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Mergers and Systemic Risk of Large Banks in India

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5.1. Introduction

The recent mergers of public sector banks in India has raised the level of concentration in the banking industry to much higher than that prevailed before. While the impact of increased concentration could be many, one important concern has been in regards to the rise in systemic risk of the financial system. Systemic risk is the risk of widespread failures of banking and financial institutions affecting the performance of their basic functions and thereby impinging upon the stability of real economy. Studies made across countries point out that consolidation of banks through mergers and acquisitions have led to higher systemic risk for both acquirers as well as their competitors (Weiss et al., 2014; Loffler and Raupach, 2018). Contrasting these are other studies that have discerned a significant decrease in systemic risk of acquiring banks after their mergers (van Dellen et al., 2018; Maslak and Senel, 2022). These differing findings have been discussed in the literature through the 'concentration-fragility' and the 'concentration-stability' hypotheses.

The prevalence of systemic risks in Indian banking, already recognized by the banking regulator, has begun to receive greater attention for academic research. The banking system here has typical features that makes the incidence of systemic risk particularly unique. Studies made over the last one decade or more indicate to certain amount of concern in some sections of the industry. More particularly that the impact of mergers and subsequent rise of banking sector concentration on the systemic risks may be significant. This paper makes an attempt to reveal the preponderance of systemic risk from having more big banks now. It examines the systemic risk contributions of banks that have become larger in size and systematically important following of their merger with others. For this, it applies certain known measures used for determining the systemic risk of banking institutions and attempts to evaluate whether the mergers have increased or reduced the risk impacts of the merged banks on the financial system.

The organization of the chapter is as follows. Section 5.2 discusses the literature on systemic risk in banking, followed by Section 5.3 on approaches for measurement of such risk. Section 5.4 reviews the studies made on systemic risk in Indian banks. Section 5.5 reports the recent events of bank mergers in Indian banking upon which the study is based. Section 5.6 discusses the data and methodological approach of this study. Section 5.7 discusses the findings and analysis and Section 5.8 concludes.

5.2. Systemic Risk in Banking Industry

Banks take various types of risks, such as credit, market, and operational risks, as part of their business. Excessive risk taking by banks often lead to banking sector crisis, and micro-prudential regulations such as the Basel Accord have been evolving to limit these risks. Bank regula-

tions have further included macro-prudential requirements such as counter cyclical buffers, and capital surcharges for banks considered as systemically important to contain the broader set of risk within the larger eco-system, industry and economy. Systemic risks are featured by their emergence as large shocks with negative externalities and impacts upon the stability of the entire financial system and the real economy (Bardo et al., 1998). The effects of systemic risk may materialize in different ways such as through disruption of information in financial markets disabling their effective functioning for intermediation (Mishkin, 1995), disruption of payment system, depression of asset values, general fear of losing savings and reduction of economic output linked to macro-economic changes (Dow, 2000).

Systemic risk may become manifested as contagion in the co-movement or correlation of bank failures in a single country or across countries (Kaufmann and Scott, 2003). Such contagion could spread in many ways which could be both rational and information based or in a random manner. For example, as Soerdarmono et al. (2017) observed abnormal loan growth and lack of credit information can lead to buildup of systemic risk. Importantly, such risk may not involve any direct causation but may develop as a chain reaction transmitted through indirect inter-connections between financial institutions. They may also occur as fall out of some exogenous or common shock such as a macro-economic disruption exposing the latent fragilities of the system. Any which way, systemic risks lead to creation of uncertainty regarding the possibility of failure of many institutions at the same time and consequently elicit strong holdup or bearish behaviors of institutions leading to extreme volatility or even freezing up of financial markets.

