 10 days before and 10 days after the effective date of the stock split or reverse stock split. Thus, the total observation period spans 21 days, including the effective date itself. The analysis steps in this study are as follows:

1. Stock return calculation: The daily stock return is calculated for all companies that have conducted

stock splits and reverse stock splits. Daily return is measured as the percentage change in the stock price from one day to the next.

2. Expected return calculation: The expected return is calculated using a market model.
3. Abnormal return calculation: Abnormal return represents the difference between a stock's actual return and its expected return. Abnormal returns are calculated for each day in the event window.

The abnormal return data is then accumulated to obtain the cumulative abnormal return during the observation period. Cumulative abnormal returns are used to evaluate the overall impact of stock splits and reverse stock splits on stock returns over the event window period (Dutta et al., 2018).

By employing an event study methodology, this research provides an understanding of how the Indonesian stock market responded to stock splits and reverse stock splits during the 2022–2023 period. The results of the analysis are expected to offer insights into stock market dynamics and strategic implications for investors and companies considering such corporate actions.

The estimation of expected returns in this study is based on the Market Model, chosen for its suitability in event studies, particularly for short-term analyses. It is crucial to distinguish the Market Model from the Capital Asset Pricing Model:

1. Capital asset pricing model: The CAPM is a theoretical model that posits the expected stock return is determined by the market's systematic risk:

$$E(R_i) = R_f + \beta_i (R_m - R_f) \tag{1}$$

where, $E(R_i)$ is the expected return of stock, R_f is the risk-free rate, β_i is the beta of stock, and R_m is the expected return of the market portfolio. CAPM assumes the market is in equilibrium and incorporates a risk-free rate, making it more appropriate for long-term theoretical equilibrium.

2. Market model: The Market Model is a statistical model that describes the linear relationship between the return of a particular security and the return of the market portfolio. It is particularly well-suited for event studies due to its empirical nature and ability to estimate normal returns over short periods without requiring the strong assumptions of CAPM, such as market equilibrium or the existence of a risk-free rate. The Market Model is represented as:

$$R_{i,t} = \alpha_i + \beta_i R_{x,t} + \varepsilon_{i,t} \tag{2}$$

where, α_i is the intercept, β_i is the sensitivity to the market, and $\varepsilon_{i,t}$ is the abnormal return.

In this approach, the expected return is not treated as constant; rather, it fluctuates according to changes in the market return. If the expected return is assumed to be constant, the estimation of abnormal returns becomes biased and less accurate.

Before presenting the results and discussion, it is important to establish the analytical framework employed in the study. Several formulas were used to analyze the relationship between a stock split and a reverse stock split to a stock's return on the effective date, based on financial models by Nayyar et al. (2023):

3. Capital market pricing model (CAPM)

$$R_{it} = a + \beta R_{x,t} + \varepsilon_{i,t} \tag{3}$$

This formula is used to model the return R_{it} of each stock in our dataset, where a represents the intercept term, β measures the sensitivity of the stock to market return, and $\varepsilon_{i,t}$ is an error term that captures the unexplained factors that affect stock returns.

4. Expected return calculation

$$ER_{i,t} = a + \beta R_{x,t} \tag{4}$$

This formula is used to calculate the expected return of each stock based on the capital market pricing model. It serves as the basis for understanding how the market anticipates each stock to perform, given its sensitivity to market return ($R_{x,t}$).

5. Abnormal return calculation

$$AR_{it} = R_{it} - ER_{it} \tag{5}$$

This formula is used to calculate the abnormal return of a stock, representing the deviation of the actual return from the expected return. It allows researchers to identify stocks that are performing better or worse than market expectations, thereby providing insight into the effectiveness of stock splits and reverse stock splits.

6. Cumulative abnormal return calculation

$$CAR_{i,x,y} = \sum_{t=-y}^{t=x} AR_{i,t} \tag{6}$$

This formula is used to calculate the cumulative abnormal return (CAR) of each stock over a specific period surrounding stock split and reverse stock split events. By aggregating abnormal returns within this period, the study assesses the overall impact of these corporate actions on stock performance.

The formula is used to accumulate abnormal returns over a 21-day window—10 days before and 10 days after the effective date—allowing for a comprehensive assessment of the impact of the effective date of the stock split and reverse stock split on stock performance in the Indonesia Stock Exchange (2022-2023). This study also takes into account microstructure effects that may influence the accuracy of short-term return measurement. These include nonsynchronous trading, which refers to timing differences in transactions between individual stocks and the market index that may bias beta estimates. In addition to that, bid-ask bounce refers to price fluctuation resulting from the

difference between bid and ask spreads rather than new information. To minimize these microstructure effects, a multi-day observation period and aggregation of average cross-sectional stock returns data are used.

