CHAPTER 5

Banking efficiency and Banking Performance

Overview: In this chapter, the researcher determines both profitability efficiency and marketability efficiency of commercial banks in India. Further, the study looks into the impact of the two efficiency scores on banking performance of commercial banks in India during 2005-2021.

5.1 Introduction

This study tries to assess banks' efficiency - profitability efficiency and marketability and then investigate the elements that factors affect efficiency in the banking performance in India. Profitability ratio measures a company's ability to create profit in relation to its return, operational costs, assets, and shareholders' equity. The profitability ratio show how successfully a company generates profit and benefits its shareholders. Efficiency ratios, contrastingly, assesses how efficiently a company uses its sources to maximize profits. Profitability efficiency refers to a bank's ability to create profits while effectively controlling risks and costs. It is a key component of banking performance, representing financial institutions' capacity to efficiently manage resources, produce long-term returns, and handle problems in a dynamic market setting. Profitability efficiency significantly helps to shareholder value development by increasing returns on equity and assets. Banks that achieve better levels of profitability efficiency attract investors, boost stock performance, and increase market capitalization, rewarding shareholders and encouraging long-term growth opportunities. Such banks are financially secured organization and better positioned to endure economic downturns, regulatory changes, and market volatility.

Marketability efficiency, on the other hands, explains how efficiently securities may be bought and sold in the market. It is determined by variables like liquidity, transparency, and investor trust. Banks rely on the capital market to raise funds through debt and stock issues. A liquid and efficient capital market enables banks to obtain money at competitive rates, allowing them to expand operations, invest in growth possibilities, and increase profitability. Marketability efficiency is critical to driving banking performance and competitiveness in today's changing economy. Banks may improve their marketability efficiency and achieve long-term growth by focusing on client demands, differentiation,

and innovation. Marketability efficiency evaluates a good or service's capacity to draw customers and turn a profit at a predetermined cost. Product creators ought to assess their goods' marketability and efficiency before releasing them for sale. The market concentration trend reflects a company's marketability in gaining market power (Abbas & Arizah 2019). Banking industries in established and emerging markets exhibit greater market strength. Structure-conduct performance, which determines the share of the market and concentration, is a definition of market authority. (Masud et al., 2019).

Examining the values of efficiency scores of banks finds relevance due to the fact that efficient banks can expand their business through deposits and credit, reach out to customers, and, lastly, help policymakers through the decision-making process using sophisticated decision-making tools. Efficient banks can compete more effectively since they have fewer operational costs (Maity & Sahu, 2022). In India, there is a significant quantity of literature on bank performance analysis, primarily focused on measuring technical and cost efficiency. Nevertheless, studies in Indian banking sector should also explore profitability efficiency and marketability efficiency of commercial banks. There are numerous reasons why Indian banks should conduct this kind of performance efficiency research.

Primarily the overall performance and profitability of commercial banks in India are expected to improve as a result of the various structural changes that have taken place in the Indian commercial banking sector with regard to operational autonomy, net interest margins, the quality of assets, and the latest technological innovations available to banks. The financial sector services are generally provided by commercial banks and other financial institutions in emerging economies. Their market success hence needs expert examination. In addition, the past of the economy of the past 20 years makes it abundantly clear that bank operations that are incompetent or inefficient are the root cause of financial crises. This observation appears consistent with the experience of India. India's banking sector has underwent a shift from a centralized to a market-based structure. (Rakshit, 2021).

The rest of the chapter has been classified into various sections. Section 5.2 discusses the development of the hypothesis; Section 5.3 gives the descriptive statistics; Section 5.4 presents the profitability efficiency and marketability efficiency scores of all 27 banks. Section 5.5 includes a comparison of marketability and profitability efficiency between

public-sector banks and private-sector banks. Section 5.6 presents the results of the regression analysis. Finally, section 5.7 presents the conclusion of this chapter

5.2 Development of hypothesis

This section discusses the development of the various hypotheses which are tested in this chapter.

According to Tan (2018), the Efficient Structure (ES) hypothesis proposes that banks' scale efficiency, rather than collaborating conduct, leads to better profitability. According to a number of research, the profitability of banks is significantly predicted by the efficiency of banks ((Olson & Zoubi, 2011); (Tan, 2018)). Lower efficiency in banking operations affects profitability by increasing interest rate spreads (Muharrami & Matthews, 2009). Numerous studies have been conducted in this regard regarding various efficiency evaluations; nonetheless, the majority of the literature reveals ambiguous and conflicting data about the impact of efficiency on bank profitability ((Chen et al.,2006); (Olson & Zoubi, 2011); Le & Ngo, 2020); (Kumar et al., 2021)). This research offers an important addition by comparing the efficiency of PVBs and PSBs in India. This kind of assessment is essential since bank objectives vary widely based on ownership type. For instance, PSBs provide loans to the priority sector with the goal of maximizing profits while simultaneously serving the interests of the country (Bhaumik & Piesse, 2008). Conversely, PVBs are driven only by profit.

Before anything else, a majority of research on bank efficiency ignored market efficiency, or the rise in the market value of banks, and instead concentrated only on profitability efficiency, or profit production. Because the current stock market should be used to evaluate a bank's genuine value, marketability efficiency is just as important as profitability efficiency for a bank.

Although efficiency assessment has been the subject of much research, little is known about how efficiency affects bank profitability in India. While some studies Olson &Zoubi (2011); Tan et al.(2017); Peng et al.(2017) looked at the impact of efficiency on the performance of banks across different developed and developing economies, most did not. The significance of marketability and profitability efficiency in the performance of banks has remained unknown in India.

Profitability efficiency: Amel et al. (2004) investigated profit efficiency in the context of the banking industry consolidation. Tobon and Kumbhakar (2013) examined the dynamic relationship between the cost, revenue, and profit efficiency of US commercial banks. It was shown that the poor performance of revenues resulted in a loss of 8.2 percent of profitability, whilst the efficiency of costs and revenues contributed 3.5 percent and 4.7 percent of the loss. di Patti and Hardy (2005), Tabak and Tecles (2010) for Brazil, and Belousova et al. (2018) for Russia, Sufian (2009) and Kamarudin et al.(2019) for Malaysia, Vu and Nahm (2013) for Vietnam are some examples of previous study on profit efficiency.

