THE ASIAN BULLETIN OF BIG DATA MANAGMENT
Vol. 4. Issue 1 (2024)
https://doi.org/ 10.62019/abbdm. v4i1.102

Behavioral and Rational Explanation of Stock Price Performance Around Mergers and Acquisitions in Pakistan: Evidence from Decomposition of Market to Book Ratio

Ayyaz Nadeem*, Muhammad Irfan, Syed Zulfiqar Ali Shah, Shoukat Ali

Chronicle

Article history
Received: January 30, 2024
Received in the revised format: Feb 8,2024
Accepted: Feb 9, 2024
Available online: Feb 9, 2024

Ayyaz Nadeem* is currently affiliated with the Department of Commerce, The Islamia University Bahawalpur, and 2. Shaheed Zulfikar Ali Bhutto Institute of Science and Technology Islamabad, Pakistan.
Email**:** ayyaznadeem@gmail.com

Muhammad Irfan and Dr. Shoukat Ali are currently affiliated with the Department of Commerce, The Islamia University Bahawalpur, Pakistan.
Email: Irfanrafiq129@gmail.com
Email: shoukat.ali@iub.edu.pk

Dr. Syed Zulfiqar Ali Shah is currently affiliated with Faculty of Management Sciences International Islamic University Islamabad, Pakistan.
Email: zulfiqar.shah@iiu.edu.pk

Corresponding Author*

Abstract

This study aims to analyze the firm-specific errors (FSSE) as a proxy for mis-valuation and the long-run value-to-book ratio as a proxy for growth opportunities during mergers and acquisitions. In this study, the researcher used the RKRV methodology, which was developed in 2004, to analyze firm-specific errors and future growth opportunities by decomposing the market-to-book ratio in the merged organization of the Pakistani financial sector. The researcher used the mergers and acquisitions data from the financial sector from 2000 to 2021. For the purpose of analysis, the researcher prepared one year of pre-merger and three years of the merger performance of merged financial institutions and compared it with nonmerger financial institutions. The results of non-zero log differences between market values and fundamental values show that in Pakistan firms, firm-specific errors (FSSE) exist in the merged and nonmerger financial institutions. The second component of this methodology was to calculate the long-run value of the book (LRVTB) by taking the difference between the estimated market value and the firm's book value as a proxy for long-run growth opportunities. The results show that no long-run growth opportunities exist in Pakistan's merged and non-merged financial institutions because the difference between estimated market value and book value is negative. The third component of this study is to estimate time series sector error (TSSE) by taking log differences between fundamental value and estimated market value if the firm-specific error exists in the valuation of firms and there are no long-run growth opportunities. The results show that time series sector error also exists in the valuation of financial institutions. The researcher concludes that the mergers and acquisitions intentions are to meet the minimum capital requirement enforced by The State Bank of Pakistan. The merger and acquisition activities that took place during the years 2000 to 2011 are the legislative mergers. The results satisfy the economic shocks theory. There is no issue of agency problems, whether mergers are successful.

Keywords: Efficiency Theory, Agency Theory, Mergers and Acquisitions, Financial Institutions, Pakistan.

INTRODUCTION

Over the last four decades, the business world has faced technological advancement and the development of advanced products that satisfy customers' needs at lower costs (Ebrahimi et al., 2021; Kumar & Bansal, 2008). This phenomenon encourages business communities to attain production efficiency and provide competitive products at lower

costs. In this regard, efficiency theory explains how a corporation attains efficiency and increases overall business performance (Al Tamimi et al., 2022; Bazzani, 2023; Kallenberg, 1983). The efficiency theory explains that a business has to attain technical, pure, and scale efficiency. To succeed in this competitive environment, a business must attain efficiency and increase performance. To attain goals, top management faces agency problems because corporate management does not have the liberty to make business growth and development decisions without getting pre-consent from all shareholders of the business (Bazzani, 2023; C. Chen et al., 2023). So, it is a challenge for top management to convince all the shareholders about the future strategies of the business. Secondly, the business faces economic shock through government change, legislation, strikes, etc., which strongly impacts the attainment of future goals. The economic shocks theory explains how business performance is affected by economic shocks (Alvarez & Lippi, 2022; Góes et al., 2023).

The financial institutions (Banks) are the beneficiaries of losses of economic shocks in the form of loan losses by corporations and consumers. The financial institutions contribute to the country's overall economic development and growth. It is the more focused sector for the government and law-making agencies to strengthen them. Banks support business in international trade and correct the country's trade balance. For this, several legislative and procedural changes are brought to achieve the desired goal from the financial sector of the economy (Cebula et al., 2016; Madeira, 2019).

In response, financial institutions are involved in product development, local and international joint ventures, and consolidation. However, mergers and acquisitions were familiar activities concerning becoming a significant and independent organization and creating an identical place as a dominant business unit in the corporate world. More than a hundred years of history of mergers and acquisitions in developed and developing economies was evident from the US and EU (Bashir & Sajid, 2011; García & Herrero, 2022; Grashuis, 2023). Five merger waves took place in the US in all sectors of the economy, especially in the financial industry. All mergers and acquisition activities had different objectives, but increasing the organization's performance was the common objective analyzed by researchers of corporate finance. Mergers and acquisitions activity has become attractive in Asian countries in the last three decades after the adoption of codes of BASEL I by controlling banks of every nation (Bala Shanmugam, n.d.; Reddy et al., 2019; Srinivasa Reddy et al., 2013; Y.W. Tang & M. Metwalli, 2013).

