Article

Impact Assessment of Share Buyback Based on Multiple Estimation Model for Pre-Post and Pandemic Period

Article History:

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Abstract: Market perception of any corporate event plays a key role in shaping a firm's value, investment choices, cost of capital, and long-term shareholder value. Share buyback serve as a powerful way to influence market perceptions thereby signaling undervaluation. From the Systematic Literature Review of the of Scopus database we find that there is no such comprehensive work on Indian companies that analyse the impact of share buyback under multiple estimation models for different periods. So, the analysis of the impact of share buyback on stock prices was examined across various dimensions like different estimation models i.e., Market Model, CAPM & Fama French Factor Model during pre, post and pandemic period. As per the thorough analysis of both event days and event windows, we see Market Model estimates are the most conservative, exhibiting fewer significant events and windows whereas Fama French Factor Model appears to provide more robust estimates with consideration to microeconomic factor.

Keywords: Share Buyback, Market Model, CAPM, Fama French Factor Model, Pre-Post and Pandemic period.

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INTRODUCTION

Market perception of any corporate event plays a key role in shaping a firm's value, investment choices, cost of capital, and long-term shareholder value. It is essential for organizations to understand the two main dimensions: why and how the market reacts to corporate decisions. This understanding helps them navigate the complex dynamics of modern finance. Corporate actions serve as a powerful way to influence market perceptions. Share buyback announcements are a key mechanism that helps reduce information asymmetry. This asymmetry poses significant challenges for weak and semi-strong capital markets. Therefore, signaling intrinsic value to the market is crucial for bridging this gap. The motive to buy back its shares may be due to range of strategic factors i.e., primarily may be due to undervaluation of shares, underperformance of the shares, utilisation of excess cash flow of the company, manage the earnings etc. The signalling motive has been resonated among the researchers and dominant over the other hypothesis (Vermaelen, 1981; Comment & Jarrell, 1991; Ikenberry et al., 1995; Brav et al., 2005; Oded, 2005; Babenko et al., 2012; Bhattacharya & Jacobsen, 2016). The signalling hypothesis indicates informational asymmetry between the shareholders and the management. The management has better access to the private information, so they are better aware of the true value of the company. Therefore, through share buyback announcement, the management convey the signals to shareholders about the undervaluation and future earnings prospects of the company. Chong et al. (2015) examined actual share buyback announcements from companies on the Bursa Malaysia market between 2007 and 2011. They used the Market-Adjusted Return Model (MARM) and found that share buybacks had only a temporary stabilizing effect that lasted around 16 days. In bearish markets, signaling effects were diminished and could not overcome sustained selling pressure. During crisis periods, market participants paid less attention to buyback announcements. In the Indian context, tender offers through share buybacks serve as a signaling mechanism, particularly during difficult times. This highlights the need for investors and fund managers to consider specific market conditions when forming strategies around such announcements. A strong impact was noted during the post-COVID period, where positive effects appeared temporary, and negative post-announcement returns indicated short-term investor interest.

The positive abnormal returns before share buybacks suggested potential information leakage and semi-strong market inefficiency (Suresha et al., 2024). Pandey and Kavidayal (2023) examined share buyback announcements and their impact on shareholder value and market confidence. The significant positive abnormal returns observed around buybacks suggested that they send value-enhancing signals to investors. The size of these abnormal returns varies by sector, indicating that they signal undervaluation and optimize capital structure, consistent with signaling and free cash flow theories. Information asymmetry and corporate governance are significant factors in share buyback strategies. Share buybacks act as a dual mechanism, serving both as a signaling tool and a means of financial optimization (Zhao et al., 2023). The study found statistically significant positive abnormal returns, with the size of the market response depending on firm size, repurchase method, and market conditions. Improved earnings per share (EPS) and return on equity (ROE) reduced share capital, strengthening overall financial performance. Additionally, market efficiency improved due to corrections in undervaluation and increased investor confidence. Similarly, Wrońska et al. (2018) analyzed the market reaction and changes in operating performance around share repurchase announcements for companies listed on the Polish NewConnect market. Their findings showed that operating performance, measured by ROA, declines before announcements and improves afterward, supporting the signaling hypothesis. Mukherjee and Chatterjee (2019) provided solid empirical evidence of the mixed effects of share repurchase announcements in India, offering detailed insights into sector variations and investor behavior. Their findings showed positive abnormal returns before announcements in the short term, but these did not last in the long run. This suggests that buybacks relate more to capital structure management than to signaling undervaluation. Gim and Jang (2020) studied stock market reactions in the restaurant industry, which is characterized by high operational risk and cash flow fluctuations. They compared investor reactions to share buybacks between asset-light and asset-heavy firms using event study methodology. Significant positive abnormal returns were found, with asset-light firms receiving a more favorable market response than asset-heavy firms. In this paper, the influence of share buyback announcement on share prices are analysed on and around the share buyback