4. Result and discussion

This study analyses the impact of stock splits and reverse stock splits on stock returns on the Indonesia Stock Exchange for the 2022–2023 period using the event study methodology. With 25 cases of stock splits and only one case of reverse stock split (PT Pelayaran Nasional Bina Buana Raya Tbk/BBRM on February 18, 2022), the findings show a significantly different pattern of market reaction between the two corporate actions. Table 1 presents all companies that conducted stock splits and reverse stock splits during the study period and summarizes stock split data for companies listed on the Indonesia Stock Exchange between 2022 and 2023. Notable cases include Metrodata Electronics Tbk (IDX: MTDL), which conducted a 1:5 stock split on January 3, 2022, reducing its nominal value from 50 to 10, and Bank Mandiri (Persero) Tbk (IDX:

BMRI), which executed a 1:2 stock split on April 6, 2023, adjusting its nominal value from 250 to 125. These stock splits reflect adjustments in share price and volume, indicating corporate strategies aimed at improving liquidity and attracting investors (Chen and Ausloos, 2023). A total of 25 companies implemented stock splits during this period, with ratios ranging from conservative (1:2, such as BMRI) to aggressive (1:10, such as BBNi and MIDI). These companies represent diverse sectors—including energy, finance, manufacturing, and technology—demonstrating that stock splits are a cross-industry strategy. Most companies proportionally reduced their nominal share value according to the split ratio, aiming to keep share prices within a psychologically appealing range for investors. The varied timing of the stock splits throughout the year suggests issuer's internal conditions and strategic goals influenced the decision-making process. Overall, the data indicate that stock splits are perceived as positive indicators of a company's growth prospects and serve as a critical basis for analyzing changes in stock performance before and after the corporate action (Perez et al., 2025).

Table 1: List of companies conducting stock splits on the Indonesia stock exchange (2022–2023)

No.	Code	Stock name	Ratio	Nominal value (Old)	Nominal value (New)	Effective date
1	IDX: MTDL	Metrodata Electronics Tbk	1:5	50	10	2022-01-03
2	IDX: AKRA	AKR Corporindo Tbk	1:5	100	20	2022-01-12
3	IDX: SILO	Siloam International Hospitals Tbk	1:8	100	12.5	2022-04-12
4	IDX: HRUM	Harum Energy Tbk	1:5	100	20	2022-06-02
5	IDX: HOMI	Grand House Mulia Tbk	1:2	100	50	2022-06-20
6	IDX: PBSA	Paramita Bangun Sarana Tbk	1:2	100	50	2022-06-22
7	IDX: MLIA	Mulia Industrindo Tbk	1:5	500	100	2022-07-15
8	IDX: JTPE	Jasuindo Tiga Perkasa Tbk	1:4	20	5	2022-07-28
9	IDX: EKAD	Ekadharna International Tbk	1:5	50	10	2022-08-22
10	IDX: TPIA	Chandra Asri Petrochemical Tbk	1:4	200	50	2022-08-23
11	IDX: BYAN	Bayan Resources Tbk	1:10	100	10	2022-12-02
12	IDX: BEBS	Berkah Beton Sadaya Tbk	1:5	50	10	2022-12-21
13	IDX: SKRN	Superkrane Mitra Utama Tbk	1:5	100	20	2023-01-06
14	IDX: SMDR	Samudera Indonesia Tbk	1:5	25	5	2023-01-31
15	IDX: MIDI	Midi Utama Indonesia Tbk	1:10	100	10	2023-03-26
16	IDX: BMRI	Bank Mandiri (Persero) Tbk	1:2	250	125	2023-04-06
17	IDX: TMAS	Temas Tbk	1:10	25	2.5	2023-05-25
18	IDX: TUGU	Asuransi Tugu Pratama Indonesia Tbk	1:2	100	50	2023-05-26
19	IDX: TCID	Mandom Indonesia Tbk	1:2	500	250	2023-06-06
20	IDX: MAPA	Map Aktif Adiperkasa Tbk	1:10	100	10	2023-07-17
21	IDX: BBNi	Bank Negara Indonesia (Persero) Tbk	1:2	7,500	3,750	2023-10-10
22	IDX: SOHO	Soho Global Health Tbk	1:10	500	50	2023-11-13
23	IDX: EDGE	Indointernet Tbk	1:5	50	10	2023-11-15
24	IDX: SKLT	Sekar Laut Tbk	1:10	100	10	2023-12-05
25	IDX: ASDM	Asuransi Dayin Mitra Tbk	1:2	250	125	2023-12-12

Table 2 summarizes reverse stock split data for companies listed on the Indonesia Stock Exchange (IDX) between 2022 and 2023, where only one company—Pelayaran Nasional Bina Buana Raya Tbk (IDX: BBRM)—conducted a reverse stock split during this period. Executed on February 18, 2022, with a 3:2 ratio, increased the nominal value of its shares from Rp100 to Rp150, indicating a reduction in the number of outstanding shares. This phenomenon suggests that reverse stock splits are

relatively uncommon in the Indonesian capital market, likely due to the negative perception often associated with them.

