Available online at
http://myjms.mohe.gov.my/index.php/JEEIR

e-ISSN: 2289-2559

Journal of Emerging Economies & Islamic Research 11(2) 2023, 1 – 15.

Journal of Emerging Economies and Islamic Research

Stock price reaction to earnings announcements: Evidence from the Colombo stock exchange, Sri Lanka

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ARTICLE INFO

Article history:
Received 20 December 2022
Accepted 15 March 2023
Published 1 May 2023

Keywords:
Earning Announcements
Informational value
Semi-strong form efficiency
Event study

DOI:
10.24191/jeeir.v11i2.21362

ABSTRACT

This study investigates the reactions of stock prices to earnings announcements of the companies listed on the Colombo Stock Exchange (CSE), Sri Lanka. To verify the informational value of announcements, and possess market efficiency, the standard event study method was utilized. 158 companies were used to collect the data considering five years period, from 2015 to 2019. There were 334 earnings announcements for the sample period. Panel Ordinary Least Square analysis and the market model were used to estimate each company's expected and abnormal returns. The results indicated that investors react immediately and positively to good news announcements while negative reactions to bad news with lag reactions. Surprisingly, it could be noted that there was a sudden reaction in the market day before the good news announcement. Overall, there was a substantial price change of all the securities on the announcement day ignoring whether it is good news or bad news. This proves that earnings announcements possess informational value. Further, the share prices change on the event day shows that the market reacts immediately to the earnings information confirming that CSE follows a semi-strong form efficient hypothesis for earnings announcements. This is important for stakeholders to make investment decisions and financial decisions. Further, regulatory agencies need to build and implement rules and regulations in the market.

1. Introduction

As the earnings of a company are one of the key indicators highlighting the company's performance, finance literature claims that company earnings reflect the company's wealth so it takes significant attention

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https://doi.org/10.24191/jeeir.v11i2.21362

from investors before making investment decisions (Li et al., 2019). Scholars argue that Earnings Per Share (EPS) reveals the company's financial position to generate income compared to their shareholder value on which investors can make the trading decisions. Beaver (1968) has highlighted three important features of company earnings; First, current-period earnings provide shreds of evidence of the behaviour of future earnings. Second, today's earnings shape the future dividend payment ability. Third, current-year earnings represent the present value of future dividends. Further, Syed and Bajwa (2018) stated that a company's financial information is a vital factor that needs to be considered when appraising the share price of such a company and determines the wealth of both company and the shareholders.

Generally, investors react positively to good news announcements and negatively to bad news announcements in the market (Louhichi, 2008). Further, Odabasi (1998) has mentioned that the mean squared excess return (abnormal return) on the announcement day is substantially larger than the average return during the non-event period. It indicates that earnings announcement is one of the investors' significant factors when making rational investment decisions (Kaniel et al., 2012).

However, to gain the fullest benefit from the announcements, the market should be efficient enough to grab the informational content in the announcements and react immediately (Lei, et al. 2020). Based on the speed of reaction, share markets are categorized into three clusters; weak-form efficient markets, semi-strong-form efficient markets and strong-form efficient markets. One of the features of an efficient market is it should not generate abnormal lag returns before or after the announcement day (Syed & Bajwa, 2018). Further, in a semi-strong efficient market, share price follows a random walk and reflects all the publicly available information through the volatility in stock prices. Further, the reaction speed for the announcements is very high. Thus, it indicates that the share prices can be used to measure the soundness of publicly available information. Further, market information can be used to make an economic profit if investors can do their trading based on the market information sets (Chen et al., 2019). Therefore, abnormal returns are unlikely to occur in the pre-announcement period or post-announcement period. However, a weak-form efficient market shows a late response to public information.

Scholars have proven that having an efficient share market is a key prerequisite to attracting investors towards the country, enhancing the expansion of capital available for the production sector (Lei, et al. 2020; Sobiech, 2019; Wang, 2019). Foreign investments bring new technology and improve knowledge and skill, leading to human capital development. Therefore, an efficient capital market in a country is a prime requirement for developing such a country (Abeka et al. 2021; Bist, 2018).

Therefore, assessing market efficiency is vital for making financial, non-financial, and policy decisions. Hence, many countries in the world and many scholars in different countries, including Colombo Stock Exchange, have paid their attention to investigating the capital market efficiency and market responding behaviour towards different types of market information.

