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Navigating the Market Environment: Share Return Dynamics Around Buyback Announcements in India

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Abstract
The given study examines the impact of buybacks on shareholder returns in the evolving Indian capital market environment, shaped by regulatory frameworks, investor sentiment, and market efficiency considerations. Using event study methodology, a dataset of 294 buybacks from 1993–2023 is analyzed. The study employs crude dependence test, BMP, cross-sectional test, and Patell test to assess abnormal returns surrounding the event. The findings reveal statistically significant Average Abnormal Returns (AAR) on the announcement day, one day after, and on the eighth day post-announcement. The CAARs are positive and statistically significant across multiple event windows, suggesting a sustained postannouncement effect in the capital market environment. However, the Patell test results indicate that riskadjusted abnormal returns are not statistically significant. These findings offer valuable insights into the functioning and dynamics of the Indian capital market highlighting how regulatory conditions and investor behavior shape the market's response to buyback announcements. From a policy perspective, the results suggest that regulators should closely monitor the implications of buybacks on market efficiency, while firms may strategically use buyback announcements to signal value and enhance shareholder wealth in an increasingly competitive environment.
Keywords: *Market Environment, Abnormal Returns, Announcement Day, Buy Back, Event Study*

1. INTRODUCTION

Share buybacks have emerged as a significant corporate strategy for returning excess capital to shareholders, signalling undervaluation, improving financial ratios, and enhancing shareholder value. The announcement of a buyback is often perceived as a positive signal by investors, leading to changes in stock prices. The efficient market hypothesis suggests that stock prices should adjust rapidly to new information, making buyback announcements an important event for empirical analysis. This study gauges the market's reaction to buyback announcements in India by examining the Abnormal Returns and Cumulative Abnormal Returns. We also employ additional statistical tests, including crosssectional tests, crude dependence tests, BMP, and Patell tests, to ensure robustness of results. Prior research has shown mixed results regarding the effects of buyback announcements. Some studies indicate a positive reaction, suggesting that investors interpret buybacks as a signal of strong future performance, while others argue that the impact is short-lived or dependent on firm-specific factors. This study contributes to the existing literature by analyzing a large sample of buyback announcements and applying multiple statistical techniques to test the significance of abnormal returns. 294 buybacks announced from 1999 to 2023 are analysed using event study methodology taking announcement day as the event day.

The results indicate that AAR are statistically significant on the event day, one day after, and on the eighth day post-announcement. Additionally, cumulative abnormal returns (CAAR) remain positive and significant across multiple event windows, suggesting a sustained market response. However, the Patell test results indicate that risk-adjusted abnormal returns are not significant, highlighting the complexity of market reactions.

The findings of the study will enhance the understanding of market efficiency and investor sentiment in response to corporate repurchase decisions. The findings have implications for investors, policymakers, and corporate managers in assessing the signalling effects and financial impact of buybacks.

2. LITERATURE REVIEW

The announcement effect of share buybacks has been widely examined in prior research. While some studies have discovered that buy back announcements lead to positive market reaction while others have observed negative or no reaction to buy back announcements in the market.

Numerous studies have support for the Signalling Hypothesis. Dann (1981) reported significant positive abnormal returns within a one-day window surrounding the announcement based on 143 tender offers

in the US over a period of 13 years. Vermaelen (1981) examined the stock price reaction to 131 buy back offers and 243 open market purchases in the US from 1962 to 1978. He found that stock prices increased after repurchase but only for tender offers. Size of offer premium, amount of buy back and percentage of insider ownership were factors influencing the amount of abnormal returns. In 1995, Ikenberry et al examined a sample of 1239 open market repurchases by US firms during 1980-1990.

They discovered negative abnormal returns over -2 days to +2 days surrounding the announcement. Firm size and buy back size were some of the factors influencing returns. Ervin and Miller (1998) analysed the signaling impact of buy backs on competing firms in the same industry by taking a sample of 240 U.S firms from 1985 to 1990. While repurchasing firms experienced a positive market reaction on announcement, a portfolio of rival firms experienced significant negative abnormal returns. Skjeltorp (2004) examined repurchase announcements and actual repurchases by Norwegian firms from 1998-2011 and observed positive announcement effects. The study supported the under-reaction hypothesis, with firms outperforming the market by 11% annually post-announcement. Chan et al (2004) explored actual repurchases by US firms during 1980-1996. They found initial excess returns of around 6.7% in the first year and annual compounded returns of 23.5% after 4 years. Chan et al. (2005) analyzed U.S. repurchase announcements over a 20-year span (1980–2000) and found that firms recorded a significant positive average abnormal return of about 1.8% during the announcement period, along with an average buy-and-hold return of 11.2% over the four years following the announcement Bargeron et al (2011) observed significant abnormal returns on 256 accelerated repurchase programs announced in the U.S from 1996 to 2008. The same year Mishra et al established a relation between credibility established through previous buy backs and current abnormal returns. They employed a sample of 1507 Canadian firms with previous share repurchase history.

The signaling effect of buy backs has been established in numerous studies in India also. Kaur and Singh (2003) reported a positive AR of 1.5% for two days around the announcement day. It was established that undervaluation and information signalling were the leading causes of such returns. Thirumalvalavan & Sunitha (2006) found significant abnormal returns in the Indian market over the announcement window which persisted only for a single day. Gupta (2006) observed lower abnormal returns for smaller firms. Using data of 46 buybacks from 1995 to 2005, it was found that share prices increased near the announcement of the buyback of shares with lower information asymmetry for larger firms. Karamjeet and Balwinder (2010) arrived at a similar conclusion by examining 100 buyback announcements of BSE-listed companies for five years. Event study analysis revealed a positive market reaction to buyback announcements. Kaur (2012) analysed 172 buyback announcements from 2001 to 2012 and reported significant positive market response for two days around the announcement day. Sivashanmugam & Sowmya (2019) investigated the impact of 182 buyback announcements over two decades. The event study analysis pointed that in the case of open market offers, pre as well as postannouncement AAR were positive. Dayanandan et al. (2020) investigated the stock market reaction to buyback announcements made by 239 Indian firms during the period 1999–2018They found the abnormal return on announcement day to be 2.07%. The reaction was stronger for firms with higher promoter ownership and weak for large firms. Shah (2021) analysed the magnitude of market reaction over share price on buyback announcements of tender offers in India using a sample of 16 companies listed in NSE. Share prices were found to be positively affected by the announcement of buyback but the impact was not persistent.

While many studies in the past have highlighted the positive impact of share buyback announcements on stock prices, some researchers have also demonstrated negative or negligible effects. These studies suggest that not all buyback announcements lead to favorable market reactions, often influenced by factors like market efficiency, competitive dynamics, or sector-specific characteristics. The following section reviews existing research studies that report negative or no significant announcement effects of the buyback of shares.

