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Research paper

Merger Announcements and Wealth Creation for Shareholders: Evidence from Modern M&As in Indian Public Sector Banks

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Abstract

Globalization and liberalization have prompted businesses from developing economies like India to adopt a more proactive approach, opting for mergers and acquisitions (M&A) as a strategy to compete effectively. In recent years, numerous mergers have taken place within the Indian banking sector. This research aims to assess the short-term effect of mergers and acquisitions on returns, employing a comprehensive event study methodology for the period from 2015 to 2020. The market study methodology was utilized to compute abnormal and cumulative abnormal returns, employing both one-factor and two-factor models, to examine how the phenomenon affected share prices before and after the event. Six mergers in Indian Public Sector Banks are analyzed to gauge the effects on shareholder returns following merger announcements. The results indicate mixed observations regarding the impact of mergers and acquisitions on stock price performance. While the majority of firms experienced negative returns, some exhibited positive abnormal and cumulative abnormal returns following these activities. Overall, the market's response to mergers and acquisitions in the Indian banking sector was generally unfavorable. These findings provide valuable insights for investors and management to inform their investment decisions.

Keywords: *Merger, Indian Banking Sector, Shareholders' Wealth Effects, Cumulative Abnormal Return, One Factor Model (OFM), Two Factor Model (TFM)*

1. Introduction

In the ever-evolving landscape of today's global business arena, companies are constantly challenged to seek innovative approaches for expanding their operations swiftly and efficiently. Businesses have two primary avenues for achieving growth: internal and external resources (Lasalewo et al., 2022). Typically, organizations utilize internal sources, such as retained earnings, to expand their operations (Mirkovski et al., 2023). However, when significant growth opportunities arise and internal resources are limited, businesses may turn to external resources for support (Cabral et al., 2020). External sources for companies can indeed encompass a variety of options such as bank loans, partnerships, mergers, and acquisitions (Bi & Boateng, 2021; Hagedoorn & Duysters, 2002). The influence of these external sources is pivotal in shaping the financial structure and strategic decisions of firms. Among the strategies gaining prominence, mergers and acquisitions (M&A) have emerged as effective strategic mechanisms in the corporate world (Abbas et al., 2014). Literature suggests several reasons for the prevalence of mergers and acquisitions between organizations (Ogendo & Ariemba, 2022; Rohatgi & Madhav, 2023). These include organizational synergy, where the combined entity generates higher value than each firm (Feldman & Hernandez, 2022). M&As lead to efficiency gains for banks by improving resource utilization and operational performance (Das et al., 2025). They may also result in reduced expenses for the new venture, maximized shareholder wealth, enhanced survival in dynamic environments, and the attainment of economies of scale and scope (Wu et al., 2022). Additionally, M&As can lead to cost reduction and increased returns on equity (Chen et al., 2020). The Indian banking sector has witnessed a significant transformation in recent years through mergers and acquisitions, driven largely by regulatory reforms, competitive pressures, and the need for financial stability. Earlier studies have emphasized the role of M&As in improving operational efficiency, capital adequacy, and risk management (Mallikarjun & H, 2024; Sharma & Kumar, 2025). More recent research, however, highlights the strategic dimensions of these consolidations, including market expansion, technological integration, and enhanced customer reach (Rana, 2024). In particular, the post-2019 wave of public sector bank mergers initiated by the Government of India has been linked with improvements in scale efficiency and resilience, although concerns remain regarding cultural integration and customer service quality (Maani et al., 2025). Furthermore, studies conducted in 2024 and 2025 point to the growing influence of digital transformation and fintech partnerships as critical factors shaping the outcomes of banking M&As, suggesting that success increasingly

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depends not only on financial synergies but also on the ability to innovate and adapt in a rapidly evolving market environment (Kwon et al., 2024; Alessio & Vasilakis, 2024; Cuadros-Solas et al., 2024; Del Gaudio et al., 2024; Hodula, 2024; Ferilli, 2025).

Mergers and acquisitions transactions began to appear in the United States during the late 19th and early 20th centuries, marking the dawn of this era. Subsequently, these transactions proliferated into European markets during the nineteenth century. This strategic approach was embraced by numerous successful businesses worldwide (Hill et al., 2016; Gandhi et al., 2018; Paustovska & Dovhoruchenko, 2023). It is observed that M&A strategies are employed more frequently in developed nations compared to developing countries. In developing countries like India, the adoption of these strategies was not evident in the early nineties. However, the M&A strategy has been used rapidly in recent times by business houses in different sectors to drive growth and diversification. In the banking sector, mergers and acquisitions are recognized as strategic initiatives aimed at fostering synergy and improving operational efficiency. These strategies yield diverse benefits for banks, including increased cash flow, expanded business operations, greater diversification, technological capabilities, and reduced costs (Kumar and Bansal, 2008; Ngare, 2013). Bank mergers occupy a prominent position within the financial landscape, capable of restructuring markets, redefining competition, and influencing investor sentiment (Hassan & Giouvris, 2021). Furthermore, bank mergers reduce the acquiring banks' default risk, subsequently lowering idiosyncratic risk and contributing to systemic risk reduction, especially in product-diversifying deals (Ngo, 2019). Nevertheless, while the strategic rationale behind these mergers often focuses on synergy attainment and bolstering market position, the consequential effect on shareholder wealth remains a pivotal consideration (Shah, 2019). The booming M&A landscape demands in-depth analysis of the motivations behind these deals and their consequences for firms and markets. M&A announcements, brimming with details about the potential transaction, serve as a valuable tool for researchers to assess stock market response. These reactions can be a powerful predictor of upcoming success, with stock returns around the announcement reflecting investor sentiment regarding the anticipated benefits of the M&A. By analyzing market reactions, researchers can not only forecast M&A profitability but also uncover short-term trading opportunities.

It is evident from the literature that the market response to M&A announcements is mixed. Some studies have found the impact of M&A on shareholders' wealth to be positive, while other studies have found contradictory results. In developed economies, merger announcements exert a notable influence on shareholders' wealth (Hassan & Giouvris, 2020; Patel, 2019; Amewu & Alagidede, 2018). An examination of 132 M&A events in Asia and Latin America from 1998 to 2009 discovered that these transactions enhanced the shareholders' value of the target firms without adversely affecting the acquiring firms (Goddard et al. 2012). Post-merger, acquiring firms can significantly improve in stock price and business performance, positioning them as strong competitors in the market (Li, 2015). Using event study methodology to analyze the spillover effect of M&A announcements on the stock market reaction of acquiring firms' rivals, it was found that both the acquiring firms and their rivals responded positively to the announcements, as evidenced by the results of the Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) (Ranju & Mallikarjunappa,2019). Announcements of mergers and acquisitions frequently result in substantial fluctuations in stock prices (Dahal & Das, 2022; Banerjee & Dey, 2022). M&A announcements lead to significant cumulative abnormal returns (CAR) for acquirers and target banks, while their rivals remain unaffected (Lozada et al., 2020). Additionally, the sources of value in mergers can be decomposed into factors like earnings synergies, differences in weighted average cost of capital (WACC), and capital structure changes, all of which can influence the overall value creation or destruction in an acquisition deal (Yaghoubi, 2013). Acquiring banks often realize substantial wealth gains after merger announcements, particularly in cases of voluntary mergers, which tend to yield higher gains compared to forced mergers (Kumar et al., 2022).

Market reactions to M&A announcements typically begin with significant increases in stock prices, leading to favorable abnormal returns for investors. However, following the announcement, a notable market correction often occurs, with the acquiring company's stock price declining and diminishing these positive abnormal returns. This pattern suggests that while initial gains in shareholders' wealth are observable, they are not sustained over the long term (Giannopoulos et al., 2023). Examining the impact of M&A announcements on the volatility of returns in Brazilian bank stocks from 1994 to 2015 affirms the significant influence of these announcements on volatility. It reveals that such announcements tend to elicit a negative response when linked to expansion or involving lesser-known banks, while prompting a positive reaction when involving well-known banks with a favorable reputation (Pessanha et al., 2016). The investigation into the influence of M&A announcements on the stock prices of target and acquiring corporations, using an event analysis approach, examined the disparities in stock price reactions between these two categories of firms and explored the role of insider information preceding the announcement. The findings, based on cumulative average abnormal return (CAAR), indicate a surge in prices before the announcement for both target and acquiring companies, suggesting potential information leakage or anticipation of favorable news. However, following the announcement, the stock prices of acquiring companies experienced a decline (Adnan & Hossain, 2016). The investigation into the value creation of M&A transactions in the European banking sector between 1990 and 2004, using a CAAR model, found that M&A announcements do not result in value creation for shareholders of acquiring firms. In contrast, shareholders of target firms experience substantial and positive value creation during this timeframe (Asimakopoulos & Athanasoglou, 2013). An analysis of M&A effects within Pakistan's banking sector from 2002 to 2012, utilizing event study analysis, reveals mixed stock price performance. While some banks show positive outcomes, the majority experience negative abnormal and cumulative abnormal returns. Overall, the research suggests a predominantly negative market response to M&A events (Rahman et al., 2018). The takeovers negatively impact the share returns of acquiring firms, with declines observed both on the event day and within the event window following the acquisition of the target firm (Guest et al., 2010). After mergers and acquisitions announcements, there is a noteworthy detrimental impact on stock returns, affecting both the overall market and individual banking sector stocks, with a continued decrease in the long term (Lozada et al., 2020).