Such actions are often viewed as indicators of financial distress or attempts to meet minimum listing price requirements. In the case of BBRM, this decision likely aimed to preserve its listing status, but carried the risk of reduced investor interest, as indicated by the negative return trends discussed in the subsequent decline in returns.

Table 2: Reverse stock split companies in Indonesia

No.	Code	Stock name	Ratio	Nominal value (old)	Nominal value (new)	Effective date
1	IDX: BBRM	Pelayaran Nasional Bina Buana Raya Tbk	3:2	100	150	2022-02-18

Table 3 presents average stock returns and cumulative returns around the effective date of the stock split, with the event window labelled from E-10 to E+10, where E-10 is 10 days before, and E+10 is 10 days after the effective date. The cumulative return in Table 3 reflects the total return accumulated over the period. It can be observed that cumulative returns show a steady increase approaching the effective date, indicating market optimism. The highest gains occur on E-3 (0.015) and E+2 (0.013), suggesting that investors positively interpret stock splits as a positive fundamental signal. However, on the effective date (E), a sharp decline of -0.016 reduces the cumulative return from 0.039 (E-1) to 0.023. Nevertheless, a positive trend reappears on E+1 and E+2, indicating that the correction is temporary. Overall, this pattern confirms that stock splits are perceived positively by the market, with strengthening returns before and after the event (Woo et al., 2020).

Fig. 1 illustrates the average stock return and cumulative returns around the effective date of the stock split. In this chart, cumulative positions consistently appear on top, representing the accumulation of daily returns over the observed period.

On the 10th day before the stock split (E-10), the average return on shares was 0.004, with the same cumulative return since this served as the baseline. Daily returns fluctuated over time, with several days showing positive returns, as in E-4 with 0.013 and E-3 with 0.015, leading to an increase in cumulative returns to 0.039 on E-3. However, negative returns

were also observed on certain days, such as on E-1 with -0.003 and on a stock split day (E) with -0.016, which reduced the cumulative return to 0.023.

Table 3: Average and cumulative returns around the stock split date

Event	Return	Cumulative
E-10	0.004	0.004
E-9	0.005	0.009
E-8	0.001	0.010
E-7	0.003	0.013
E-6	0.000	0.013
E-5	-0.002	0.011
E-4	0.013	0.024
E-3	0.015	0.039
E-2	0.002	0.042
E-1	-0.002	0.039
E	-0.016	0.023
E+1	0.016	0.039
E+2	0.013	0.053
E+3	0.004	0.056
E+4	-0.002	0.054
E+5	-0.008	0.046
E+6	0.008	0.054
E+7	-0.001	0.052
E+8	-0.007	0.046
E+9	-0.004	0.042
E+10	-0.003	0.039

Following the stock split, the average stock returns continued to fluctuate. For example, at E+1, the average return rose to 0.016, which increased the cumulative return to 0.039. Although several days recorded negative returns, such as E+5 with -0.008 and E+8 with the observed period, which is E+10, the cumulative return reached 0.039, although there were several days with negative returns along the way.