Rakshit and Bardhan (2022) finds that profit efficiency improves bank performance. Profit efficiency is positively correlated with Chinese commercial bank performance, showing that rising efficiency bring to greater performance of bank (Fang et. al.,2009). Based on existing the literature, the hypothesis tested for addressing this gap is

H5$_a$: There is a positive relationship between profitability efficiency and banking performance.

Marketability efficiency: The marketability efficiency was estimated based on the past studies of Rakshit (2019) in India, Abbas and Arizah (2019) in Indonesia, Chao et al. (2018) in Taiwan, & Shahwan and Hassan (2013) in the UAE. No study has addressed the impact of marketability efficiency on banking performance in India. Although, existing literature found that, marketability efficiency increases investor confidence and trust in the financial system. A transparent and well-regulated capital market attracts both domestic and foreign investors, resulting in higher capital inflows and liquidity. This, in turn, improves banks' stability and resilience, boosting their long-term performance. Hence, the hypothesis tested for addressing this gap is

H5$_b$ = There is a positive relationship between marketability efficiency and banking performance.

5.3 Descriptive statistics: Table 5.1 presents the summary statistics for the variables used in the study. As can be seen from Table 5.1, the percentage of ROA range from -67.52 to 25.02 with a mean value 1.42 Similarly, ROE and Tobin's q range from -75.31 to 31.6 and

0.01 to 5.70. The average of ROE and Tobin's Q is 8.42 and 15.85 It indicates that banks' performance varies widely from 2005 to 2021. The average profitable efficiency value is .965 with a range from .6 to 1. The mean value of marketability efficiency is .911 with range from .41 to 1. Indian banking sector perform better in terms of profitability efficiency compare to marketability efficiency. However, It indicates that banks in India are still a long way to achieve efficiency. The lowest value of marketability efficiency is less than .5 which means that the Indian banking sector has to give much more focus on marketability. According to the table, it can be concluded that there is a large difference in the profitability of the sample banks. Also, there is a large difference in return on assets (ROA), return on equity (ROE) of banks as there are banks having negative ROA and ROE and banks having positive ROA and ROE

Table 5.1: Descriptive statistics

Variable	Minimum	Maximum	Mean	Std. deviation
ROA	-67.52	25.02	1.42	5.27
ROE	-75.31	31.60	8.42	15.85
TOBQ	0.01	5.70	0.21	0.36
Profitable efficiency	0.60	1	0.97	0.05
Market efficiency	0.41	1	0.91	0.14
MCP	1.95	5.92	3.94	0.74
Liquidity	0.01	19.43	0.17	0.95
Size	3.11	7	5.07	.669
GDP	-7.40	8.50	5.98	3.68
INFL	3.30	11.90	6.81	2.70

Source: Author's computation

5.3.1 Correlation Analysis*:* Before performing a regression analysis, we test for multicollinearity by using the Pearson correlation. Table 5.2 displays the correlation matrix results, which exhibit a low correlation between the explanatory variables. As a result, multicollinearity does not create an issue for the regression analysis. If the basic correlation coefficient between two regressors is less than 0.8, multicollinearity is not a major issue.(Mayers, 1990 cited in Goswami, et. al, 2019). Given that the values in this matrix are less than 0.8, we can say that multicollinearity is not a significant issue for the set of data.

Table 5.2: Correlation matrix;

Variables	ROE	ROA	TOBQ	Prof ef	Mkt ef	MCP	LIQU	Size	GDP	INFL
ROE	1									
ROA	.085	1								
TOBQ	.195**	.128**	1							
Prof eff	.073	.123	.079	1						
Mkt eff	.189**	.054	.060	.399**	1					
MCP	.063	-.011	.420**	.322*	.188	1				
LIQU	.034	-.027	.009	-.019	.026	.030	1			
Size	-.13**	-.058	-.027	.028	.220**	.31**	.056	1		
GDP	.161**	.166**	.044	.036	.020	-.094*	.028	-.161**	1	
INF	.350**	.126**	-.018	-.003	-.046	.-065	-.054	.15**	-.001	1
VIF	1.47									

We also checked for the Variance Inflation Factor (VIF) multicollinearity. Gujarati (2003) states that the standardized value of VIF for each variable must be less than 5, and that a tolerance level close to zero indicates no multicollinearity. VIF less than 10 indicates that

there is no major multicollinearity concern. Since this matrix contains no values bigger the 5, multicollinearity is not a significant issue in this data set.

5.4: Analysis of profitability and marketability efficiency:

5.4.1 Profitability analysis: Table 5.3 shows the individual profitability efficiency scores of 27 banks by using the DEA model. Throughout the analysis, we discovered seven banks that consistently received an efficiency score of 1. These banks are- The State Bank of India(SBI), Central bank of India (RBI), HDFC, ICICI, Axis Bank, IndusInd Bank Ltd. and Kotak Mahindra Bank Ltd. Out of these seven banks, the first two are public sector banks and the rest five are private sector banks. As discussed in the section 3.4.1, an efficiency score of unity indicates that the DMU, here bank, is the best performing and the performance of other banks vary between 0 to 1. The efficiencies of other banks are relative to the best-performing bank. Thus, we understand that these seven banks are the most efficient in terms of profitability among the set of 27 banks over 2005 to 2021.

Table 5. 3: Profitability technical efficiency score of Indian banks using DEA method

