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## RECAPITALIZATION AND ITS IMPACT ON BANK'S STABILITY, COMPETITIVENESS AND PROFITABILITY: EVIDENCE FROM INDIAN PSBs

**Keywords:** capital infusion, asset quality, profitability.

**J E L Classification:** G20, G21, G28.

**Abstract:** There is a current argument relating to the capital infusion to the banks for strengthening capital on one side, without taking prudential measures to reduce the strains already present in the credit quality of banks on the other. The regulators thought that recapitalization of banks will be used to effectively reduce the cost of

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funds in the regular business provided when there is a higher lending demand. The capital infusion may turn out ineffective if there is less loan demand. On this background, this paper examines the effect of recapitalization of Indian public sector banks, and its impact on banks stability, competitiveness and profitability. Out of 21 banks, 18 banks reacted positively in case of one indicator, but failed in regard to overall indicators. Finally, the study reveals an interesting outcome that, there is no relationship between the size of the infusion and the performance of the bank. Hence, the study concludes that the capital infusion will help the banks significantly to improve the stability, competitiveness and profitability only when the banks' fundamentals are strong, combined with the deployment of fresh funds and their managerial capability.

### ■■■ INTRODUCTION

Recapitalization of banks is the strategic move towards cleaning stressed assets of strained banks' balance sheet. The policy makers believe that it has the potential to increase the lending capacity even during the crisis period. The practice of injecting capital to the banks differs with the level of the economy the state holds; some do equity purchases, some may do subordinated debt or otherwise injection of cash or else introducing recapitalization bonds both negotiable/non-negotiable mostly by the Governments or the combination of these methods of issuing fresh capital. The agenda of injecting new capital is to strengthen the banks during crisis period and to recover quickly once economy speedup.

### RECAPITALIZATION: A VARIETY OF PRACTICES

The recapitalization of banks has the clear vision on removing the strains present in the bank's balance sheet and fulfilling the capital requirement to stay along with the global regulation. The devising of various strategies for recapitalization of banks purely depends on the economy of the country. The various recapitalizations which happened previously are: Mexico, in 1995–1996, FOBAPROA, a bank restructuring organization issued non-tradable bonds with 10-year maturity to purchase bad asset of banks; Korea, in 1998–1999, (KAMCO) the Korean Asset Management Company purchased bad assets and equities by issuing tradable bonds; Malaysia, 1998–1999, Danaharta a government owned asset Management Company issued zero coupon bonds with market-based yield to finance banks' bad assets. And also, the Malaysian Government setup

separate independent bank to assess the recapitalization requirements of Malaysian banks, mostly the injection was in the form of equity or hybrid instruments. In Thailand, 1999–2000, the Government issued 10 years maturity recapitalization bond with market-related fixed interest rates both tradable and non-tradable bonds to purchase bank equity as well as debentures.

After the global financial crisis, most of the developed countries, especially global currency regions like US Dollar and Euro regions, announced comprehensive rescue packages involving some combination of recapitalization like debt guarantees and asset purchases. Capital injections in the Netherlands amounted to 5.1 percent of GDP in 2008, in the UK (3.4 percent), US (2.1 percent), France (1.4 percent) and Japan (0.1 percent). Practices of countries differed widely in terms of the features of the recapitalization plan.

**Table 1.** Recapitalization in advanced economies

Sl.No	Country	Month & year	Relief amount	Type of Instrument used
1	Germany	13-10-2008	80 billion €	Any appropriate means
2	France	13-10-2008	40 billion €	Subordinated debt, Preferred shares and common/ordinary shares for distressed banks
3	Spain	13-10-2008	–	Preferred shares, Common/ordinary shares, and/or non-voting shares
4	Italy	8-10-2008 28-11-2008	–	Preferred shares Undated/perpetual subordinated debt/loan
5	Netherlands	9-10-2008	20 billion €	Any appropriate means
6	Japan	17-12-2008 17-03-2009	12 trillion ¥ 1 trillion ¥	Preferred shares, Subordinated debt, undated/perpetual subordinated debt/loan
7	United Kingdom	8-10-2008	50 billion £	Common/ordinary shares, preferred shares
8	United States	13-10-2008 10-02-2009	250 billion \$ –	Preferred shares, warrants Mandatory convertible preferred (MCP) shares (converts after 7 years), warrants

– : Not available.

Source : Panetta, Faeh, Grande, Ho, King, Levy, Signoretti, Taboga & Zaghini, 2009.