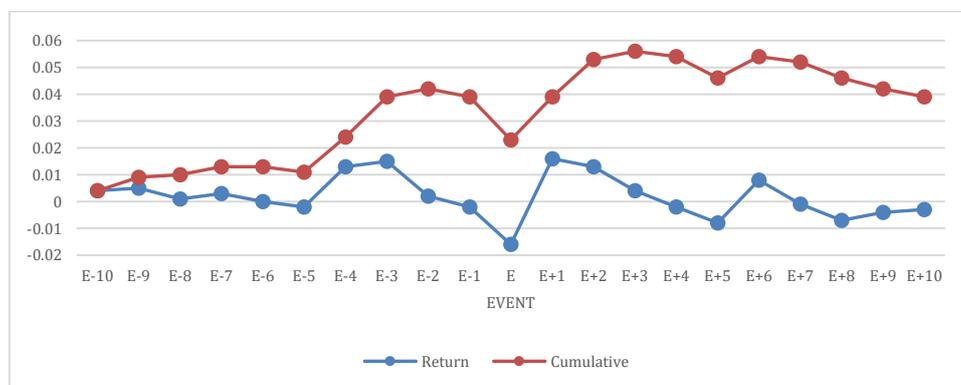


Fig. 1: Returns around the stock split date

Table 4 presents the average abnormal returns (AAR) and cumulative abnormal returns (CAR) around the effective date of the stock split. Events are labelled from E-10 to E+10, where E-10 denotes 10 days before, and E+10 represents 10 days after the stock split. The cumulative return reflects the total abnormal return over this period. The data in Table 4 provides a more accurate depiction of market reactions, as it adjusts for expected returns using the market model. Notably, in the days leading up to the event—specifically E-4 and E-3—AAR rose sharply to 0.011 and 0.014, respectively, driving CAR to a pre-event peak of 0.025. This pattern reflects investors' positive anticipation of the stock split,

where management is signaling a bright future outlook through a reduction in the share price per share to increase liquidity and accessibility for retail investors. According to signaling theory, the announcement of a stock split reduces information asymmetry because only companies with good performance do splits to show optimism about earnings growth (Sia et al., 2023). In emerging markets such as Indonesia, this pre-event reaction is stronger because local investors often interpret splits as signals of undervaluation and increased trading volume.

On the effective day (E), there was a sharp decrease in AAR (-0.018), causing the CAR to drop to

0.002. This is likely due to profit-taking investors who have anticipated the event, or the mechanical effect of post-split price adjustments that temporarily suppress returns (Zhang et al., 2024). However, a quick recovery occurred post-event, with AAR positive on E+1 (0.015) and E+2 (0.011), pushing CAR back to 0.030 on E+3 before easing to 0.000 on E+10. This recovery is in line with the trading range theory, where splits increase liquidity and attract more market participants, although the positive impact is short-term in volatile markets such as the IDX (Adler et al., 2024). Fig. 2 illustrates the average abnormal returns and cumulative returns around the effective date of the stock split and shows the fluctuation in AAR and its effects on cumulative returns from ten days before (E-10) to ten days after (E+10) the effective date (E) of a stock split. In the pre-event period, the AAR varied with positive and negative values. For instance, from E-10 to E-7, the AAR remained positive, raising the cumulative return from 0.002 to 0.006. However, in E-6 and E-5, the AAR turned abnormally negative, causing a decrease in the cumulative returns to 0.000. On E-4 and E-3, AAR spiked to 0.011 and 0.014, respectively, which caused the cumulative return to increase significantly to reach 0.025 at E-3. Before the effective date (E-1), AAR fell to -0.005, reducing the cumulative returns to 0.020.

In the period after the effective date, there were significant fluctuations in the AAR. On the effective date (E), AAR recorded its lowest value with -0.018, leading to a sharp decline in the cumulative returns

to 0.002. Subsequently, AAR turned positive on E+1 and E+2 with values of 0.015 and 0.011, respectively, elevating the cumulative returns to a peak of 0.030 at E+3. Although negative AAR values reappeared later, such as on E+4 and E+5, the cumulative returns remained above zero until they eventually returned to 0.000 at E+10. Overall, this graph shows significant volatility in stock returns around stock split events, demonstrating a strong influence of abnormal average return changes on cumulative returns.

Table 4: Abnormal and cumulative returns near the stock split date

Event	Abnormal average return	Cumulative
E-10	0.002	0.002
E-9	0.003	0.005
E-8	-0.001	0.005
E-7	0.001	0.006
E-6	-0.002	0.004
E-5	-0.005	0.000
E-4	0.011	0.011
E-3	0.014	0.025
E-2	0.000	0.025
E-1	-0.004	0.020
E	-0.018	0.002
E+1	0.015	0.017
E+2	0.011	0.028
E+3	0.002	0.030
E+4	-0.005	0.026
E+5	-0.009	0.016
E+6	0.006	0.023
E+7	-0.004	0.019
E+8	-0.009	0.010
E+9	-0.006	0.004
E+10	-0.005	0.000