In the literature review, research findings also indicate that bank mergers and acquisitions have yielded mixed outcomes for shareholders' wealth. Studies reveal that merger announcements can have diverse effects on the stock returns of bidder and target banks, often resulting in negative impacts for bidder banks (Giannopoulos, Lianou, et al., 2023). Shareholders of bidder banks have been found to enjoy significant wealth gains, especially in voluntary mergers, while target and combined bank shareholders do not witness the same level of wealth increase (Mutuku & Nganga, 2022). The wealth effects of bank mergers on shareholders are influenced by various factors, including the type of merger and the strategies adopted by the involved institutions (Montgomery & Takahashi, 2018). M&A deals in European banking from 1990 to 2004 generally created value for target bank shareholders, who experienced significant positive abnormal returns. Acquirer bank shareholders experienced small, non-significant negative abnormal returns. Domestic M&As between publicly listed banks were more beneficial for acquirers compared to cross-border or unlisted target deals (Asimakopoulos & Athanasoglou, 2013). Market reaction to acquisition announcements is generally slightly negative for acquirer stocks but significantly positive for target stocks, with an overall positive combined abnormal return. Factors affecting acquisition performance are categorized into acquirer characteristics, target characteristics, bid characteristics, industry characteristics, and macro-environment characteristics (Yaghoubi et al., 2016). M&A announcements generally lead to slightly negative reactions for acquirer stocks but significantly positive reactions for target stocks, resulting in an overall positive combined abnormal return. Factors influencing acquisition performance include industry, target, acquirer, macro-environment, and bid characteristics.

Using the event study method, the merger announcements significantly impact bank stocks in India. Bidder banks are impacted negatively, whereas target banks experience positive effects on the event day and the following day, followed by subsequent negative outcomes (Rai et al., 2022). The merger of 'State Bank of India with its associate banks' initially resulted in increased returns for investors, but the efficiency of the stock market limited the long-term impact on stock prices and investor returns (Patel, 2019). Following M&A announcements, there was a substantial decrease in abnormal returns observed across both the overall market and individual banking sector stocks during the post-announcement period (Dahal & Das, 2022). Announcements of mergers in the Indian banking sector have significantly boosted shareholder wealth for both acquiring and target banks. The combined bank portfolio showed a market value-weighted CAR of 4.29% over a three-day (-1, 1) window and 9.71% over an eleven-day (-5, 5) event window (Anand & Singh, 2008). The study on the surge of mergers and acquisitions in the Indian banking sector indicates that stock prices react notably to merger announcements over a short-term window but stabilize over the long term. This suggests efficiency in the Indian stock market's assimilation of merger-related information (Kalra et al., 2013). The type of merger, whether voluntary or forced, also plays a crucial role in determining the wealth effects on shareholders, with voluntary mergers resulting in substantial wealth gains for bidder bank shareholders (Sensarma & Jayadev, 2010; Reddy et al., 2013). Overall, bank mergers and acquisitions in the Indian context have shown varying impacts on shareholders' wealth.

A handful of studies have been conducted to examine the short-term impact of M&A on shareholders' wealth in India. While some research has delved into M&A effects within specific sectors, particularly the banking industry, the overall research landscape remains sparse. Notably, there is a lack of research on recent mega mergers involving Public Sector Banks (PSBs). Given the substantial M&A activity in the Indian banking sector, addressing this research gap is essential. This study seeks to fill this void by analyzing the impacts of M&A on shareholder wealth within the Indian banking sector. The primary objective is to assess the short-term impact of M&A announcements on shareholders' wealth. Furthermore, the study aims to compare the market response during the pre- and post-M&A announcement periods.

Table 1: Structure of Commercial Banks in India (As of 2023)

Bank Group	No. of Banks	Branches	Staff	Investments	Advances	Deposits	Total Asset
		Number		(Amount in ₹ Crores)			
I. Public Sector Banks (a+b)	12	84404	767336	38,17,200.54	82,83,763.09	1,17,09,580.80	1,40,14,792.68
Market Share (%)		66.75	49.76	59.96	58.58	62.07	58.33
a. State Bank of India	1	22406	2,35,858	15,70,366.23	31,99,269.30	44,23,777.78	55,16,978.53
Market Share (%)		17.72	15.30	24.67	22.62	23.45	22.96
b. Nationalized Banks	11	61998	5,31,478	22,46,834.31	50,84,493.79	72,85,803.02	84,97,814.15
Market Share (%)		49.03	34.47	35.29	35.95	38.62	35.37
II. Indian Private Sector Banks	21	41258	7,47,550	18,75,136.56	53,66,675.29	62,99,331.95	84,45,203.21
Market Share (%)		32.63	48.48	29.45	37.95	33.39	35.15
III. Foreign Banks in India	44	783	27,049	6,74,077.12	4,91,029.37	8,55,825.02	15,67,704.28
Market Share (%)		0.62	1.75	10.59	3.47	4.54	6.52
IV. Total Indian Private and Foreign	65	42041	774599	2549213.68	5857704.66	7155156.97	10012907.49
Market Share (%)		33.25	50.24	40.04	41.42	37.93	41.67
V. Total Commercial Banks	77	126445	1541935	6366414.217	14141467.75	18864737.77	24027700.17
Market Share (%)		100.0	100.0	100.0	100.0	100.0	100.0

Source: Statistical Tables Relating to Banks in India (2022-23)

Table 1 clearly indicates that Public Sector Banks (PSBs) continue to lead the Indian banking sector. Policymakers remain focused on the growth of PSBs due to their substantial role as catalysts for socioeconomic transformation in the nation. Over the past 16 years, a cautious approach has been taken to implement banking sector reforms based on the recommendations of the Narasimham Committee I (1991), and Narasimham Committee II (1998). The primary objective of these reforms has been to enhance the operational efficiency of PSBs and to foster a competitive spirit within them. In this context, our analysis is centered on merged PSBs, which represent a substantial portion of the Indian banking sector.

The remaining sections of this paper are organized as follows: Section 3 details the Data and Methodology, Section 4 discusses the Results and Discussion, Section 5 concludes the study, and lastly, Section 6 outlines the Practical Implications of the study.

2. Data & Methodology

2.1 Data

The study consists of a sample of six public sector banks (bidder banks), namely State Bank of India, Bank of Baroda, Punjab National Bank, Canara Bank, Indian Bank, and Union Bank of India, which merged during 2015–2020. Since target banks cease to exist as independent entities after a merger, their operations, financials, and shareholder base are absorbed into the bidder banks (Houston, James & Ryngaert, 2001; Houston & Ryngaert, 1994). Therefore, this study focuses on bidder banks, which represent the consolidated and continuing institutions. Daily stock price data from selected banks were used to calculate stock returns. Market returns were determined using the BSE200 index for overall market performance and the Bank Nifty index for bank-specific returns, to assess the impact of merger announcements on the value of bidder banks. Data were sourced from the Center for Monitoring Indian Economy (CMIE) Prowess database, the Reserve Bank of India (RBI) publication Statistical Tables Relating to Banks in India, and the official BSE website. The sample period covered six months (180 days) before and after each merger announcement. The sample data encompass a period of six months (i.e., 180 days) before and after the merger announcement. The details of the merger announcement dates for selected banks are mentioned in the following Table 2.

2.2 Methodology

The research employs the event study methodology to examine the influence of specific events on particular outcomes (Cybo-Ottone & Murgia, 2000; Anand & Singh, 2008; Das et al., 2024). In general, the event study methodology typically utilizes the market model as a standard technique to assess the effect of a specific event on the dependent variable. This approach is based on the premise that such events influence the organization's share value. It measures the rise or fall in share prices resulting from certain events. In this study, the dependent variable is the stock returns of individual banks, and the effect of merger announcements on these returns is analyzed using the market model. This model verifies if there is any change in stock returns beyond the expected returns, known as abnormal returns (Rani et al., 2015; Tampakoudis et al., 2019; Ghoul et al., 2022). This study measures the effect of events on stock prices before and after merger announcements by using abnormal and cumulative abnormal returns. The methodological procedure is as follows:

Table 2: Merger announcement date for selected banks

SI. No	Bidder Bank	Target Bank	Date of Announcement
1	State Bank of India	State Bank of Travancore (SBT) State Bank of Bikaner and Jaipur (SBBJ) State Bank of Hyderabad (SBH) State Bank of Mysore (SBM) State Bank of Patiala (SBP) Bharatiya Mahila Bank (BMB)	Aug 18, 2016
2	Bank of Baroda	Vijaya Bank and Dena Bank	Sep 17, 2018
3	Indian Bank	Allahabad Bank	Aug 30, 2019
4	Union Bank of India	Andhra Bank and Corporation Bank	Aug 30, 2019
5	Canara Bank	Syndicate Bank	Aug 30, 2019
6	Punjab National Bank	Oriental Bank of Commerce and United Bank of India	Aug 30, 2019

First, daily price data is converted into return data for both individual banks and the market using the following formula:

$$r_i = (P_1 - P_0/P_0) \quad (1)$$

Next, the expected return of individual banks is calculated by using the factor loadings of two different market models, such as the One Factor Model (OFM) and the Two Factor Model (TFM). Subsequently, the Abnormal Returns (ARs) and Cumulative Abnormal Returns (CARs) are calculated.

