

Stock Prices Reactions to Earnings Announcement Released During Trading versus Non-Trading Hours

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Abstract:

The study has examined the stock prices reactions to quarterly earnings announcements released during trading versus non-trading hours. An event study method is applied to test whether the Indian stock market is semi-efficient. The NSE Nifty 500 companies are included in our sample. The sales, profit, and EPS figures from the current year are compared to similar quarters from the prior year to determine earnings changes. According to the study, the market's reaction to the announcements both during and non- trading hours was similar. We found that Firms generally released positive earnings changes during trading hours and negative earnings changes outside of regular trading hours. An empirical examination of CARs for multi-day event windows indicates there is market inefficiency and that there is a delayed price reactions.

Keywords: Stock prices, Event Study, Earnings Announcements, Earnings Change, semi-efficient

Introduction:

A key idea in financial and investment theory is the Efficient Market Hypothesis (EMH). It contends that efficient financial markets result in asset values that accurately reflect all available information at all times. It is impossible to continuously generate above-average profits through market timing or stock selection in an efficient market since shares are always reasonably priced. Examining empirical data and determining if markets display the traits predicted by the EMH allows us to assess the viability of this hypothesis. Business environments nowadays are dynamic, complicated, and multidimensional. Annual accounting data are not sufficient to assess an entity's performance because of the increased scope of company activities, the economies of different countries, and other economic conditions. As a result, investors continuously estimate, compare, and evaluate possible cash flows in terms of amount, timing, and related uncertainty in order to make quick decisions. The Continuous Reporting Process was started to satisfy users. It gives investors the chance to evaluate their portfolio and their financial performance and to make financial decisions during the year rather than at the end. The deliberate and selective distribution of financial data by a corporation with the goal of influencing investors' views and expectations about its performance is known as a strategic earnings disclosure. The timing of earnings announcements may have an impact on share prices. For publicly traded companies, the announcement

of earnings results is a big deal since it offers important financial data that analysts and investors need to evaluate the company's performance and make investment decisions. The timing of the earnings announcement during the trading session may also have an impact on share price movement. When earnings are announced before or after market hours, there may be large price discrepancies when the market opens; this can be advantageous or detrimental depending on the nature of the earnings report. It is possible to intentionally time the release of earnings reports to coincide with positive news or events that could obscure any unfavorable financial outcomes. By doing this, businesses can control how the market reacts and lessen the impact of disappointing financial announcements. Our study aims to examine stock prices reactions to quarterly earnings announcements released during trading versus non-trading hours and to analyze whether earnings changes influences the announcement timing decision.

Review of Literature:

Fama et al. conducted the initial research on the semi-strong form of the efficient markets hypothesis in 1969. When they examined the post-announcement residual behavior of stock splits, they discovered that there had been a considerable market response. The study's findings provide substantial support for the idea that the stock market is "efficient" because of how quickly prices fluctuate in response to fresh information. Similar studies were conducted by **Iqbal & Mallikarjunappa (2010)**, **Mallikarjunappa & Dsouza (2013, 2014)**, and **Dsouza & Mallikarjunappa (2016, 2017)** in the Indian context, and they found that stock prices do not quickly react to earnings news and concluded that the stock market is not efficient in its semi-strong form. **William Kross and Douglas A. Schroeder (1984)** examined both the association between quarterly announcement timing, either early or later, and the type of news, either good or bad, reported, and the relationship between stock returns and timing around earnings announcement dates. The study covers a sample of 297 NYSE and ASE firms and 3552 observations per firm for examination of stock price behavior. The results of the study found that earnings announcement timing was associated with abnormal stock returns around the earnings announcement date. The abnormal returns of firms that announced early (late) were significantly higher (lower) than the returns of firms that announced late. It has been concluded that timing can greatly influence stock returns. **Francis, Pagach, and Stephan (1992)** examined the price and volume reactions to non-trading hours, i.e., overnight, and trading hours, i.e., daytime announcements, made by the same firm in adjacent years. The final sample includes 150 BMO, 129 AMC, and 279 Matched trading hours, i.e., market open earnings announcements. It reveals no evidence that investors impound information conveyed in overnight disclosures in positions taken at the following open, even though the open represents investors' first opportunity to trade on the information. Its result was that the opening price was somewhat uninformative. It was concluded that the failure to find an opening reaction does not constitute definitive evidence of a delayed market response. **DeHaan, Shevlin, and Thornock (2015)** looked into whether managers "hide" bad news by making earnings announcements when nobody is paying attention or by giving less notice before doing so. Their findings are in line with the fact that managers tend to provide bad news after market hours, on busy days, and with less warning, and that earnings are given less attention under these circumstances. **Prasad and Prabhu (2020)** explored whether earnings surprise influences the decision to make earnings releases during or after market hours and its impact on the market response. They discovered statistically significant differences in market reactions to earnings releases given before and after trading hours. According to the study, the market reacted negatively to earnings announcements issued after trade hours. According to the findings, firms that seek to prevent