In Sri Lankan context, there are two schools of thought among scholars regarding the market efficiency in the Colombo Stock Exchange (CSE). One line of scholars claims that CSE is a weak-form efficient market (Ramesh and Rajumesh, 2014; Deyshappriya, 2014; Weerakoon Banda and Yeshani, 2019) while another school of thought hold the opposite view and prove CSE is not a weak-form efficient market (Dharmarathne, 2013; Hua and Ramesh, 2013; Ramesh and Rajumesh, 2015; Fernando and Gunasekara, 2018; Hewage and Rasika, 2022). This becomes more and more complicated when there are shreds of evidence to confirm CSE reacts immediately to one set of announcements while showing a lethargic reaction to another set of announcements. For instance, the market reacts immediately to election announcements but weakly reacts to dividend announcements. Therefore, there is no uniform conclusion among researchers regarding the market efficiency of the Colombo Stock Exchange.

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Therefore, identifying and concluding which type of market efficiency is in CSE and how the market behaves for the different types of announcements is still a puzzle and can be concluded that test results depend on the type of announcements that the scholars are investigating upon.

Thus, the empirical literature demands a comprehensive analysis of the market efficiency in CSE for earnings announcements. Hence, this study is carried out with two objectives; first, it aims to investigate whether there is informational content in earnings announcements and does investors react to the information. The second is to examine the market efficiency to test the semi-strong form efficiency of CSE. Therefore, the results are important for all the stakeholders who make financial decisions upon the earnings announcements.

The remainder of this paper has been structured with four sections, section two reviews the empirical pieces of literature followed by methodology in section 3. Section 4 explains the analysis and the empirical findings while section 5 concludes with practical implications

2. Literature review

Empirical literature shows that there are ample studies have been carried out to investigate the market reaction to different types of announcements, including dividend announcements, changes in company composition, initial public offerings, bonuses and right issues. Generally, scholars have revealed that investors react before the earnings announcements appear in the market anticipating that the company making a profit or loss in the relevant period (Sehgal and Bijoy, 2015). Landsman and Maydew (2002) found that more than 80 per cent of the investors react before the yearend earnings announcements and the market has reflected the net effect of the announcements through the share price because interim financial reports have already been published through the media. Moreover, Afego (2013) showed investors react 20 days before the earnings announcements are realized to the market.

Lei et al. (2020), stated that pre-announcement drifts cause to alleviate the underreaction for the earnings information which helps the market to direct towards the market equilibrium by forcing the market to make a full response to the announcements. Meanwhile, Mudalige et al. (2020) studied the individual and industrial trading around earnings announcements and found that there is a pre-announcement drift in both individual and industrial investors and react before the announcements depending on the earnings news published on social media. Their investment decisions are irrational and may sometimes overreact to the announcements based on their high expectations. Furthermore, industries respond faster than individuals to earnings announcements. Moreover, they confirmed that industrial investors use more private information (insider dealing) than individual investors while making investment decisions.

However, scholars argue that share prices get changed during the announcements period (Basu et al., 2013). Johnson et al. (2018) stated that stock price and trade volume show significant volatility during the announcement period. Further, scholars claim that changing share prices reflect the evolution of investors' beliefs towards the earnings ability of a firm while variations in trade volume indicate how investors interpret the earnings announcement made by the companies. Hence, they confirm that in good news (bad news) announcements, investors react positively (negatively) and share prices move accordingly (Beaver et al., 2018; Jang and Lee, 2020). Further, Li et al. (2019) stated that when there is a positive announcement (good news) the market drift differs from normal volatility in the market.

Louhichi (2008) shows that market information can be categorized under three subtitles depending on the investor's reaction to each announcement: good news, bad news, or no news. He said that investors react positively to good news but adversely to bad news announcements. However, the market follows a lethargic response or no response for no news situation. Because, when the information is not strong enough to react upon, investors do not follow the information and show a significant reaction to the market information.

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Furthermore, they found that the abnormal return due to the market information gets disappeared within a shorter period, like 15 minutes. Moreover, the share prices quickly return to market equilibrium for good news than bad news.