Wang et al. (2009) provided evidence supporting the free cash flow hypothesis, noting that the market penalized firms with high Tobin's q for undertaking successive buybacks, with the effect being more pronounced in the case of large-scale buybacks. Chan et al (2010) pointed that managers with lower earnings quality may use buyback as a tool to mislead investors. Their findings were based on a sample of 7628 OMR announcements in the US from 1980-2000. In India, Hyderabad (2009) found negative CARs post-offer and positive CARs pre-offer for 79 buyback announcements till March 2008, contradicting the signaling hypothesis. Similarly, Ishwar (2010) reported insignificant AARs on the event day for 106 BSE-listed firms (1996–2006). Bhargava and Agrawal (2015) examined data of 42 NSE listed companies from

2010 to 2014 using 252 days' estimation period and 31 days' event window and did not find any significant abnormal returns. Bhama (2023) analysed the market reaction to open market repurchase announcements by 100 firms listed on the BSE from 2010 to 2020. They found maximum significant abnormal return of 1.1% only on the announcement day. Results were negative and insignificant pre and post announcement.

Existing studies on share buyback announcements have mixed observations. Some Studies reported significant negative returns for varying windows, especially before the announcement of the buyback of shares. Some researchers have found short term positive impacts but long-term negative impacts of buyback of shares after the announcement of buyback of shares. It can be observed that several studies reported positive abnormal returns. However, some studies conveyed a negative or negligible impact of the buyback announcements, suggesting that the market reaction can vary based on prior stock performance and company specifics.

3. Sample

3.1 Sampling Period

The sample consists of buybacks announced by companies listed on the Bombay Stock Exchange between 1st April 1999 to 31st March 2023. The data pertaining to announcements of buyback of shares has been taken from Prime Database. The present study has sourced additional datasets relating to closing share prices and company-specific indicators from the CMIE corporate database- ProwessIQ. S& P BSE 500 is used as the Market index. Data for the same is sourced from Bombay Stock Exchange's official website.

3.2 Sample Size and Data

In the period under study, 712 buyback announcements were made by the different companies. The final sample consisted of 294 Buyback announcements made by 195 companies. Table 1 explains the final sample selection.

(A) Total Announcements (Opening date from 1st April 1999 to 31st April)	712
(B) Number of Announcements deleted due to the same dates of Buyback announcements of two companies and missing data on Public Announcement dates.	167
(C) No of Announcements Left (A)-(B)	546
(D) Excluded due to other reasons[2]	252
Final Sample (C) – (D)	294

Table 1: Sample Description

4. RESEARCH METHODOLOGY

The announcement effect of share buybacks is examined through event study analysis using the market model, where Abnormal Returns (ARs) are measured as the difference between actual and expected (normal) returns.

$$AR_{it} = R_{it} - NR_{it} \quad (1)$$

Normal Return is calculated using the following mode

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (2)$$

Where,

R_{it} = daily returns of company i at time t R_{mt} = daily market returns of company i at time t α = intercept β = slope

The parameters α and β are estimated using the ordinary least square (OLS) method by using returns data of sample companies and market index during the estimation window of 180 days. Normal returns using the market model are calculated as:

$$NR_{it} = \hat{\alpha}_i + \beta_i R_{mt} \quad (3)$$

Where,

NR_{it} = Normal return of company i at time t

$\hat{\alpha}$= Estimated Intercept Coefficient of market model

β = Slope Coefficient of market model

R_{mt} = Market return (S& P BSE 500) at time t

The AARs are tested using the following hypothesis:
H_0: E (AAR_t) =0
H_1: E (AAR_t) ≠ 0
Where, t= -30 to +30 days
Buyback of shares will have significant impact on stock returns around announcement if AARs are statistically significant and different from zero.
The cumulative effect is captured by calculating cumulative average abnormal returns using equation:

$$CAAR_{it} = \sum t_{t=t}^{2} 1\ AAR_{it} \quad (4)$$

If CAAR is found to be greater than zero with significant p-values, it means that buyback of shares has significant impact on abnormal returns.

5. RESULTS AND ANALYSIS:

5.1 Impact on Average Abnormal Return

The AARs on and around the buyback announcement day of all companies in the sample is presented in Fig 1. The graph shows the extent of excess gains in shareholders' value:

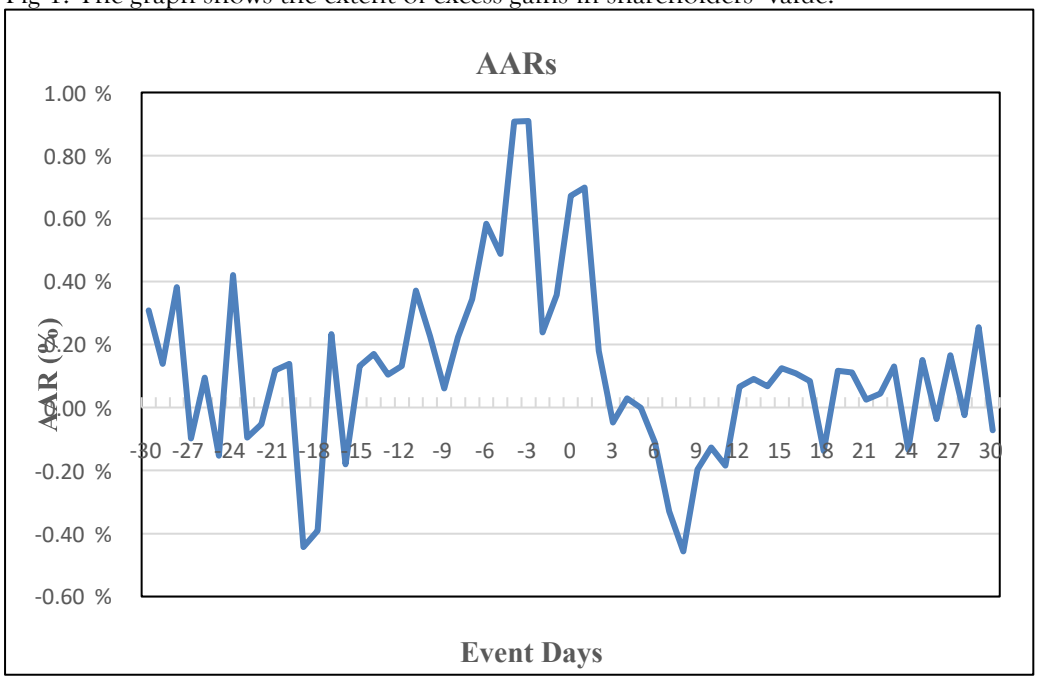

Figure 1: Average Abnormal returns

The graph shows that pre-event AARs are increasing but start falling after t_{+2} trading day. AARs show an increasing trend in the pre-event window as well as on the day of announcement. Thereafter, a fall in most of the AARs can be observed. Overall, the AARs are both positive and negative in the event window of 61 days.