Systemic risks are often associated with large 'too big to fail' (TBTF) banks. TBTF banks take higher risk (Blundell-Wignall et al., 2014), have more market based activities (Laeven, 2014) and greater inter-connectedness with rest of financial industry (Dudley, 2012; Barth and Wihlborg, 2016), and hence threaten to impose their risk externalities (Taleb and Tapiero, 2010; Moenninghoff and Wieandt, 2011) and spill-over effects of their failure upon the financial system. Accordingly, they are known and classified as systemically important financial institutions (SIFI) that need exceptional government and stakeholder support for continued existence. However, expectation of such support may also lead to moral hazards and discrepant behaviour such as reduced market discipline, creation of competitive distortions, and increased probability of distress in future. Thus, they are likely to have higher tail risk shifted to debtholders without wealth gains for shareholders (Hagendorff, et al., 2018). These challenges necessitate that SIFIs be monitored stringently and subject to additional regulation to deal with the systemic risks posed by them. As complement to the Basel III reform measures, global systemically important banks (G-SIB) are subject to have Total Loss Absorption Capacity (TLAC) to absorb losses and be recapitalized if they fail. Bank consolidation by way of mergers and acquisition are of concern as they may lead to creation of TBTF banks posing systemic risk to the financial system (Kim, 2016).

Besides, systemic risks may also originate from other smaller and non TBTF banks who have lower levels of capital, liquidity deficit or less diversified portfolio and hence are weak and susceptible to exogenous shocks. These banks perform certain niche functions at important junctions and nodes in the financial network. Therefore, they can be the conduits for transmission of the contagion across the system. Failure of these may also trigger a chain reaction which can amplify and take over the entire system. Hence, there may be need for broader regulatory frameworks and provisions to identify the vulnerable and exposed institutions in order to contain systemic risks as they threaten to overwhelm the entire financial system at once.

5.3. Measuring Systemic Risks in Banking

Identification of systemically risky banks requires ex-ante determination of their systemic risks using well-defined and accepted procedures. Assessment of such risk for any institution would require measurement of the

contributing factors such as their size, individual vulnerability and inter-connectedness with the banking system. Broadly, there are two ways of identifying systemic risk from macroeconomic and microeconomic point of view (Vallascas and Keaset, 2012), which look at the contribution of each individual institution and how individual institutions react to systemic shocks respectively. Borri et al. (2012) have identified two approaches such as (i) network analysis and (ii) micro evidence approach to address systemic risk as an inter-connectedness phenomena and contribution of banks. Similarly, Gerlach (2009) and Cerutti et al. (2012) have identified three approaches to measurement of systemic risk by (i) monitoring the aggregate indicators of solvency of banks, (ii) measuring bank interconnections and (iii) analysing changes in bank asset prices. After the global financial crisis, the International Monetary Fund published a set of four approaches to assess financial sector systemic risks by determining systemic linkages: (i) the network approach, (ii) the co-risk model, (iii) the distress dependence matrix and (iv) the default intensity model (IMF, 2009). A summary of the various approaches to measure systemic risk with comments on their applicability for banking regulation can be found in Sum (2016).

One of the methods used to determine the systemic risk of banks has been the Conditional Value at Risk (CoVaR) approach. The CoVaR is an extension of the more popular measure of risk called Value at Risk (VaR) that quantifies the amount of loss to be suffered on a portfolio position over a period with a given level of confidence. The VaR measure, being determined under normal market or business conditions, provides the risk estimate for which strategies such as provisioning and capital adequacy work to strengthen the bank. However, the measure does not include the tail risk of the portfolio, which comprises of the extreme losses that may be encountered due to rare and unforeseen events and large shocks to the business. Systemic risks may be visualized as a tail risk for banks. Acerbi and Tasche (2001) offered the concept of expected shortfall that refers to the losses in the tail of the distribution of returns to a portfolio. It is the expected loss that could be incurred in the worst case scenario, when losses exceeds the VaR estimates. Adrian and Brunnermeier (2011) have elaborated the use of the CoVaR measure for a bank as function of VaR levels of other banks. Their methodology comprised of determining the CoVaR in critical conditions as against the CoVaR in median conditions. Several studies have used the CoVaR measure to determine the systemic risks of banks (Ayomi and Hermanto, 2013; Muharam and Erwin, 2017; Nabella et al., 2020).