overreaction and under reaction to earnings surprises are more likely to release earnings announcements after trading hours.

Objectives of the study:

The following are the objectives of the study:

- To examine the stock price reactions to quarterly earnings announcements made during trading hours and non-trading hours.
- To analyze the influence of earnings changes on the earnings announcements timing decisions.
- To test whether Indian stock market follows semi-strong EHM.

Hypotheses of the study

The following hypotheses are to be tested:

- The AAR and CAAR are close to zero
- There is no difference in the abnormal returns of firms that announce the results during trading hours and non- trading hours.

Data and Sample:

The NSE Nifty 500 index-based companies are selected as a sample of our study as they are liquid stocks and represent major industries of the economy. The quarterly results for the time period of study, March-June-2020, were used. The daily abnormal returns are computed to test the earnings announcements effect. We used data such as the dates on which sample companies' quarterly results were announced in the media, their adjusted closing share prices on the National Stock Exchange, earnings media announcement timings and the daily closing prices of the NSE Nifty 500 index. The data is obtained from the Prowess IQ Data Base of the Center for Monitoring Indian Economy (CMIE) and NSE corporate announcement portal.

Table 1: Distribution of sample

Month	During trading hours	Non-trading hours
April	02	11
May	21	52
June	29	77
July	39	51
August	40	82
September	02	15
Total	133	288

Source: NSE website

Research Methodology:

Event Study

One of the key tools used today in corporate finance research is event studies. It has a vast and continually expanding body of research. The date on which the sample companies announce their quarterly earnings is known as the "event date" ($t = 0$). The event window is defined as the 61 days surrounding the announcement of earnings (i.e., $t = -30, \dots, 0, \dots, +30$) 20 trading days (-30-day) and 30

days (+30-day) before the quarterly EAs are included in the pre-announcement and post-announcement periods, respectively. The "estimation" period is the number of days preceding the event (i.e., -282,..., -31).

Sharpe's (1964) market model method is used compute the expected returns. The Abnormal return is the difference between actual return and expected return of each day. The computed abnormal returns are averaged across securities to calculate average abnormal returns (AARs) and average abnormal returns are then cumulated over time in order to ascertain cumulative average abnormal returns (CAARs).

Actual Return Measures:

Let R_{it} to be the observed daily return on the equity share of firm i on day t and R_{mt} to be the observed daily return on the market

$$\text{Daily Return} = \{(Closing Price - Opening Price) / Opening Price\}$$

Abnormal Return (AR) Measures:

Let A_{it} to be the abnormal return for security i on day t . we use market model to estimate the abnormal return for each day in the event window. The abnormal return is the difference between actual return and expected return of each security.

$$A_{it} = R_{it} - \check{R}_{it}$$

To calculate expected return, the market model expressed as

$$A_{it} = \alpha_i + \beta_i R_{mt} + e_{it}$$

Where, $\alpha_i, \beta_i =$ regression parameters; $e_{it} =$ random error term having the standard normality properties

Expected Returns are calculated by using the following formulae

$$\check{R}_{it} = \alpha_i + \beta_i R_{mt}$$

The coefficients α_i (Alpha) and β_i (Beta) are estimated by running an ordinary least-square (OLS) regression over the estimation window (252 days).