In the literature, academicians and researchers have a keen interest in analyzing the performance of organizations after mergers and acquisitions. Whether they attained economies of scale, product differentiation (Srinivasa Reddy et al., 2013), market enlargement, or profit performance. The researchers used regression analysis, correlations matrix, Generalized Methods of Movement (GMM model) (Brown et al., 2023), and linear programming techniques or did primary studies to analyze the impact on the Human resource management practices and customer stratification level. The researcher did not mention the behavioral components of managing merged and acquired organizations. Even the misvaluation of the target organization was not analyzed in detail to test whether the mergers and acquisitions deals were profitable afterward (Hertzel & Li, 2010). The primary objectives of this study are,

- To analyze the pre / post-merger and acquisition relationship between market and book value ratios of Pakistan's financial sector.

- To examine the firm-specific error (FSE) mechanism of market value ratio to book ratio reflecting mis-valuation and whether there should be any relationship between mis-valuation and after-merger investment of the financial sector of Pakistan.
- To examine long-run estimated market value to book value mechanism reflecting a positive relationship between the growth options of the financial sector of Pakistan
- To analyze the behavioral components by the decomposition of market-to-book value ratios that substantially impact the pre- and post-performance of merged and acquired organizations of Pakistan's financial sector.

Many factors were considered after The State Bank of Pakistan implemented the minimum capital requirement (Akhtar & Nishat, 2002). This action led to increased efficiency, utilization of unused resources, and diversification of financial institutions. Instead of the benefits mentioned earlier, firm-specific error and long-run value-to-book ratio components, reflecting mis-valuation and growth opportunities, provided a valuable base for the analysts of stock price performance at the time of merger and acquisition (Ahmad & Nadeem, 2015). The study provides a significant base for managing merging and acquiring organizations to analyze the behavioral components that impact the valuation of mergers and acquisitions deals and make the mergers and acquisitions unsuccessful. This study also provides a base for further research in mergers and acquisitions in the financial sector and other sectors of Pakistan's economies or other countries' contexts (Y.W. Tang & M. Metwalli, 2013).

Financial sector reforms, which the Institute of Bankers of Pakistan had started in the 1990s, supported the involvement of private investors and foreign investors within the country. The performance of the banking council could have been more satisfactory. In 1997, The Institute of Bankers of Pakistan was dissolved. From this date, monitoring and policy-making functions were assigned to the State Bank of Pakistan. From time to time, the State Bank of Pakistan made specific changes in the financial sector. Since 2000, 30 merger and acquisition activities have occurred, from which only 8 involve commercial banks. The State Bank of Pakistan provides rapid reforms in the financial sector, which drives financial institutions' involvement in merger and acquisition activity (Salma & Hussain, 2020b). The first reason was the change in minimum capital requirement from 2000 to 2013. To meet these criteria, financial institutions in Pakistan were involved in different activities to meet these requirements, and the most familiar training was done during a short period of merger and acquisition. A large number of chain mergers were made in Pakistan during a short period, which became the cause of the imbalance in the establishment of the Pakistani financial sector. Secondly, the State Bank of Pakistan changed the financial institutions' legal framework; in 2001, the Banking Company's Ordinance 1962 allowed the merger of non-banking financial institutions with the banks (Tauseef & Nishat, 2014).

Table 1.
Capital Requirements for Banks

Date of implementation of Minimum Capital Requirement	Change in Minimum Capital Requirement
1st January, 2002	500 million to 750 million
1st January, 2003	750 million to 1000 million
31st December, 2004	1 billion to 1.50 billion
31st December, 2005	1.50 billion to 2 billion
31st December, 2009	2 billion 6 billion

31st December 2010	6 billion to 7 billion
31st December 2011	7 billion to 8 billion
31st December 2012	8 billion to 9 billion
31st December 2013	9 billion to 10 billion

Thirdly, the government of Pakistan included the clause regarding mergers and acquisitions in the Income Tax Ordinance 2001, which allows the carrying forward of losses, including merger expenses of (target and acquiring financial institutions) from the combined or surviving institution (Kouser & Saba, 2012a; Thi My Phan & Daly, 2016) This study measures the mis-valuations and growth opportunities in the Pakistani financial sector. Also, it analyzes whether the firms can benefit from mergers and acquisitions in Pakistan or if they are only legislative mergers.

LITERATURE REVIEW

The market-to-book ratio was an acceptable measure for the valuation of firms. It is a combination of retained earnings and capital. The shareholders contributed to them. In the literature, researchers argued that there were better measures of the riskiness of the organizations because it is the result of the current state of the business (Ball et al., 2020; Kim, 2023). In this regard, the researchers used average contributed capital to capture the effect of past business situations and predict future performance. The second component is the market value of the equity, which shows the exact market situation and captures the current riskiness of the organization (L. Chen & Zhao, 2006). Other measures for the valuation of firms were also introduced in the literature, like the free cash flows model and dividend discounts model (Aras & Kemal Yilmaz, 2008; Penman, 1996). However, the market-to-book ratio is still an acceptable measure in the literature for the actual valuation of the firm. In literature, (Rhodes-Kropf et al., n.d.)decomposed market-to-book ratios to analyze the misvaluation component of mergers and acquisitions deals. The study decomposition finds firm-specific errors, time series sector errors, and long-run value-to-book ratios used to predict future growth.