One widely applied measure of systemic risk was put forth by Acharya et al. (2010) who determined a bank's systemic risk by estimating the capital shortfall contribution to the overall capital shortfall of the system during a crisis. Their model was based on conditional expected losses and the systemic risk measures derived were called as Systemic Expected Shortfall (SES) and Marginal Expected Shortfall (MES). SES was the propensity of a bank to be undercapitalized when the system as a whole is under-capitalized. It is a measure of a bank's expected contribution to systemic crisis. The MES measures a bank's expected equity loss when market falls below a certain threshold over a given horizon. For example, the average return of a bank's stock during the 5 percent worst days for the market when the banking system as a whole may have been in crisis. Patro et al. (2013) have proposed a method based on stock return correlations of financial institutions, for regulators to monitor and track the level of systemic risk. They observe that increase in stock return correlation are largely driven by increase in correlation between bank's idiosyncratic risks.

MES has shortcomings as it is an incremental risk measure which does not indicate to the absolute contribution of a financial institution to systemic risk. Idier et al. (2013) observed that standard balance-sheet metrics like the tier one solvency ratio are better able than the MES to predict equity losses conditionally to a true crisis. In view of this another measure called the Component Expected Shortfall (CES) was proposed by Banulescu and Dumitrescu (2012) where they considered the relative size of the financial institution in the system i.e. its market capitalization. CES being an absolute measure of the institution's contribution indicates the largest contributor of systemic risk.

This even helps in ranking the financial institutions according to their riskiness. Also, MES does not take into consideration the financial institutions' characteristics.

Brownlees and Engle (2010, 2017) added an economic layer to overcome MES's shortcomings by taking into account certain characteristics of the financial institutions and proposed the measure called SRISK. SRISK is defined as the expected capital shortfall of an entity conditional to a prolonged market decline, such as when the broad indices fall by 40% over six months, and is determined from the following equation:

$$SRISK = K \times DEBT - (1 - K)(1 - LRMES) \times EQUITY$$

..... Equation 5.1

Wherein, DEBT = Total liabilities of the bank, EQUITY = Total Tier I Capital including paid-up capital and reserves and surplus, LRMES = Long Run Marginal Expected Shortfall, which is the decline in equity values to be expected in the event of a financial crisis, and K = Capital adequacy factor or prudential level of equity relative to assets.

They approximated LRMES from the short run MES (SRMES), which was based on the expected return of a bank in case of 2% decline in daily market return. Thus, they extrapolated the SRMES to match a 'once-per-decade' crisis to determine LRMES using the following formulation, where the parameter k has been estimated via extreme value theory (for T = 6 months, they determined the value of k to be close to 18):

$$LRMES = 1 - \exp(- k \times SRMES)$$

..... Equation 5.2

The SRISK measure has found immense following including by some regulators (Migueis and Jiron, 2020) but have also received a number of criticism. Bancel et al. (2014) have expressed concerns with SRISK for taking into account market value of equity in a prudential framework. Besides, they also point out to the lack of particular definition of the K ratio and its application to different financial institutions irrespective of their nature. Fisher (2015) identified four shortcomings of SRISK, such as (i) market value is not an adequate substitute for book value in measuring systemic risk, (ii) failing to account for credit derivatives and other off-balance sheet risk, (iii) dependent on regulatory disclosures for capture of market data and (iv) can be applied only to publicly listed firms

Other recent studies (Verma et al, 2019; Khan et al., 2021; Wang et al., 2022) have also attempted to measure systemic risk as function of inter-connectedness of banks but in conjunction with other methods such as the CoVaR. These studies have used the method called as Tail Event Driven Network (TENET) modelling which identifies and ranks systemic risk emitters and receivers within the financial systems. Hardle et al. (2016) have used such technique to determine the systemic risk in the U.S. during the period 2007 – 2012. The IMF (2009) report has recommended use of multiple approaches to determine systemic risk. Accordingly, Das et al. (2022) combined banking system interconnectedness with default probabilities to determine systemic risks in emerging markets.