Lei, et al. (2020) have stated that distributing the information among the market participants and having the freedom to the immediate reaction to the market information are key factors influencing getting the maximum benefit of any market news. Hence, analyzing market efficiency has become a most debatable and crucial topic in finance literature. Because having a clear understanding of market efficiency is a crucial factor for decision-making because making a wrong decision based on misleading market information make significant damage to both market and the investors (Villanueva and Feinstein, 2021). Because it affects the trustworthiness of the investors against the share market and leads to the withdrawal of the investors from the market. Hence, Budanova et al., (2021) showed that investors make irrational decisions due to uncertainty in share markets, the productivity of the company, and the weaknesses in the financial reporting systems. Further, Choi, (2019) stated that the market does not reflect all the information in full through share prices due to the disturbances inflowing the market information.

3. Methodology

3.1 Data collection and sample

The sample consisted of 334 earnings announcements made by 67 companies from 2015 to 2019. Out of 334 announcements, there were 235 good news announcements while there were 99 bad news announcements. The study identified the good news as either company profit has increased or loss has decreased and vice versa. The list of sectors where the announcements are made with the number of announcements is shown in Table A1 and Table A2 in the appendix. Further, the sample selection criteria are presented in Table A3 in the appendix.

3.2 Event date, estimation period and event period

The day when the announcements were published in the Stock Market Daily report (SMD) is considered the event date and was denoted as day 0. The estimation period consisted of 120 days before the event period and started on day -130. The event period is structured with 21 days and has two segments 10 days before the announcement day and 10 days after the announcement day (See Figure 1).

Setting the estimation period is very much crucial because it uses to measure the market risk and returns (α and β).

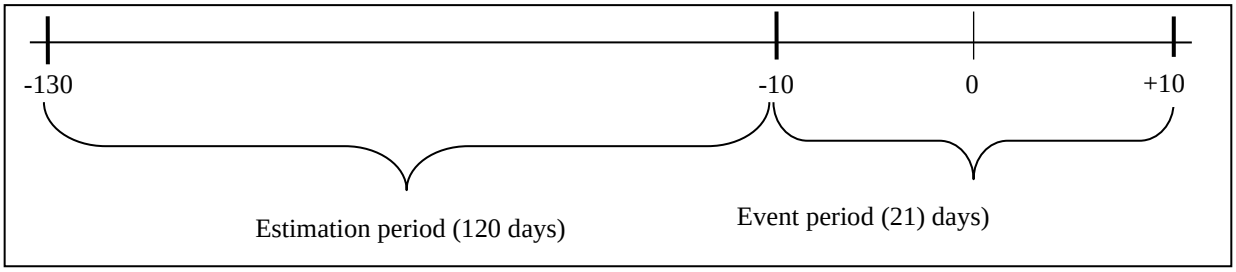

Figure 1. Estimation period and event period
Source: Author constructed

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3.3 Data analysis tool

The study followed the standard event study methodology which was introduced by Brown and Warner (1980, 1985) and modified by Butler and Malaikah (1992) into the event study method. Here the study used the Average Abnormal Returns (AAR) and the Cumulative Average Abnormal Return (CAAR) to assess the market reaction to the announcement. The general equations used in the study has been presented in Table 1.