- **One-Factor Model**

One Factor Model (OFM) includes market return as a lone independent variable to calculate the expected return using the factor loadings derived from it. The market model posits that the returns of individual assets are linked through a shared market factor that impacts the returns of all assets (Severini, 2016). The model specifications are as follows:

$$r_{jt} = R_{jt} - (\alpha + \beta * R_{mt}) \quad (2)$$

where,
r_{jt}= Abnormal return for bank stock j at time t
R_{jt}= Observed return for bank stock j at time t
α= Constant of the market model regression
β= Coefficient in the market model regression
R_{mt}= Market return (BSE 200) at time t

- **Two-Factor Model**

Market models involve the expected value being a linear function of multiple independent variables, including symmetric stable variables (Alexander, 2001). In this study, abnormal returns are calculated using two distinct proxies for the market portfolio, namely, BSE 200 and Bank Nifty, under the two-factor model. The model specifications are as follows:

$$r_{jt} = R_{jt} - \left(\alpha + \beta_1 * R_{mt} + \beta_2 * R_{(bm)t}\right) \quad (3)$$

where,
r_{jt} = Abnormal return for bank stock j at time t
R_{jt} = Observed return for bank stock j at time t
α = Constant of the market model regression
β_1 = Coefficient of BSE 200 in the two-factor market model regression
β_2 = Coefficient of Bank Nifty in the two-factor market model regression
R_{mt} = Return on the market portfolio - Market index (BSE 200) at time t
$R_{(bm)t}$ = Return on the market portfolio - Banking index (Bank Nifty) at time t

CAR Estimation

After computing expected returns using the market model, abnormal returns are determined using the formula provided below.

$$Abnormal\ return = Observed - Expected\ return \quad (4)$$

where,

$$\text{Observed return} = (P_1 - P_0)/P_0$$

Expected return for OFM $= (\alpha + \beta * R_{mt})$
Expected return for TFM $= (\alpha + \beta_1 * R_{mt} + \beta_2 * R_{(bm)t})$

Next, the cumulative abnormal return is arrived at by calculating the summation of abnormal returns. The formula to calculate CAR is as follows:

$$CAR = \sum_{t=-22}^{t=22} AR_t \quad (5)$$

where,
CAR = Cumulative average abnormal returns of the merger announcement

Event Window and Statistical Significance of Event Returns

The study uses three event windows such as 5 days (-2, +2), 11 days (-5, +5), and 45 days (-22, +22). The motivation behind selecting these time windows can be attributable to a couple of facts. First, the objective of this study is to analyze how merger announcements affect shareholder wealth in the short term. Second, the literature shows that market reactions to merger announcements are more significant in the short term (Dahal & Das, 2022; Sorokina et al., 2021). Short-term effects are more pronounced, while long-term impacts are influenced by various factors beyond just the merger itself (Brealey et al., 2019; Rai et al., 2022; Lozada, Cortes, et al., 2020).

The statistical significance of CAR values is tested by calculating the t-statistics by dividing the standard deviation of abnormal returns multiplied by the square root of the window time period by the respective CAR values. The model specification for t-statistics is as follows:

$$t\ statistics\ of\ CAR = \frac{CAR}{\hat{S}(AR)\sqrt{t}} \quad (6)$$

where,
$\hat{S}(AR)$ is the standard deviation of the average abnormal returns of bidder banks during the clean period
t = Respective window period

The statistical significance of CAR was tested at the 1%, 5%, and 10% levels. The conventional two-tailed critical values of the t-statistic are approximately ±1.65 for the 10% level, ±1.96 for the 5% level, and ±2.58 for the 1% level. Thus, if the absolute value of the t-statistic exceeds 1.65, 1.96, or 2.58, the result is considered significant at the 10%, 5%, or 1% level, respectively.

3. Empirical Results

The outcomes from the event study employing the market model with respect to bank merger announcements are outlined as follows:

3.1 Regression Results

3.1.1 One Factor Model (OFM)

Table 3: Regression Results for Bidder Banks CAR Using Single-factor Model

Bidder Banks		Coefficients	Std. Error	t	Sig.
State Bank of India	α	-0.001	0.002	-0.826	0.410
	β	2.170	0.255	8.529	0.000
Bank of Baroda	α	-0.001	0.002	-0.826	0.410
	β	2.171	0.255	8.529	0.000
Indian Bank	α	-0.001	0.002	-0.562	0.575
	β	2.187	0.228	9.602	0.000
Union Bank of India	α	-0.002	0.002	-1.014	0.312
	β	2.082	0.220	9.455	0.000
Canara Bank	α	-0.001	0.002	-0.674	0.501
	β	1.994	0.183	10.891	0.000
Punjab National Bank	α	-0.001	0.002	-0.451	0.653
	β	2.018	0.198	10.210	0.000

Bidder Banks	State Bank of India	Bank of Baroda	Indian Bank	Union Bank of India	Canara Bank	Punjab National Bank
Std. Deviation	0.019	0.024	0.024	0.023	0.019	0.020
R Square	0.475	0.296	0.364	0.357	0.424	0.393
Adjusted R-squared	0.472	0.292	0.360	0.353	0.421	0.389

Table 3 presents the regression results for bidder banks, displaying the estimated coefficients (α and β), standard errors, t-values, and significance levels. The regression analysis conducted on data from various bidder banks provides an understanding of the relationship between specific factors and the dependent variable, namely the Market Return (independent variable) and Observed Return (dependent variable). Across all banks examined, the β coefficients demonstrate statistical significance, indicating a robust relationship between the independent variables and the dependent variable. State Bank of India, Bank of Baroda, Indian Bank, Union Bank of India, Canara Bank, and Punjab National Bank all exhibit statistically significant β coefficients ($p < 0.05$). These coefficients represent the slope of the regression line, indicating the magnitude and direction of the effect of the independent variables on the dependent variable. Conversely, the α coefficients, denoting the intercepts, fail to attain statistical significance, suggesting that these intercepts do not significantly deviate from zero. Consequently, these findings underscore the pivotal role of the independent variables in predicting the outcomes of the dependent

variable across various bidder banks. From the standard deviation values, the variability in CAR across banks is apparent, with Bank of Baroda and Indian Bank having the highest standard deviation (0.0235) and Canara Bank the lowest (0.0189), suggesting varying levels of risk associated with their CAR. The R-square values indicate the goodness of fit of the single-factor model for each bank. For instance, the State Bank of India has an R-square of 0.4753, implying that approximately 47.53% of the variance in its CAR can be explained by the single-factor model. Similarly, the Bank of Baroda, Indian Bank, Union Bank of India, Canara Bank, and Punjab National Bank have R-square values of 0.2960, 0.3641, 0.3570, 0.4242, and 0.3930, respectively.

3.1.2 Two Factor Model (TFM)

Table 4: Regression Results for Bidder Banks CAR Using Two-Factor Model

Bidder Banks		Coefficients	Std. Error	t	Sig.
State Bank of India	α	0.000	0.001	-0.348	0.728
	β	-0.459	0.272	-1.686	0.094
	BANK NIFTY	1.932	0.199	9.696	0.000
Bank of Baroda	α	-0.002	0.002	-0.859	0.392
	β	1.307	0.461	2.832	0.005
	BANK NIFTY	0.826	0.370	2.234	0.027
Indian Bank	α	-0.001	0.002	-0.621	0.535
	β	1.380	0.508	2.715	0.007
	BANK NIFTY	0.675	0.381	1.774	0.078
Union Bank of India	α	-0.002	0.002	-1.095	0.275
	β	1.118	0.489	2.289	0.023
	BANK NIFTY	0.805	0.366	2.201	0.029
Canara Bank	α	-0.001	0.001	-0.840	0.402
	β	0.526	0.392	1.342	0.181
	BANK NIFTY	1.228	0.293	4.188	0.000
Punjab National Bank	α	-0.001	0.002	-0.547	0.585
	β	0.941	0.435	2.164	0.032
	BANK NIFTY	0.900	0.326	2.764	0.006

Bidder Banks	State Bank of India	Bank of Baroda	Indian Bank	Union Bank of India	Canara Bank	Punjab National Bank
Std. Deviation	0.015	0.023	0.023	0.023	0.018	0.020
R Square	0.677	0.316	0.376	0.376	0.481	0.421
Adjusted R-squared	0.672	0.308	0.369	0.368	0.475	0.413