5.4. Systemic Risk in Indian Banking

The Indian banking system, with high level of government ownership of banks, may pose typical context for incidence of systemic risks. For example, Acharya and Kulkarni (2012) observed during the period of 2007-09, as the performance of vulnerable private sector banks became worse, their state owned counterparts continued to access deposit and grow their advances on the back of implicit government guarantees. Acharya and Subramanian (2016) as well as Dash (2021) have pointed out that public sector banks posed significantly greater systemic risk to the Indian banking system compared to the private sector banks. Engle et al. (2014) measured and found the SRISK value for Indian banking to be at US$ 70 billion. Gupta and Kashiramka (2021) studied well-diversified sets of listed commercial banks estimating the SRISK level to be around US$ 90 billion for the banking system in 2018-19 with public sector banks contributing significantly higher to the systemic risk than the private sector banks.

TABLE 5.1

Public Sector Bank Mergers and their Asset Sizes (Rs billion)

Year of merger	*Bank*	*Merged with*	*2019**	*2022*
April 2019	Bank of Baroda	Dena Bank & Vijaya Bank	7809.87	12779.99
April 2020	Punjab National	Oriental Bank & United Bank	7749.49	13148.05
April 2020	Canara Bank	Syndicate Bank	6947.66	12269.79
April 2020	Indian Bank	Allahabad Bank	2800.65	6716.68
April 2020	Union Bank	Corporation Bank & Andhra Bank	4940.38	11875.91

Note: * Size on standalone basis without the merging banks.

Other studies such as Gupta and Jayadev (2016) noticed that systemic risk of banks were related to their strategic choices which contrasted significantly with international evidence. They found that diversification across business segments by private sector banks reduced systemic risk while their differentiation strategy have no such effect. Also, systemic risk could be reduced if state-owned banks focused less on corporate segments. Verma et al. (2019) observed the intensifying inter-connectedness amongst Indian banks during times of crisis and made it a case for monitoring of systemic risks. Khan et al. (2021) found in their study of a few large private and public sector banks that both are sensitive to macro variables such as global risk, market risk, exchange rate volatility and liquidity spread. In a cross-country analysis of systemic risk around Covid 19, Duan et al. (2021) found that large, highly leveraged, riskier, high loan-to-assets, undercapitalized, and low network centrality banks exhibit higher systemic risk due to the pandemic induced shock. Das et al. (2022) observed that India faced one of the highest times of systemic risk during the taper tantrum in 2013 and later during demonetization in 2016.

In July 2014, the Reserve Bank of India (RBI) issued the framework for identifying domestic systemically important banks (DSIBs) using a number of parameters indicative of systemic risks, such as size, complexity, lack of substitutability and interconnectedness[1]. Accordingly, additional common equity Tier 1 (CET1) capital requirement over and above capital conservation buffer was introduced for DSIBs, which became fully effective from April 2019. In January 2023, the RBI updated its list of DSIBs identifying the State Bank of India, HDFC Bank and ICICI Bank as such banks.

1. https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=31680

5.5. Mergers and Systemic Risks in Indian Banking

Indian banking industry has witnessed a large number of bank mergers in the last two decades. However, the recent public sector bank mergers that occurred in the latter half of the last decade (Table 5.1) have been different than earlier ones. While in the early 2000s, there were mergers of weak or failed banks with others (such as that of Global Trust Bank with Oriental Bank of Commerce), mergers of subsidiaries (IDBI Bank with IDBI Limited) or takeover of much smaller banks (acquisition of Centurion Bank by HDFC Bank or Bank of Rajasthan by ICICI Bank), the more recent mergers were, mediated between performing banks to strengthen the banking system. These have led to a sharp increase in asset sizes of the banks involved compared to that before the merger. Therefore, while the effect of the earlier mergers on banking system concentration were lower, the ones made now may have indeed led to a higher concentration.