Table 1. General Equations

Daily Company Returns	Company return is calculated as the difference of the share price change between today and yesterday measured as the proportion of yesterday's price;	$R_{i,t} = \left[P_{i,t} - P_{i,t-1}\right] / P_{i,t-1}$ $R_{i,t}$ indicates the company return while $P_{i,t}$ shows today's share price of the company i and $P_{i,t-1}$ represents yesterday's share price of the company i.
Daily Market Return	The daily market return is calculated after dividing the value change of the market between yesterday and today by yesterday's market value.	$R_{m,t} = \left[A_t - A_{t-1}\right] / A_{t-1}$ Where; R_{mt} shows the market return. A_t indicates today's ASPI (All Share Price Index) value while A_{t-1} says yesterday's ASPI value
Firm Expected Return	The company expected return of the event window is calculated as the market model-adjusted return for the period. The company's expected return is calculated based on a single-factor market model. Researchers regress the change in company returns concerning the change of the market return.	$E(R_{i,t}) = \widehat{\propto_i} + \widehat{\beta_i} R_{m,t}$ Where; $E(R_{it})$ is the expected return of firm i at day t in the event period. $\widehat{\propto_i}$ indicates the intercept or the constant and β_i is the estimated systematic risk (beta) for stock i. R_m is the market return.
Firm Abnormal Return (FAR)	Firm abnormal return is the difference between the actual return of the firm and the expected return of the firm which is calculated as a market model adjusted return.	$AR_{i,t} = R_{i,t} - \left(\widehat{\propto_i} + \widehat{\beta_i} R_{m,t}\right)$ Where, $AR_{i,t}$ shows the firm abnormal return for firm i at time t in the event period. $R_{i,t}$ denotes the actual returns of firm i on day t in the event period. $\widehat{\propto}$ is the calculated constant value and $\widehat{\beta_i}$ is the estimated systematic risk of stock i. $R_{m,t}$ is the market return
Average Abnormal Returns (AARs)	The average abnormal return shows the arithmetic mean of abnormal returns of all the firms	$AAR_{i,t} = \frac{1}{N} * \left[R_{i,t} - (\propto_i + \beta_i R_{m,t})\right]$ Where; $AAR_{i,t}$ shows the average abnormal returns of the firm i during the event period. $R_{i,t}$ indicates the rate of returns of firm i on day t, and $R_{m,t}$ says the market return. Parameters $\propto_i$ and β_i represent the intercept and the systematic

		risk of company stock respectively. N states the number of companies.
Cumulative Average Abnormal Return (CAAR)	CAAR shows the continuous increasing/decreasing pattern of grand values of abnormal returns. Significant CAAR is considered as share prices are adjusting to the new information.	$CAAR_p = \sum_{t=1}^{P} AAR_t$ Where; $CAAR_P$ is the cumulative abnormal returns of the event window and AAR_t is the average abnormal return on day t.

Source: Author constructed

3.4 Test the information content and market response

The information content of the announcement and the response of the market are tested using t statistics. The significant change in Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR) highlights that there is information content in the announcement and market response immediately upon the announcements. However, if the AAR and CAAR show a significant amount but on a later day after the announcement indicates there is information content but the market shows weak-form efficiency. If a significant amount occurred before the announcement day indicates there is pre-announcement drift in the market and may have insider dealing.

3.5 Test the significance of AAR

The significance of the Average Abnormal Returns (AAR) is measured with a t-statistic. The test hypothesis is shown below; Here, the AAR difference from zero indicates there is informational content in earnings announcements.

H_{0a}: $\overline{AAR} = 0$
H_{1a}: $\overline{AAR} \neq 0$

When; $AR_{i,t} \sim (0, \sigma_i^2)$
Where; σ_i^2 is the variance and AR is the Abnormal return.

3.6 Significance Test for CAAR

The Significance of the Cumulative Average Abnormal Returns (CAARs) is tested with t – statistics. When CAAR is different from zero indicates that there is a market reaction to the announcement.
H_{0b}: $\overline{CAAR} = 0$
H_{1b}: $\overline{CAAR} \neq 0$
Assume; $CAAR_t \sim (0, \sigma_i^2)$,
Where; σ_i^2 is the variance of CAAR and CAAR shows the cumulative average abnormal return.

4. Results and discussion

Two analyses were done using company abnormal return and market abnormal return values. The study examined the changes in share prices around the announcement day (event day) using the simple expectation model. (i.e., a positive price change for "Good News" and conversely for "Bad News").

https://doi.org/10.24191/jeeir.v11i2.21362

4.1 Analysing the share price reaction to earnings announcement

This study conducted the volatility analysis for company returns (market-adjusted average abnormal return model) to test the market reaction to earnings announcements. There are two types of earnings announcements: good news announcements (either an increase in the company's profit compared to the previous years or a decrease of loss related to the last couple of years) and Bad news announcements where company profits get decreased or high negative profit compare to previous years. Significant changes in AAR and CAAR within the event period indicate that earnings announcement has an information validity. Further, a significant change in AAR and CAAR on event day demonstrates that the market reacts immediately to the new information. Therefore, it can be concluded that the market follows a semi-strong form of efficiency.

4.2 Analysing the share price reaction to a good news announcement

The study used 235 good news announcements and Table 2 illustrates the test results of AAR and CAAR with a market-adjusted average abnormal return model.