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source date. Thus, from the Systematic Literature Review of the literature through PRISMA framework of Scopus database we find that there is no such comprehensive work on Indian companies that analyse the impact of share buyback under multiple estimation models for different periods. So, The analysis of the impact of share buyback on stock prices was examined across various dimensions like different estimation models and different periods. To achieve the objective, the study employs thorough analytical framework. The whole study period from 2014 i.e. after the implementation of the Companies Act 2013, is divided in three economic periods, such as pre-pandemic, pandemic, and post-pandemic as the whole world market faced structural break due to the COVID 19 pandemic situation. The period from March 2020 to March 2022 is considered as Pandemic period. Prime minister Narendra Modi declared nationwide lock down from 22 March 2020 and last order regarding the COVID 19 issued by Ministry of Home Affairs are on 22 March 2022 on discontinuing of containment measures to all the states administration and union territories. Post pandemic period ranges from 1st April 2022 to 31st March 2024. The share buyback data has been collected from the SEBI filings documents i.e., "Public Announcement", "Letter of Offer" and "Post-Buyback Public Announcement". Active companies' price data has been collected from BSE Stock Exchange. This paper uses advanced quantitative methods to estimate abnormal returns i.e., market model, capital asset pricing model and Fama-French factor models. The use of multiple return estimation models strengthens the findings and provides robustness check as majority of the studies employs market model. It provides a lucid image of the pattern of returns during pre-pandemic, pandemic and post pandemic period that might help investor and other stakeholders to understand the market dynamics regarding share buybacks under these different economic periods. The hypothesis can be stated as:

H1: The announcement of a share buyback triggers abnormal positive returns for the firms announcing share buyback, with distinct effects observable across different economic period.

Event Study Methodology (ESM)

Event Study Methodology (ESM) offers an empirical framework to measure abnormal returns around specific events, testing whether these events convey private information, known as the signaling hypothesis (Chatterjee and Mukherjee, 2015). ESM quantifies the impact of an economic event by abnormal returns. Normal returns are estimated by various models like Market model, CAPM, Fama-French Factor model, Fama-French-Momentum 4 Factor model and Fama-French 5 Factor model. For the purposes of our study, we have estimated the returns by applying, Market model, CAPM, Fama-French Factor models. The expected return models applied are discussed below:

Market Model

Algebraically, the return on security (i) in period t, $\hat{R}_{it}$ is hypothesized to be equal to the expected return plus an unexpected element ($\hat{e}_{it}$):

$$\hat{R}_{it} = a_i + \beta_i R_{mt} + \hat{e}_{it}$$

Where α and β are based on regression estimates, R_{mt} is the market return during period t.

CAPM

$$\hat{R}_{it} = R_f + \beta_i (R_{mt} - R_f)$$

where $\hat{R}_{it}$ is the expected return of stock (i), R_f is the risk-free rate, R_{mt} is the return of the market.