COMPANY	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AXIS BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
BANK OF BARODA	0.96	0.96	1.00	1.00	0.97	0.96	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.98
BANK OF INDIA	0.91	0.95	0.95	0.95	0.92	0.90	0.91	0.94	0.95	0.92	0.90	0.90	0.95	0.91	0.92	0.92	0.85
BANK OF MAHARASTRA	0.93	1.00	1.00	1.00	0.93	1.00	1.00	0.90	0.91	1.00	0.98	0.93	0.99	0.94	0.92	0.93	0.90
CANARA BANK	1.00	0.95	0.98	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CENTRAL BANK OF INDIA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
INDIAN BANK	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.96	0.98	0.96	0.90	0.89	0.93	0.89	0.97
INDIAN OVERSEA BANK	1.00	1.00	1.00	0.99	0.90	1.00	0.90	0.97	0.99	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PUNJAB NATIONAL BANK	1.00	1.00	1.00	0.93	1.00	1.00	1.00	1.00	1.00	0.96	0.93	0.90	1.00	1.00	0.98	0.91	1.00
PUNJAB SIND BANK	0.7	0.75	0.74	0.7	0.9	0.8	0.8	0.85	0.8	0.9	1	0.96	0.95	0.88	0.6	0.72	0.87
STATE BANK OF IINDIA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UCO BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81
UNION BANK OF INDIA	1.00	0.93	1.00	0.94	0.90	0.94	0.99	0.97	0.96	1.00	1.00	0.97	0.94	0.93	0.98	1.00	1.00
DCB BANK	1.00	1.00	1.00	0.96	0.94	0.96	0.94	1.00	1.00	1.00	1.00	1.00	0.97	0.95	.90	.92	.98
DHANLAXMI BANK LTD	0.96	0.98	0.99	0.97	0.93	0.88	0.90	0.93	0.95	0.92	0.88	0.95	0.94	0.90	0.88	0.96	0.91
HDFC BANK	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
ICICI LTD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Bank																	
IDBI BANK	1.00	0.98	1.00	0.78	0.74	0.88	1.00	0.97	0.89	0.96	0.96	0.89	0.93	1.00	0.87	0.80	0.93
INDUSIND BANK LTD.	1.00	1.00	1.00	1.00	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CITY UNION BANK	1.00	1.00	1.00	1.00	1.00	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.96
FEDERAL BANK	0.94	1.00	0.91	0.96	0.93	1.00	1.00	1.00	0.92	0.98	0.97	0.91	0.87	0.87	0.90	0.88	0.91
J& K BANK	1.00	0.94	1.00	0.91	0.90	0.91	0.94	0.90	0.96	0.93	0.98	0.95	0.97	0.94	0.95	0.99	0.95
KARNATAKA BANK	0.95	0.92	0.95	1.00	1.00	1.00	0.93	0.95	0.98	1.00	1.00	1.00	0.97	0.98	0.91	0.92	0.99
KARUR VYSYA BANK LTD.	1.00	1.00	1.00	0.94	1.00	0.99	0.98	0.95	0.96	0.97	0.95	0.89	0.88	.90	.82	1.00	0.92
KOTAK MAHINDRA BANK LTD.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98	0.99	1.00	1.00	1.00
THE SOUTH INDIAN BANK	1.00	0.93	0.94	0.94	0.95	1.00	1.00	1.00	0.98	0.95	0.97	0.98	0.94	0.93	0.91	0.96	1.00
YES BANK LTD	0.74	0.84	0.84	0.95	0.88	0.88	0.87	0.94	0.89	0.93	0.9	0.96	0.92	0.84	0.9	0.95	0.93
YEARLY AVG	0.97	0.97	0.97	0.96	0.95	0.97	0.97	0.97	0.97	0.98	0.98	0.97	0.97	0.96	0.94	0.95	0.96

Source: Author's calculation

From Table 5.3, it is also observed that 19 banks obtained an efficiency score of one in the year 2005 which has later decreased to 12 in the years 2020 and 2021. The number of best-performing banks has reduced over these years which is a matter of serious concern for the banking sector in India. In 2021, the worst-performing banks were - UCO with profitability efficiency (0.81), BOI (0.85), and Punjab and Sind Bank (0.87)

Figure 5.1 provides a picture of the year-to-year average profitability efficiency score of 27 scheduled commercial banks. The yearly average profitability efficiency of the banks is observed to have an increasing trend from 2009 to 2015 after which the trend seems declining till the year 2019. In 2014 and 2015, the yearly average score was highest (0.98) while in 2019 the score was lowest (0.94).
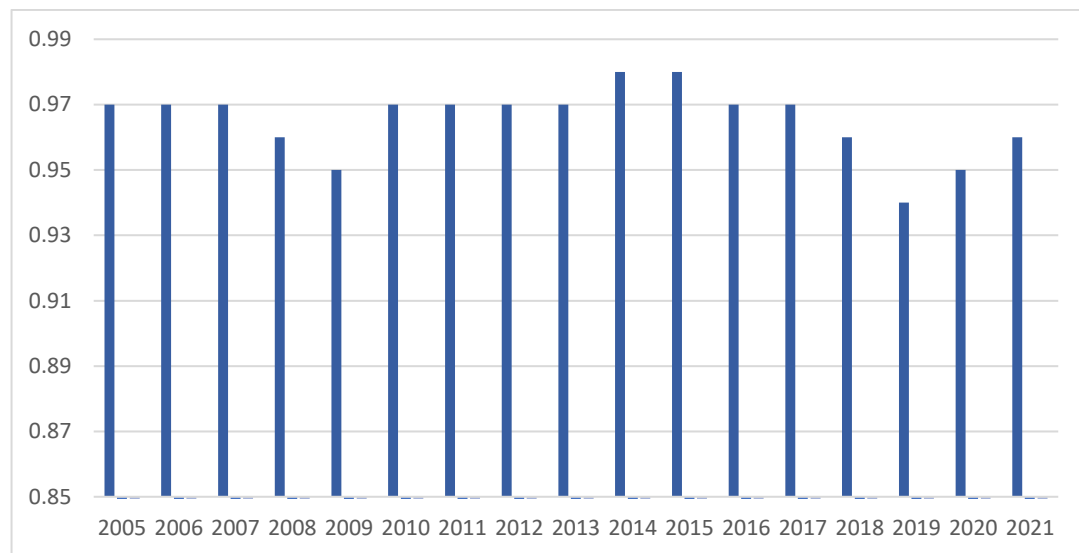
Figure 5.1 Yearly average profitability efficiency

Source: Author's calculation

The declining profitability efficiency of the banks in India was an obvious matter of concern for the government following which some crucial measures were seen to be adopted by the government in 2019. To obtain recognition and higher ratings in the worldwide market, as well as to expand opportunities for small banks to gear up to the international level with innovative goods and services, the government of India announced the merger of ten public sector banks into four major public sector banks in 2019. The list of bank mergers that accordingly happened in 2020 is shown in Table 5.4:

Table 5.4: Banks Mergers (2020)

Banks merged	Merger into Anchor (banks)
Punjab national bank	Oriental Bank of Commerce
	United Bank of India
Canara Bank	Syndicate Bank
Indian Bank	Allahabad Bank
Union Bank of India	Andhra Bank
	Corporation Bank

Source: Author's compilation

In a recent study by Herwadkar et al.,(2022),it was found that efficiency of acquired banks improved after the merger in India as it resulted in increased scale of production or productive capability. The rising trend of profitability efficiency of the banks since 2020 in Figure 5.1 also supports the same.