In a later Financial Stability Report of 2021, the RBI has observed that the systemic risk generated by the category of merged public sector banks was comparatively higher than the unmerged public banks (Reserve Bank of India, 2021). This raises important questions such as whether and to what extent the systemic risks have become raised owing to the mergers of the public sector banks in India.

The banking industry has been subject to repeated shocks both from external as well as internal sources. From the global financial crisis, to the ramped up domestic non-performing loans, non-bank finance companies debacle and the recent global pandemic followed by the war in Europe, the Indian economy and the banking system have been severely challenged. The government and the regulator have responded to all these challenges to keep the economy moving ahead. The mergers of public sector banks have been a major strategic decision intended to strengthen the banking system for the long run[2]. However, as these mergers have led to a significant rise in concentration of the industry, there may be possibility of other consequences for the banking system in terms of their systemic risk contribution. It is therefore important to examine the likely effect of the mergers on the change in systemic risks posed by these entities.

5.6. Methodology

This paper has applied the models of MES and SRISK developed by Acharya et al. (2010) and Brownlees et al. (2010, 2017) to determine systemic risks of banks. A sample set includes five public sector banks: Bank of Baroda, Punjab National Bank, Union Bank of India, Canara Bank and Indian Bank that have recently merged with other banks. These banks had government shareholding varying between 56.9 to 89.1 per cent in March 2021. Systemic risks for these banks were determined for periods corresponding to before and after their merger and compared to discern any significant change following the event. Also, the systemic risks of the banks were compared for the same periods with other banks of large sizes in the public sector (State Bank of India and Bank of India) and the private sector (HDFC Bank. ICICI Bank and Axis Bank) that did not undergo any merger during the period of reckoning (Table 5.2). Some of these banks have been recognized as DSIBs by the RBI. Limiting the systemic risk comparisons between merged and non-merged banks to the given set of large banks in both categories follows recent findings that TBTF banks are different from non-TBTF banks in regards of their risk taking and tail risk (Li and Lai, 2021).

TABLE 5.2

Asset Sizes (Re billion) of Other Large Banks

Bank	*2019*	*2022*
State Bank of India	36809.14	49875.97
Bank of India	6252.22	7346.14
Axis Bank	8008.86	11751.78
HDFC Bank	12445.40	20685.35
ICICI Bank	9644.59	14112.97

Data for the study were obtained from various sources such as the Reserve Bank of India Database titled Statistical Tables Relating to Banks in India and Annual Reports of banks - for bank specific data including Basel Pillar III disclosures, website of the National Stock Exchange (NSE) - for stock market data, website of Reserve Bank of India (RBI) - for macro-economic data. Daily closing stock prices of banks and Bank Nifty, from beginning of FY 2008 to the end of FY 2022, were used to determine the returns.

Specifically, the steps involved in the process were first, the determination of equity returns of banks and system wide correlation. Equity returns were determined for bank stocks and Bank Nifty from their data of prices. Estimation of correlation was made between the return on bank stocks and that of Bank Nifty. Second, the requirement of systemic risk capital of banks was estimated. From the data set comprising of Bank Nifty returns for 3736 days, the lowest 5 days of each year when returns declined by more than 2% were included to determine the MES. Third, for each of these days, the returns for the individual banks were obtained to calculate their short run MES (SRMES) from the simple average of stock returns from these days. The value of LRMES were then determined from values of SRMES. Fourth, for each bank the SRISK were determined as function of their debt (amount of total liabilities minus total equity), capitalization (level of Tier 1 capital), the prudential level of equity relative to

2. India needs 4-5 more banks like SBI to meet changing requirements of the Indian Economy. https://pib.gov.in/PressReleasePage.aspx?PRID=1758243.