### RECAPITALIZATION OF PUBLIC SECTOR BANKS IN INDIA

In 1993–1994,<sup>1</sup> the glorious era of Indian banking sector took place because most of the reforms started during this period. The major reformations like the introduction of prudential norms and capital adequacy norms geared the capital positions of the state-owned banks in India. January 1, 1994 the first capital infusion by the Government of India injected fresh capital of Rs. 57 billion under equity and bonds. The next injection amounted to Rs. 204 billion to the public sector banks from 1992–1993 to 1998–1999. The Government fixed certain eligibility criteria to avail fresh capital by the participating banks to improve the performance and the structural changes in the operational policies and organizational structure in line with the global standards and also increasing the usage of technology in operation as well as providing services to the customer. From 2007–2008 to 2009–2010, total amounts of Rs. 131 billion was injected in PSBs. During this period, the global financial crisis shook the root of the western side of the banking sector but the Indian banking sector escaped largely because of the stringent regulatory norms imposed by the RBI. From 2010–2011 to 2014–2015, an attempt was made to link the eligibility of the PSBs to get capital infusion purely based on performance was initiated and the total amount of Rs. 666 billion was injected in PSBs during this period. From 2015–2016 to 2018–2019, the government estimated Rs. 1.8 trillion capital requirements and it devised a plan named as Indra Dhanush. Under this plan, Rs. 700 billion has been allocated on finance budget and the remaining Rs. 1.1 trillion has to be raised in the market by divesting their non-core assets. To fulfill the Basel III norms again in October 2017, the Government announced a major recapitalization plan of Rs. 2.11 trillion to support the PSBs struggling with high levels of bad assets. Hence, the recapitalization of PSBs has been a regular exercise by the government to ensure the stability of the banking sector because the banking sector plays a major role in any economy, especially in a developing economy.

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<sup>1</sup> 1. Report on Trend and Progress of Banking in India for the year ended June 30, 2017 submitted to the Central Government in terms of Section 36(2) of the Banking Regulation Act, 1949.

2. Issuing Government Bonds to Finance Bank Recapitalization and Restructuring: Design Factors That Affect Banks' Financial Performance', IMF Policy Discussion Paper, PDP/03/4, International Monetary Fund.

### RELATED LITERATURE

Recapitalization of banks literature has limited studies, most of which concentrate on measuring the effectiveness of particular capital infusion such as Troubled Asset Relief Program (TARP), Capital Purchase Program (CPP), Seasoned Equity Offerings (SEOs) in bank lending and most particularly during the crisis period. Therefore, the present study addresses the overall effect of recapitalization, not particular and it also measures the recapitalized banks financial health and its effect on various parameters such as profitability, competitiveness and stability with different period of capital injection of PSBs with different financial condition.

Chiarella, Cubillas and Suarez (2019) compared the effect of different issuing methods like Seasoned Equity Offerings (SEOs), rights issues and many more ways of doing the capital infusion in banks. Unlike the literature related to recapitalization, most of which concentrate on non-banking firms and largely on US conditions, this study evaluates the announcement effect of 124 SEOs by 66 banks from 20 European countries. The study reveals that the recapitalization of banks is more beneficial if the bank has capital access in the equity market whenever needed or under crises. But practically this is not possible as it requires more formalities for the bank to raise the capital in the market and also their ownership and the market information about all these parameters play major role in the effective way of recapitalization.

Beccalli, Frantz and Lenoci (2018) claim that the recapitalization of banks through seasoned equity offerings (SEOs) has effect on asset growth and does not have effect on deleveraging. Moreover, SEOs reduce profitability and lending and increase systemic risk after the recapitalization. The impact of SEOs is measured on capital shortage as bank uses SEO to further strengthen their capital and capital surplus banks use SEOs for reducing nonperforming loans. In underpriced banks, SEOs lead to increase in systemic risk. Hence, the finding supports the view that the ownership plays a role in the usage of SEOs, the state-owned banks react to the SEOs increases in the profitability and reduce the systemic risk. Moreover, the bank that uses SEOs to recapitalize is the biggest loser and contributor for the further crisis.

Tahir, Adegbite and Guney (2017) evaluate the effectiveness of bank recapitalization by using macroeconomic variables in five countries. The author claims that the study does not focus on a single country unlike prior studies,

but it is an internationally focused study relating to recapitalization of banks. The result shows that response to the recapitalization of banks is similar in both developed and developing nations. The main findings of the study state that the recapitalization reduces the lending rates of the banks in all five countries. The important findings of the study reveal that the developing nations are deficient in introducing activities for creating demand for loans.