Now define the abnormal return for firm i at time t as;

$$AR_{it} = R_{it} - \check{R}_{it}$$

Average Abnormal Returns (AAR) is calculated using the following formulae

$$AAR_{it} = \frac{\sum_{i=1}^N AR_{it}}{N}$$

Where, i represents different securities in the study;

$N =$ total number of securities;

$t =$ the days surrounding the event day

Cumulative Average Abnormal Returns (CAAR) is calculated using the following formulae. The AARS values are cumulated over event window (61-day) to find out CAARS and expect that the CAARS values should be nearly zero.

$$CAAR_{it} = \sum_{t=-30}^K AAR_{it}$$

Where, $t = -30, \dots, 0, \dots, +30$ days, $K = 30$

Standardized Abnormal Returns (SAR) and Standardized Cumulative Average Abnormal Returns (SCAR)

To test the hypothesis of significance of abnormal returns the standardized abnormal returns are calculated where each excess returns A_t is first divided by its estimated standard deviation to yield a standardized excess returns, $A_{i,t}^t$ the standardized abnormal returns are then cumulated over event period in order to ascertain standardized cumulative average abnormal returns (SCAR).

$$A_{i,t}^t = A_{i,t} / \check{S}(A_{i,t}),$$

Where,

$$\check{S}(A_{i,t}) = \sqrt{\left(\sum_{t=-282}^{t=-31} (A_{i,t} - A_t^*)^2 \right) / 251},$$

$$A_t^* = \frac{1}{252} \sum_{t=-282}^{t=-31} A_{i,t}$$

The test statistics for any given day is given by

$$\left(\sum_{t=1}^{N_t} A_{j,t}^t \right) \cdot (N_t)^{-\frac{1}{2}}$$

Table 2: Descriptive Statistics

Variable	Mean	S.D	Sum	Minimum	Median	Maximum
Trading Hours						
AAR	0.11	1.14	15.20	-3.83	0.09	5.24
CAAR	3.26	4.89	433.33	-12.67	3.06	19.23
ΔSales	-7.93	93.62	-1055.23	-99.97	-11.17	978.74
ΔProfit	84.61	1562.67	11253.61	-2887.36	-17.77	17477.35
ΔEPS	99.24	1764.60	13198.39	-2893.78	-18.13	19900.00
Non-Trading Hours						
AAR	0.25	1.18	72.00	-3.09	0.11	5.20
CAAR	2.75	6.31	792.71	-17.74	2.60	27.02
ΔSales	-8.04	90.77	-2315.58	-100.00	-9.05	1447.51
ΔProfit	-11.29	812.36	-3251.83	-4687.11	-24.04	10842.61
ΔEPS	-27.75	700.75	-7991.76	-4613.33	-25.87	8386.67
<p>* All units expressed are in %, AAR, CAAR – announcement day, SD – standard deviation Δ – changes in particular variable</p>						

Source: Computed

Table 1 displays the descriptive statistics. The average abnormal earnings were positive all over trading and non-trading hours. Variables such as sales, profit, and EPS data from the current year are compared to similar quarters from the prior year to determine percentage changes. It was discovered that earnings were positively changed for trading hour announcements and were conveyed to the market, whereas earnings were negatively changed for non-trading hour announcements and were positively accepted by the market. Firms generally released positive profit changes during trading hours and negative earnings changes outside of regular trading hours. Therefore, the time of the earnings announcement decision is significantly impacted by changes in earnings.

Results and Discussion:

The average abnormal returns (AAR) and cumulative average abnormal returns (CAR) are computed for a 61-day event window (-30, +30) to observe the price response to the quarterly earnings news. A perusal of Table 1(a) and graph 1 reveals that the AAR for the announcement made during trading hour is 0.11% which is insignificant, whereas the AAR for the announcement made during trading hours is 0.25 which is significant. So a non-trading hours results statement is twice responsive than one made on a trading hours. It is possibly deduced that non-trading hour’s announcements enable investors to allocate extra time to evaluate results and take appropriate action.