Fama-French 3 Factor Model

$$\hat{R}_{it} = R_f + \beta_{i,m}(R_m - R_f) + \beta_{i,smb} smb + \beta_{i,hml} hml + \hat{e}_{it}$$

where $\hat{R}_{it}$ is the expected return of stock (i), R_f is the risk-free rate, R_m is the return of the market portfolio, smb is the size factor, and hml is the value factor. $\beta_{i,m}$, $\beta_{i,smb}$, $\beta_{i,hml}$ are the factor sensitive or loadings of stock (i).

we shall compute the daily abnormal returns (AR_i) for security 'i' from 25 days before to 25 days after the announcement (t = -25 to +25) of the event by using the equation:

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

where R_{it} is the raw return on security 'i' for day 't', $\hat{R}_{it}$ is the expected return on security 'i' during 't.' The Average Abnormal Return for each relative day as

$$AAR_t = \frac{1}{N \sum AR_{it}}$$

(N is the number of securities with abnormal returns during day 't') and daily cumulative average abnormal returns (Cu.AAR) by using the average abnormal returns over event time i.e.,

$$Cu.AAR_t = \sum AAR_t$$

Then we have evaluated the significance of the average abnormal return by using the t-test as

$$T_{Statistics} = \frac{AAR_t / SAR_t}{\sqrt{N}}$$

SAR_t is the standard Deviation of abnormal returns on day "t". A significant t-value implies the significant impact of the share buyback on stock price.

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Analysis of the Empirical Results
Analysis based on estimation models

The short-term impact of share buyback announcement is measured by abnormal returns. The Average Abnormal Returns (AAR) with t-values and Cumulative Average Abnormal Return (Cu.AAR) under Market Model, Capital Asset Pricing Model and Fama French factor model are depicted in Table 1, 2, and 3 (see annexture). AAR and Cu.AAR of different period i.e., Pre-Pandemic, Pandemic and Post-Pandemic period are plotted and presented in chart 1a, 1b for market model, 2a, 2b for Capital Asset Pricing Model and 3a, 3b for Fama French factor model and finally, Table 4. presents the t-values for various span of event windows under the above-mentioned models in different periods.

Pre-Pandemic Period

At event day (Day 0), AAR stands as 0.26 % (i.e., statistically insignificant) and Cu-AAR as 2.05 % from -0.33% on day -25, suggesting the announcement itself added little incremental abnormal return under market model presented in table 1. There is a gradual decline in Cu-AAR from –0.33% at day –25 to – 3.30 % at day –6, reflecting negative abnormal returns leading up to buyback announcements. A sharp reversal occurs at pre-announcement period between day –5 and day –2 where AAR stands 0.97 % at day -5, 1.09 % at day – 4, 1.11% at day – 3, & 1.53% at day -2 with AARs being significant at 1% level of significance. These four days account for most of the positive cumulative build-up from –3.30% at day -6 to 1.41% at day -2, indicating significant market anticipation of buyback effects under market model estimation. During the post announcement period, positive AAR peaks with significant AAR of 0.47 % and Cu-AAR of 2.36 % at day 5. Thereafter mixed signs prevail, and no such strong sustained drift were found, Cu-AAR plateaus around 1.84 % by day 25.

Similar statistically insignificant results are evident at event date i.e., day 0 in case of both CAPM model and Fama French Factor model with AAR of 0.27 % and 0.39 % depicted in table 2 and 3. The Cu-AAR declined from -0.22 % to -1.14 % at day -6 under CAPM model and from -0.19% to -1.21% at day -6 under Fama French Factor model. Further, same reversal pattern was seen in case of CAPM & Fama French Factor model from day -5 to day -1 with statistically significant AAR of 0.84% at day -5, 1 % at day -4, 1.19 % at day -3, 1.53 % at day -2 and 0.46 % at day -1 under CAPM model estimation. AAR of 0.88 % at day -5, 1.04 % at day -4, 1.28 % at day -3, 1.55 % at day -2 and 0.53 % at day -1 are depicted under Fama French Factor model. Cu-AAR from CAPM and Fama French Factor model reached to 4.17 % and 4.48 % at day 0 from -1.14 % and -1.21 % at day -6 which represents homogenous patterns across all models.