Event Day	AAR (%)	t-stat	p-value*	Event Day	AAR (%)	t-stat	p-value*
-30	0.31%	1.53	0.13	1	0.70%	3.47	**0.00**
-29	0.14%	0.69	0.49	2	0.18%	0.89	0.37
-28	0.38%	1.90	0.06	3	-0.05%	-0.23	0.82
-27	-0.10%	-0.49	0.62	4	0.03%	0.14	0.89
-26	0.09%	0.47	0.64	5	0.00%	-0.01	1.00
-25	-0.15%	-0.76	0.45	6	-0.11%	-0.55	0.58
-24	0.42%	2.09	**0.04**	7	-0.33%	-1.64	0.10

-23	-0.09%	-0.47	0.64	8	-0.46%	-2.27	**0.02**
-22	-0.05%	-0.26	0.79	9	-0.20%	-0.97	0.33
-21	0.12%	0.59	0.56	10	-0.13%	-0.63	0.53
-20	0.14%	0.69	0.49	11	-0.18%	-0.91	0.36
-19	-0.44%	-2.20	**0.03**	12	0.07%	0.33	0.74
-18	-0.39%	-1.95	**0.05**	13	0.09%	0.45	0.65
-17	0.23%	1.16	0.25	14	0.07%	0.33	0.74
-16	-0.18%	-0.89	0.37	15	0.12%	0.62	0.54
-15	0.13%	0.65	0.51	16	0.11%	0.54	0.59
-14	0.17%	0.85	0.40	17	0.08%	0.42	0.68
-13	0.10%	0.52	0.61	18	-0.14%	-0.68	0.50
-12	0.13%	0.66	0.51	19	0.12%	0.58	0.56
-11	0.37%	1.84	0.07	20	0.11%	0.55	0.58
-10	0.23%	1.12	0.26	21	0.03%	0.13	0.90
-9	0.06%	0.30	0.76	22	0.04%	0.22	0.83
-8	0.22%	1.11	0.27	23	0.13%	0.65	0.52
-7	0.34%	1.71	0.09	24	-0.13%	-0.67	0.51
-6	0.58%	2.89	**0.00**	25	0.15%	0.75	0.46
-5	0.49%	2.42	**0.02**	26	-0.04%	-0.18	0.86
-4	0.91%	4.51	**0.00**	27	0.17%	0.82	0.41
-3	0.91%	4.52	**0.00**	28	-0.02%	-0.12	0.90
-2	0.24%	1.19	0.24	29	0.25%	1.26	0.21
-1	0.36%	1.77	**0.08**	30	-0.07%	-0.36	0.72
0	0.67%	3.34	**0.00**				

* Values highlighted in bold denote statistical significance at the 5% level

Table 2: Average Abnormal Returns around Buy Back Announcement

Table 2 shows that Average Abnormal Returns are not statistically significant for all days in the event window of 61 days. However, AARs are statistically significant on the day of the event and one day after the event. AARs are statistically significant on days prior to the announcement of buyback of shares (t_{-24}, t_{-19}, t_{-18}, t_{-6}, t_{-5}, t_{-4}, t_{-3} and t_{-1}). AAR is again significant on t_8 day.

It can be inferred from the above discussion that AARs are statistically significant on the day of announcement. Significant pre-announcement AARs indicates information leakage before the buyback announcement. Ikenberry, Lakonishok and Vermaelen (1995) has also suggested information leakage as a probable reason behind significant AARs prior to the announcement.

5.2 Impact on Cumulative Average Abnormal Returns

In this section, we have calculated CAARS to see the cumulative effect of buyback announcement on share returns.

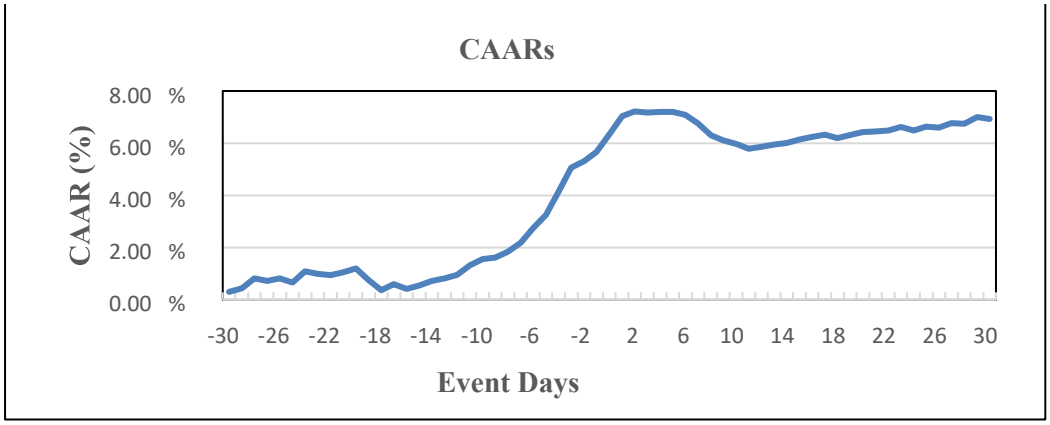

Figure 2: CAARs

Fig. 2 depicts the cumulative average abnormal returns over the event window of 61 days. CAARs remain positive throughout the event window. The CAARs have been tested using the following hypothesis: H_0: $CAAR_t = 0$
H_1: $CAAR_t \neq 0$ Where
t= -30 to +30 days
CAARs have been estimated using equation 4. Statistically Significant values of CAARs before the event suggests the leakage of information before the announcement of buyback of shares. According to Efficient Market Hypothesis, if there is information leakage prior to a corporate announcement, the CAARs will gradually increase during the pre-announcement period. This occurs as the leaked information is gradually incorporated into the stock prices. On the announcement day, CAARs may decrease because the stock prices of companies where no information leakage occurred will adjust to the newly available information (Ikenberry, Lakonishok & Vermaelen, 1995).

Event Window	Number of days	CAAR (%)	t-stat	p-value*
(-30,+30)	61	6.93%	4.405	**0.000**
(-25,+25)	51	5.81%	4.045	**0.000**
(-20,+20)	41	5.36%	4.159	**0.000**
(-15,+15)	31	5.72%	5.104	**0.000**
(-10,+10)	21	4.65%	5.038	**0.000**
(-8,+8)	17	4.68%	5.644	**0.000**
(-5,+5)	11	4.43%	6.638	**0.000**
(-2,+2)	5	2.15%	4.769	**0.009**
(-1,+1)	3	1.73%	4.957	**0.038**
(-6,+1)	8	4.86%	8.527	**0.000**
0	1	0.67%	3.340	**0.001**

* Values bold denote significance at the 5% level
Table 3: CAARs for different event windows

Table 3 depicts the cumulative average abnormal return for different event windows. It can be noted that CAARs for all event windows are significant at 1%.