5.4.2 Marketability efficiency

Table 5.5 shows the individual marketability efficiency scores of 27 banks by using the DEA method. Throughout the analysis, we discovered five banks that consistently received an efficiency score of 1. These banks are - The state bank of India, the Central bank of India, ICICI banks. ltd, HDFC bank. ltd and Axis bank. Out of five banks, first two banks are public sector banks and rest three are private banks. From this, we can understand that these five banks are the most efficient.

Table 5. 5: Marketability technical efficiency score of Indian banks using DEA method

DMU	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AXIS BANK	1	1	1	1	1	.97	1	.99	1	1	1	1	.98	.99	1	1	1
BANK OF BARODA	1	1	1	1	0.9	0.91	0.95	0.95	1	1	1	1	1	.98.	0.98	1	1
BANK OF INDIA	1	1	0.9	1	1	1	1	1	1	0.87	1	1	0.92	0.95	0.85	0.95	0.8
BANK OF MAHARASTRA	1	1	0.86	0.87	0.86	0.88	1	0.77	0.77	0.86	0.83	0.89	0.94	0.9	0.98	0.88	0.87
CANARA BANK	1	1	1	1	1	1	1	1	1	1	1	0.93	0.9	0.96	1	1	1
CENTRAL BANK OF INDIA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
INDIAN BANK	0.84	0.83	0.83	0.9	0.98	0.89	1	1	1	1	0.98	1	1	1	0.93	0.96	1
INDIAN OVERSEA BANK	0.86	0.86	0.88	0.9	0.87	0.99	0.9	0.82	0.82	0.94	1	1	1	1	0.9	1	1
PUNJAB NATIONAL BANK	1	1	1	1	1	0.98	1	1	1	0.96	1	0.95	1	0.95	1	1	1
PUNJAB SIND BANK	1	1	1	0.85	0.86	0.88	0.88	0.8	0.8	0.95	0.88	0.88	0.88	0.96	0.8	0.74	0.41
STATE BANK OF IMDIA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UCO BANK	0.99	0.97	0.92	1	0.95	0.95	1	1	1	0.92	0.87	1	1	1	0.99	0.89	0.47
UNION BANK OF INDIA	1	1	1	0.98	0.97	0.97	0.98	0.97	0.97	0.98	0.97	1	1	1	0.96	0.97	0.99
DCB BANK	1	1	1	0.9	1	0.85	0.9	1	1	1	1	1	1	1	1	1	1
DHANLAXMI BANK LTD	0.92	0.91	0.94	0.88	0.87	0.89	0.89	0.77	0.77	0.99	0.93	1	0.94	0.95	0.87	0.93	0.86
HDFC BANK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ICICI LTD	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Bank																	
IDBI BANK	0.78	1	1	0.62	0.76	1	0.98	0.72	0.72	0.79	0.82	1	1	1	1	0.96	0.41
INDUSIND BANK LTD.	1	0.95	0.91	1	0..95	0..95	0.96	1	1	1	1	1	1	1	1	1	1
CITY UNION BANK	0.89	0.88	0.81	0.92	0.96	0.94	0.97	1	1	1	1	1	0.9	1	0.98	0.92	0.66
FEDERAL BANK	0.81	0.79	0.89	0.81	0.73	0.76	0.77	0.88	0.88	0.88	0.88	0.88	0.87	0.91	0.91	0.95	1
J& K BANK	0.93	1	1	0.93	0.88	0.77	0.84	0.87	0.87	0.72	0.79	0.81	1	0.86	0.81	0.8	0.5
KARNATAKA BANK	0.84	0.83	0.87	1	1	1	1	1	1	1	1	1	1	1	1	0.8	0.95
KARUR VYSYA BANK LTD.	1	1	1	0.93	0.91	0.85	0.92	0.86	0.86	0.91	0.85	0.84	0.86	0.86	0.82	0.86	0.49
KOTAK MAHINDRA BANK LTD.	1	0.96	0.99	1	1	1	1	1	1	0..98	0.98	1	1	0.99	1	0.98	0.98
THE SOUTH INDIAN BANK	1	0.66	0.53	0.98	0.93	0.89	0.97	0.87	0.87	0.92	0.9	0.72	0.91	0.95	0.99	0.98	0.52
YES BANK LTD	1		0.62	0.74	0.67	0.62	0.81	0.67	0.67	0.85	0.8	0.78	0.6	0.74	0.72	0.7	0.75
AVERAGE	**.98**	**0.96**	**.94**	**.95**	**.95**	**.95**	**.97**	**.93**	**.93**	**.96**	**.96**	**.97**	**.97**	**.97**	**.94**	**.94**	**.85**

Source: Author's calculation

From Table 5.5, it is evident that 18 banks had an efficiency score of one in 2005, which later decreased to 13 in 2021. Like in the previous case, the number of best markets-performing banks has reduced over the years. This poses a major challenge for the banking sector in India as well as the capital market of India. In 2021, the worst-performing banks in terms of marketability efficiency were - Punjab Sind bank with profitability efficiency (0.41), IDBI (0.41), UCO bank (0.47), Karur Vysya Bank (0.49), Jammu and Kashmir Bank (0.5) and South Indian bank (0.52). These scores are extremely low and for Punjab Sind bank, IDBI, UCO bank and Karur Vysya bank the marketability efficiency is below 50 percentage. Moreover, Punjab Sind bank and UCO bank are among the worst-performing banks in cases of both profitability and marketability efficiency demanding immediate attention.

Figure 5.2 offer an insight of the year-to-year average marketability efficiency score of India's 27 scheduled commercial banks. The highest yearly average (.96) was recorded in the year of 2018 and the lowest score in 2021 (.85). It is observed that bank frauds have increased over the years. Indian banks hit the highest amount of bank fraud in the year of 2020 (figure 5.6). It is possible that this has resulted in the lowest marketability efficiency score in 2021. Figure 5.6 shows the trend of bank fraud in India.
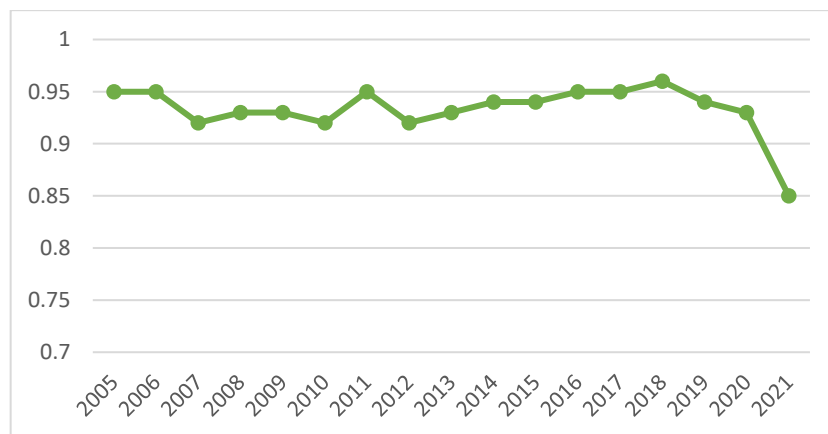
Figure 5.2: Yearly average marketability efficiency