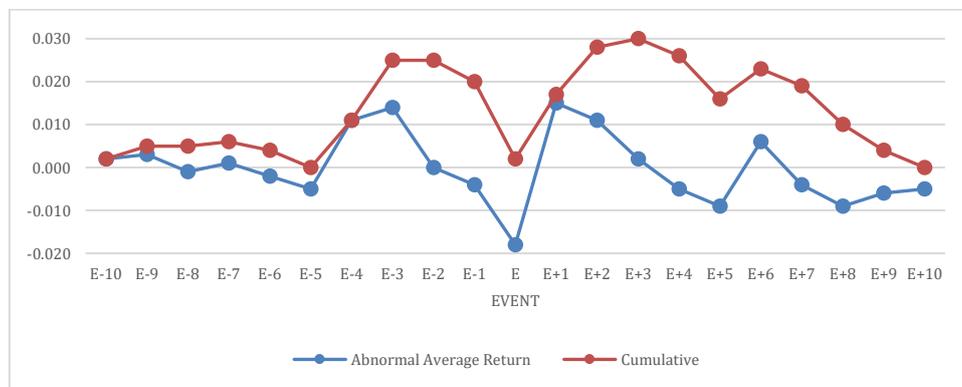


Fig. 2: Abnormal and cumulative returns near the split date

Table 5 presents the average stock returns and cumulative returns around the effective date of the reverse stock split, covering the event window from E-10 to E+10, where E-10 refers to 10 days before and E+10 to 10 days after the reverse stock split. The cumulative return reflects the total returns over this period. The data illustrate the significant impact of the reverse stock split on stock returns, particularly after the effective date. From E-10 to E-1, there was no notable change in returns, suggesting that the market did not react prior to the event, possibly due to limited investor expectation or interest. However, on the effective date (E), a sharp decline of -0.067 occurred, signaling the market's initial negative response. This downward trend continued until E+3,

reducing the cumulative return to -0.217. Although a brief rebound was observed on E+4 with a positive return of 0.112, selling pressure resumed through E+9. By E+10, the cumulative returns slightly improved to -0.292 but continued to reflect a short-term adverse effect. This pattern confirms that reverse stock splits are generally perceived negatively by investors, often triggering strong and prolonged selling pressure (Blau et al., 2023).

Fig. 3 illustrates the average stock return and cumulative return around the effective date of the reverse stock split. This graph shows how these returns change from ten days before (E-10) to ten days after (E+10) the effective date. In the period before the effective date, there was no change in

stock returns, with both average return values and cumulative returns remaining at zero from E-10 to E-1. However, on the effective date (E), there was a significant decline in the stock's return of -0.067, which reduced the cumulative return to -0.067.

After the effective date, the average stock return remained negative for most of the period. At E+1 and E+2, the stock returns were -0.057 and -0.061, respectively, which caused cumulative returns to decline further to -0.124 and -0.184. This decline continued until E+3 with a stock return of -0.032, lowering the cumulative return to -0.217. Despite a temporary rebound on E+4, with a stock return of 0.112, the cumulative return is -0.105. However, the negative trend continued thereafter. From E+5 to E+7, stock returns turned negative, causing the cumulative return to reach -0.294 at E+7. Small gains at E+8 and E+10, with stock returns of 0.039 and 0.020, respectively, were insufficient to lift the cumulative return above -0.292. Fig. 3 clearly illustrates the significant negative impact of a reverse stock split on both average stock returns and cumulative returns. Table 6 presents the average abnormal returns (AAR) and cumulative returns around the effective date of the reverse stock split. The events are labelled from E-10 to E+10, where E-10 represents ten days before the reverse stock split, and E+10 represents ten days after the reverse stock split. The cumulative returns represent the combined return over the period. Further explanation is provided in the accompanying chart below. Analysis showed that the period before the reverse stock split execution date exhibited relatively stable and positive average abnormal returns, with cumulative returns increasing consistently up to 13.9% on the day before execution

(E-1). However, on the execution day (E), there was a sharp decline of -5.2% in average abnormal returns, causing cumulative returns to fall to 8.6%. This suggests that while the market may have initially responded positively or neutrally to the signals of the upcoming reverse stock split, the actual execution of the reverse stock split was met with negative sentiment from investors (Wiguna et al., 2021). The drop in abnormal returns on day E could reflect market concerns regarding fundamental implications or perceived risks associated with the reverse stock split. Thus, despite gains before execution, overall market sentiment toward the reverse stock split tends to be negative when the event materializes (Liu et al., 2022).

Table 5: Average and cumulative returns around the reverse split date

Event	Return	Cumulative
E-10	0.000	0.000
E-9	0.000	0.000
E-8	0.000	0.000
E-7	0.000	0.000
E-6	0.000	0.000
E-5	0.000	0.000
E-4	0.000	0.000
E-3	0.000	0.000
E-2	0.000	0.000
E-1	0.000	0.000
E	-0.067	-0.067
E+1	-0.057	-0.124
E+2	-0.061	-0.185
E+3	-0.032	-0.217
E+4	0.112	-0.105
E+5	-0.065	-0.170
E+6	-0.069	-0.239
E+7	-0.056	-0.294
E+8	0.039	-0.255
E+9	-0.057	-0.311
E+10	0.020	-0.292