Table 1. AAR and CAAR – Good news announcement

Event Window	Company Return (Market adjusted Average Abnormal Return model)			
	AAR	t-statistics	CAAR	t-statistics
-10	0.0023	0.5515	0.0035	0.3252
-9	-0.0054	-1.3172	-0.0019	-0.1720
-8	0.0005	0.1254	-0.0014	-0.1247
-7	-0.0012	-0.2884	-0.0025	-0.2335
-6	0.0004	0.0987	-0.0021	-0.1963
-5	-0.0054	-1.3013	-0.0075	-0.6875
-4	-0.0058	-1.4059	-0.0133	-1.2182
-3	-0.0007	-0.1768	-0.0140	-1.2849
-2	0.0007	0.1661	-0.0133	-1.2222
-1	-0.0088	-2.1345*	-0.0221	-2.0279
0	0.0164	3.9978**	-0.0057	-0.5189
1	-0.0056	-1.3722	-0.0113	-1.0369
2	-0.0024	-0.5919	-0.0137	-1.2603
3	-0.0016	-0.3940	-0.0154	-1.4090
4	-0.0007	-0.1690	-0.0160	-1.4728
5	-0.0015	-0.3544	-0.0175	-1.6066
6	0.0007	0.1676	-0.0168	-1.5433
7	-0.0012	-0.2910	-0.0180	-1.6531
8	-0.0032	-0.7707	-0.0212	-1.9441
9	-0.0003	-0.0652	-0.0214	-1.9687
10	-0.0039	-0.9504	-0.0254	-2.3274

https://doi.org/10.24191/jeeir.v11i2.21362

Source: Author constructed using excel output
** Significant at 0.01 level * Significant at 0.05 level

Table 2 confirms that AAR shows a significant positive reaction on announcement day as well as the day before the announcement. This may be because investors already know that the firm is making profits during the financial period and wait till it gets confirmed. Hence, just before the announcement was made, the market react to the announcement and the day when the information appeared in the market. However, there is no significant reaction after the announcement. Hence, it proves two important points; the first is positive earnings announcement (good news) carries informational content. The second is market reacts immediately to new information.

Furthermore, during the pre-announcement period, the cumulative average abnormal return shows a gradually decreasing trend till the announcement day. However, the day when the announcement was made shows a significant positive upward shock confirming that there is an immediate reaction in the market to the announcement. This can be shown with a graphical presentation as in Figure 2.

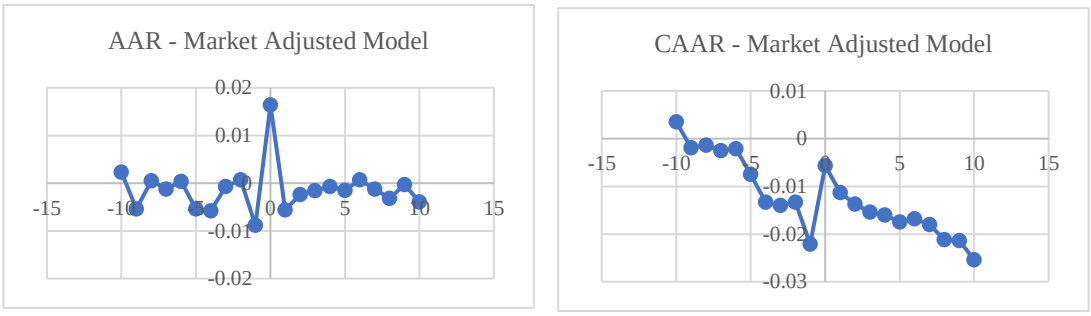

Figure 2. AAR and CAAR - Good News Announcement

Source: Author Constructed

Figure 2 presents that AAR does not significantly differ from its mean (zero) until the event day and the period after the event day confirming that there no significant changes happen in the share prices before or after the announcement. However, on the event day, AAR has taken a sudden positive shock (upward jump) allowing the abnormal capital gain on announcement day. Because under favourable earnings announcements (Good news), investors are motivated to buy shares and get the maximum benefit. Hence, AAR takes an upward trend from zero and shows a sudden pop-up from the mean AAR line. But just after the event day, the AAR has pushed towards the market mean (zero) and hanging around zero indicating the high speed of adjusting the prices to market equilibrium.

Adding, CAAR evidences the gradually decreasing trend until the day before an announcement. And then shows a significant positive shock on the event day. This confirms in the Good News announcement market immediately responded with a positive reaction. Further, in the post-announcement period, CAAR again follows the usual downward trend proving that the earnings announcement is valid only until the event day.