5.3 Impact on Average Abnormal Returns using Cross Sectional t-Test

Cross section t-test is applied to determine the impact of any announcement on share prices due to firm specific characteristics.

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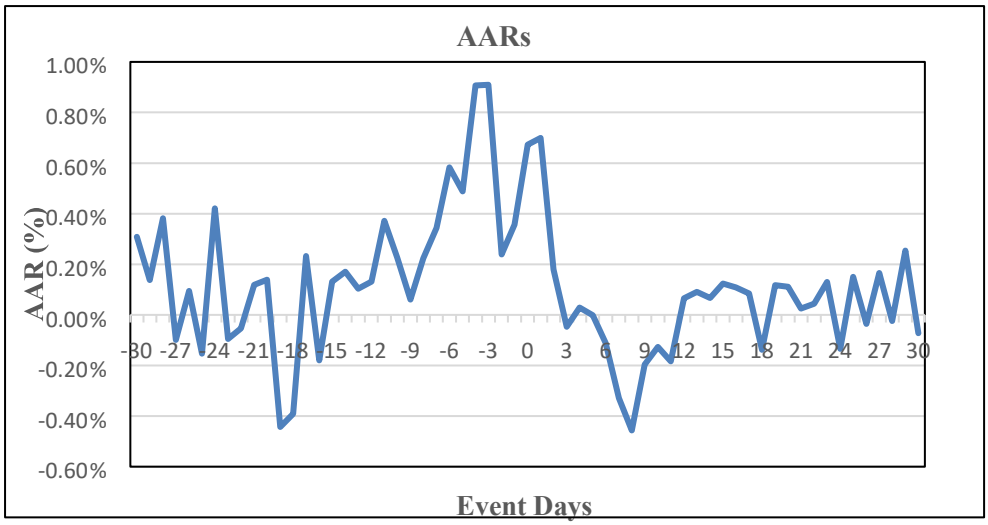

Figure 3: Average Abnormal Returns

Fig. 3 shows that AARs both positive and negative in the event window of 61 days. There is a significant rise in AARs on the announcement day followed by a subsequent decline. Overall, it can be observed that in the entire event window, positive AARs outnumbered the negative AARs. To check the statistical significance of AAR following hypothesis has been developed and analysed using t-test.

H_0: $AAR_t = 0$

H_1: $AAR_t \neq 0$

Where t= -30 to +30 days

Event Day	AAR (%)	t-stat	p-value*	Event Day	AAR(%)	t-stat	p-value*
-30	0.31%	1.55	0.12	1	0.70%	3.56	**0.00**
-29	0.14%	0.76	0.45	2	0.18%	1.05	0.29
-28	0.38%	2.05	0.04	3	-0.05%	-0.33	0.74
-27	-0.10%	-0.53	0.60	4	0.03%	0.19	0.85
-26	0.09%	0.64	0.52	5	0.00%	-0.01	0.99
-25	-0.15%	-0.89	0.37	6	-0.11%	-0.71	0.48
-24	0.42%	2.37	0.02	7	-0.33%	-1.83	0.07
-23	-0.09%	-0.62	0.54	8	-0.46%	-2.75	**0.01**
-22	-0.05%	-0.33	0.75	9	-0.20%	-1.18	0.24
-21	0.12%	0.71	0.48	10	-0.13%	-0.84	0.40
-20	0.14%	0.95	0.34	11	-0.18%	-1.20	0.23
-19	-0.44%	-2.53	**0.01**	12	0.07%	0.40	0.69
-18	-0.39%	-2.11	0.04	13	0.09%	0.62	0.53
-17	0.23%	1.24	0.22	14	0.07%	0.47	0.64
-16	-0.18%	-1.11	0.27	15	0.12%	0.91	0.37
-15	0.13%	0.75	0.46	16	0.11%	0.80	0.43
-14	0.17%	1.04	0.30	17	0.08%	0.55	0.58
-13	0.10%	0.68	0.50	18	-0.14%	-0.84	0.40
-12	0.13%	0.74	0.46	19	0.12%	0.86	0.39
-11	0.37%	1.88	0.06	20	0.11%	0.75	0.45

-10	0.23%	1.19	0.23	21	0.03%	0.17	0.86
-9	0.06%	0.38	0.71	22	0.04%	0.30	0.76
-8	0.22%	1.27	0.21	23	0.13%	1.04	0.30
Event Day	**AAR (%)**	**t-stat**	**p-value***	**Event Day**	**AAR(%)**	**t-stat**	**p-value***
-7	0.34%	2.08	**0.04**	24	-0.13%	-0.92	0.36
-6	0.58%	3.43	**0.00**	25	0.15%	0.96	0.34
-5	0.49%	2.58	**0.01**	26	-0.04%	-0.24	0.81
-4	0.91%	3.81	**0.00**	27	0.17%	1.02	0.31
-3	0.91%	4.92	**0.00**	28	-0.02%	-0.18	0.86
-2	0.24%	1.14	0.25	29	0.25%	1.67	0.10
-1	0.36%	1.85	0.06	30	-0.07%	-0.52	0.60
0	0.67%	2.95	**0.00**				

* Values in bold denote significance at the 5% level
Table 4: Cross Sectional t-Test

Table 4 shows that there is significant AAR on the announcement day and one day after. The shareholders have gained 0.67% on an average over and above the expected return on announcement day. On the next day, the return is further increased to 0.70%. AARs are significant at the 5% on t_{-7} to t_{-3} days, on announcement day and a day post announcement. It is again significant on t_8 day.

5.4 Impact on Cumulative Average Abnormal Returns using Cross Sectional t-Test

CAARs have been calculated to see the cumulative effect of buyback announcements on share returns. The following graph shows that CAARs are positive in all the days of event window implying that buyback had a positive impact on share returns.