Table 3: AAR and CAR around the Quarterly Earnings Announcements (QEA): Trading hours V/S Non-Trading hours

Days	Trading Hours				Non-Trading Hours			
	AAR (%)	CAR (%)	T-value	% of Cos +VE Returns	AAR (%)	CAR (%)	T-value	% of Cos +VE Returns
-30	0.05	0.05	0.37	49.62	0.16	0.16	2.03*	51.74
-29	0.17	0.22	1.60	48.87	0.15	0.32	1.77	55.21
-28	0.28	0.50	2.66*	56.39	0.02	0.33	0.21	51.39
-27	0.09	0.58	0.81	47.37	0.07	0.40	0.88	46.53
-26	0.00	0.58	-0.04	45.86	0.19	0.59	2.31*	54.86
-25	0.10	0.68	0.86	50.38	0.11	0.70	1.42	47.57
-24	0.08	0.76	0.91	56.39	0.11	0.81	1.33	51.39
-23	-0.05	0.71	-0.51	49.62	-0.01	0.80	-0.17	43.06
-22	0.09	0.80	0.71	46.62	-0.05	0.74	-0.67	46.53
-21	0.23	1.03	2.99*	58.65	0.01	0.76	0.18	43.40
-20	0.10	1.13	1.04	46.62	-0.05	0.71	-0.72	45.83
-19	-0.04	1.09	-0.31	43.61	-0.10	0.60	-1.40	42.01
-18	0.09	1.18	0.82	45.86	0.13	0.73	1.36	51.74
-17	0.15	1.33	1.82	53.38	0.14	0.87	1.71	52.08
-16	0.24	1.57	2.77*	57.14	0.07	0.94	0.82	46.18
-15	0.11	1.69	1.45	54.14	0.11	1.05	1.19	53.47
-14	0.07	1.76	0.98	51.88	0.02	1.08	0.28	47.22
-13	0.19	1.95	1.82	52.63	0.08	1.15	1.07	46.88