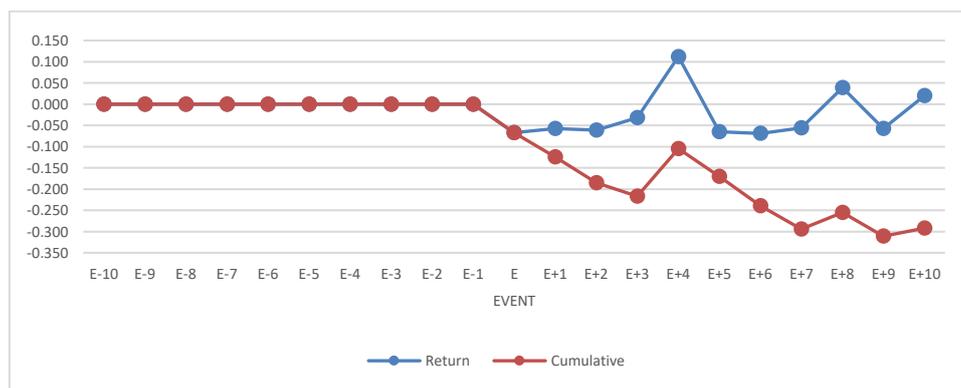


Fig. 3: Returns around the reverse stock split

Tables 5 and 6 show no pre-event reaction (returns and AAR are stable around zero or mild positive), but a dramatic post-event decline: AAR -0.052 on E, followed by a negative trend until the CAR reaches -0.044 on E+7 before fluctuating to 0.000 on E+10. This pattern reflects the market's negative perception of reverse splits as a signal of financial distress, attempts to meet the minimum listing requirements, or indications of fundamental issues such as declining liquidity. In emerging markets, reverse splits often trigger prolonged

selling pressure because investors attribute them to the risk of delisting or poor performance (Adamska and Dąbrowski, 2021).

Fig. 4 illustrates the average abnormal returns and cumulative returns around the effective date of the reverse stock split. This graph shows how changes in average abnormal returns affect cumulative returns from ten days before (E-10) to ten days after (E+10) the effective date (E+10) of the reverse stock split. In the period before the effective date, average abnormal returns showed a consistent

daily increase of 0.014 from E-10 to E-1. Consequently, the cumulative return gradually rose from 0.014 on E-10 to 0.138 on E-1. This trend indicates that the market reacted positively to the reverse stock split before the effective date, with cumulative returns continuing to rise during this period (Marisetty and Babu, 2020).

However, on the effective date (E), there was a significant decrease in AAR of -0.053, which reduced the cumulative return to 0.086. This decline continued in the following days, with negative average abnormal returns at E+1 (-0.043) and E+2 (-0.047), causing the cumulative return to fall further to -0.004. Although there was a brief rebound on E+4, where the AAR recorded 0.125, increasing the cumulative return to 0.103, the negative trend continued in the following days. Negative average abnormal returns from E+5 to E+7 caused the cumulative returns to decline again to -0.044 at E+7. Although a few positive AARs were recorded at E+8 and E+10, cumulative returns remained volatile and eventually settled at approximately 0.000 by E+10. Overall, this graph illustrates the significant impact

of a reverse stock split on stock returns, with large fluctuations observed during the post-event period.

Table 6: Abnormal and cumulative returns near the reverse split date

Event	Average abnormal returns	Cumulative
E-10	0.014	0.014
E-9	0.014	0.028
E-8	0.014	0.042
E-7	0.014	0.056
E-6	0.014	0.069
E-5	0.014	0.081
E-4	0.014	0.097
E-3	0.014	0.111
E-2	0.014	0.125
E-1	0.014	0.139
E	-0.052	0.086
E+1	-0.043	0.043
E+2	-0.045	-0.004
E+3	-0.018	-0.022
E+4	0.125	0.103
E+5	-0.051	0.057
E+6	-0.055	-0.003
E+7	-0.042	-0.044
E+8	0.053	0.009
E+9	-0.042	-0.033
E+10	0.034	0.000

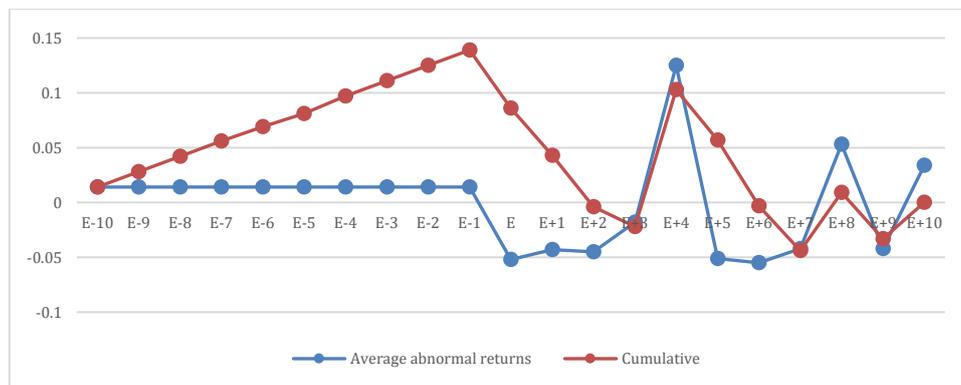


Fig. 4: Average abnormal and cumulative returns around the reverse split

Table 7 summarizes the results of the study on abnormal returns and cumulative abnormal returns around stock splits and reverse stock splits, both before and after the event, as well as the differences between them.