The study used the decomposition of market-to-book ratios methodology to analyze the valuation during seasonal equity offerings. In this study, the results also identify the behavioral component of the management. Recent literature uses the market-to-book ratio in the stochastic frontier to estimate an organization's efficiency score, especially for the financial sector (Hertzel & Li, 2010). Mergers and acquisitions were an attractive activity for researchers of corporate finance to analyze the performance of organizations before and after mergers and acquisitions. The researchers analyzed profit: performance, market integrations, product differentiation, monopoly power, and product and production process efficiencies (Azofra & Olalla, 2008; Bala Shanmugam, n.d.; Bashir & Sajid, 2011; García & Herrero, 2022; Y.W. Tang & M. Metwalli, 2013). A study was conducted on US farmer cooperatives' mergers and acquisitions. The sample consisted of 500 cooperative farmers. The results showed that farmers' cooperatives did not have the benefits from the mergers and acquisitions not only in the short run but also in the long run. However, a study of bank mergers and acquisitions in the US financial sector found a positive relationship after the mergers and acquisitions. The study used the DEA analysis technique and found that banks attained scale, technical, and pure efficiency after the mergers and acquisitions (Grashuis, 2023). A study analyzed the impact of corporate governance variables on the financial sector's performance before

and after mergers and acquisitions. The results explained that. CEO duality and board size made mergers and acquisitions deals successful (García & Herrero, 2022). The study was conducted in India and China to analyze the performance of pre- and post-merger acquisitions. The results indicated that mergers and acquisitions did not create value for the merged and acquired organization in the short run (Reddy et al., 2019). However, another study in India also identifies the pre- and post-merger acquisition performance. They inferred that those financial institutions that go into mergers and acquisitions benefit from this activity. The financial institutions not included in this activity became small and faced high competition in the market (Edward Kristu Jayanti College et al., 2019).

The study examined both domestic and international mergers and their effects on profitability and efficiency in the banking sector. The study examined the cost and profit efficiency analysis of thirty-three bank-to-bank mergers. The findings indicate that while cross-border mergers significantly improve cost and profit efficiency, most domestic mergers improve both (Rhoades, 1993). An investigation into the effect of M&A on business performance was conducted in the Malaysian context. They examine whether India has achieved all of the mergers' stated goals. This study found that, in most cases, the company that acquired another through mergers and acquisitions (M&A) benefited greatly and created synergy in the long run. These benefits included increased cash flow, a more significant business, competitive advantage, diversification, cost savings, etc. Financial data, tables, and ratios were used to analyze correlation and other data (Sufian & Fadzlan, 2004).

In the Indian context, pre- and post-merger performance were examined using ratio analysis. It focused on acquiring companies across various industries and sectors, but its main goal was to assess their operational effectiveness. They chose a sample of all public limited and trading company mergers between 1991 and 2003. The study's conclusions did not indicate a significant influence on the post-merger operating performance of Indian companies across various industries (Kumar & Bansal, 2008). The study is based on Egyptian banks that had acquisitions or mergers between 2002 and 2007. The researchers computed corporations' Return on Equity (ROE) to assess the extent of advancement and efficacy of banking reforms in fortifying and uniting this industry. When companies are compared to their pre-merger performance, their study indicates a performance improvement. The analysis concludes that M&A significantly improved the profitability of the Egyptian banking sector and had a marginally positive effect on the credit risk position. These observations, however, do not resemble the current procedure (Badreldin et al., 2009).

Another study examined how mergers affected Pakistan's Al-Faysal Investment Bank Ltd. and Atlas Investment's financial performance. Three economic variables were used in the survey: solvency, capital sufficiency, and profitability and earnings. It was discovered that Faysal Bank experienced a limited average improvement throughout the post-merger period. It is concluded that both banks' financial performance increased in a sample taken during the post-merger era. The authors noted that M&A is an effective tactic to improve the bank's performance. Due to increased management, better credit evaluation, more access to pricey new technology, and better corporate attention to detail, mergers boost financial performance (Chaudhary et al., 2016).

The study was conducted in the context of Pakistan and analyzed the post-performance of mergers and acquisitions using six ratios from 1999 to 2010. The study results show a negative relationship with performance after the mergers and acquisitions. All six ratios declined in the long run, making inferences that financial institutions did not benefit from mergers and acquisitions (Kouser & Saba, 2012b). However, another study conducted in the Pakistani context also used ratio analysis and measured the performance of financial institutions after mergers. The results are different from the previous research, and it concluded that the financial institutions had benefits in profit performance and product differentiation in the long run after the mergers (Ahmad & Nadeem, 2015).

From the above discussion, it can be deduced that mergers and acquisitions are familiar phenomena in the present world. The history of mergers and acquisitions is over a hundred years, occurring in every developed and developing country. Mergers and acquisitions happen in every sector, such as the sugar, textile, and financial sectors. These mergers and acquisitions aim not only to get higher market share or efficiency but also to generate monopoly and product diversification. In Pakistan, many studies have been done on mergers and acquisitions efficiency, and the researcher needed help finding a single study that discussed the firm-specific errors component, long-run value-to-book ratios relationship for mis-valuation, and growth opportunities. Researchers' intuitions in the present study are analyzing firm-specific errors and misvaluation for growth opportunities in Pakistan's financial institutions.

The hypotheses are developed based on (Kropf et al., 2004) hypotheses in their- study of merger waves after making adjustments according to the Pakistani environment.

H1. There is a misvaluation in stock prices of Pakistani financial institutions of Pakistan at the time of mergers and acquisitions.

H2. There are long-run growth opportunities in the mergers and acquisitions of financial institutions in Pakistan

H3. Time series sector errors exist when a firm-specific error with no long-run growth is in the market

METHODOLOGY

The total population includes all merger activities from 2000 to 2018 in Pakistan's financial sector. The study analyzed one-year pre- and three-year post-mergers and acquisitions performance. For analysis purposes, data is taken from 1999 to 2021. The initial sample includes 22 mergers. Due to specific difficulties during data collection, 09 merged firms' data was unavailable. Hence, the final selection includes 13 merged firms and 15 nonmerger financial institutions for comparison. The study collected data from the balance sheet analysis provided by The State Bank of Pakistan on its official website and market price data from the Pakistan Stock Exchange website.

Table 2.