-12	-0.13	1.83	-1.65	42.86	0.06	1.22	1.01	51.39
-11	0.03	1.85	0.37	48.87	0.00	1.22	0.00	43.40
-10	0.08	1.93	0.83	48.87	0.04	1.25	0.52	47.92
-9	0.20	2.12	2.16*	50.38	0.06	1.32	0.91	46.53
-8	0.25	2.38	2.63*	52.63	0.11	1.42	2.04*	55.56
-7	0.05	2.43	0.61	45.11	0.08	1.50	1.10	49.31
-6	0.15	2.58	1.71	54.14	0.04	1.54	0.64	51.39
-5	0.03	2.61	0.48	46.62	0.26	1.80	3.24*	52.43
-4	0.14	2.76	1.89	53.38	0.04	1.84	0.61	47.22
-3	0.08	2.84	1.13	54.89	0.23	2.07	3.67*	57.99
-2	0.12	2.96	1.57	60.90	0.17	2.24	2.70*	54.51
-1	0.19	3.14	2.18*	51.13	0.26	2.50	3.58*	56.94
0	0.11	3.26	1.16	53.38	0.25	2.75	3.59*	54.17
1	0.33	3.58	2.12*	54.14	0.32	3.08	2.67*	52.78
2	0.20	3.78	1.89	51.88	0.05	3.12	0.64	45.83
3	0.07	3.86	0.88	48.12	0.00	3.12	-0.04	46.18
4	0.11	3.97	1.45	52.63	0.12	3.24	1.94	47.22
5	0.24	4.21	3.89*	60.90	0.14	3.38	2.22*	51.39
6	0.21	4.42	3.05*	54.89	0.07	3.45	1.03	47.22
7	0.06	4.48	0.89	49.62	0.00	3.45	-0.01	46.53
8	0.10	4.58	1.40	51.13	0.11	3.56	1.86	50.00
9	0.04	4.62	0.60	47.37	0.13	3.69	2.31*	49.31
10	0.16	4.78	2.15*	49.62	0.14	3.83	2.28*	49.31
11	0.09	4.88	0.93	51.13	0.13	3.96	2.07*	50.35
12	0.09	4.96	1.12	50.38	0.04	4.01	0.79	51.39
13	0.07	5.03	0.89	50.38	0.00	4.00	-0.05	46.18
14	-0.02	5.01	-0.20	54.14	-0.07	3.93	-1.50	43.75
15	0.03	5.04	0.35	44.36	0.02	3.95	0.40	50.69
16	0.04	5.08	0.46	48.12	0.00	3.95	-0.09	47.22
17	0.02	5.10	0.25	49.62	-0.11	3.83	-2.28*	42.71
18	0.19	5.29	2.10*	53.38	0.00	3.83	0.03	44.10
19	0.03	5.32	0.50	45.86	0.08	3.91	1.31	50.69
20	0.12	5.44	1.39	48.12	-0.02	3.89	-0.50	44.79
21	-0.12	5.32	-1.60	36.09	0.04	3.93	0.79	46.53
22	-0.09	5.24	-1.00	48.12	0.05	3.98	0.93	45.49
23	0.09	5.33	1.13	48.12	-0.03	3.96	-0.49	45.83
24	0.07	5.39	0.88	51.13	0.01	3.96	0.14	48.96
25	0.02	5.41	0.29	52.63	0.02	3.99	0.40	48.96
26	0.00	5.41	-0.05	49.62	0.01	4.00	0.27	50.69
27	0.07	5.48	0.80	48.12	0.01	4.01	0.12	43.06
28	0.12	5.60	1.40	45.86	0.03	4.03	0.43	49.31
29	-0.09	5.51	-1.26	42.11	-0.06	3.97	-1.14	42.71

30	0.11	5.62	1.20	51.88	0.06	4.04	1.10	47.57
Avg.	0.09	3.25	1.04		0.07	2.43	0.90	
Med.	0.09	3.26	0.93		0.05	2.75	0.82	
S.D	0.09	1.83	1.09		0.09	1.42	1.26	
S.E	0.01	0.23	0.14		0.01	0.18	0.16	
T-test	7.64*	13.84*	7.51*		5.74*	13.42*	5.59*	

Source: Computed from Prowess IQ Data Base of CMIE

Note:*Indicates statistically significant at 5% level of significance

It can be shown that in the case of the trading hour’s earnings announcement, the abnormal returns are positive and significant for 7 days before event day, while they are positive and significant for 5 days after event day. In the case of non-trading-hour earnings announcements, the abnormal returns are positive and significant for 7 days before event day, while they are positive and significant for 5 days after event day. Hence we accept that AARs are close to zero.

The CAR of the 61-day event window appears to be 5.62% and 4.04% during trading hours and non-trading hours, respectively. Overall, in the case of the trading day announcement, the AARs were negative for 3 days and positive for 27 days during the pre-event period, and they were positive for 26 days and negative for 4 days after the event day. In the case of non-trading day announcements, the AARs are negative for 4 days and positive for 26 days during the pre-event period, and they are positive for 25 days and negative for 5 days after the event day. It is inferred that the market was expecting good news from the company, as we can see positive abnormal returns before event day, and companies were successful in disseminating the same to investors, as we can see the majority of days made positive abnormal returns after event day.