Pandemic Period

The significant positive AAR of 1.13 % at day 0, reflected an immediate positive reaction to share buyback event under Market Model. Slightly negative abnormal returns hovers around until day –7, bringing down the Cu-AAR from -0.17% at day -25 to -0.11 % at day -7 then a clear positive AARs build-up at day –5 with AAR of 0.61 %, followed by significant positive AAR of 1.02 % at day -4, 1.35 % at day -3, 2.73 % at day -2 and 1.02 % at day -1. These positive pre-announcement returns drive Cu-AAR to 6.88 % by day –1 from -0.17 % at day -25. Continued significant positive AARs prevail till event day 0 peaking AAR at 1.13 % and Cu-AAR at 8.02 %. Thereafter, abnormal returns gradually taper, followed by significant negative AAR at day 4 (-0.34 %), day 8 (-0.45 %), day 10 (-0.48 %), day 12 (-0.44 %) and day 20 (-0.47 %) ending at –0.07 % and Cu-AAR of 5.56% by day 25. Thus, wiping out the maximum Cu-AAR of 8.02 % at day 0 to 5.56 at day 25.

Based on the other estimation models i.e., CAPM & Fama French Factor Models, similar pattern of outcomes is evident, as significant AAR of 1.11 % under CAPM and 1.18% under Fama-French Factor model are recorded at event day (day 0). Significant positive AAR of 0.065% at day -5, 1.07% at day -4, 1.48 % at day -3, 2.73 % at day -2 and 1.05 % at day -1 are recorded for CAPM and AAR of 0.065% at day -5, 1.04% at day -4, 1.48 % at day -3, 2.84 % at day -2 and 0.95 % at day -1 are recorded for Fama-French Factor Model. Unlike Market model and Fama-French Factor Model, CAPM exhibit negative Cu-AAR of -0.13% at day -14 there after it record positive Cu-AAR and plunge from 0.46 % at day -7 to 8.94 % at event day. For Fama French Factor Model, negative Cu-AAR of -0.06 % at day -7 are recorded and thereafter positive Cu-AAR of 0.33% at day -6 are exhibited to peaking near 8.47 % at day 0. Like Market Model, significant negative AARs are recorded at day 8 (-0.41%), day 10 (-0.51%), day 12 (-0.37%), and day 20 (-0.47%) under CAPM and day 4 (-0.33%), day 8 (-0.42%), day 9 (-0.44%), day 10 (-0.61), day 12 (-0.46%) and day 20 (-0.58%)

Post-Pandemic Period

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The event day 0 recorded AAR of 0.0071 with borderline significance i.e., significant at 10 % level of significance, indicating a modest announcement effect under Market Model. Negative or insignificant abnormal returns were recorded until Day –5 , then a subtle significant positive AAR is depicted at day -4 (0.0131), day -3 (0.0165) and day -2 (0.0143) contributing to Cu-AAR of 0.0551 by day –1. Mixed returns prevail with occasional negative days and significant negative AAR recorded at day -10 (-0.0057) & day -22 (-0.0043) thereby Cu-AAR plateaus around 0.0460 by day 25 under market Model.

The event day records similar trend of peripheral significance is evident with 5% and 10 % level of significance in case of CAPM and Fama French Factor Model. The Cu-AAR of both CAPM and Fama French Factor Moder almost plunges down to as low as -1.20% at day -6 from -0.19 % at day -25 and -1.44 % at day -6 from -0.08 % at day -25. Significant positive AAR at day -4 (1.25%), day -3 (1.54%) and day -2 (1.44%) with 1% level of significance and day -1 (0.67%) with 5% level of significance whereas for for Fama French Factor Model AAR at day -4 (1.12%), day -3 (1.45%) and day -2 (1.39%) with 1% level of significance and day -1 (0.7%) with 10% level of significance are recorded. Significant negative AAR follows for both models CAPM and Fama French Factor Model like Market Model at day 4 (-0.33%), day 10 (-0.67%), day 22 (-0.62%) and day 9 (-0.45%), day 10 (-0.75%), day 22 (-0.53%).

Persistent negative AAR succeeded the event day thereby bringing down the Cu-AAR to 2.98% at day 25 from 5.01% at day 1 under CAPM and to 1.65% at day 25 from 4.44% at day 1. Similar patterns under Market Model, CAPM and Fama French Factor Model benchmarks confirm that the abnormal return is not an artifact of model choice but a genuine market reaction.