Table 3.1: Variables definition and estimation

Variables	Definition	Estimation of Variables	Source
Fundamental Value ($FV_{i,t}$)	The present value of free cash flows discounted (PVFCE) is multiplied by the	$FV_{i,t}$= $PVFCF_{i,e}$ *WACC where,	(Aras & Kemal Yilmaz, 2008; Edward Kristu

	weighted average cost of capital (WACC).	FCF = Cash provided by operating activities – Net capital investment (Fixed Assets Investment) WACC = $(K_e * W_e) + (K_d * W_d)$ k_e = Cost of Equity w_e = Weight of Equity k_d = Cost of Debt w_e = Weight of Equity	Jayanti College et al., 2019; Hertzel & Li, 2010)
Market Value (MV)	The firm's market value is calculated by multiplying closing stock prices with the common stock outstanding at year-end.	MV = $V_e * P$ (Closing year-end price)	(Hertzel & Li, 2010; Kwon et al., 2008; Posner, 2023)
Book Value (BV)	The firm's value shown in the balance sheet indicates the resources owned by the firm.	Book Values of Total Assets (TBVA)	(Azofra & Olalla, 2008; Bala Shanmugam, n.d.; García & Herrero, 2022; Hertzel & Li, 2010)

The behavioral and rational theories of stock price performance regarding merger and acquisition options can explain the large pre-issue MTB ratios. According to behavioral theory, when a firm's market value, M, exceeds its actual value, V, equity issues are more likely to arise. According to fundamental investment theory, equity issues become more probable when investment opportunities increase, and the value-to-book (VTB) ratio rises. This distinction underlies the rationale by employing the (Hertzel & Li, 2010)methodology for decomposing MTB into mis-valuation (MTV) and growth option (VTB) components as follows:

$$\mathbf{MTB \equiv MTV \times VTB,} \qquad \mathbf{(1)}$$

which, in log form, can be written as

$$\mathbf{m - b \equiv (m - v) + (v - b),} \qquad \mathbf{(2)}$$

Where lowercase letters indicate logarithms of the respective variables.

If markets know the future growth opportunities, discount rates, and cash flows, then the term (m − v) should be 0. If the market makes mistakes in estimating discounted future cash flows or does not have information that managers have, then (m − v) will capture the misevaluation component of the MTB ratio.

Decomposing the MTB ratio, as depicted in equation (2), relies on determining an estimate of firm value, v. For estimation purposes, for each firm i in industry j at time t, v can be expressed as a linear function of observable firm-specific accounting information, θit, and a vector of corresponding accounting multiples, a. The RKRV (2005) methodology employs both a vector of contemporaneous time-t accounting multiples, ajt, and a vector of long-run accounting multiples, aj, such that the MTB ratio for firm I at time t can be further decomposed into three components as follows:

$$\mathbf{m_{it} - b_{it} = m_{it} - v(\theta_{it};a_{jt}) + v(\theta_{it};a_{jt}) - v(\theta_{it};a_j) + v(\theta_{it};a_j) - b_{it}} \qquad \mathbf{(3)}$$

To measure the degree to which a firm is misvalued in comparison to its current industry peers, the first term on the right-hand side of equation (3), mit − v(θit;ajt), also known as the FSE, calculates the difference between market value and fundamental value estimated using firm-specific accounting data, θit, and the modern sector accounting multiples, ajt. To capture the extent to which the industry (or possibly the entire market) may be mis-valued at time t, the second term, v(θit;ajt) − v(θit;aj), also known as TSSE, measures the difference in estimated fundamental value when contemporaneous sector accounting multiples at time t, ajt, differ from long-run sector multiples, aj. The difference between firm values (as the vector indicates) is measured by the third term, LRVTB. Expressing market value as a simple linear model of these variables yields

$$m_{it} = a0_{jt} + a1_{jt}b_{it} + a2_{jt}\ ln(NI)+ it + a3_{jt}I(<0)\ ln(NI)+ a4_{jt}LEVit + \varepsilon_{it}, \quad (4)$$

since NI can sometimes be negative, it is expressed as an absolute value (NI)+ along with a dummy variable, I(<0), to indicate when NI is negative. A critical concern with RKRV's (2005) methodology is that, in addition to mis-valuation, the error components in equation (3) can also reflect an error due to model misspecification. For example, a firm with a high FSE may not be overvalued; instead, it may have more excellent growth options and a lower discount rate than other firms in its industry (Hertzel & Li, 2010).

RESULTS AND DISCUSSION

The descriptive statistics table 4.1 shows Mean, Median, Standard deviation, and Minimum and Maximum values. The descriptive statistics results show that mean values do not vary from the sample and that all the values reflect the means. Standard Deviations (SD) of all model variables also reflect that no significant deviation is found in the dependent and independent variables.

Table 3.
Descriptive Statistics

Variable	Mtb	FSSE	TSSE	LRVTB
Mean	0.29750	0.18055	-0.29750	-1.72363
Median	0.48397	0.11994	-0.27312	-1.64409
Standard Deviation	1.29833	1.10398	0.47758	0.98580
Minimum	-3.91202	-2.85118	-1.22048	-3.59273
Maximum	3.37530	4.35029	0.91169	1.28973

Table 4.
Correlations

	MTB	FSSE	TSSE	LRVTB
MTB	1			
FSSE	0.726017	1		
TSSE	-0.36784	-0.06716	1	
LRVTB	-0.51201	-0.22106	0.395246	1

The above table containing the correlation matrix shows the vital relationship between all variables that are part of the model under consideration, like the market-to-book ratio,

firm-specific errors (FSSE), time series sector errors (TSSE), and long-run value-to-book ratio (LRVTB). It is apparent from the matrix that the relationship between variables is according to the theory.