Source: Author's compilation

Market efficiency bank is influenced by the confidence and faith of customers and investors in banks. The escalating incidences of frauds in financial sector and people's deteriorating faith in banking services would affect the global capital market and banking industry, as well as erode investor confidence on banking services (Mangala & Soni, 2023). Parvathy and Satheesh (2019) point out that the announcement of the occurrence of fraud has a detrimental

impact on the wealth of the shareholders. They lose faith in the banks where such fraud takes place. It will lower the demand for bank shares on the market. Thus, it adversely affects the marketing performance and overall efficiency of banking sector of India. Whereas, the rising trend of fraud in the Indian banking sector has resulted in an increase in NPAs and an adverse effect on the performance of the Indian banking sector (Hani, 2020). Hence, investors have become concerned about the future of the banking sector. It will bring down the market performance of the banking industry. Kelkar (2022) finds that bank fraud can have a significant impact on economies. Economic imbalances caused by bank fraud can cause the stock market to fall. According to Pooja (2019) growing frauds would result in a drop in share price, decreased staff efficiency, lower profit, reputation risk, negative regulatory intervention, and media attention. As a result, there will be less demand on the capital market for bank shares and this makes the banking sector inefficient.

To summarise the profitability and marketability efficiencies of all 27 banks, their average scores are presented in Table 5.6.

Table 5.6: Average Profitability and Marketability Efficiency of bank in India

Profitability efficiency		Marketability efficiency	
DMUs	Score	DMUs	Score
Central bank of India	1	Central bank of India	1.00
State bank of India	1	State bank of India	1.00
HDFC bank	1	HDFC bank	1.00
ICICI Ltd	1	ICICI Ltd	1.00
AXIS BANK	1	AXIS BANK	1.00
IndusInd Bank Ltd.	1	Kotak Mahindra Bank Ltd.	0.99
Kotak Mahindra Bank Ltd.	1	Punjab national bank	0.99
Canara bank	0.99	IndusInd Bank Ltd.	0.99
City union bank	0.99	Canara bank	0.99
UCO bank	0.99	Union Bank of India	0.98
Indian oversea bank	0.98	Bank of Baroda	0.98
Bank of Baroda	0.98	DCB bank	0.98
Punjab national bank	0.98	Karnataka bank	0.96
Union Bank of India	0.97	Dhanlaxmi Bank Ltd	0.96
Karnataka bank	0.97	Indian Bank	0.95

Indian Bank	0.97	Bank of India	0.95
The South Indian bank	0.96	UCO bank	0.94
Bank of Maharashtra	0.96	City union bank	0.93
Karur Vysya Bank Ltd.	0.95	Indian oversea bank	0.92
J& K BANK	0.95	Bank of Maharashtra	0.89
Federal Bank	0.94	Karur Vysya Bank Ltd.	0.87
DCB bank	0.93	The South Indian bank	0.86
Dhanlaxmi Bank Ltd	0.93	Federal Bank	0.86
Bank of India	0.92	IDBI bank	0.86
IDBI bank	0.92	J& K BANK	0.85
Yes bank ltd	0.89	Punjab sind bank	0.85
Punjab and Sind bank	0.82	Yes bank ltd	0.73

Source: Author's computation

Further, to understand if bank mergers of 2020 have an impact on the profitability and marketability efficiency scores in our study, we have computed the average DEA scores from 2005 to 2019 and compared them with the average DEA scores from 2005 to 2021. It found that there is not much difference between the profitability and marketability efficiency scores of banks prior to and after the merger in 2020.

Table 5.7: Comparison of efficiency score of banks between prior merger and post-merger in 2019.

Company	Profitability efficiency scores		Marketability efficiency scores	
	2019	**2021**	**2019**	**2021**
Axis bank	1.00	1.00	1.00	1.00
Bank of baroda	0.99	0.98	0.98	0.98
Bank of India	0.93	0.92	0.97	0.95
Bank of maharastra	0.96	0.96	0.89	0.89
Canara bank	0.99	0.99	0.99	0.99
Central bank of India	1.00	1.00	1.00	1.00
Indian bank	0.97	0.97	0.95	0.95

Indian oversea bank	0.98	0.98	0.92	0.92
Punjab national bank	0.98	0.98	0.99	0.99
Punjab sind bank	0.82	0.82	0.89	0.85
State bank of iindia	1.00	1.00	1.00	1.00
UCO bank	1.00	0.99	0.97	0.94
Union bank of india	0.96	0.97	0.98	0.98
DCB bank	0.97	0.93	0.98	0.98
Dhanlaxmi bank ltd	0.93	0.93	0.94	0.96
HDFC bank	1.00	1.00	1.00	1.00
ICICI bank ltd	1.00	1.00	1.00	1.00
IDBI bank	0.92	0.92	0.88	0.86
Indusind bank ltd.	1.00	1.00	0.99	0.99
City union bank	1.00	0.99	0.95	0.93
Federal bank	0.94	0.94	0.84	0.86
J& k bank	0.95	0.95	0.87	0.85
Karnataka bank	0.97	0.97	0.97	0.96
Karur Vysya bank ltd.	0.95	0.95	0.90	0.87
Kotak mahindra bank ltd.	1.00	1.00	0.99	0.99
The south indian bank	0.96	0.96	0.87	0.86
Yes bank ltd	0.89	0.89	0.74	0.73