Analysis of the Abnormal Returns over the Event Windows based on Estimation Models in different periods

Table 4. reports t-values with 1% (***), 5%(**) and 10%(*) level of significance under Market Model, CAPM and Fama French Factor Model for Pre Pandemic, Pandemic and Post Pandemic period event over various event window i.e., (-25 to +25),

(-20 to +20), (-15 to +15), (-10 to +10), (-5 to +5), (-3 to +3), (-25 to -1), (-20 to -1), (-15 to -1), (-10 to -1), (-5 to -1), (+1 to +25), (+1 to +20), (+1 to +15), (+1 to +10) and (+1 to +5). All models yield statistically significant positive AARs in the short windows i.e., (-5 to +5), (-10 to -1) and (-5 to -1) over all the periods due to the positive pre-event effect. Most of the long windows i.e., (-25 to +25), (-20 to +20), (-15 to +15), (-10 to +10), (-25 to -1), (-20 to -1), (-15 to -1) and post event windows i.e., (+1 to +25), (+1 to +20), (+1 to +15), (+1 to +10) and (+1 to +5) are insignificant.

Pre-pandemic period is marked with significant positive AAR only in shorter windows like (-5 to +5), (-10 to -1) and (-5 to -1) with t-values of 2.92, 1.862 & 5.428 significant at 5%, 10% and 1% level under Market Mode. Whereas for CAPM and Fama French Factor Model, except for post event windows nearly all other windows i.e., (-25 to +25), (-20 to +20), (-15 to +15), (-10 to +10), (-5 to +5), (-3 to +3), (-20 to -1), (-15 to -1), (-10 to -1), (-5 to -1) are significant.

Pandemic Period record significant positive AARs for most of the pre-event windows like (-5 to +5), (-25 to -1), (-20 to -1), (-15 to -1), (-10 to -1), (-5 to -1) and exhibits significant negative AARs at post-event windows i.e., (+1 to +20), (+1 to +15), (+1 to +10) and (+1 to +5) under market model. Similar pattern of outcome is recorded for both CAPM and Fama French Factor Model for pre-event windows like (-25 to -1), (-20 to -1), (-15 to -1), (-10 to -1), (-5 to -1). Like Market Model, significant negative t values are evident at post event windows i.e., (+1 to +20), (+1 to +5) and (+1 to +20), (+1 to +15), (+1 to +10), (+1 to +5) under CAPM and Fama French Factor Model thus wiping out most of the abnormal returns.

As per the thorough analysis of both event days and event windows, CAPM yields more significance R Square than market model but less than Fama French Factor Model. we see Market Model estimates are the most conservative, exhibiting fewer significant events and windows whereas Fama French Factor Model appears to provide more robust estimates with consideration to microeconomic factors producing slightly more significant windows capturing additional risk factor.

Event Windows	Market Model	Capital Asset Pricing Model	Fama French 3 factor Model