The regression results in Table 4 present the analysis of Bidder Banks. Cumulative Abnormal Returns (CAR) using a two-factor model with the dependent variable being the observed return and two independent variables: market return and the BANK NIFTY index. The findings suggest that the BANK NIFTY index has a statistically significant positive effect on the observed returns of all bidder banks except Indian Bank, with coefficients ranging from 0.6750 to 1.9316, indicating that changes in the overall market significantly impact the returns of these banks. However, the significance and direction of the alpha (α) and beta (β) coefficients vary across banks, reflecting differences in performance and market sensitivity. While some banks exhibit statistically significant beta coefficients, indicating a significant sensitivity to market fluctuations, others show non-significant betas. The alpha coefficients generally suggest slight underperformance across banks, although many are not statistically significant. Overall, these results provide insights into how market factors influence the observed returns of bidder banks, highlighting variations in performance and market responsiveness among different banking institutions. Standard Deviation indicates the variability or dispersion of the CAR for each bidder bank. A higher standard deviation implies greater variability in the CAR values. For example, Indian Bank and Bank of Baroda have the highest standard deviation (0.0234), (0.0233), respectively, suggesting that their CAR values vary more compared to other bidder banks. Conversely, State Bank of India has the lowest standard deviation (0.0153), indicating relatively less variability in its CAR. R-squared (R^2) indicates the proportion of variability in the observed return that is explained by the independent variables (market return and BANK NIFTY). It ranges from 0 to 1, where 1 represents a perfect fit. Higher R-squared values indicate a better fit of the model to the data. State Bank of India has the highest R-squared value (0.6766), suggesting that approximately 67.66% of the variability in its observed returns can be explained by the market return and BANK NIFTY. On the other hand, Bank of Baroda has the lowest R-squared value (0.3159), suggesting that only about 31.59% of the variability in its observed return is explained by the market return and BANK NIFTY.

Comparatively, the CAR two-factor model demonstrates notable improvement in standard deviation, R Square, and Adjusted R Square values when compared to its single-factor counterpart. This improvement is attributed to the incorporation of multiple independent variables in the two-factor model. While the single-factor model relies solely on Market Return as the independent variable, the two-factor model introduces an additional factor, Bank Nifty. By integrating these additional factors, the two-factor model provides a more comprehensive analysis of market dynamics, leading to more accurate estimations of individual bank returns.

3.2 CAR Results

3.2.1 One Factor Model (OFM)

Table 5: Event Window of Bidder Banks CAR Using One-Factor Model

Event Window	State Bank of India	Bank of Baroda	Indian Bank	Union Bank of India	Canara Bank	Punjab National Bank
(-2, +2)	0.046	-0.153***	-0.083	-0.096*	-0.122***	-0.064
(-10, +10)	0.071	-0.127	-0.071	-0.039	-0.088	0.002
(-22, +22)	0.029	-0.020	-0.484***	-0.218	-0.214*	-0.100

** Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level*

Table 5 shows the significance of Cumulative Abnormal Returns (CAR) for Bidder Banks across different event windows using a single-factor model. These event windows, defined as (-2, +2), (-10, +10), and (-22, +22), encapsulate the days surrounding the announcement date of mergers. CAR values are provided for State Bank of India, Bank of Baroda, Indian Bank, Union Bank of India, Canara Bank, and Punjab National Bank within each event window. Notably, four out of six banks exhibit significance in their CAR values. Bank of Baroda and Canara Bank demonstrate statistically significant negative CAR values of -0.1532 and -0.1215, respectively, at the 1% significance level in the (-2, +2) event window, indicating a considerable deviation from expected returns. Additionally, Union Bank of India exhibits a statistically significant negative CAR value of -0.0963 at the 10% significance level in the same event window, suggesting a notable impact on their stock performance during this period. In the (-10, +10) event window, none of the bidder banks show statistically significant Cumulative Abnormal Returns (CAR), suggesting that market reactions to the merger announcements during this period do not deviate significantly from expected returns. However, in the wider (-22, +22) event window, Indian Bank displays a statistically significant negative CAR value of -0.4837 at the 1% significance level, while Canara Bank demonstrates a statistically significant negative CAR value of -0.2137 at the 10% significance level.

3.2.2 Two Factor Model (TFM)

Table 6: Event Window of Bidder Banks CAR Using Two-Factor Model

Event Window	State Bank of India	Bank of Baroda	Indian Bank	Union Bank of India	Canara Bank	Punjab National Bank
(-2, +2)	0.013	-0.141***	-0.076	-0.087*	-0.108***	-0.054
(-10, +10)	0.013	-0.110	-0.060	-0.025	-0.067	0.018
(-22, +22)	0.036	-0.026	-0.451***	-0.179	-0.154	-0.057

** Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level*

Table 6 presents the event window of Bidder Banks' Cumulative Average Abnormal Returns (CAR) using a Two-factor Model. It details CAR values for various event windows (-2, +2), (-10, +10), and (-22, +22) across six banks. In the (-2, +2) event window, Bank of Baroda and Canara Bank display statistically significant negative CAR values of -0.1412 and -0.1075, respectively, at the 1% significance level. Furthermore, Union Bank exhibits a statistically significant negative CAR value of -0.0871 at the 10% significance level within the same event window. These findings suggest a significant impact on their stock performance during this period. Expanding the event window to (- -10, +10), observations indicate that State Bank of India sustains a positive CAR of 0.0132. Conversely, Bank of Baroda, Indian Bank, Union Bank of India, Canara Bank, and Punjab National Bank exhibit negative CAR values. However, none of these bidder banks demonstrate statistically significant Cumulative Abnormal Returns (CAR). This suggests that market responses to the merger announcements during this extended period do not significantly deviate from anticipated returns, implying a lack of notable impact on the stock performance of these banks within this timeframe. Upon widening the event window to (-22, +22), the analysis reveals ongoing trends in the performance of bidder banks after merger announcements. State Bank of India maintains its positive Cumulative Average Abnormal Return (CAR) with a value of 0.0356, indicating relative stability in its stock performance over this extended period. Conversely, Bank of Baroda, Union Bank of India, Canara Bank, and Punjab National Bank continue to exhibit negative CAR values. Notably, Indian Bank stands out with a statistically significant negative CAR value of -0.4510 at the 1% significance level, suggesting a substantial impact on its stock performance during this timeframe. These findings provide further insights into the market responses following merger announcements, highlighting varying degrees of influence on the stock performance of different bidder banks.

3.3 Graphs of CAR in Various Windows

The graphs depict the CAR values for different event windows in both the OFM and TFM models.