TABLE 5.3
Correlation between Stock Returns of Various Banks and Bank NIFTY

	BNIFTY	*PSB1*	*PSB2*	*PSB3*	*PSB4*	*PSB5*	*PSB6*	*PSB7*	*PRB1*	*PRB2*
BNIFTY	1									
PSB1	.637**	1								
PSB2	.648**	.712**	1							
PSB3	.550**	.574**	.570**	1						
PSB4	.661**	.711**	.699**	.581**	1					
PSB5	.602**	.712**	.684**	.587**	.702**	1				
PSB6	.812**	.688**	.707**	.560**	.692**	.647**	1			
PSB7	.611**	.687**	.688**	.586**	.683**	.710**	.636**	1		
PRB1	.809**	.512**	.506**	.429**	.525**	.467**	.614**	.480**	1	
PRB2	.810**	.406**	.413**	.370**	.435**	.384**	.525**	.395**	.590**	1
PRB3	.881**	.535**	.532**	.456**	.557**	.492**	.674**	.504**	.711**	.635**

Note: ** Correlation is significant at the 0.01 level (2-tailed).

asset (taken as 9.5%; includes minimum Tier I capital ratio of 7% and capital conservation buffer 2.5%) and the calculated MES. SRISK values were also determined for the erstwhile public sector banks that became merged with the banks in the sample. These values have been added up to determine SRISK values for the merged entities and reported at the relevant place. Fifth, the amount of Tier 1 capital available for the bank was compared with that required to meet the credit, market and operational risk capital as well as the capital shortfall measured as SRISK. Data for credit, market and operational risk capital requirement were obtained from Pillar III disclosures made by banks. Names of the banks have been disguised in the analysis keeping in view the limitations of data and methodology used in the study, and thus the possible tentativeness of the results and findings.

5.7. Analysis and Implications

Analysis of correlation of stock returns of the banks with each other and the Bank NIFTY in Table 5.3 indicates a high degree of association between the variables. These large correlations reflect the market beta for the banks, which have generally been found to be higher than firms in other industries (Chakrabarti and Das, 2021). Within the set of banks, the stock returns of the DSIBs and private banks have higher correlation with the market returns, which can be explained by the fact of their higher market beta, and also their significantly higher weightage in Bank NIFTY. The high correlations suggest a strong underlying potential for systemic risk following adverse financial market risk events, such as sharp decline in stock prices and returns of these banks, being transmitted to other banks and the banking system.

Figure 5.1 trends the lowest 5 days of Bank Nifty returns, which declined by more than 2%, for each of the years from 2007-08 to 2021-22. The decline rose to around 9% during the

FIGURE 5.1
Trend of Decline in Bank Nifty Returns

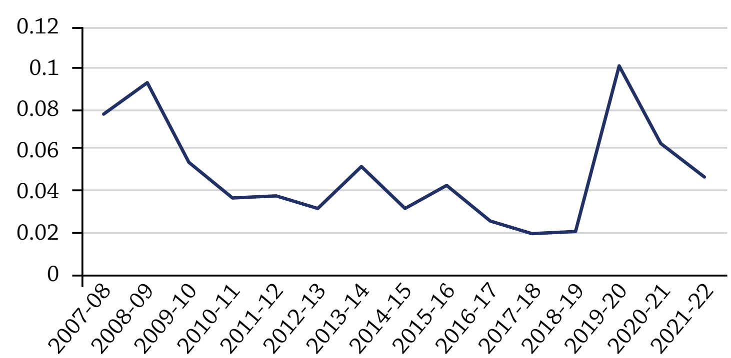
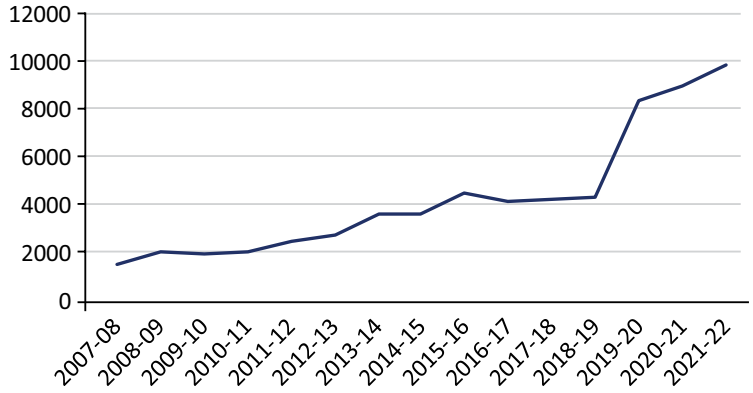