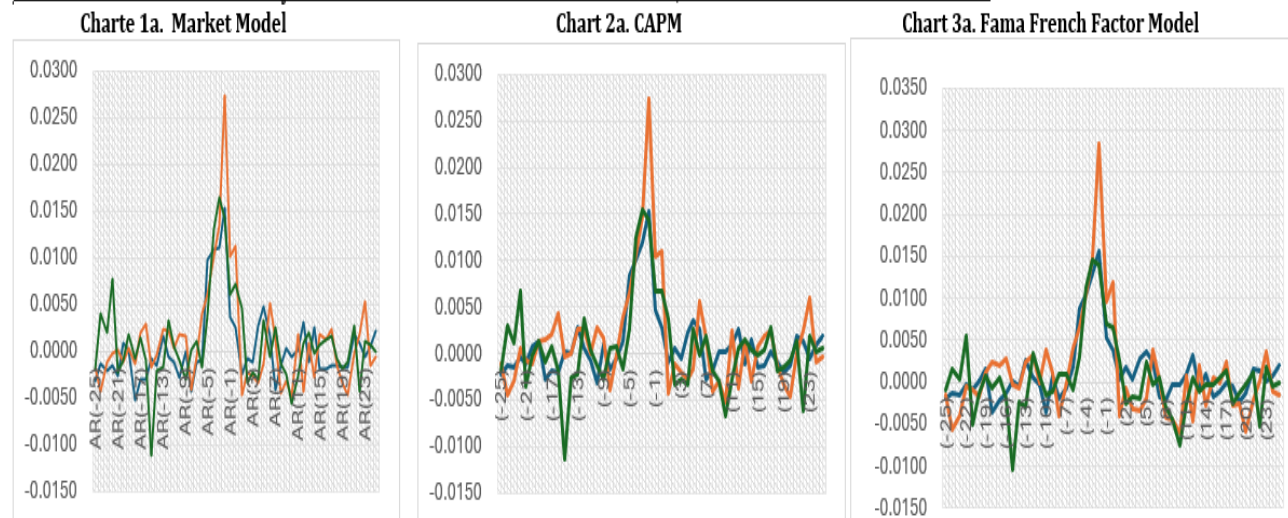|	Pre Pandemic Period	Pandemic Period	Post Pandemic Period	Pre Pandemic Period	Pandemic Period	Post Pandemic Period	Pre Pandemic Period	Pandemic Period	Post Pandemic Period
(-25 to +25)	0.788	1.463	1.355	1.819 *	1.786 *	0.888	2.046 **	1.117	0.512
(-20 to +20)	0.874	1.483	1.124	1.888 *	1.884 *	0.839	2.083 **	1.486	0.582
(-15 to +15)	1.661	1.612	1.161	2.434 **	1.869 *	0.905	2.65 **	1.593	0.758
(-10 to +10)	1.725	1.663	1.689	2.299 **	1.857 *	1.479	2.554 **	1.632	1.427
(-5 to +5)	2.92 **	1.971 *	2.598 **	3.21 ***	2.126 *	2.435 **	3.854 ***	2.037*	2.672 **
(-3 to +3)	1.591	1.734	2.14 *	1.976 *	1.878	2.1 *	2.484 **	1.831	2.212 *
(-25 to -1)	0.67	2.052 *	1.597	1.611	2.313 **	1.346	1.616	2.073 **	1.256
(-20 to -1)	1.115	2.395 **	1.33	1.955 *	2.772 **	1.203	1.912 *	2.639 **	1.248
(-15 to -1)	1.639	2.39 **	1.33	2.334 **	2.595 **	1.252	2.304 **	2.512 **	1.38
(-10 to -1)	1.862 *	2.477 **	2.153 *	2.339 **	2.624 **	2.129 *	2.338 **	2.555 **	2.365 **
(-5 to -1)	5.428 ***	3.684 **	4.315 **	5.698 ***	3.895 **	4.215 **	6.086 ***	3.61 **	4.555 **
(+1 to +25)	-0.21	-1.637	-0.734	0.636	-1.114	-1.257	1.212	(-2.739) **	(-2.11) **
(+1 to +20)	-0.695	(-2.239) **	-0.818	-0.039	(-1.832) *	-1.24	0.543	(-2.891) ***	(-2.109) **
(+1 to +15)	0.182	(-1.989) *	-0.735	0.699	-1.653	-1.243	1.295	(-2.526) **	(-1.988) *
(+1 to +10)	-0.11	(-2.058) *	-0.824	0.445	-1.677	-1.244	1.098	(-2.601) **	-1.648
(+1 to +5)	0.463	(-4.939) ***	-0.106	1.082	(-4.379) **	-0.387	2.709*	(-4.538) **	-0.229

Table 4. T-value and significance of the event windows under different Estimation Model in different periods

Analysis of the AAR and Cu-AAR over the Periods

The charts 1a., 2a., 3a presents AAR and 1b., 2b., 3b presents Cu-AAR under Market Model, CAPM and Fama France Factory Model segmented by pre pandemic, pandemic and post pandemic periods. In Charts 1a, 2a, and 3a, the spike near the event day is quite evident with pandemic period peaking the highest followed by post pandemic and pre pandemic across all the estimated models. The pattern suggests the market react positively on and around the event day, especially during the pandemic period. In Chart 1b, 2b, 3b, Cu-AAR begins to rise sharply before the event day and peaking, the strongest effect can be seen for pandemic period, indicating market's strong favour in this strategic move by the company. Both pre- pandemic and post pandemic show significant positive impact but are modest related to the pandemic period. All line flatten after the announcement effect plays out indicating most abnormal returns are captured within the event day. Thus, share buyback announcements drive significant positive short-term abnormal returns (Shaw, Chatterjee and

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Rakshit (2019), especially during periods of heightened uncertainty (pandemic period). Markets may interpret buybacks during the pandemic as strong positive signals, possibly due to perceptions of undervaluation or management confidence. The effect persists post-pandemic but with diminished magnitude, and lowest in pre-pandemic period. These patterns are typical in event studies, confirming that market reactions to corporate decisions like buybacks can vary significantly based on macroeconomic context.