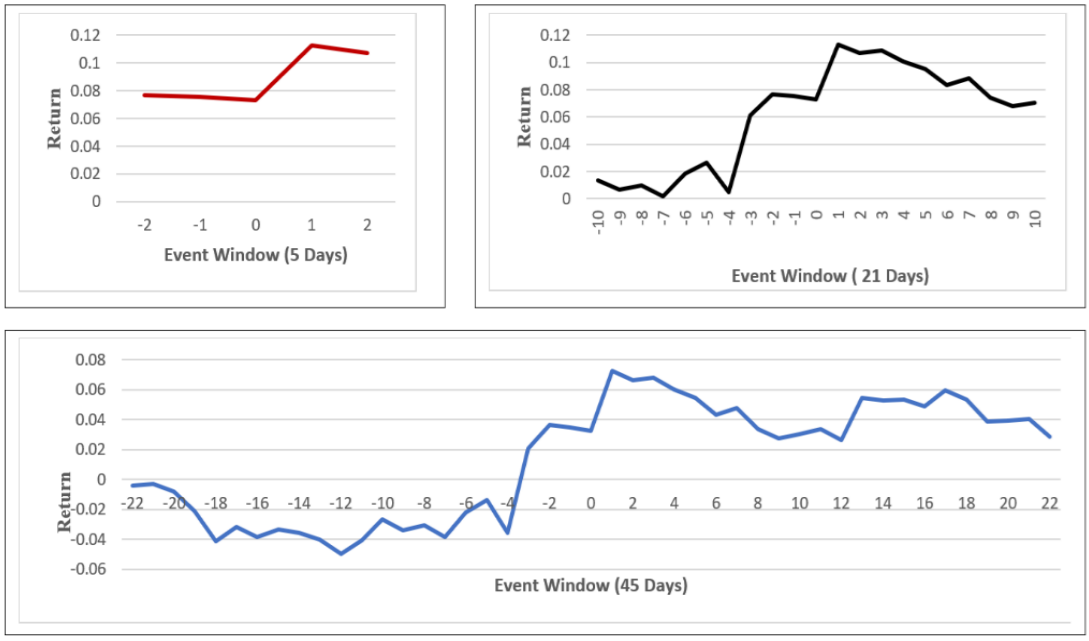

Fig.1: Single Factor Model Results: CAR of State Bank of India

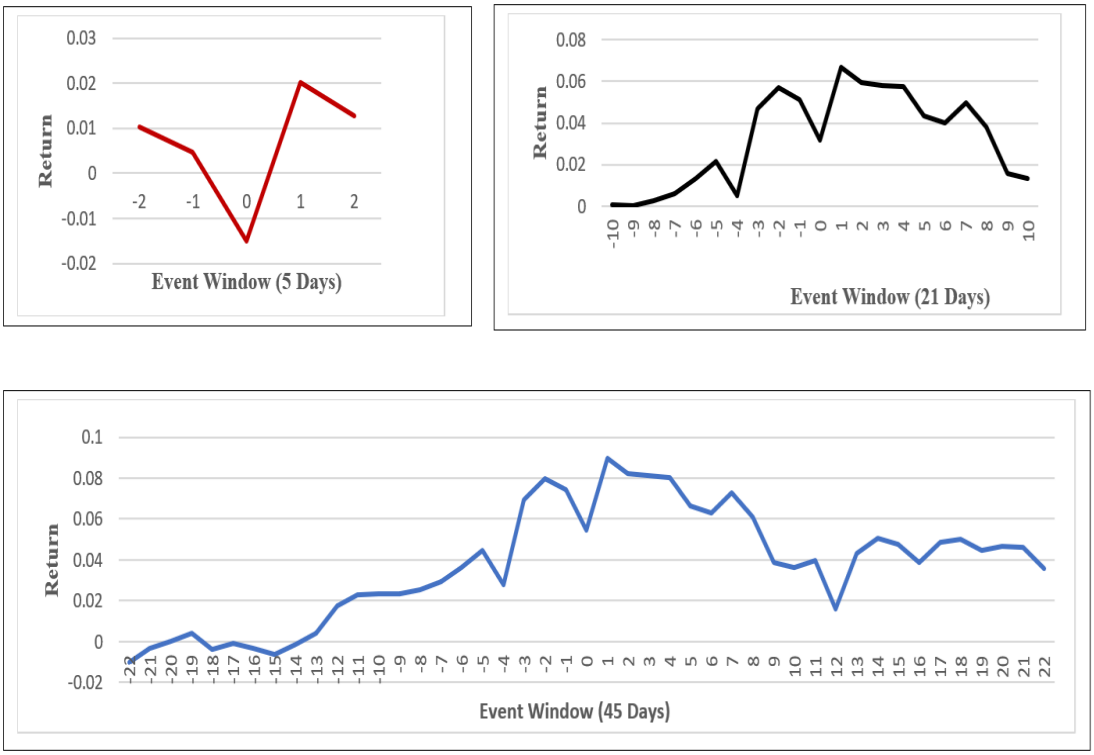

Fig.2: Two Factor Model Results: CAR of State Bank of India

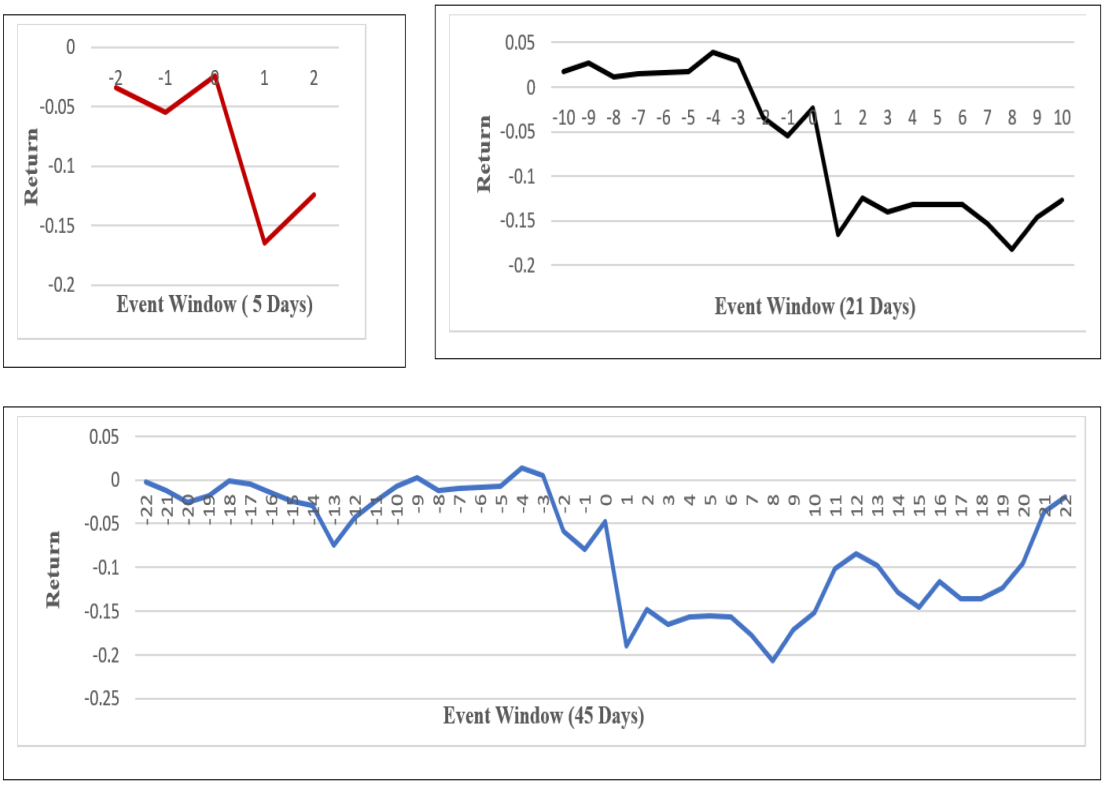

Fig.3: Single Factor Model Results: CAR of Bank of Baroda

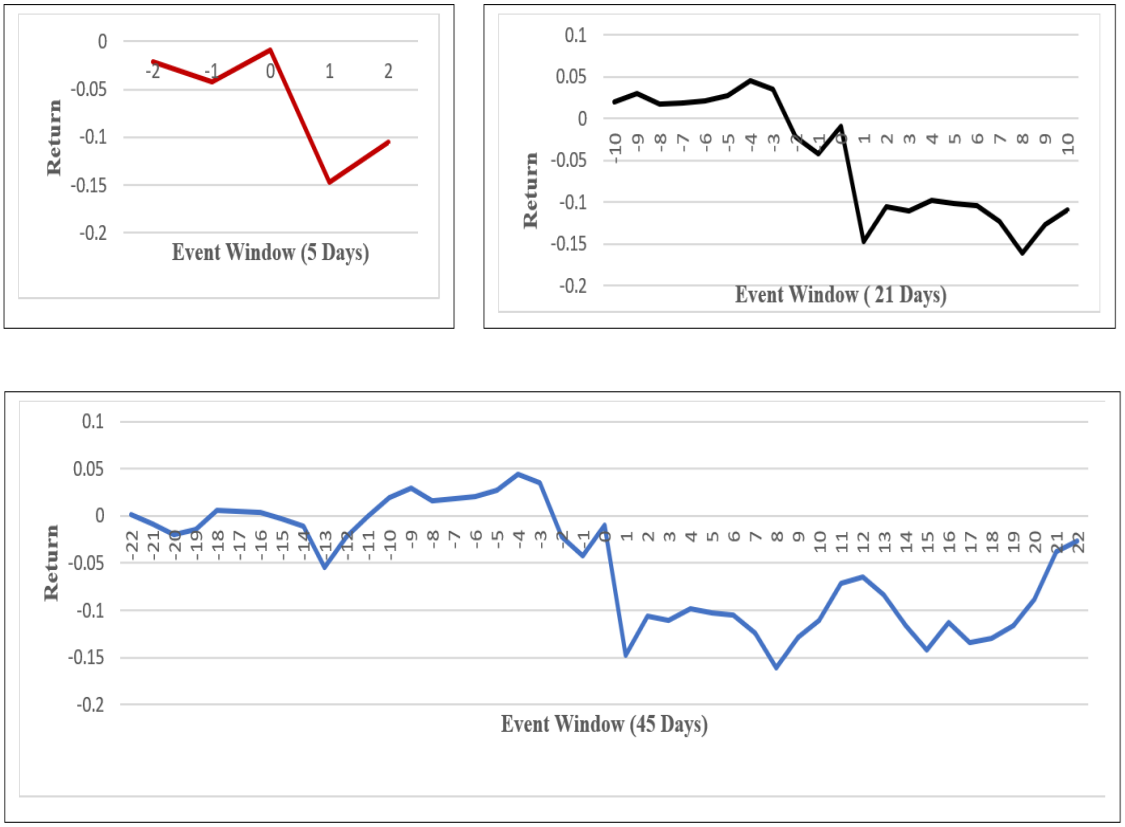

Fig.4: Two- Factor Model Results: CAR of Bank of Baroda

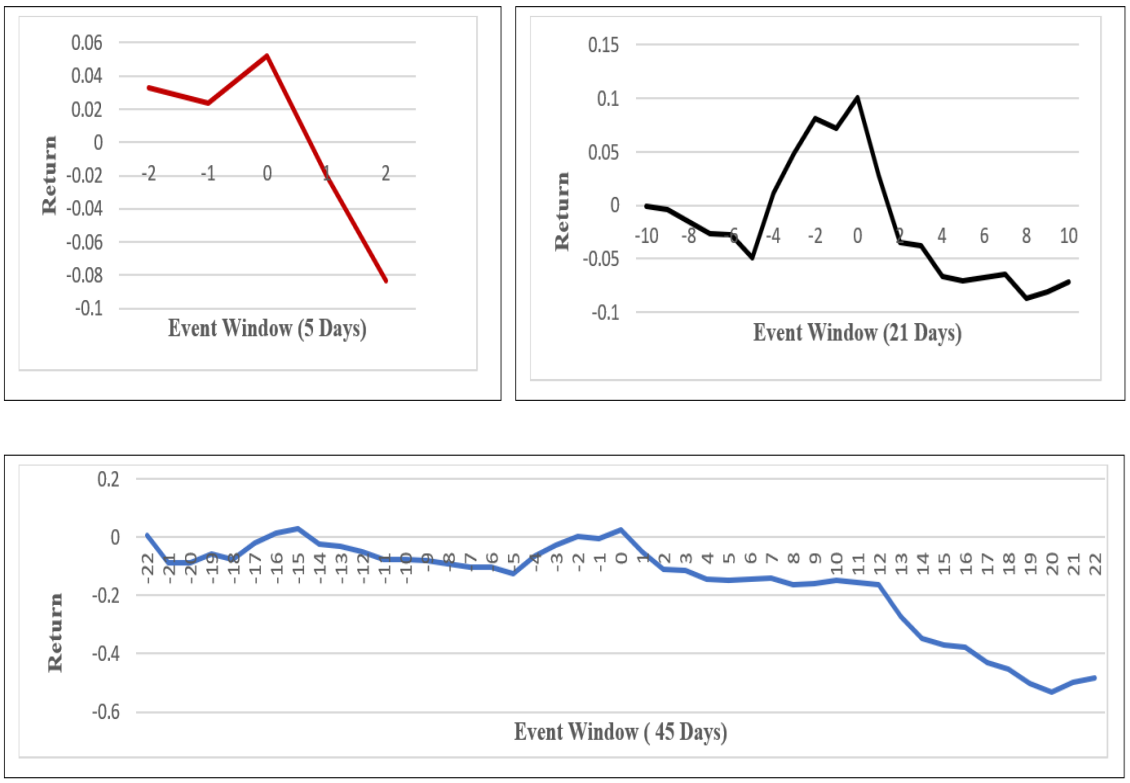

Fig.5: Single Factor Model Results: CAR of Indian Bank

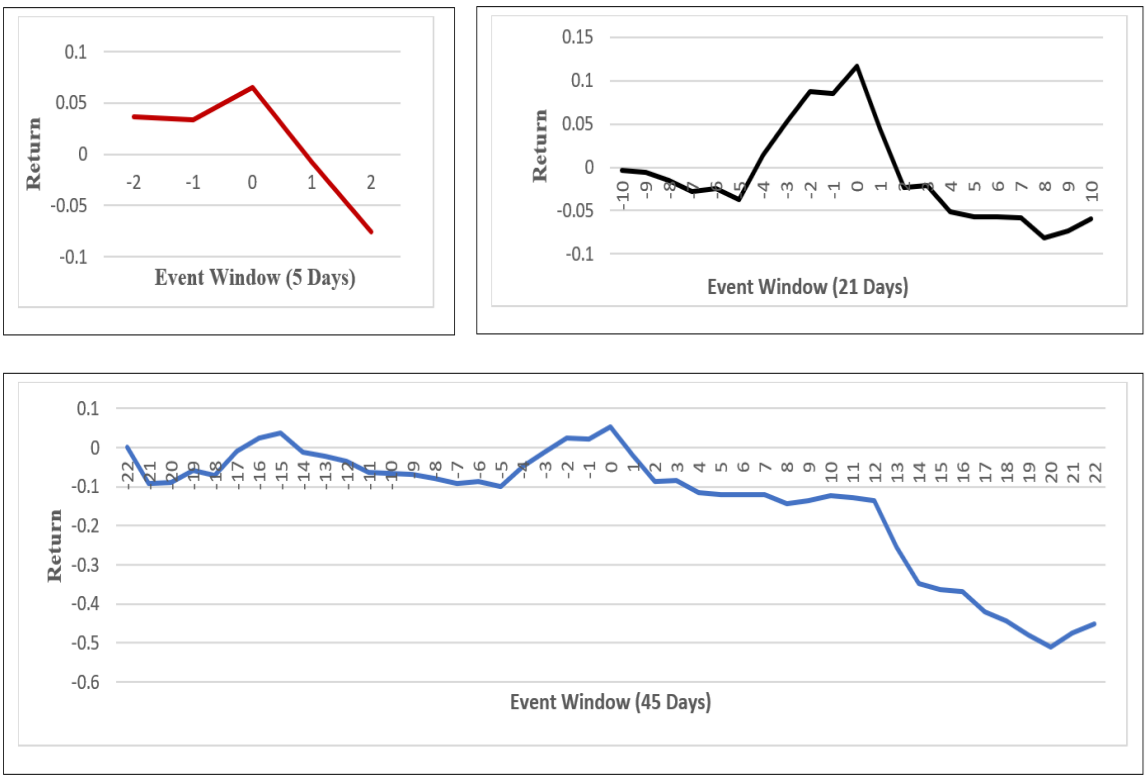

Fig.6: Two Factor Model Results: CAR of Indian Bank

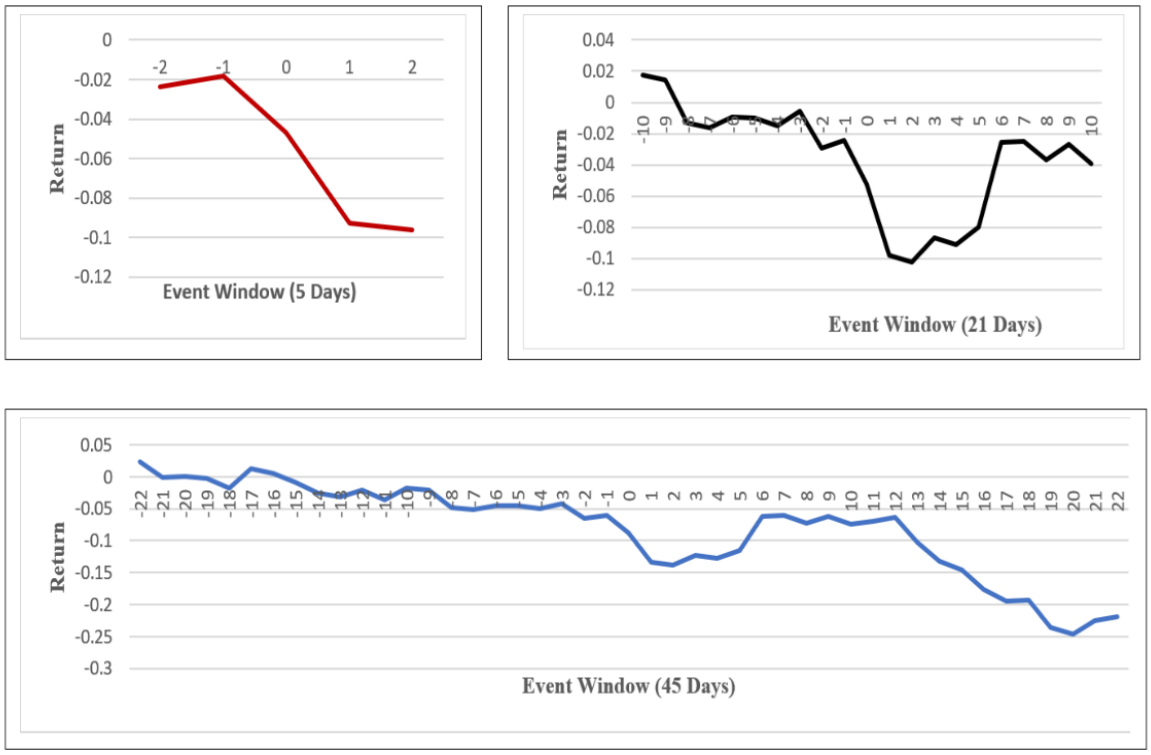

Fig.7: Single Factor Model Results: CAR of Union Bank of India

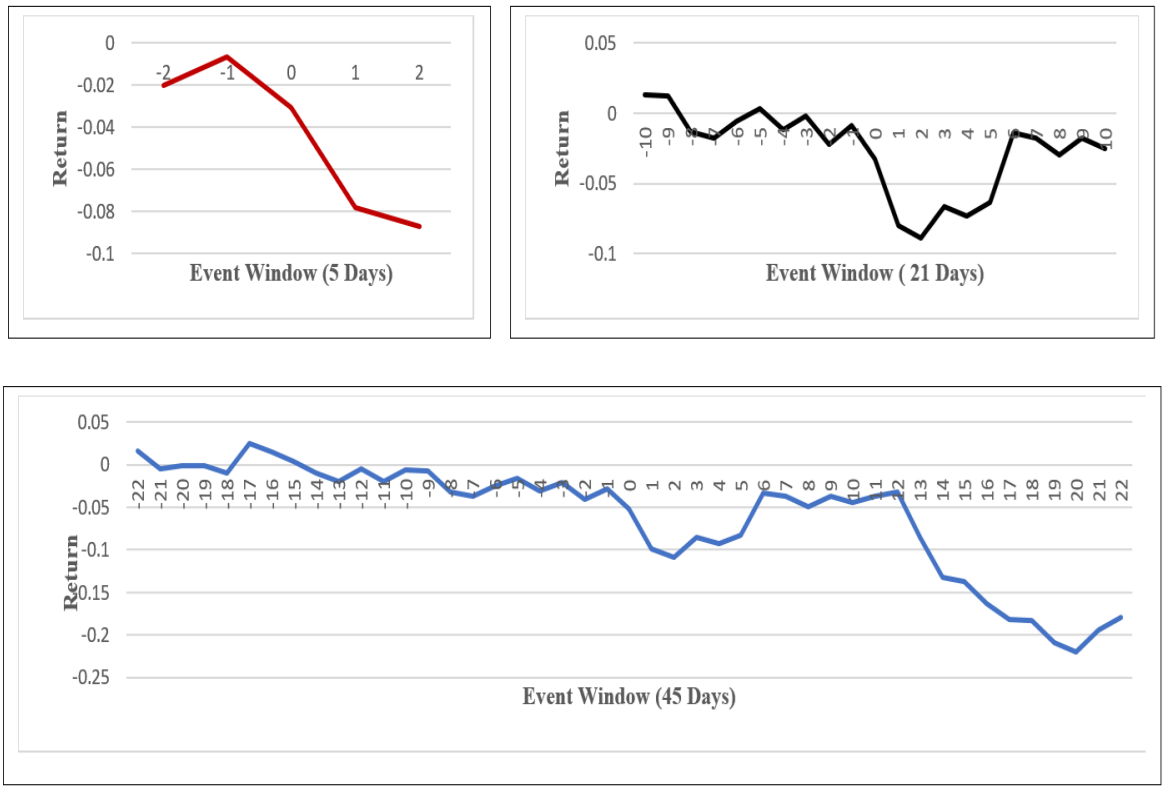

Fig.8: Two Factor Model Results: CAR of Union Bank of India

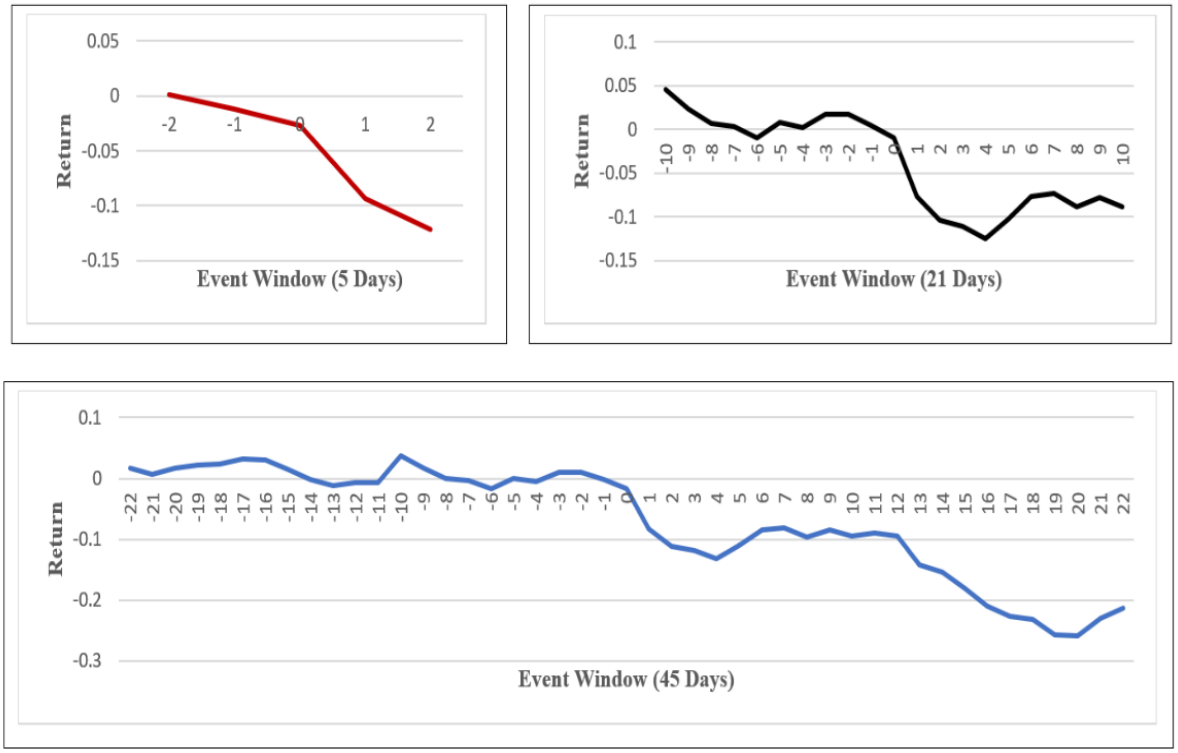

Fig. 9: Single factor model results: CAR of Canara Bank

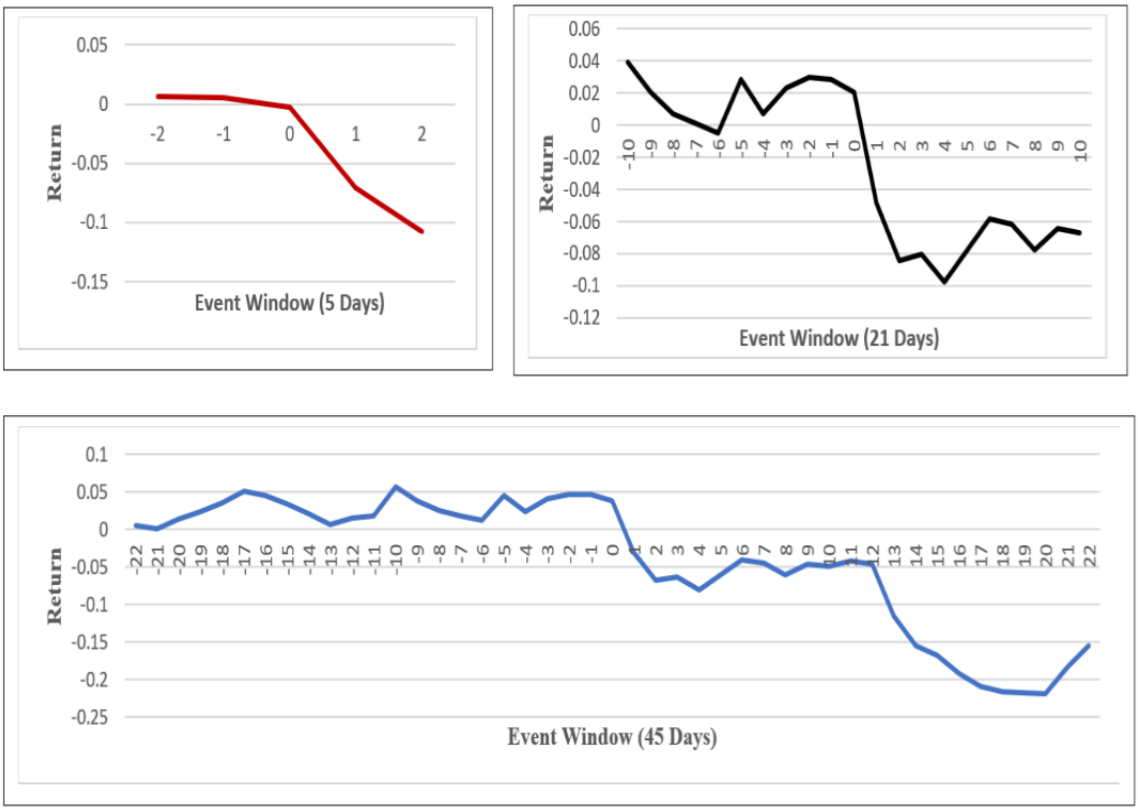

Fig.10: Two factor model results: CAR of Canara Bank

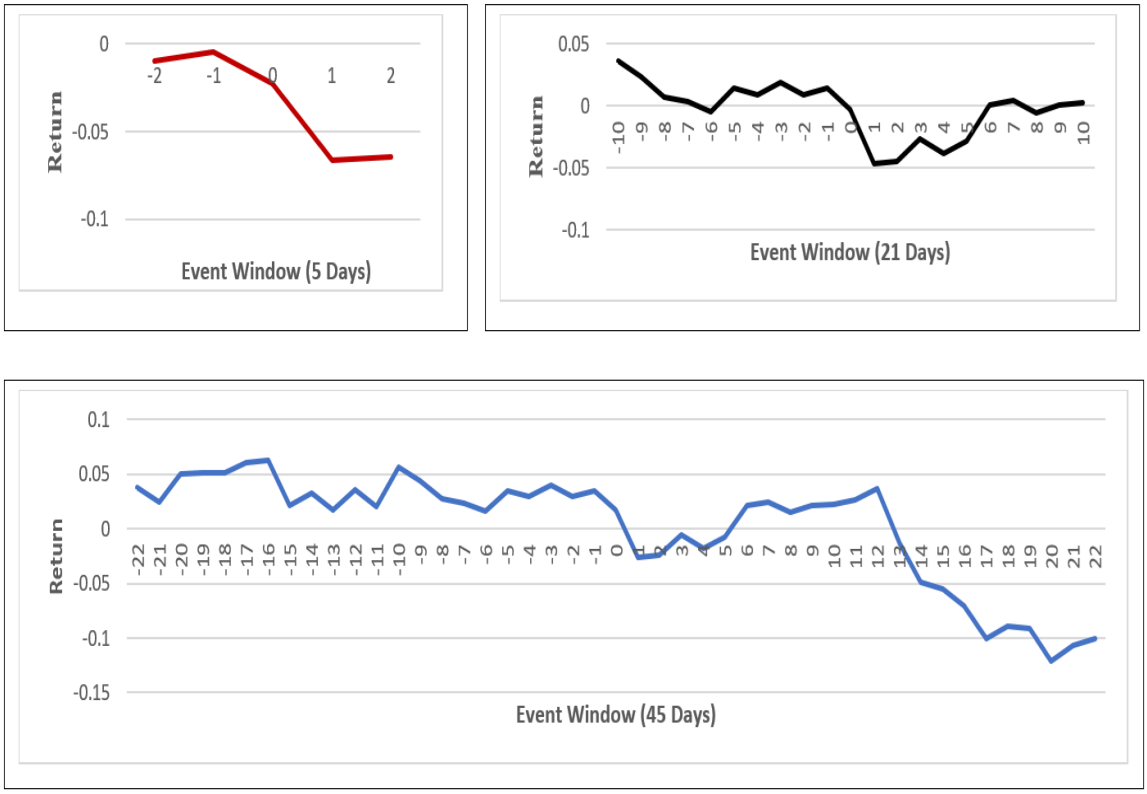

Fig. 11: Single factor model results: CAR of Punjab National Bank

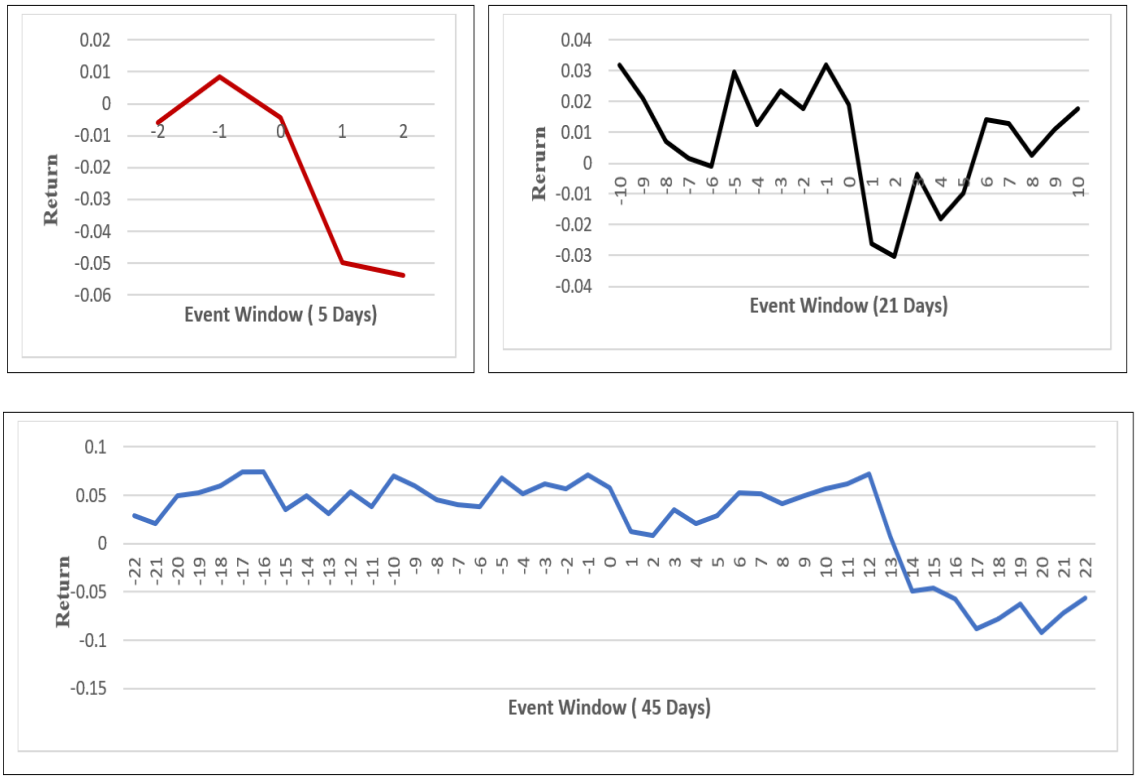

Fig. 12: Two-factor model results: CAR of Punjab National Bank

4. Findings and Conclusion

In this research, the effect of M&A on shareholder wealth (stock returns) in the Indian banking sector from 2015 to 2020 was analyzed. The primary objective was to analyze abnormal and cumulative abnormal returns (ARs and CARs) of stock prices using both CAR single and two-factor models. Empirical findings revealed a mixed outcome, with