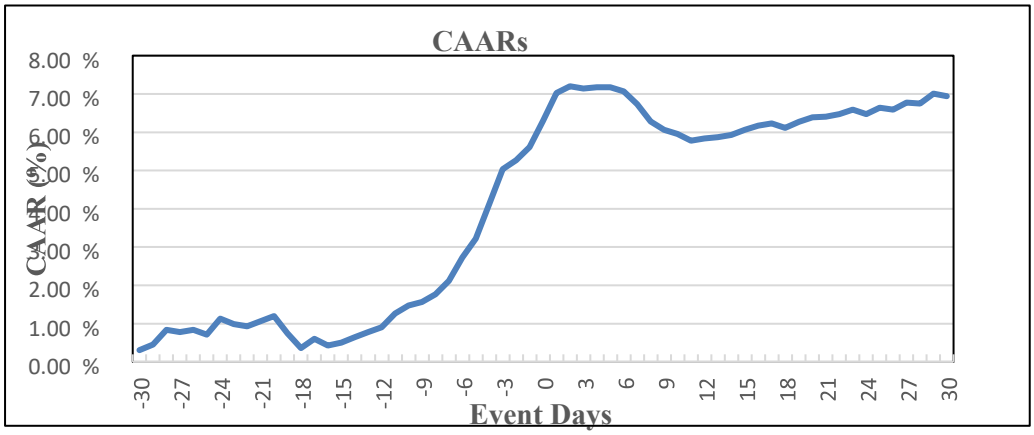

Figure 1: Cumulative Average Abnormal Returns

To check the statistical significance of CAARs, following hypotheses have been formulated:

H_0: $CAAR_t = 0$

H_1: $CAAR_t \neq 0$ Where,

t= -30 to +30 days

CAARs are also found to be statistically significant on all the days. Therefore, announcement of buyback of shares has positive and statistically significant impact on share returns. The CAARs remained significant on all days' post-announcement. The results align with studies suggesting that buybacks in emerging markets like India lead to prolonged market responses (Mishra, 2005; Gupta & Gupta, 2017)

5.5 Impact on Average Abnormal Returns: Crude Dependence Adjusted t- Test

Brown and Warner (1980) suggested the procedure of Crude Dependence Adjustment to address the limitations of conventional cross section t-test.

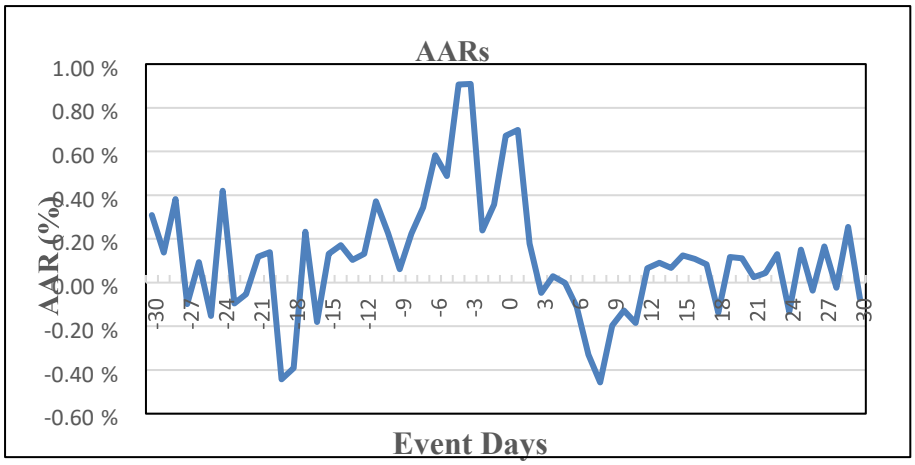

Figure 5: Average Abnormal Returns

Figure 5 shows a mix of both positive and negative AARs is observed during the 61-days event window. AAR is positive on announcement day and turns negative on t_3 day. Statistical significance of AARs is tested with the following hypotheses and analysed using t-test.

H_0: $AAR_t = 0$

H_1: $AAR_t \neq 0$ Where

t = -30 to +30 days

Event Day	AAR (%)	t-stat	p-value	Event Day	AAR (%)	t-stat	p-value
-30	0.31%	25.64	**0.00**	1	0.70%	58.12	**0.00**
-29	0.14%	11.50	**0.00**	2	0.18%	14.89	**0.00**
-28	0.38%	31.79	**0.00**	3	-0.05%	-3.92	**0.00**
-27	-0.10%	-8.21	**0.00**	4	0.03%	2.42	**0.02**
-26	0.09%	7.83	**0.00**	5	0.00%	-0.10	0.92
-25	-0.15%	-12.70	**0.00**	6	-0.11%	-9.28	**0.00**
-24	0.42%	35.02	**0.00**	7	-0.33%	-27.43	**0.00**
-23	-0.09%	-7.90	**0.00**	8	-0.46%	-37.99	**0.00**
-22	-0.05%	-4.42	**0.00**	9	-0.20%	-16.32	**0.00**
-21	0.12%	9.83	**0.00**	10	-0.13%	-10.59	**0.00**
-20	0.14%	11.53	**0.00**	11	-0.18%	-15.32	**0.00**
-19	-0.44%	-36.84	**0.00**	12	0.07%	5.46	**0.00**
-18	-0.39%	-32.57	**0.00**	13	0.09%	7.52	**0.00**
-17	0.23%	19.34	**0.00**	14	0.07%	5.60	**0.00**
-16	-0.18%	-14.94	**0.00**	15	0.12%	10.34	**0.00**
-15	0.13%	10.94	**0.00**	16	0.11%	8.99	**0.00**
-14	0.17%	14.19	**0.00**	17	0.08%	7.00	**0.00**
-13	0.10%	8.65	**0.00**	18	-0.14%	-11.44	**0.00**
-12	0.13%	10.97	**0.00**	19	0.12%	9.74	**0.00**
-11	0.37%	30.88	**0.00**	20	0.11%	9.23	**0.00**
-10	0.23%	18.82	**0.00**	21	0.03%	2.10	**0.04**
-9	0.06%	5.07	**0.00**	22	0.04%	3.68	**0.00**

-8	0.22%	18.61	**0.00**	23	0.13%	10.82	**0.00**
-7	0.34%	28.57	**0.00**	24	-0.13%	-11.15	**0.00**
-6	0.58%	48.47	**0.00**	25	0.15%	12.50	**0.00**
-5	0.49%	40.58	**0.00**	26	-0.04%	-3.01	**0.00**
Event Day	**AAR (%)**	**t-stat**	**p-value**	**Event Day**	**AAR (%)**	**t-stat**	**p-value**
-4	0.91%	75.47	**0.00**	27	0.17%	13.79	**0.00**
-3	0.91%	75.64	**0.00**	28	-0.02%	-2.01	**0.05**
-2	0.24%	19.89	**0.00**	29	0.25%	21.16	**0.00**
-1	0.36%	29.71	**0.00**	30	-0.07%	-6.05	**0.00**
0	0.67%	55.93	**0.00**				

Table 5: Crude Dependence Adjusted t-Test

Table 5 presents statistically significant AARs on all the days in the entire event window except on t_5 day. On the announcement day, AAR is 0.70% and statistically significant.

5.6: Impact on Cumulative Average Standardised Abnormal Returns:Crude Dependence Adjusted t-Test

In this section, we examine the cumulative effect of buyback announcements on stock returns. **Figure 5.6** displays that CAARs are positive on all the days of event window. This suggests that announcement of buyback of shares positively impact the share returns.