After referring to Table 1 and Figure 2, it confirms that the earnings announcement has an informational value and CSE react immediately to the announcement proving that the market follows the semi-strong form efficiency concerning the good news announcement.

https://doi.org/10.24191/jeeir.v11i2.21362

4.3 Analysis of stock price reaction to bad news announcement

The study used 99 bad news announcements to investigate how CSE react to bad news in the market. Tables 3 and Figure 3 show the algebraic and graphical presentation of market reaction.

Results confirm that AAR gets a significantly negative value on the event day than the other days in the event period. This highlights that investors react adversely to bad news showing that with bad news announcements, investors react immediately and try to sell their shares as much as possible. This results from the sudden dropdown of share prices and make the AAR get drastic fall on the event day.

Surprisingly, on the day before the event, there is a slight positive share price movement can be identified. This may be because the shareholders make the stock purchases expecting that firms may announce a piece of favourable information to the market. Moreover, CAAR confirms the same and shows that cumulative value has a significant positive movement on Day -1 (the day before the event day). However, just after the announcement, CAAR shows a radical drop on event day and a further gradual downturn.

Moreover, under the bad news announcements, the market shows a post-announcement drift (significant average abnormal return value on day 6). This indicates that there is a late reaction in the market to bad news announcements. The possible reasons for the delayed response are the potentially inherent slow reaction behaviour of investors, lack of responsiveness to information by the investors, and investors may follow the "wait and see" strategy before making the decision. Therefore, the delayed response creates an opportunity for the investors to make continuous abnormal returns that counter the efficient market hypothesis.

Table 2. AAR and CAAR for Bad News Announcement

Event Window	Market Adjusted Average Abnormal Return model			
	AAR	t-statistics	CAAR	t-statistics
-10	0.0044	1.1194	-0.0100	-0.3997
-9	-0.0036	-0.9083	-0.0135	-0.5429
-8	-0.0010	-0.2599	-0.0146	-0.5839
-7	-0.0023	-0.5750	-0.0168	-0.6745
-6	-0.0004	-0.1029	-0.0172	-0.6908
-5	-0.0034	-0.8608	-0.0206	-0.8265
-4	-0.0003	-0.0683	-0.0209	-0.8372
-3	-0.0038	-0.9684	-0.0247	-0.9899
-2	-0.0022	-0.5690	-0.0269	-1.0796
-1	0.0069	1.7443	-0.0201	-0.8046
0	**-0.0137**	**-3.4766***	-0.0337	-1.3527
1	-0.0033	-0.8497	-0.0371	-1.4866
2	-0.0008	-0.2159	-0.0379	-1.5207
3	-0.0045	-1.1349	-0.0424	-1.6996
4	-0.0024	-0.6016	-0.0447	-1.7944
5	-0.0023	-0.5902	-0.0471	-1.8875
6	**-0.0111**	**-2.8354****	**-0.0582**	**-2.3345***

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7	0.0004	0.1116	-0.0578	-2.3169
8	-0.0038	-0.9620	-0.0615	-2.4685
9	-0.0033	-0.8493	-0.0649	-2.6024
10	0.0024	0.6212	-0.0624	-2.5045

Source: Author Constructed using excel output
** Significant at 0.01 level * Significant at 0.05 level