FIGURE 5.2

Trend of SRISK Values (Rs billion) Added for the Ten Bank Sample



global financial crisis in 2008-09, and following a recovery to around 2% in 2017-18, increased sharply to more than 10% before the onset of global pandemic in 2020-21, after which it came down to 5% in 2021-22. The beginning of the bank mergers just preceded the year of the global pandemic and provides a context to evaluate them and determine whether they enhanced the resilience of the banks involved better than other large banks. Accordingly, the findings are reported for two years: 2019 (before the merger) and 2022 (after the merger).

Figure 5.2 depicts the aggregated value of SRISK for the ten large banks which together which form around 74% of total banking sector assets. The SRISK value reached a peak earlier in 2008-09, then after a brief period of recovery, it had begun to rise from the beginning of the year 2011-12 until 2015-16 when it reached a new high. Thereafter, it remained almost constant till the end of year 2018-19. The values are consistent with the trends reported in other studies such as by Engle et al. (2014) and Gupta and Kashiramka (2021). After 2018-19, however, with further declines in Bank Nifty returns, the value of SRISK surged upwards.

The SRISK measures for the banks incorporating the effect of their size and level of leverage on systemic risk, are reported in Table 5.4. For the merged ones, the individual SRISK measures as well as the sum of SRISK values of all the merging entities before the mergers have been provided for the year 2019 and compared with the measures obtained after their merger for the year 2022. It is observed that the systemic risk of the banking system (indicated by the sum of SRISK of all the ten merged as well as non-merged banks) has increased over the years under study. However, the rate of increase of the summated values of SRISK for the merged banks has been significantly lower than that of the non-merged banks (particularly the DSIBs) between the two years. The size of assets of the merged banks, however, grew at lower rates than the non-merged banks particularly those in the private sector, leading the latter to pose a higher level of systemic risk. Credit growth of private banks indeed remained at the same rate between the pre and post pandemic period compared to the significant drop in the public sector banks (Sengupta and Vardhan, 2022).

Table 5.5 further provides data on the estimated capital shortfall as percentage of Tier I capital of banks. The estimated capital shortfall has been arrived at by deducting the SRISK capital from the buffer available after meeting the capital required for business risk (credit, mar-

TABLE 5.4

Amount of SRISK (Rs billion) for Banks

Banks with Mergers				*Banks without Mergers*		
Bank	*2019**	*2019***	*2022*	*Bank*	*2019*	*2022*
PSB1	476.06	592.31	939.06	PSB6	1919.49	3509.57
PSB2	415.37	637.49	930.71	PSB7	362.56	496.01
PSB3	178.91	347.64	481.55	PRB1	239.29	578.71
PSB4	447.92	642.64	954.23	PRB2	-94.81	602.85
PSB5	309.39	641.24	900.55	PRB3	177.22	528.86

Notes: *Standalone value of the bank; **Summated value of the merging banks.