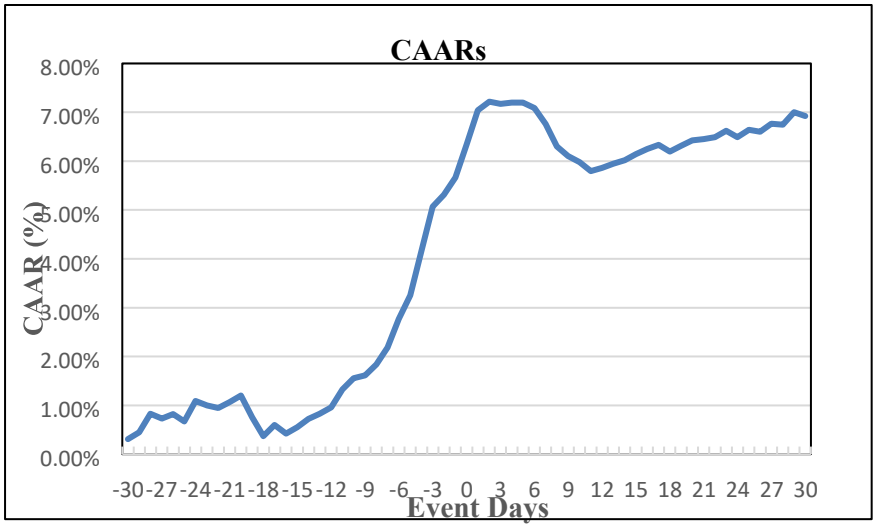

Figure 6: Cumulative Average Abnormal Returns

Figure 6 exhibits the cumulative average abnormal returns. To check the statistical significance of CAARs following hypotheses have been formulated.

H_0: $CAAR_t = 0$

H_1: $CAAR_t \neq 0$ Where,

t = -30 to +30 days

The results suggest that announcement of buyback of shares has a positive and statistically significant impact on share returns. This test revealed that both AARs and CAARs are significant on all days within the event window. It suggests that market's response to buybacks is consistently significant across the entire period analysed. The results are in line with the results suggested by Lasfer (2002), Oswald and Young (2004) and Thirumavalvan and Sunitha (2006).

Patell (1976) introduced standardised residual test and Boehmer, Musumeci and Poulsen (1991) proposed Standardised Cross-section Test to accumulate event induced volatility in the returns. These

tests relax the assumption of equality of variance of abnormal returns across firms. The results of these tests are reported below:

5.7 Impact on Average Standardised Abnormal Returns: Patell's test

In Patell's test, the abnormal returns calculated in the event window are standardised by calculating the standard deviation of the abnormal returns in the entire estimation period. Standardization minimizes the influence of shares with high return volatility within the sample. This test also assumes that abnormal returns are cross-sectionally independent. The average standardised abnormal returns using this test are mix of positives and negatives. On event day the average standardised abnormal return is 9.3%.

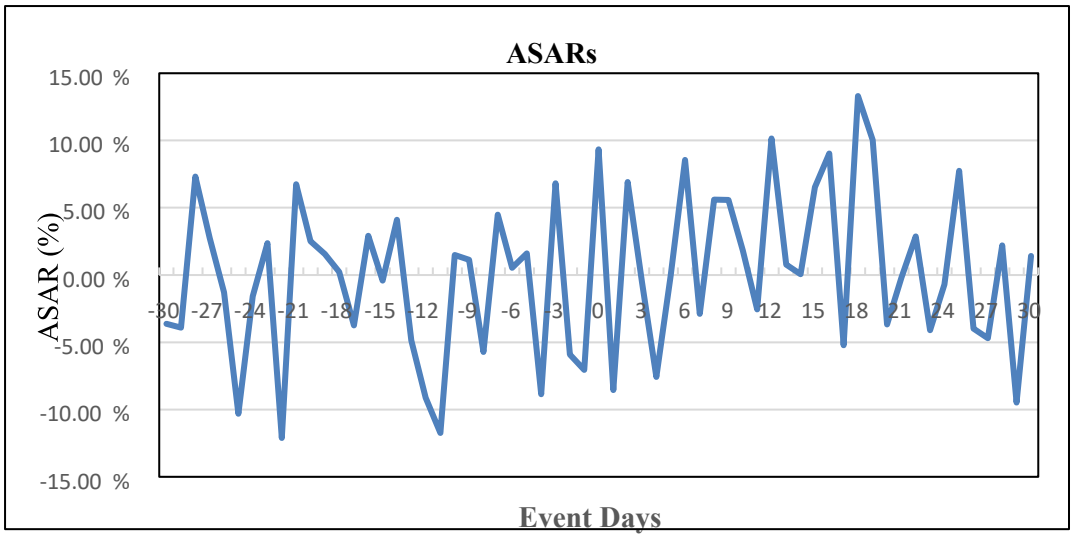

Figure 7: Average Standardised Abnormal Returns

The following hypotheses checks statistical significance of Average Standardised Abnormal Returns.

H_0: $ASAR_t = 0$

H_1: $ASAR_t \neq 0$

Where t= -30 to 30 days

Event Days	ASAR	z-stat	p-value	Event Days	ASAR	z-stat	pvalue
-30	-0.036	-0.617	0.537	1	-0.086	-1.459	0.145
-29	-0.039	-0.668	0.504	2	0.069	1.178	0.239
-28	0.073	1.247	0.212	3	-0.005	-0.089	0.929
-27	0.027	0.468	0.640	4	-0.076	-1.290	0.197
-26	-0.013	-0.221	0.825	5	0.000	-0.006	0.995
-25	-0.103	-1.759	0.079	6	0.086	1.459	0.145
-24	-0.016	-0.270	0.787	7	-0.029	-0.493	0.622
-23	0.024	0.405	0.685	8	0.056	0.954	0.340
-22	-0.121	-2.065	0.039	9	0.056	0.952	0.341
-21	0.068	1.152	0.249	10	0.018	0.311	0.756
-20	0.025	0.427	0.669	11	-0.026	-0.437	0.662
-19	0.016	0.268	0.789	12	0.102	1.731	0.084
-18	0.002	0.041	0.968	13	0.008	0.134	0.894
-17	-0.038	-0.640	0.522	14	0.001	0.009	0.993
-16	0.029	0.497	0.620	15	0.065	1.115	0.265
-15	-0.004	-0.070	0.944	16	0.090	1.539	0.124

-14	0.041	0.702	0.483	17	-0.052	-0.890	0.374
-13	-0.049	-0.828	0.408	18	**0.133**	2.268	**0.023**
-12	-0.091	-1.555	0.120	19	0.100	1.712	0.087
-11	-0.118	-2.004	0.045	20	-0.037	-0.625	0.532
-10	0.015	0.254	0.799	21	-0.002	-0.036	0.972
-9	0.011	0.192	0.848	22	0.029	0.491	0.624
-8	-0.057	-0.976	0.329	23	-0.041	-0.700	0.484
-7	0.045	0.765	0.445	24	-0.007	-0.120	0.905
-6	0.005	0.094	0.926	25	0.077	1.320	0.187
-5	0.016	0.273	0.785	26	-0.040	-0.681	0.496
-4	-0.089	-1.509	0.131	27	-0.047	-0.801	0.423
-3	0.068	1.164	0.244	28	0.022	0.375	0.707
-2	-0.059	-1.009	0.313	29	-0.095	-1.617	0.106
-1	-0.071	-1.203	0.229	30	0.014	0.242	0.809
0	0.093	1.592	0.111				

Table 6: Standardized Residual Test [Patell (1976)]

Table 6 shows the statistical significance of standardised abnormal returns of 61 days averaged across the announcement events (ASARs). The results show that AR per unit of risk is not statistically significant in the entire event window of 61 days except on the 18th day. This suggests that while the announcement impacts return, it may not always provide risk-adjusted abnormal returns, which could indicate that the market's response is not entirely risk-based.