Source: Author's calculation

5.5 Profitability and marketability efficiency between public and private sector banks

Further, in Figure 5.3 we compare the yearly average profitability efficiency scores of private and public sector banks and observe that the profitability efficiency score of private sector banks is higher as compared to that of public sector banks throughout 2005 to 2021.
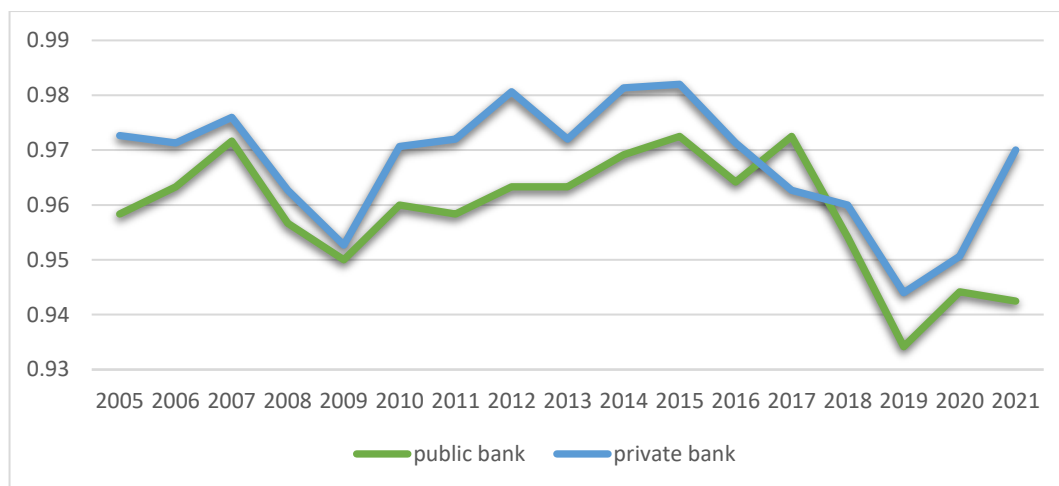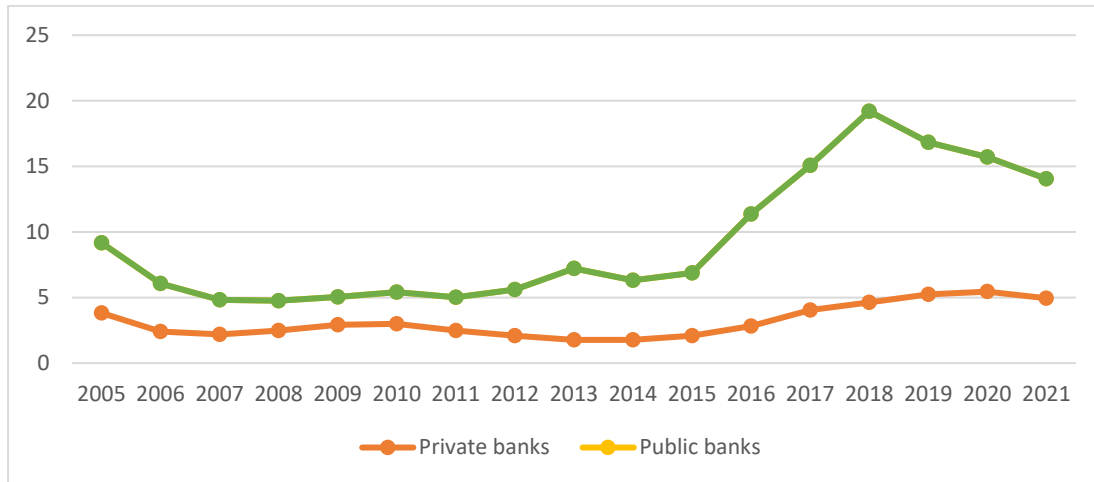
Figure 5.3: Profitability efficiency of private vs public sector banks
Source: Author's calculation

The high percentage of non-performing assets (NPAs) in public sector banks is most certainly the cause of their inferior profitability and efficiency. When compared to Indian private sector banks, the country's public sector banks have a higher NPA percentage. (Goyal, 2017).

This is clearly reflected in the figure in 5.4 The rate of profit is negatively impacted by the increase of non-performing loans. Expanding non-performing assets (NPAs) are concerning for banks as they are a significant source of revenue and profit for them. It diminishes their interest earnings on the one hand, while also affecting prospective investments and increasing their operational costs as the expense of recovering NPAs rises. Moreover, private sector banks have a focused strategy for profitable business segments. In contrast, public banks have a social mission, a substantial employees base, and a rural branch network to achieve. The findings are in line with Singh and Thaker (2020). As per RBI reports, the gross NPA of public sector banks in India has remained quite high compared to that of private sector banks from 2005 to 2021. In 2005, the percentage of gross Nonperforming assets to gross loans and advances of public sector banks in India was 5.35 percent while that of private sector banks stood at 3.83 percent. In 2021, these values increased for both public sector and private sector banks but for public sector banks the increase has been seen by a large extent to 9.11 per cent. Meanwhile, in private sector banks this increased to 4.94 percent. This substantiates our claim that the higher NPAs of public sector banks are responsible for their lower performance in terms of profitability efficiency. The government of India's initiative of the merger of public sector banks in 2019 should be able to bring down the percentage of gross nonperforming assets to gross

loans and advances of Indian public sector banks and thereby improve the profitability efficiency of Indian scheduled commercial banks in coming years.

Figure:5.4*: Gross NPA of the Indian banking Sector

Source: Author's calculation
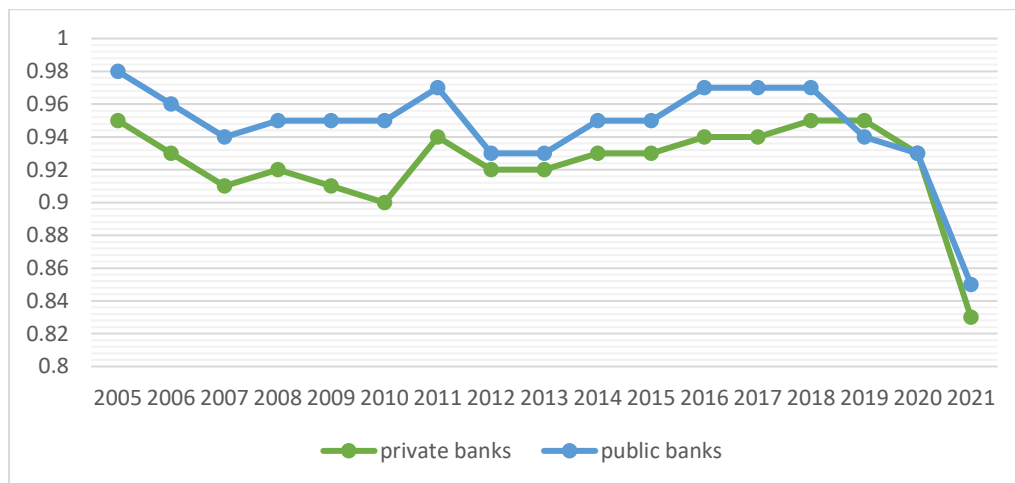
Figure 5.5: Marketability efficiency of private V/S public sector banks
Source: Authors compilation

Further, in Figure 5.5, we depict the marketability efficiency of private sector banks vis public sector banks. Contrary to the findings of profitability efficiency, it is observed that public-sector banks are more efficient in terms of marketability compared to profitability efficiency. We can observe that, over time, private banks have never surpassed public sector banks in terms of marketability efficiency., Compared to private banks, public sector banks enforced greater market discipline in India which has helped the public sector witness greater marketability efficiency and an improvement throughout the period.