<u>AAR on and around the Share Buyback Announcement Date under Market Model, CAPM and Fama French Factor Model</u>

Charte 1a. Market Model — Chart 2a. CAPM — Chart 3a. Fama French Factor Model

<u>Cu-AAR on and around the Share Buyback Announcement Date under Market Model, CAPM and Fama French Factor Model</u>

Chart 1b. Market Model — Chart 2b. CAPM — Chart 3b. Fama French Factor Model

— Pre Pandemic Period   — Pandemic Period   — Post Pandemic Period
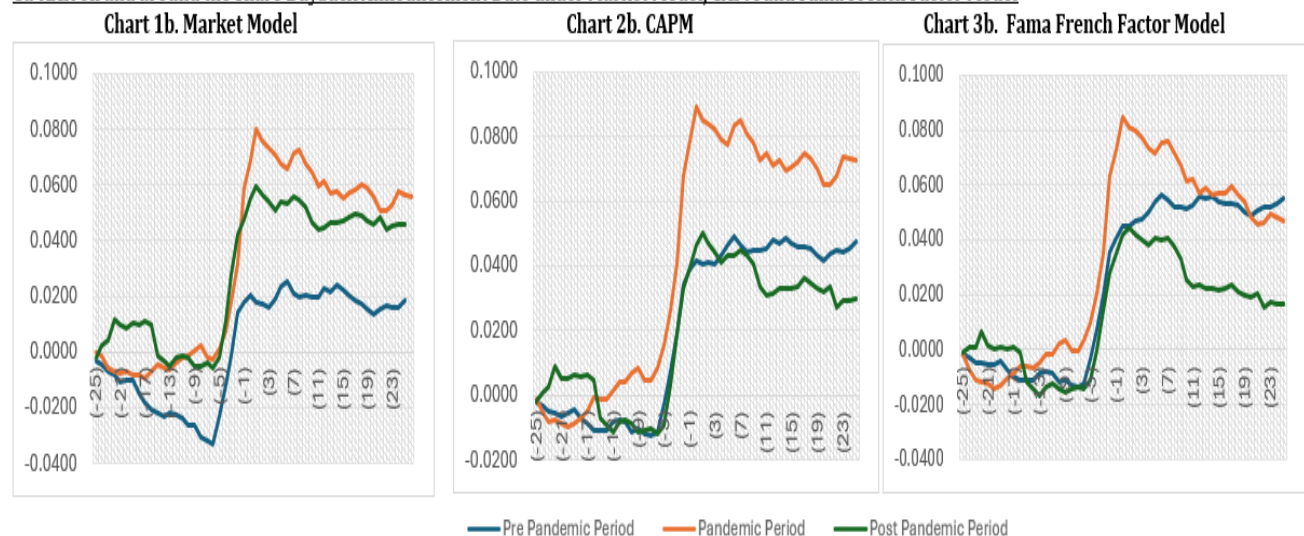
Conclusion

The impact of share buybacks on stock returns varies remarkably across the pre-pandemic, pandemic, and post-pandemic periods. Pre-pandemic buybacks exhibit a pronounced positive impact immediately before the announcement (Rakshit and Chatterjee, 2018), pandemic buybacks show sustained positive abnormal returns both before and after the event, and post-pandemic buybacks display more muted and less statistically significant effects throughout the event window.

Pre-Announcement returns are strongest during the pandemic, followed by post-pandemic and pre-pandemic. Pandemic period shows the most statistically robust event-day abnormal return, whereas pre-pandemic announcement effects are muted. Post-Announcement drift is considerably weak and short-lived in all periods, suggesting that the bulk of abnormal performance is realized before or on the announcement date, especially during heightened market uncertainty (pandemic) depicting information leakage and information content are well incorporated in the price before

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the event date hinting at semi-strong form of efficiency

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