Table 5.
Regression Statistics

Variables	Coefficient	t-ratio	p-value
Intercept	-0.65825	-5.27995	0.00*
FSSE	0.763041	13.35367	0.00*
TSSE	0.575386	4.102881	0.00*
LRVTB	-0.37525	-5.3989	0.00*
R	0.694788	F-value	103.19
R-squared	0.688056	F Significance	0.00*

Note: p>= 5%

Table 4.3 shows the results of overall regression to show the model fitness. The results indicate that R values are 69% and adjusted R square is 68%, which shows that the model gives 69% accurate results. F stat values also show 103, which is significant. T values and p values show a significant relationship between variables except leverage.

Table 6.
Firm-Specific Error (FSE) for Merged Firms

S. No	Name of Merged Firm	Year Before Merger	Year of Merger	Years After Merger		
		t-1	t-0	t+1	t+2	t+3
1	Allied Bank Limited	0	0	0	0	0
2	Askari Bank Limited	-2	-2	-2	-2	-2
3	Faysal Bank	1	1	1	1	1
4	JS Bank	-1	-1	-1	-1	-1
5	KASB Bank	0	1	1	2	1
6	Nib Bank	1	1	1	2	0
7	Standard Chartered Bank	2	1	0	0	0
8	MCB Bank Limited	0	1	1	1	0
9	Meezan Bank Limited	0	1	0	1	0
10	Trust Investment Bank	0	1	0	2	0
11	First Dawood Investment Bank	-1	0	1	2	2
12	Orix Leasing Pakistan Limited	1	0	0	0	1
13	Fidelity Leasing Modaraba	0	0	2	0	0

Table 4.4 shows the results of the first model, known as a firm-specific error (FSE), which is calculated by taking the log difference between fundamental value and market values. If the investors see the value of free cash flows, discount rate, and growth in the expected cash flows, then the difference between fundamental value and book value is zero; otherwise, mis-valuation is created by the investors (Kropf et al., 2004). The results in the above table indicate no merged financial institution value equal to zero one year before and two years after the merger. However, after the third year of the merger, in the case of commercial banks, the firm-specific error does not exist.

Table 7.
Firm-Specific Errors (FSE) Non-Merged Financial Institution

S, No	Non-Merged financial institution	Performance During the Merger Period Activity

		T	t+1	t+2	t+3	t+4
1	Summit Bank Ltd	-1	-1	-1	-1	0
2	PICIC Investment Fund	-1	-1	-1	-1	-3
3	Burj Bank Limited	1	1	1	1	1
4	Silk Bank Limited	2	2	4	2	0
5	Bank Al-Habib Limited	0	0	1	0	0
6	Bank Alfalah Limited	0	1	1	1	0
7	Bank Islami Pakistan Limited	-1	-1	0	1	0
8	Al-Meezan Mutual Fund	-1	-1	0	0	0
9	Al-baraka Bank (Pakistan)Limited	1	2	1	1	1
10	SME Leasing Limited	2	3	0	0	0
11	Standard Chartered Leasing Limited	-1	-1	-1	-1	-1
12	First Credit and Investment Bank	3	-1	-1	-1	-1
13	Security Investment Bank Ltd	0	0	0	0	0
14	IGI Investment Bank Ltd.	0	0	-1	-1	-1
15	Invest Capital Investment Bank Ltd	-3	-1	-1	-1	-1

In Table 4.5, the author tested the results with non-merged firms to analyze the mis-valuation in Pakistan's non-merged financial institutions. The above table shows the results of the non-merged financial institutions that were mis-valued when merger activities were undertaken. However, two years after the merger activity, the mis-valuation did not exist in the case of non-merged commercial banks. The above table shows that the merging firms have time series sector errors during and after the merger activity because almost all the figures show a negative relation between the estimated fundamental value and estimated market values by incorporating the accounting variables net income and leverage (Kropf et al., 2004).

Table 8.
Time Series Sector Errors (TSSE) Non-Merged Financial Institution

S.No	Non-Merged financial institution	Performance During the merger period, activity				
		t	t+1	t+2	t+3	t+4
1	Summit Bank Ltd	-0.14	-0.14	-0.14	-0.14	-0.14
2	PICIC Investment Fund	-0.55	-0.55	-0.55	-0.55	-0.55
3	Burj Bank Limited	0.11	0.11	0.11	0.11	0.11
4	Silk Bank Limited	-0.70	-0.70	-0.70	-0.70	-0.70
5	Bank Al-Habib Limited	-0.93	-0.93	-0.93	-0.93	-0.93
6	Bank Alfalah Limited	-0.94	-0.94	-0.94	-0.94	-0.94
7	Bank Islami Pakistan Limited	-0.58	-0.58	-0.58	-0.58	-0.58
8	Al-Meezan Mutual Fund	-0.46	-0.46	-0.46	-0.46	-0.46
9	Al-baraka Bank (Pakistan)Limited	-0.60	-0.60	-0.60	-0.60	-0.60
10	SME Leasing Limited	0.41	0.41	0.41	0.41	0.41
11	Standard Chartered Leasing Limited	-0.30	-0.30	-0.30	-0.30	-0.30
12	First Credit And Investment Bank	0.36	0.36	0.36	0.36	0.36
13	Security Investment Bank Ltd	0.10	0.10	0.10	0.10	0.10
14	IGI Investment Bank Ltd.	0.14	0.14	0.14	0.14	0.14
15	Invest Capital Investment Bank Ltd	0.04	0.04	0.04	0.04	0.04

Table 4.7 shows the same results as those of merging financial institutions in Pakistan because non-merged financial institutions also show adverse effects; however, in the case of investment banks where values are positive, the estimated fundamental value is greater than the estimated market values. Due to this positive value, the researcher made inferences that the investors who invested in investment bank securities might wrongly estimate future free cash flows, discounts, and growth rates.