Moreover, if the announcement of event induces returns and variances to change, in such cases standardised cross section test given by Boehmer, Musumeci and Poulsen (1991) is more powerful as compared to standardised residual test given by Patell (1976).

5.8 Impact on Cumulative Average Standardised Abnormal Returns

The average standardised abnormal returns are cumulated across the event window to see the impact of cumulative returns.

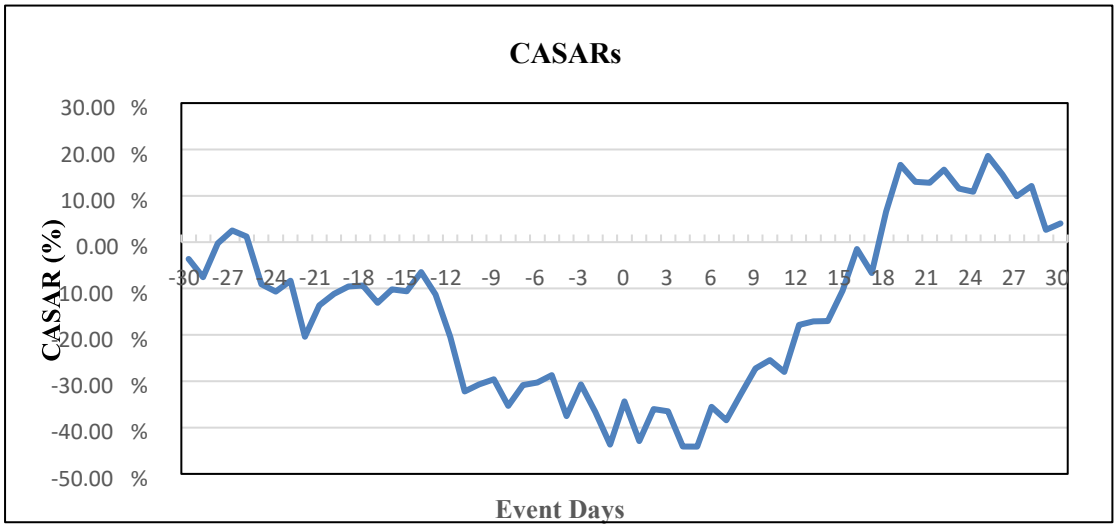

Figure 7: Cumulative Average Standardised Abnormal Returns

To check the statistical significance of Cumulative Average Standardised Abnormal Returns, following hypotheses have been formulated.

H_0: $CASAR_t = 0$

H_1: $CASAR_t \neq 0$ Where

t= -30 to +30 days

CASARs are not statistically significant in the entire event window. The results suggest that announcement of buyback of shares does not lead to sustained or uniform impact on stock prices across the sample companies. It further indicates the impact of factors like firm-specific characteristics, investor sentiment, and prevailing market conditions.

5.9 Impact on Average Standardised Abnormal Returns: BMP Test

Boehmer et al. developed the "standardised cross-sectional test" in which information in the event window as well as estimation period is incorporated. Here, the standardisation of abnormal returns is done by calculating the standard deviation in the estimation period. The average abnormal returns are standardised to relax the assumption of equality of variance across the firms. The BMP test takes care of event induced variance and cross-sectional correlation. The ASAR is mostly positive and on the day of the announcement it is 22.8%.

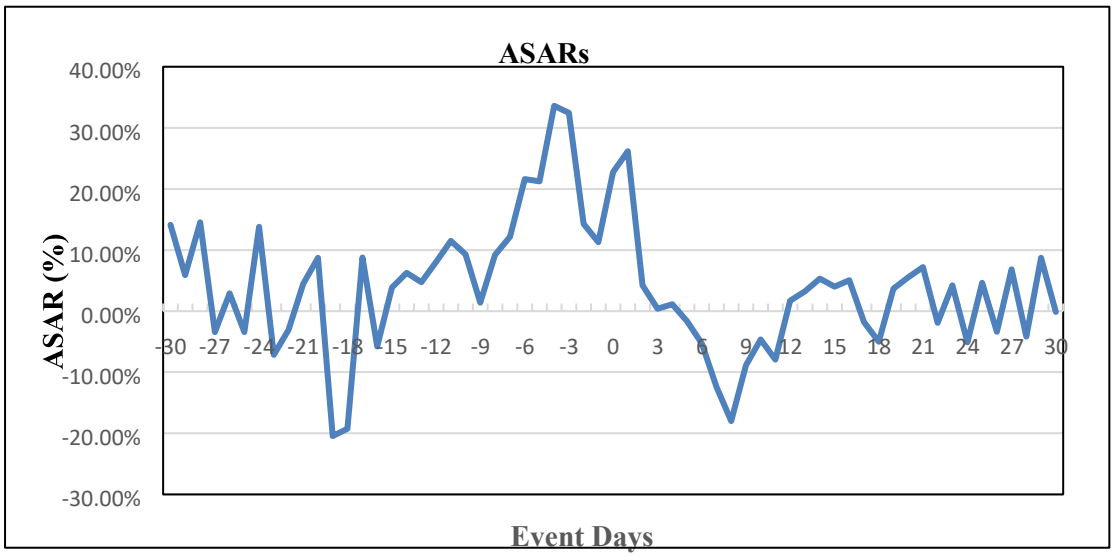

Figure 8: Average Standardised Abnormal Returns

To check the statistical significance of Average Standardised Abnormal Returns, following hypotheses have been formulated.