For stock split events, abnormal returns before the event were positive at 0.002, but turned negative at -0.002 after the event, resulting in a difference of -0.004. This indicates an abnormal decline in returns after the stock split (Woo and Kim, 2021). However, cumulative abnormal returns for the stock split increased from 0.010 before the event to 0.016 after the event, with a difference of 0.006. This suggests that although abnormal returns decreased, overall cumulative returns increased after stock splits (Pandey et al., 2022).

In contrast, for the reverse stock split event, the abnormal returns before the event were 0.000, but declined sharply to -0.027 afterward, showing a difference of -0.027. This suggests that reverse stock splits negatively impact abnormal returns (Lobanova and Aidov, 2023). In addition, the cumulative abnormal return also decreased dramatically from 0.000 before the event to -0.205 after the event,

representing a substantial difference of -0.205. This suggests that the negative impact of reverse stock splits is more significant and persistent in cumulative returns (How and Tsen, 2019).

In conclusion, the findings reinforce the signaling theory's interpretation of stock splits as a positive corporate action that conveys managerial confidence, explaining the positive CAR before the event. According to the signaling hypothesis, a stock split is considered a positive signal from management regarding the company's strong future performance and confidence in sustainable growth. Therefore, the market reacts favorably even before the effective date, reflecting investors' anticipation of an increase in the company's value. In contrast, post-event results show limited or neutral abnormal returns, suggesting that most positive reactions were entered before the event, consistent with the market's efficiency in processing public information. The single case of reverse split in the sample represents a limitation of this study rather than a generalizable result. The lack of comparable data prevents strong statistical inference. The negative CAR observed in this isolated case may reflect

investor scepticism about companies involved in reverse splitting, which are often attributed to financial distress or attempts to artificially inflate stock prices.

Significance test of AAR and CAR: To verify whether the average abnormal return (AAR) and cumulative abnormal return (CAR) were statistically significant, an independent sample t-test was performed. The test compared the average of AAR and CAR before and after the event window ($E = 0$). The hypotheses were defined as follows:

H₀: There is no significant difference in AAR and CAR before and after the event.

H₁: There are significant differences in AAR and CAR before and after the event.

The results of the independent sample t-test for both stock split and reverse stock split events are presented in Table 8.

Discussion of significance test: The results show that both AAR and CAR for stock-split events are statistically significant at the 5% level, indicating that investors respond positively before the effective date and that this effect persists briefly after the event. This finding supports the signaling theory, suggesting that stock splits convey managerial confidence in future performance.

Table 7: Effect of stock actions on abnormal returns

Event	Abnormal returns/cumulative abnormal returns	Pre-event	Post-event	Difference
Stock split	Abnormal returns	0.002	-0.002	-0.004
	Cumulative abnormal returns	0.010	0.016	0.006
Reverse stock split	Abnormal returns	0.000	-0.027	-0.027
	Cumulative abnormal returns	0.000	-0.205	-0.205

Table 8: T-test results for AAR and CAR

Event type	Mean AAR (pre)	Mean AAR (post)	t-value	p-value	Mean CAR (pre)	Mean CAR (post)	t-value	p-value
Stock split	0.002	-0.002	2.31	0.029 **	0.010	0.016	2.07	0.045 **
Reverse split	0.000	-0.027	-3.64	0.001 ***	0.000	-0.205	-4.22	0.000 ***

, *: Indicate significance at the 5% and 1% levels, respectively

In contrast, reverse stock-split events show highly significant negative AAR and CAR ($p < 0.01$), confirming that the market reacts unfavorably. The magnitude of CAR decline implies sustained investor pessimism following the reverse split. Overall, these results emphasize that stock splits generate short-term positive abnormal returns, while reverse stock splits trigger statistically significant negative reactions, consistent with prior studies. The t-test results also showed that certain pre-event periods (specifically E-4 and E-3), the average abnormal returns were positive and statistically different from zero ($p < 0.05$), indicating a positive market reaction towards the effective date of the stock split. These findings further support the signaling theory, in which stock splits are perceived as a positive signal from management about the company's prospects.