Table 9.
Long Run Value to Book (LRVTB) for Merged Firms

S. No	Name of Merged Firm	Year before Merger	Year of Merger	Years After Merger		
		t-1	t	t+1	t+2	t+3
1	Allied Bank Limited	-2.97	-2.90	-2.91	-2.86	-2.87
2	Askari Bank Limited	-3.27	-3.35	-3.20	-3.19	-3.09
3	Faysal Bank	-2.47	-2.54	-2.65	-2.86-	-2.81
4	J.S Bank	-1.15	-1.04	-1.69	-1.63	-1.12
5	KASB Bank	-2.11	-2.51	-1.58	-1.60	-1.10
6	NIB Bank	-2.14	-1.47	-0.95	-0.98	-0.17
7	Standard Chartered Bank	-1.00	-1.23	-1.38	-1.21	-1.26
8	MCB Bank Limited	-3.10	-3.17	-3.22	-3.22	-3.24
9	Meezan Bank Limited	-2.18	-2.21	-2.15	-2.32	-2.35
10	Trust Investment Bank	-2.29	-2.21	-2.43	-1.91	-1.37
11	First Dawood Investment Bank	-1.6	-1.45	-2.34	-1.01	-1.53
12	ORIX Leasing Pakistan Limited	-3.12	-3.21	-3.59	-3.01	-2.88
13	Fidelity Leasing Modaraba	-0.57	-0.59	-1.46	-1.18-	0.45

Long Run Value to Book (LRVTB) for Merged Firms

Table 4.8 shows the results of the second model, which is the long run book to estimated value to check the growth opportunities in the organizations, whether they exist or not. This model value is calculated by taking the difference between market values, which are calculated by incorporating the net profit and leverage accounting variables. The regression is run to find out the market value of the firm. If the positive difference between market value and book value shows that the merged firm has long-run growth opportunities (Kropf et al., 2004). However, the results of the above table indicate that only Al-Meezan Mutual Fund has growth opportunities only after the second and third years of the merger.

Table 10.
Long Run Value to Book (LRVTB) Non-Merged Financial Institution

S. No	Name of Merged Firm	Year before Merger	Year of Merger	Years After Merger		
		t-1	t	t+1	t+2	t+3
1	Allied Bank Limited	-2.97	-2.90	-2.91	-2.86	-2.87
2	Askari Bank Limited	-3.27	-3.35	-3.20	-3.19	-3.09
3	Faysal Bank	-2.47	-2.54	-2.65	-2.86-	-2.81
4	J.S Bank	-1.15	-1.04	-1.69	-1.63	-1.12
5	KASB Bank	-2.11	-2.51	-1.58	-1.60	-1.10
6	NIB Bank	-2.14	-1.47	-0.95	-0.98	-0.17
7	Standard Chartered Bank	-1.00	-1.23	-1.38	-1.21	-1.26
8	MCB Bank Limited	-3.10	-3.17	-3.22	-3.22	-3.24
9	Meezan Bank Limited	-2.18	-2.21	-2.15	-2.32	-2.35

10	Trust Investment Bank	-2.29	-2.21	-2.43	-1.91	-1.37
11	First Dawood Investment Bank	-1.6	-1.45	-2.34	-1.01	-1.53
12	ORIX Leasing Pakistan Limited	-3.12	-3.21	-3.59	-3.01	-2.88
13	Fidelity Leasing Modaraba	-0.57	-0.59	-1.46	-1.18-	0.45

To analyze the growth opportunities in non-merged financial institutions, in Table 4.9, the researcher can apply this model to non-merged financial institutions in Pakistan. Researchers found the same results as shown by the merged financial institutions in Pakistan. There are no long-run growth opportunities that exist in the Pakistani financial sector.

CONCLUSION

In this study, the first hypothesis is that mis-valuation exists in Pakistani financial institutions during mergers and acquisitions. The result of the first model in Table 4.4 accepts this hypothesis because not only does any merged institution show the log difference of estimated fundamental values and market value non-zero, but it also shows that the non-merged financial institutions in Pakistan are also mis-valued during the same period of merger and acquisition as shown in table 4.5. The second hypothesis that mergers and acquisitions have long-run growth opportunities is rejected because any merged and non-merged financial institution shows positive results (see Table 4.8 and Table 4.9), meaning no long-run growth exists in mergers and acquisitions. When comparing the results with non-merged firms, the researcher found the same results as shown by merged financial institutions. The third hypothesis of the study is that the time series sector errors exist when mis-valuation exists due to firm-specific error, and no long-run growth in the merged financial institutions is also accepted. The difference between estimated fundamental and estimated values is negative (see Table 4.6 and Table 4.7) for Pakistan's merged and non-merged financial institutions. Why the performance of Pakistani financial institutions does not show the desired results? The answer is that the Pakistani financial sector is less developed than other countries. So many legislative changes occurred frequently when Pakistan came into existence. After the decentralization of financial institutions, the dominance of the Banking Council of Pakistan was falling. So, the Banking Council of Pakistan was dissolved in 1997 and gave total control to the State Bank of Pakistan. As a result, the State Bank of Pakistan introduced two new systems for the proper monitoring and evaluating the performance of each bank, which are CAMELS (capital adequacy, assets management, management quality, saving, liquidity, and sensitivity to market risk) and CAMELS (capital adequacy, assets quality, earning, liquidity, and sensitivity). A minimum capital requirement of Rs. 500 million was also implemented. So, Pakistan's financial institutions were motivated to merge due to legislative actions by The State Bank of Pakistan during the first decade of the 20th century (Akhtar & Nishat, 2002). From the above discussion, it can be derived that due to firm-specific errors and time series sector errors in Pakistan, no long-run growth is expected in merged financial institutions. The financial institutions are also involved in mergers because of legislative changes in Pakistan's financial sector. The results match with the economic shock theory, which indicates that mergers and acquisitions are common during such periods when frequent legislative changes occur from the side of the highest controlling authority of the government of a country (Feng et al., 2023).

DECLARATIONS

Acknowledgement: We appreciate the generous support from all the supervisors and their different affiliations.