The marketability efficiency of both public and private banks is dramatically reduced in 2021. This can be explained by the growing number of fraud incidents in both private and public sector banks in India. According to the RBI annual report 2020-2021, private sector banks saw the highest number of fraud incidents, while public sector banks contributed the most in terms of fraud value. The number of fraud cases reported in the case of private sector banks was 3,710 in 2020-2021 and that of public sector banks was 2,901. On the other hand, in terms of fraud value, public banks recorded an amount of Rs.80,901 crore during 2020-21, and for, private sector banks the value was Rs. 46,335 crores. Growing incidences of fraudulent activities in the banking sector has a negative impact on the market performance of banks directly causing a decline in the market efficiency of both private and public sector banks.
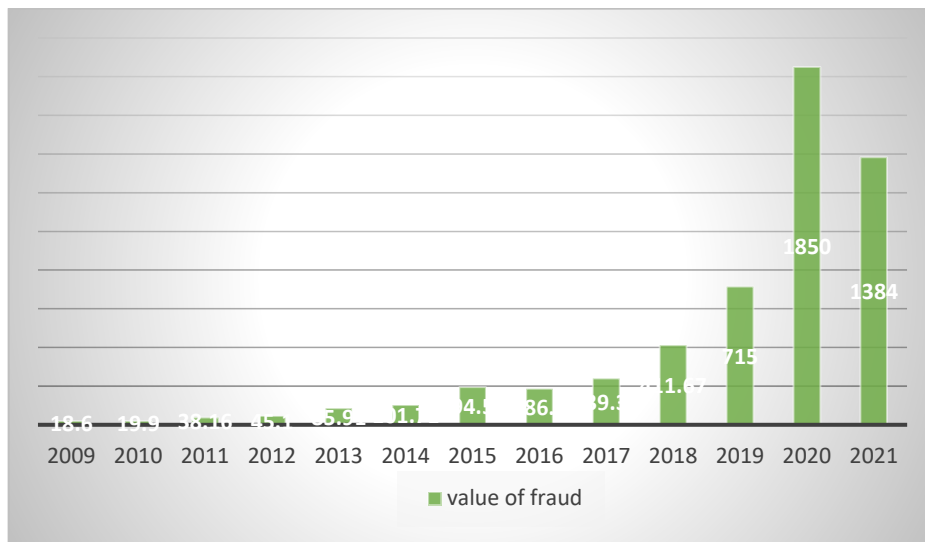
Figure 5.6: Value of bank frauds across India between from financial year

Source: Indian Statista

5.6 Regression Analysis

Table 5.8 shows the results of the various diagnostic tests, for all three regression models described in chapter 3.7

Table 5.8: Diagnostic test

Diagnostic test	ROA	ROE	Tobin's
Breusch–Pagan test for heteroscedasticity	Chi2= 2.06 P=.0385	Chi2= 4.1 P=.0004	Chi2= 2.04 P= .0407
Endogeneity for Wu–Hausman test (Beyer 2002)	Chi2=27.8 P=.000	Chi2= 7.4 P= .007	Chi2=69.9 P = .000
Arellano-Bond test (1995) for Autocorrelation	P= .3297	P= .1002	P=.3238
Frees' test for Cross-section dependence	P= .1794	P= .1794	P= .1794

Source: Author's calculations

Table 5.8 shows the results of the various diagnostic tests. The Arellano-Bond test shows no second-order serial correlation, whereas the Breusch-Pagan test indicates heteroskedasticity. The Frees' test demonstrates no cross-sectional dependence. Wu–Hausman test discovered the existence of endogeneity. The occurrence of these issues shows that the GMM is better suited for our data. Furthermore, our data set shows that N is bigger than T, indicating that the GMM model is suitable for estimation.

Table 5.9, shows SGMM the results of the Model. Our regression model is not suffer from multicollinearity as the variance inflation factor (VIF), which is used to detect multicollinearity, is less than 5 for all regressors.

Table 5.9: SGMM Estimation

Explanatory Variables	Dependent variable					
	ROA		ROE		TOBQ	
	Coefficient	Z	Coefficient	Z	Coefficient	Z
Profitable efficiency	.034**	2.42	.849**	2.25	.005***	3.72
Market efficiency	.106***	11.43	.115*	1.85	.001***	3.02
MCP	.032***	14.25	.058**	2.43	.001***	7.85
LIQU	-.018***	-5.22	-.072*	-1.73	-.007**	-2.17
SIZE	.069***	15.21	.112***	3.70	.003***	15.94
Lag (dependent variable)	1.03***	12.6	.834***	15.21	.917***	11.3
GDP	.011***	11.69	.004***	5.26	.004***	14.39
INFL	.022***	14.91	.009***	5.61	-.003***	-4.13
Wald chi2	47500		79146		75800	
P value	0.00		0.00		0.00	
VIF	1.68					

Source: Author's calculations

The results indicate that profitability efficiency and marketability efficiency are established to be significant and favorable related to the banking performance across the three different measures of bank's performance. The findings support our research hypothesis showing that, profitability efficiency brings positive performance outcomes in banking by addressing various business needs. Hence, we accept our first null hypothesis, which assumes that there is a positive relationship between profitability efficiency and bank performance. Additionally, the results shows that marketing efficiency creates positive impact on banking performance. Therefore, we accept our second null hypothesis, which assumes that there is a positive relationship between marketability efficiency and bank performance. It indicates that commercial banks with higher profitability efficiency and marketability efficiency have better financial performance.