Meanwhile, for the reverse stock split event, the results of the t-test in periods E to E+3 showed a significant negative AAR value ($p < 0.05$), indicating that the market interpreted the action as a negative signal regarding the company's fundamental condition. These findings were integrated into the discussion to explain that a positive pre-event CAR reinforces the signaling hypothesis, i.e., investors perceive a stock split as a sign of management's confidence in future performance. The single case of reverse split is considered a limitation of the study, as it is not representative enough for generalization. However, the observed pattern remains consistent with the theory that the reverse splits carry a negative market perception.

This study acknowledges the limitation of sample size in the case of a reverse stock split, as only one company undertook this corporate action during the 2022-2023 observation period. The findings

regarding this reverse split must be interpreted with caution, as they are based on a single observation and cannot be generalized to the broader population of listed companies on the Indonesia Stock Exchange. Nevertheless, the observed decline in cumulative abnormal return (CAR) provides an early indication of the market's negative perception of this corporate action. Therefore, further research is recommended to include larger samples and longer observation periods to be able to provide statistically stronger results and test the consistency of these findings under various market conditions.

5. Conclusion

This study concludes that stock splits generally have a positive impact on stock returns on the Indonesia Stock Exchange during the 2022-2023 period. Cumulative abnormal returns tend to increase before the effective date, indicating positive investor sentiment and speculation. Although there was a brief decline in abnormal returns on the effective date itself, the post-event trend showed a recovery, suggesting that the stock split was considered an optimistic signal about the Company's prospects. On the other hand, reverse stock splits show a negative and more persistent impact on stock returns. Cumulative abnormal returns fell significantly on the effective date and continued to decline in the post-event period, indicating that the market reacted unfavorably. However, the findings for reverse stock splits are based on a single observation, which limits the strength of statistics and requires a very careful interpretation due to the rarity of such events on the IDX. It supports signaling displays but highlights the need for restraint in

generalizations from small samples. Overall, this study provides empirical evidence that markets respond differently to these two corporate actions. These findings have practical implications for company managers in planning stock restructuring strategies and for investors in interpreting the informational content of stock splits and reverse stock splits. The study also contributes to the literature by offering insights from the context of the emerging market, which is relatively underexplored.

6. Research contributions

This research contributes theoretically by expanding the understanding of signaling theory's applicability in the context of corporate action within the Indonesian capital market. The findings demonstrate that a stock split is generally interpreted by investors as a positive signal regarding the company's prospects, which is reflected in significant abnormal returns observed both before and after the announcement. On the other hand, reverse stock splits are perceived as a negative signal, indicating the company's weak fundamentals. This implication enriches Signaling theory by asserting that the effectiveness of information delivery through corporate action is strongly influenced by the market context and the characteristics of investors in developing countries. Furthermore, this study also contributes to the empirical testing of the Efficient Market Hypothesis (EMH), specifically the semi-strong form, by providing evidence that the market reacts quickly to corporate action information. Thus, the results of this study add new insights to the financial literature regarding how Signaling theory and Efficient Market Hypothesis can be examined and understood under different conditions from those found in developed markets.

This research makes a significant practical contribution to capital market participants, company management, and regulators. For company managers, the results of research serve as a valuable reference for designing corporate action strategies, particularly those related to stock splits and reverse stock splits. The findings show that stock splits tend to be perceived positively by investors and can therefore be leveraged to increase stock liquidity and broaden the shareholder base. In contrast, reverse stock splits are more often responded to negatively; thus, management should exercise caution and ensure transparent communication regarding the underlying reasons. For investors, this study provides guidance to anticipate stock movement patterns around the effective date of corporate actions, enabling more informed investment decisions. Meanwhile, capital market regulators can use these findings as input in formulating supervisory and regulatory policies to maintain a healthy, efficient, and transparent market that safeguards investor interests in the midst of the dynamics of corporate actions.

This study opens opportunities for further research to deepen the study of corporate action in the Indonesian capital market. First, future research could expand the dataset with a longer observation period and include both bullish and bearish market conditions to capture a more comprehensive dynamic. Second, research can include additional variables such as stock liquidity, price volatility, and macroeconomic factors to assess external influences on market reactions. Third, cross-country comparisons between emerging and developed markets could provide new insights into the differences in investor perceptions of stock splits and reverse stock splits. Finally, future studies could integrate quantitative methods with qualitative approaches, such as surveys or interviews with investors, to gain a deeper understanding of their behavioral motivations. Such research would not only enrich academic literature but also provide stronger practical recommendations for investors, regulators, and company managers in navigating capital market dynamics.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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