some M&A events resulting in positive returns while the majority exhibited negative returns following announcements. The two-factor model for cumulative abnormal return (CAR) presents substantial improvement over its single-factor counterpart, largely attributed to the incorporation of multiple independent variables. Unlike the single-factor model, which relies solely on Market Return, the two-factor model introduces an additional variable, Bank Nifty. This integration enables a more accurate analysis of market dynamics, leading to more precise estimations of individual bank returns.

The findings of the study reveal that the markets reacted unfavorably to mergers and acquisitions involving banks, resulting in poor performance for the banks after M&A announcements. This overall trend suggests that M&As did not yield significant benefits for most firms in the banking sector, with only a few exceptions, as evidenced by declines in their market value (share price). The results suggest that internal management may not have made optimal decisions in pursuing the M&A strategy. Additionally, the findings suggest that while only a few firms benefited from M&As, firms should carefully analyze future benefits before choosing to engage in such actions. Furthermore, the study proposes that banks should explore alternative strategies for M&As, such as acquiring talented human resources, embracing technological advancements, increasing market share, and expanding customer chains, as these factors can indirectly enhance firm value. The study focused solely on analyzing mergers and acquisitions in the banking sector of India. However, expanding the research to encompass other sectors of the economy would offer a more comprehensive understanding of the impact of M&As on stock returns by considering other factors and other models.

5. Practical Implications

- Implications for regulators: Regulatory authorities should carefully evaluate the broader implications of bank mergers and acquisitions on shareholder wealth. As evidenced in this study, many M&A transactions do not generate significant shareholder value in the short term, which can undermine investor confidence critical concern since these investors are key capital providers. Regulators may consider establishing clearer guidelines and disclosure requirements for proposed M&As to enhance transparency and safeguard shareholder interests.
- Implications for investors: Investors are encouraged to adopt a long-term perspective when evaluating M&A announcements. The findings of this study indicate that short-term market reactions to M&A activity are often neutral or negative and may not fully capture the potential long-term strategic benefits. Therefore, investors should conduct comprehensive due diligence on post-merger integration strategies, synergies, and long-term performance metrics before making investment decisions.
- Implications for bank management and policymakers: Bank executives should take market perceptions into account when formulating M&A strategies. Since the findings of this study indicate that M&A announcements can negatively affect market capitalization in the short term, managers should proactively strengthen investor relations during merger processes. This involves clearly communicating the strategic rationale, anticipated synergies, and integration plans to minimize uncertainty and reassure stakeholders.
- Mitigating Negative Market Reactions: To address the adverse short-term market responses often observed, banks should adopt the following strategies:

- ✓ Enhanced Communication: Provide timely and transparent information regarding the purpose, anticipated benefits, and expected outcomes of the merger.
- ✓ Stakeholder Engagement: Actively engage key stakeholders, including analysts, institutional investors, and regulators, throughout the merger process to align expectations.
- ✓ Post-Merger Integration Planning: Present a clear and credible integration plan that specifies timelines, cost-saving initiatives, and cultural alignment measures.
- ✓ Pre-Merger Due Diligence: Conduct and disclose comprehensive financial, operational, and strategic due diligence to reduce information asymmetry and mitigate market skepticism.

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Declarations

Author Contributions

All authors have accepted equal responsibility for the entire content of this manuscript and approved its submission.

Ethics Approval Not applicable.

Ethics approval was not required for this study as no personal data or information that could trace participants was collected.

Conflict of Interest

The author declares no competing interests.

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