Banks with a better degree of profit efficiency have a greater opportunity to enhance their cost efficiency, which leads to increased profitability of bank. In other words, efficient banks are able to reduce their cost and it leads to earn more profit from their banking business. Also, it is observed that NPAs are lower if banks are efficient, which makes them cost-efficient (Patra et al., 2023). Our findings are consistent with the findings of Rakshit (2022) which states that profit efficiency has a beneficial effect on performance of bank in the context of Indian banking and in the context of Chinese banking (Fang et al., 2019). Profit maximizing necessitates not just cost reduction but also income maximization. Profit efficiency is important, since profit is the primary objective of firms. As profit efficiency has a favourable influence on bank profitability, policymakers should prioritize profit efficiency above cost efficiency and revenue efficiency to improve bank performance in India.

The bank's involvement and performance in the share market is crucial as it positively influences the share market by improving liquidity in the capital market. This liquidity allows investors to quickly turn their investments into cash as needed, lowering the risk of being unable to sell assets amid volatile market conditions or emergencies. It will increase the trust of investors in banks. Which will positively affect banking performance. If banks are efficient in terms of marketability, they are able to raise the fund at lower cost since the investors have high confidence on them. It will increase the performance of the banks. Efficient banks are able to ensure that prices of assets and liabilities are correctly reflecting in the market. It will reduce mis-pricing and ensure high return to the investors. Additionally, market-efficient banks are better able to allocate capital effectively

compared to inefficient banks. High marketability efficiency guarantees that banks can readily acquire and sell these assets as needed, allowing them to adapt their asset mix to changing market conditions, regulatory needs, or risk management strategies. Moreover, efficient banks have maintained sufficient liquidity by transforming liquid assets, such as government securities or highly rated corporate bonds, into cash as needed. This ability to quickly obtain liquidity enables banks to avert liquidity crises and maintain financial stability. Banks with high marketability efficiency may have a competitive advantage in the marketplace. They can react faster to market opportunities, consumer needs, and regulatory changes than banks with lesser marketability efficiency. This agility and responsiveness enable banks to attract and keep clients, increase market share, and achieve long-term growth.

In the case of the control variables, market capitalization has a significant and favourable effect on explaining banking performance. Higher market capitalization leads to greater access to capital, market confidence and valuation, economies of scale and so on which in turn raise performance of banking sector. It is one of the most dependable measures of determining a company's worth. Investors realize the value of a firm is determined by its shares and they are able to compare the performance of the several banks by using this indicator. This is a typical measure for determining a company's market value. This comparison not only helps to understand a company's growth but also the risks associated with investing in it. It will eventually have a favourable effect on Indian banking performance and profitability.

In explaining the performance of banks in India, liquidity has significant and negative association. It implies that, idle cash in reserves, as well as low-yield liquid assets like cash or short-term government securities, often earn lower returns than loans or higher-yielding investments. Maintaining excess liquidity can incur costs for the bank, including storage costs for physical cash, administrative expenses. The bank size has a significant and favourable impact on explaining performance of banks because when the bank expands in size, it is able to make profit from economies of scale. It will decrease overhead costs and, as a result, better financial performance.

The rate of GDP growth has a positive impact on the economy. Rising level of GDP indicates expansion of economic activities that is backed by greater investment raised from the banking sector. This along with the rural Sector, there is growth and expansion of the

financial sector. Hence, we find a positive impact of GDP on ROA and ROE of banks. At the same time, expansion of GDP will see a raise in inflation which is controlled by hikes in interest rates. As interest rates raise, the market value falls creating a negative impact on the market performance poxy of Tobin's Q. Moreover, inflation have significant and positive effect on both ROA and ROE. Banks modify interest rates in response to the economy's inflation rate. This will result in sales growing faster than costs, which will boost profitability.

5.7: Conclusion

This study examined the profitability and marketability of 27 commercial banks in India. Private sector banks are found more efficient in terms of marketability and profitability efficiency. Since the higher number of private banks are efficient in terms of profitability and marketability efficiency. The number of banks achieving marketability efficiency is lesser than profitability efficient banks ((Uddin et al., 2022); (Luo ,2021)). Furthermore, the study found extremely low marketability efficiency scores of worst-performing banks and some of them are not able to attain a minimum of 50 percent of marketability efficiency scores. Moreover, Punjab Sind bank and UCO bank are among the worst-performing banks in cases of both profitability and marketability efficiency demanding immediate attention.

The global expansion of financial institutions necessitates an in-depth study of the banking sector's performance for an emerging and growing country like India. In India, the banking sector's growth trajectory has significantly improved, yet several public and private sector banks have continued to be vulnerable to the changes in the global economic, political and financial situations. This study finds that the banking industry's success is significantly influenced by the profitability and marketability efficiency of banks.

 A bank's profitability and marketability are crucial, as the stock market determines its final worth (Luo, 2003). Those banks generated higher profits; they did not generate as much market value. In other words, the inefficiency in Indian public and private banks is related to marketability efficiency rather than profitability efficiency (Nagaraju, 2014).

Private banks do better than public banks in terms of revenue creation and profitability. Public sector banks were more inefficient since they lacked in income production and dealing with NPAs, and they were unable to maximize income from their deposits.(Kumar & Kar, 2023). Policies that can increase banks' market participation should be considered.

Banking success is influenced by more than just the number of bank-specific elements. Everything depends on how effectively banks utilize their resources. Therefore, the Indian banking industry should equally focus on profitability and marketability efficiency. A bank must be profitable in order to function, but marketability is just as crucial as the present state of the stock market should ultimately define a bank's true value. The Indian banking sector should place a greater emphasis on marketability and expedite its drive to broaden its horizons in order to capture the capital market and improve its market value. Market-efficient banks increase their shareholders' wealth and returns. The study suggests that Indian public and private banks conduct frequent benchmarking to assess their effectiveness. Public sector banks should prioritize fee and commission income, which is more stable due to upfront payments. Mobilizing deposits can increase a bank's market share and improve company operations. Banks in India, particularly PSBs, should diversify revenue generation tactics such as fees and commissions to reduce non-performing assets. Diversifying revenue streams helps banks gain market share in the banking sector. To boost efficiency in PSBs, government shareholding should be minimized. This could help PSBs manage loan defaults. Finally, to address NPAs in PSBs, the government should use the "Bad Bank" idea (Hauck et al., 2015). In a developing nation like Indonesia, this tactic has proven effective (Brei et al., 2020).