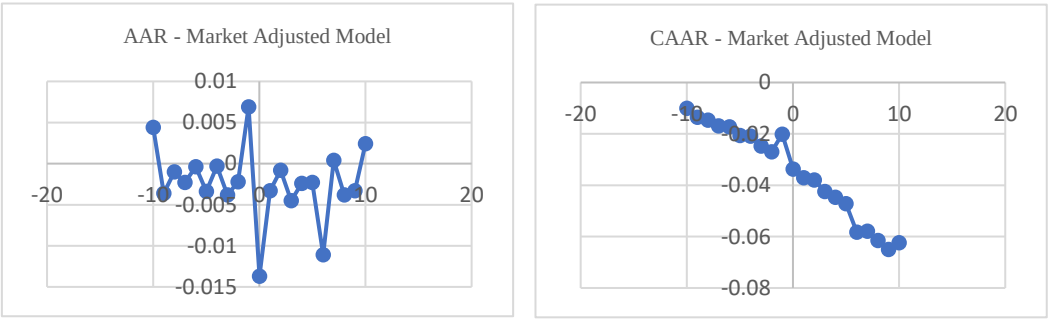

Figure 3. AAR and CAAR for Bad News Announcements
Source: Author Constructed

In general, the analysis results confirm that CSE follows the semi-strong form efficiency in terms of good news announcements and aligns with studies carried out by Dharmarathene (2013) and Fernando and Gunasekara, (2018). Further, the good news announcement contained informational value which was suggested by Hewage and Rasika (2022). However, in terms of bad news announcements, CSE shows a lag reaction and also shows some pre-announcement drafts. Hence, it can be concluded that the market follows the weak form efficient hypothesis and supports the argument of Weerakoon Banda and Yeshani, (2019) that CSE does not show semi-strong form efficiency.

5. Conclusion

This study considered the market behaviour when there is an earnings announcement. There were two objectives of this study. First, to investigate whether earnings announcement carries information content, and the second objective was to examine the market efficiency of the Colombo Stock Exchange concerning the earnings announcements. The study used 235 good news announcements and 99 bad news announcements made within five years period from 2012 to 2019. Analysis was done with the standard event study method and results are tested with Average Abnormal Return and Cumulative Average Abnormal Return. Findings confirmed that investors show an immediate positive response to good news announcements while negative reaction to bad news announcements.

Further, under the good news announcement, share prices jump up on the event day and the day before the event occurs indicating that investors overreact to the announcement before the information appears in the market. However, just after the announcement, the market shows an immediate return to its equilibrium price (zero abnormal return).

However, in the bad news announcement, share prices show a sudden drop on event day but surprisingly has a price increment on the day before the event day. This indicates that investors buy a share with the intention that firms may announce good news. Furthermore, the market shows a post-announcement drift on

the 6th day from the announcement day. This highlights that investors follow a late reaction behaviour. This creates an opportunity for the investors to make an abnormal return after the bad news announcements.

Therefore, the findings enlighten the way forward for studies on this topic and the results are important for stakeholders, including investors and brokerage firms, to make rational financial decisions and access their wealth. Furthermore, share market regulatory bodies, government agencies, and policy decision-makers must update the existing rules and impose new regulations to maintain an efficient and effective capital market. Finally, findings are important for the companies to obtain a competitive advantage and access the company's wealth.

Conflict of interest statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

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Appendix

Table A1. Good News announcements

Sector	No. of Companies in the sector	No. of Earnings Announcements
Bank Finance and Insurance	71	65
Chemicals and Pharmaceuticals	12	4
Construction and Engineering	4	7
Diversified Holdings	20	12
Beverage, Food, and Tobacco	21	15
Footwear and Textiles	6	7
Health Care	7	8
Hotels and travels	39	21
Information Technology	2	2

Investment Trust	11	3
Land and Property	19	13
Manufacturing	40	35
Motors	6	3
Plantation	20	20
Power and Energy	9	6
Telecommunication	2	7
Trading	9	7
		235

Table A2. Bad News announcements

Sector	No. of Companies in the sector	No. of Earnings Announcements
Bank Finance and Insurance	71	16
Chemicals and Pharmaceuticals	12	3
Construction and Engineering	4	3
Diversified Holdings	20	9
Beverage, Food, and Tobacco	21	5
Hotels and travels	39	13
Information Technology	2	2
Investment Trust	11	3
Land and Property	19	7
Manufacturing	40	21
Plantation	20	9
Power and Energy	9	5
Trading	9	3
		99

Table A2. Bad News announcements

- The company must be a listed company registered on the Colombo Stock Exchange (CSE) during the sample period mentioned above.
- The study selected only the companies, which announced the selected events and traded at least 180 market operating days per year out of 240 market operating days to maintain the market liquidity of the company.
- There should not have 2 non-trading days within the event period
- The company should not have other market announcements during the event period

https://doi.org/10.24191/jeeir.v11i1.21362

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Authors' contributions

Hewage Rishan Sampath designed the conceptualization, data collection, formal analysis and writing the original draft. Norashida Othman work as project administration, funding acquisition, revised the article. Both Jaafar Pyeman and Norashida Othman supervised research progress and writing - review & editing final draft.