TABLE 5.5

Capital Shortfall as Percentage of Tier 1 Capital of Banks

Banks with Mergers			*Banks without Mergers*		
Bank	*2019**	*2022*	*Bank*	*2019*	*2022*
PSB1	106.59	67.77	PSB6	67.77	129.45
PSB2	89.72	95.79	PSB7	53.68	42.18
PSB3	74.39	91.45	PRB1	12.81	25.13
PSB4	130.26	138.23	PRB2	-32.41	-5.07
PSB5	131.09	102.84	PRB3	-5.81	-3.08

Note: *Values on standalone basis without the other merging banks.

keting and operational risk) from the Tier I capital. The negative values indicate the presence of excess capital even after meeting the requirement for systemic risk as measured. For certain banks, the capital shortfall is found to be more than 100% of Tier I capital suggesting the need for higher capitalization. This may, however, be anomalous due to the SRISK methodology of comparing of the book value of equity with capital shortfall measured in terms of the market value of equity for entities having lower free-float market capitalization. However, the figures also suggest that the capital shortfall has declined for some of the merged banks. Also, it has declined for PSB7 but not for PSB6 and PRB1. Two of the PRBs have sufficient capital for meeting the systemic risk for both years.

Table 5.6 provides data of percentage increase in the components of Tier 1 capital: paid-up and reserves and surplus for the two years (for the standalone bank in 2019 and for the merged banks in 2022). It indicates that for all the merged banks, there has been increase in their capital base. These banks have benefited from capital infusion into itself as well as into the erstwhile banks that became merged. Similarly, PSB7 has also benefited from addition of paid up capital by shareholders. For PSB6 and the private banks, however, their increase in Tier 1 capital has been mostly through the rise in earnings and their reserves and surplus.

The table also indicates that the reserves and surplus of the merged banks have grown at much faster rate than the other non-merged banks. Within the set of former banks, for PRB2 and PRB3, the increase in reserves and surplus seem to have matched the increase in paid-up capital. These are also the banks that seem to have contained their capital shortfall. This means that the mergers may have resulted in gains in efficiency and profitability for banks even during the short period of observation.

TABLE 5.6

Increase (%) in Components of Tier 1 Capital

Banks with Mergers			*Banks without Mergers*		
Bank	*A**	*B**	*Bank*	*A**	*B**
PSB1	31.87	18.14	PSB6	0.00	5.05
PSB2	14.29	14.64	PSB7	18.67	8.58
PSB3	20.99	18.76	PRB1	3.65	12.69
PSB4	19.86	13.01	PRB2	1.33	17.72
PSB5	42.79	21.72	PRB3	1.57	10.20

Note: * A: Paid up capital; B: Reserves and surplus.

5.8. Concluding Observations

To conclude, the findings from the study point out that there has been increase in systemic risk after the recent public sector bank mergers, measured as SRISK, which includes bank specific characteristics such as size and leverage. However, in the period after the mergers there has been a significant rise of SRISK for non-merged large banks, particularly the DSIBs owing to their higher growth of credit as compared with the merged banks. For the private banks, SRISK have risen sharply but they seem to have sufficient capital buffer to meet their business as well as systemic risks. Therefore, while size and growth of banks appears to be significant for systemic risk, the level of bank capitalization also emerges to be important. The study finds that though the recently merged banks may have received significant capital infusions during the merger, they may have managed the transition during the merger better by growing steadily and becoming more efficient and profitable.

Several limitations of the study owing to data and methodological gaps are acknowledged. Since public sector banks have relatively small free float market capitalization due to government shareholding, their decline in decline in market value of equity along with fall of Bank NIFTY may not be accurately represented. The application of SRISK methodology to measure of systemic risk for these banks may indeed be problematic. The study does not report on estimates of systemic risk contribution of the banks determined by measuring the component expected shortfall. Also, it does not examine other aspects of systemic risk, such as activities of inter-bank borrowing and lending and such networks between banks, as well as increased digitization and involvement of fintech companies in bank lending processes, which can form potent channels for transmission of risk and contagion effects.

Acknowledgement: *The author would like to thank Dr. Partha Ray and Dr. Ashish Srivastava, for their helpful comments on the paper, and Dr. Tasneem Chherawala for her presentation on the topic in a monthly seminar of NIBM. Earlier discussions with Ms Anushi Malik, PGDM Batch of 2019-21 are also thankfully acknowledged.*

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