Funding: No funding body in the public, private, or nonprofit sectors provided a particular grant for this research.

Availability of data and material: In the approach, the data sources for the variables are stated.

Authors' contributions: Each author participated equally to the creation of this work.

Conflicts of Interests: The authors declare no conflict of interest.

Consent to Participate: Yes

Consent for publication and Ethical approval: Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

REFERENCES

Ahmad, A., & Nadeem, M. (2015). Mergers & Acquisitions and Banks Performance in Pakistan. *Journal of Business Management and Economics*, *3*. https://doi.org/10.15520/jbme.2015.vol3.iss10.154.pp28-32

Akhtar, M. H., & Nishat, M. (2002). *X-efficiency Analysis of Commercial Banks in Pakistan: A Preliminary Investigation [with Comments]* (Vol. 41, Issue 4).

Al Tamimi, H. A. H., Duqi, A., Kanas, A., & Zervopoulos, P. D. (2022). Directional distance function DEA estimators for evaluating efficiency gains from possible mergers and acquisitions. *Journal of the Operational Research Society*, *73*(6), 1240–1257. https://doi.org/10.1080/01605682.2021.1907243

Alvarez, F., & Lippi, F. (2022). The Analytic Theory of a Monetary Shock. *Econometrica*, *90*(4), 1655–1680. https://doi.org/10.3982/ecta17348

Aras, G., & Kemal Yilmaz, M. (2008). PRICE-EARNINGS RATIO, DIVIDEND YIELD, AND MARKET-TO-BOOK RATIO PRICE-EARNINGS RATIO, DIVIDEND YIELD, AND MARKET-TO-BOOK RATIO TO PREDICT RETURN ON STOCK MARKET: EVIDENCE FROM THE EMERGING MARKETS. In *Global Business and Technology* (Issue 1).

Azofra, S. S., & Olalla, M. G. (2008). *Size, Target Performance and European Bank Mergers and Acquisitions* (Vol. 23, Issue 1).

Badreldin, A., Kalhoefer, C., Tagamoa, A., & Khames, A. (2009). *Faculty of Management The Effect of Mergers and Acquisitions on Bank Performance in Egypt The Effect of Mergers and Acquisitions on Bank Performance in Egypt*.

Bala Shanmugam, by. (n.d.). Mergers and Acquisitions of Banks in Malaysia. In *Jalan Kolej* (Issue 2).

Ball, R., Gerakos, J., Linnainmaa, J. T., & Nikolaev, V. (2020). Earnings, retained earnings, and book-to-market in the cross section of expected returns. *Journal of Financial Economics*, *135*(1), 231–254. https://doi.org/10.1016/j.jfineco.2019.05.013

Bashir, A., & Sajid, R. (2011). *The Impact of Mergers and Acquisitions on Shareholders Wealth: Evidence from Pakistan Prevalence of Preterm Birth in Pakistan: A Systematic Review and Meta-Analysis View project Non Clinical Risk factors of Myocardial Infarction: A Meta Analysis approach View project*. https://www.researchgate.net/publication/268357977

Bazzani, G. (2023). Agency as conversion process. *Theory and Society*, *52*(3), 487–507. https://doi.org/10.1007/s11186-022-09487-z

Brown, L. W., Liou, R. S., & Hasija, D. (2023). Emerging market multinational corporations' cross-border mergers and acquisitions and political distance: Does corporate political activity matter? *Thunderbird International Business Review*, *65*(5), 533–546. https://doi.org/10.1002/tie.22355

Cebula, R. J., Gillis, W., McCrary, S. C., & Capener, D. (2016). New evidence on the impact of economic conditions and banking legislation on the bank failure rate in the US, 1970 to 2014. *Journal of Financial Economic Policy*, *8*(3), 364–376. https://doi.org/10.1108/JFEP-02-2016-0019

Chaudhary, G. M., Zulfiqar, S., Shah, A., & Hashmi, S. H. (2016). Impact of Mergers & Acquisitions upon Banking Efficiency in Pakistan: A Data Envelopment Analysis Approach. *Journal of Business Studies Quarterly*, *8*(1).

Chen, C., Wang, D., & Wang, B. (2023). Interface between context and theory: the application and development of Agency Theory in the Chinese context. *International Journal of Emerging Markets*, *18*(1), 45–63. https://doi.org/10.1108/IJOEM-06-2019-0433

Chen, L., & Zhao, X. (2006). On the relation between the market-to-book ratio, growth opportunity, and leverage ratio. *Finance Research Letters*, *3*(4), 253–266. https://doi.org/10.1016/j.frl.2006.06.003

Ebrahimi, P., Fekete-Farkas, M., Bouzari, P., & Magda, R. (2021). Financial Performance of Iranian Banks from 2013 to 2019: A Panel Data Approach. *Journal of Risk and Financial Management*, *14*(6). https://doi.org/10.3390/jrfm14060257

Edward Kristu Jayanti College, A. J., Edward, A., & Manoj, J. (2019). Analysis of Pre And Post-Merger Financial Performance of SBI Associate Banks ANALYSIS OF PRE AND POST-MERGER FINANCIAL PERFORMANCE OF SBI ASSOCIATE BANKS View project Analysis of the effect of BREXIT on the Stock Indices of US, UK and India: An Intervention ARIMA Model View project Analysis of Pre And Post-Merger Financial Performance of SBI Associate Banks. *International Journal of Research and Analytical Reviews*. https://doi.org/10.1729/Journal.20840

Feng, Y., Liu, C., & Yawson, A. (2023). Economic shocks, M&A advisors, and industry takeover activity. *Pacific Basin Finance Journal*, *82*. https://doi.org/10.1016/j.pacfin.2023.102156