H_0: $ASAR_t = 0$

H_1: $ASAR_t \neq 0$

Where t= -30 to +30 days

Event Days	ASAR	z-stat	p-value	Event Days	ASAR	z-stat	p-value
-30	0.141	2.043	0.041	1	**0.262**	3.783	**0.000**
-29	0.059	0.952	0.341	2	0.042	0.736	0.462
-28	0.146	2.105	0.035	3	0.004	0.079	0.937
-27	-0.035	-0.558	0.577	4	0.011	0.214	0.830
-26	0.029	0.554	0.580	5	-0.016	-0.387	0.699
-25	-0.034	-0.570	0.568	6	-0.053	-0.969	0.332
-24	0.138	2.118	0.034	7	-0.124	-1.945	0.052
-23	-0.071	-1.289	0.197	8	**-0.180**	-2.993	**0.003**
-22	-0.031	-0.497	0.619	9	-0.089	-1.515	0.130
-21	0.045	0.772	0.440	10	-0.046	-0.877	0.380
-20	0.087	1.553	0.120	11	-0.079	-1.425	0.154
-19	-0.204	-2.773	0.006	12	0.017	0.312	0.755

-18	-0.192	-2.437	0.015	13	0.032	0.614	0.539
-17	0.088	1.238	0.216	14	0.053	1.142	0.253
-16	-0.058	-1.007	0.314	15	0.040	0.878	0.380
-15	0.038	0.524	0.601	16	0.050	0.973	0.331
-14	0.063	1.062	0.288	17	-0.018	-0.336	0.737
-13	0.048	0.824	0.410	18	-0.050	-0.933	0.351
-12	0.081	1.319	0.187	19	0.037	0.785	0.432
-11	0.115	1.688	0.091	20	0.055	1.121	0.262
-10	0.093	1.359	0.174	21	0.072	1.124	0.261
-9	0.014	0.249	0.804	22	-0.019	-0.364	0.716
-8	0.092	1.404	0.160	23	0.042	0.894	0.372
-7	**0.122**	1.936	**0.053**	24	-0.051	-1.000	0.317
-6	**0.216**	3.600	**0.000**	25	0.046	0.820	0.412
-5	**0.213**	3.193	**0.001**	26	-0.034	-0.665	0.506
-4	**0.336**	4.260	**0.000**	27	0.069	1.239	0.216
-3	**0.325**	4.740	**0.000**	28	-0.042	-0.783	0.433
-2	0.143	1.958	0.050	29	0.087	1.702	0.089
-1	0.113	1.473	0.141	30	-0.001	-0.030	0.976
0	**0.228**	2.985	**0.003**				

* Values highlighted in bold denote statistical significance at the 5% level
Table 7: Standardized Cross-Sectional test (BMP, 1991)

Table 7 reports the significance of standardised abnormal returns averaged over events (ASAR) by incorporating the non-constant behaviour of variance accredited to the event. The ASAR are statistically significant on the announcement day and one day after the announcement. ASAR are again statistically significant on the t_{+8} day.

5.10 Impact on Average Standardised Cumulative Abnormal Returns

The average standardised abnormal returns have been cumulated across the event window to see the cumulative effect.

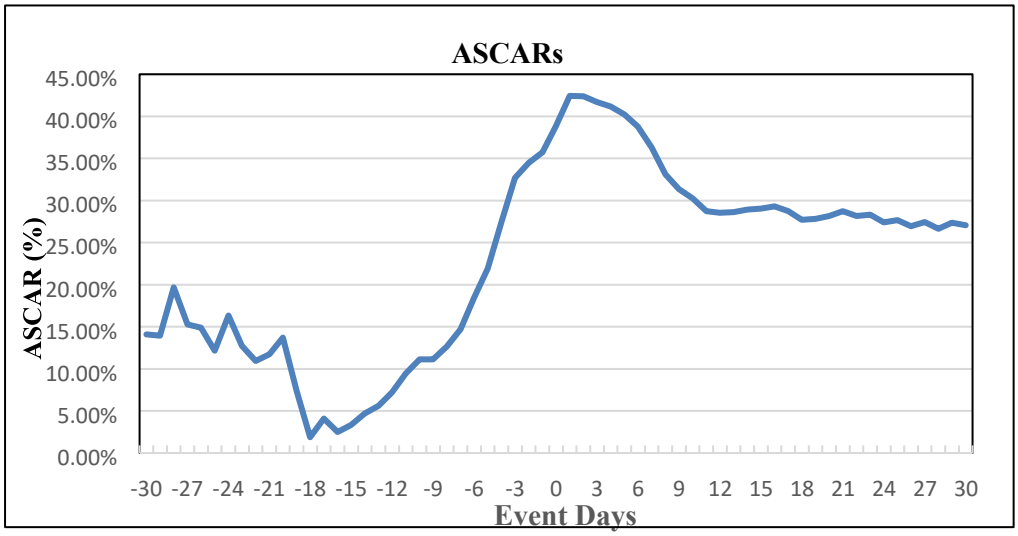

Figure 9: Average Standardised Cumulative Abnormal returns

To check the statistical significance of Average Standardised Cumulative Abnormal Returns, following hypotheses have been formulated.

H_0: $ASCAR_t$ =0
H_1: $ASCAR_t \neq 0$
Where, t= -30 to
+30 days
From Fig 9, we can conclude that announcement of buyback of shares have a statistically significant positive impact on the share returns. The buyback announcement has a lingering effect, with the cumulative abnormal return maintaining significance over an extended period.

6. CONCLUSION

The above empirical analysis provides support for the Signalling Hypothesis that buyback announcements has a positive signal in the Indian market by impacting the share prices. The analysis shows that shareholders experience statistically significant positive abnormal returns on the announcement day and other days in the event window. These findings reinstate that buyback announcement conveys favourable positive information about future prospects of a firm. The cumulative average abnormal returns were also found to be positive and statistically significant in multi- day event windows implying wealth creation for the shareholders. However, unlike Singh & Dhillon (2018), who reported that CAAR post-announcement were not always significant in the Indian context, our results show sustained post-announcement CAAR. Additionally, the Patell test results, indicating a lack of significance in risk-adjusted abnormal returns, contrast with the findings by Bansal et al. (2016), who observed risk-adjusted returns following buybacks in similar emerging markets. The most beneficial event window is +30 to -30 days as the return generated in this period is maximum that is 6.9%. Our study aligns with research showing the extended impact of buybacks on cumulative returns, notably consistent with Sharma & Singh (2020), who found significant CAAR several weeks' postannouncement. However, contrary to Mittal (2015), which documented inconsistent pre-announcement abnormal returns, this study shows clear and significant AAR prior to the announcement, suggesting that buyback signals may be more transparent in recent years.

7. Robustness

In this study, multiple statistical tests were applied to ensure robustness in analyzing the buyback announcement effect on stock returns. The Cross-Sectional Test checks consistency of abnormal returns across firms, while the Crude Dependence Test adjusts for clustering of buybacks. The Patell Test uses standardized abnormal returns but relies on normality assumptions, which may not hold in emerging markets like India. To address both cross-sectional dependence and event-induced variance, the BMP Test was used. Given its reliability for large samples and its ability to adjust for variance changes and trading activity shifts, the BMP Test provides the most robust results for this study.

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