Graph 1: Movement of AAR and CAR for the 61-day event window

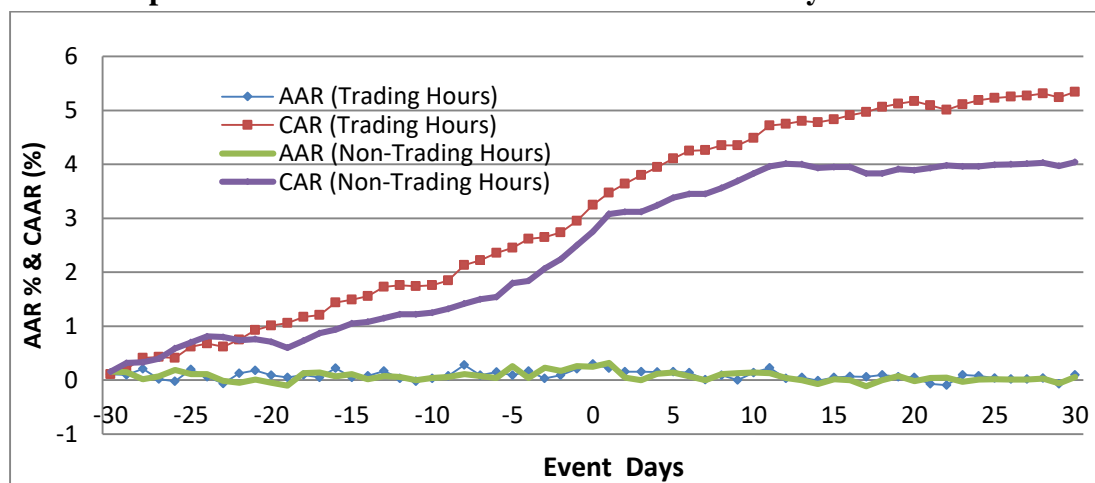


Table 4
Abnormal Returns for the QEA during Multi-days Event Window

Sub Periods	Trading Hours		Non-Trading hours	
	Average Abnormal Returns			
	Cumulative	Median	Cumulative	Median
(-5, 0)	0.67*	0.71	1.22*	0.96
(-1, 0)	0.30*	0.26	0.51*	0.31
(0, 1)	0.44*	0.32	0.57*	0.37
(0, +5)	1.07*	0.69	0.88*	0.55
(+2, 10)	1.20*	0.87	0.76*	0.35
(+2, 20)	1.85*	1.80	0.81*	0.56
(+2, 30)	2.03*	1.65	0.96*	0.56
(-1, 1)	0.63*	0.38	0.84*	0.49
(-2, 2)	0.95*	0.40	1.05*	0.64
(-5, 5)	1.63*	1.22	1.84*	1.29
(-10, 10)	2.93*	2.46	2.62*	2.13
(-20, 20)	4.41*	4.77	3.13*	3.20
(-30, 30)	5.62*	5.56	4.04*	3.57

Source: Computed

Table 4 presents the cumulative average abnormal returns for the multi-day event window. The CARs for all the sub periods are positive and significant. That means earnings announced on both during trading hours and non-trading hours are affected positively. So, we accept that CAARs are not close to zero. It can be inferred that stock prices immediately do not absorb information fully. That means a delayed price reaction. In general, companies with favorable profit changes should announce them during trading hours to increase their market price by an additional 2.03%. Firms having negative earnings changes should announce them outside of trade hours to minimize any negative effects.

Conclusion:

We have examined stock prices reactions to quarterly earnings announcements released during trading hours versus non-trading hours. We found that the market's reaction to the announcements both during and outside of trading hours was similar; this is inconsistent with Prasad & Prabhu (2020). To analyze whether earnings changes influence the announcement timing decision, the sales, profit, and EPS figures from the current year are compared to similar quarters from the prior year to determine earnings changes. We found that Firms generally released positive earnings changes during trading hours and negative earnings changes outside of regular trading hours. This result is consistent with DeHaan, Shevlin, and Thornock (2015) and Prasad & Prabhu (2020). Therefore, it is concluded that the timing of the earnings announcement decision is significantly impacted by changes in earnings. This result is consistent with that of William Kross and Douglas A. Schroeder (1984). The CARs of multiple event windows were analyzed and found to be positive and significant for all periods. It can be inferred that stock prices immediately do not absorb information fully. That means a delayed price reaction. *This result is consistent with Iqbal & Mallikarjunappa (2010), Mallikarjunappa & Dsouza (2013, 2014), and Dsouza & Mallikarjunappa (2016, 2017).*

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