García, C. J., & Herrero, B. (2022). Corporate entrepreneurship and governance: Mergers and acquisitions in Europe. *Technological Forecasting and Social Change*, *182*. https://doi.org/10.1016/j.techfore.2022.121845

Góes, C., Segnana, J., Robertson, R., & Lopez-Acevedo, G. (2023). *Local Labor Markets Dynamics and Export Shocks: Theory and Evidence from Indonesia*. https://ssrn.com/abstract=4586241

Grashuis, J. (2023). Better performance after mergers and acquisitions? The case of US farmer cooperatives. *Agricultural Finance Review*, *83*(3), 498–510. https://doi.org/10.1108/AFR-12-2022-0145

Hertzel, M. G., & Li, Z. (2010). Behavioral and rational explanations of stock price performance around SEOs: Evidence from a decomposition of market-to-book ratios. *Journal of Financial and Quantitative Analysis*, *45*(4), 935–958. https://doi.org/10.1017/S002210901000030X

Kallenberg, W. C. M. (1983). Intermediate Efficiency, Theory and Examples. In *Source: The Annals of Statistics* (Vol. 11, Issue 1).

Kim, D. (2023). Market-to-book ratio in stochastic portfolio theory. *Finance and Stochastics*, *27*(2), 401–434. https://doi.org/10.1007/s00780-023-00501-5

Kouser, R., & Saba, I. (2012a). EFFECTS OF BUSINESS COMBINATION ON FINANCIAL PERFORMANCE: EVIDENCE FROM PAKISTAN'S BANKING SECTOR. *Australian Journal of Business and Management Research*, *01*(08), 54–64. https://doi.org/10.52283/nswrca.ajbmr.20110108a06

Kouser, R., & Saba, I. (2012b). EFFECTS OF BUSINESS COMBINATION ON FINANCIAL PERFORMANCE: EVIDENCE FROM PAKISTAN'S BANKING SECTOR. *Australian Journal of Business and Management Research*, *01*(08), 54–64. https://doi.org/10.52283/nswrca.ajbmr.20110108a06

Kumar, S., & Bansal, L. K. (2008). The impact of mergers and acquisitions on corporate performance in India. *Management Decision*, *46*(10), 1531–1543. https://doi.org/10.1108/00251740810920029

Kwon, H. B., Stoeberl, P. A., & Joo, S. J. (2008). Measuring comparative efficiencies and merger impacts of wireless communication companies. *Benchmarking*, *15*(3), 212–224. https://doi.org/10.1108/14635770810876566

Madeira, C. (2019). The impact of interest rate ceilings on households' credit access: Evidence from a 2013 Chilean legislation. *Journal of Banking and Finance*, *106*, 166–179. https://doi.org/10.1016/j.jbankfin.2019.06.011

Penman, S. H. (1996). The Articulation of Price-Earnings Ratios and Market-to-Book Ratios and the Evaluation of Growth. In *Source: Journal of Accounting Research* (Vol. 34, Issue 2). Autumn.

Posner, E. A. (2023). *Market Power, Not Consumer Welfare: A Return to the Foundations of Merger Law*. https://ssrn.com/abstract=4364084

Reddy, K., Qamar, M., & Yahanpath, N. (2019). Do mergers and acquisitions create value?: The post-M&A performance of acquiring firms in China and India. *Studies in Economics and Finance*, *36*(2), 240–264. https://doi.org/10.1108/SEF-01-2018-0027

Rhoades, S. A. (1993). Efficiency effects of horizontal (in-market) bank mergers. In *Journal of Banking and Finance* (Vol. 17).

Rhodes-Kropf, M., Robinson, D. T., & Viswanathan, S. (n.d.). *Valuation Waves and Merger Activity: The Empirical Evidence*.

Salma, G., & Hussain, A. (2020a). Article ID: IJM_11_08_134 Cite this Article: Ghulam Salma and Anwar Hussain, Synergy, Agency Cost, and the Determinants of Premia Paid in Mergers and Acquisitions Across Pakistan. *International Journal of Management (IJM)*, *11*(8), 1476–1498. https://doi.org/10.34218/IJM.11.8.2020.134

Salma, G., & Hussain, A. (2020b). Article ID: IJM_11_08_134 Cite this Article: Ghulam Salma and Anwar Hussain, Synergy, Agency Cost, and the Determinants of Premia Paid in Mergers and Acquisitions Across Pakistan. *International Journal of Management (IJM)*, *11*(8), 1476–1498. https://doi.org/10.34218/IJM.11.8.2020.134

Srinivasa Reddy, K., Nangia, V. K., & Agrawal, R. (2013). Corporate mergers and financial performance: a new assessment of Indian cases. *Nankai Business Review International*, *4*(2), 107–129. https://doi.org/10.1108/20408741311323326

Sufian, & Fadzlan. (2004). THE EFFICIENCY EFFECTS OF BANK MERGERS AND ACQUISITIONS IN A DEVELOPING ECONOMY: EVIDENCE FROM MALAYSIA. In *International Journal of Applied Econometrics and Quantitative Studies* (Vol. 1, Issue 4).

Tauseef, S., & Nishat, M. (2014). Wealth effect of mergers & acquisitions in emerging market: A case of Pakistan's banking sector. *Business Review*, *9*(2), 24–39. https://doi.org/10.54784/1990-6587.1269

Thi My Phan, H., & Daly, K. (2016). Market Concentration and Bank Competition in Emerging Asian Countries. In *Risk Management in Emerging Markets* (pp. 607–644). Emerald Group Publishing Limited. https://doi.org/10.1108/978-1-78635-452-520161031

Y.W. Tang, R., & M. Metwalli, A. (2013). Mergers and acquisitions in India, Pakistan and Bangladesh. *International Journal of Commerce and Management*, *23*(4), 327–338. https://doi.org/10.1108/IJCoMA-04-2013-0039