Liu, Kolari, Tippens and Fraser (2013) compared the financial condition of the US banks that received TARP funds to cleaning up the troubled banks under the Capital Purchase Program (CPP). The result of the study reveals that the banks which are recovering from crisis improved their financial condition more than non-recovery banks. Moreover, the study suggests that the restrictions in CEO payment increased the likelihood of repayment. Bayazitova and Shivdasani (2012) also reveal that the restrictions in executive payment encouraged banks to repay TARP funds. The study findings state that the TARP relief programme counters the crisis and speeds up the recovery of distressed banks. Moreover, the capital infusion improves the market discipline of the distressed banks.

Brei, Gambacorta and von Peter (2013) study the effect of how the rescue packages helped to stabilize the supply of bank lending during the crisis period. This study focuses on both global as well as local factors in the context of recapitalization of the banks. The main result suggests that the banks already having capital strength use the capital infusion for further lending and it enhances bank lending. On the other hand, the banks which are undercapitalized may not utilize or transfer the capital injection into additional lending. Here, the undercapitalized banks use this to restore the regulatory capital requirement. The study also suggests that the rescue packages work once the bank's balance sheet gets cleared with the distressed assets.

Black and Hazelwood (2013) examine the effect of TARP on bank risk-taking behavior. The results indicate that the large TARP recipient's bank average risk rating is higher when compared with large non-TARP banks in terms of loan origination. Moreover, the large capital infused banks have used the capital for further lending which may also increase the credit risk but it is not in the case of small banks because they use the capital infusion for their further strengthening of bank capital. Overall, the results suggest that the origination of loans during the crisis increases the risk of further diminution in asset quality of large TARP banks but conversely it decreases the outstanding Commercial & Industrial loans compared with non-TARP banks. Therefore, the study sug-

gests that the credit expansion during crisis period increases the asset quality and reduces the risk.

Montgomery and Shimizutani (2009) compared the bank policy with the practice of bank recapitalization in Japanese banks. The findings of the study reveal that the first round of capital injection in 1997 had effect on increase in capital ratios on internationally active banks and no effect on domestic banks. In 1998, the second round of injections was effective not only in raising capital ratios for international and domestic banks but also significantly impacted other policy objectives as well. The study further reveals the difference between the two injections. The first injection does not have any selection criteria for the recipient banks, so it does not have much impact. But the second capital injection is huge and there is a selection criterion for banks according to their individual financial conditions.

Overall, after reviewing the existing studies, the author assumes that the recapitalization of banks will facilitate in complying with international capital standards of Basel III norms. It helps in strengthening banks liquidity, and in turn the banks will increase the lending activities and it automatically increases the asset size of the bank. Moreover, it increases the profit margin of the bank. Overall, the recapitalization will enlarge the volume of business and increases the banks financial stability and competitiveness. It also reduces the quantum of NPAs accumulation and in turn it will reduce the burden of provisioning for the bad loans and the cost of funds will also get reduced. Hence, the capital infusion will also increase the overall performance of the bank. The present study uses the main variable as capital infusion from 2008–2009 to 2018–2019 and its impact on 21 public sector banks competitiveness, stability and profitability indicators have been depicted below.

### **OBJECTIVE**

Based on the above literature reviewed, the study aimed at analyzing the overall effect of recapitalization of Indian PSBs and its impact on banks stability, profitability and competitiveness.

## METHODOLOGY

The study uses panel data analysis to measure the relationship between the time series and cross-sectional data. The OLS (ordinary least square) regression method is the basic and simplest method to pool the data and measure the association between the dependent and independent variables. The basic assumption in using the common effect OLS method is a difference in intercepts across time series or cross-sectional data (Fitrianto & Kahal Musakkal, 2016). It is also used to estimate both one way, i.e., the individual model and two way, i.e., between the model.

The model is given by the basic equation:

$$Y_t = a + b X_t + u \quad [1]$$

$$Y_i = a + b X_i + u \quad [2]$$

Where:

i = unit of observation,

t = period of time,

a = intercept,

b = coefficient of the independent variables,

x = vector of observations of explanatory variables,

u = error term.

## DATA DESCRIPTION AND TERMINOLOGIES

The study uses secondary data collected from RBI website relating to 21 public sector banks for a period of 10 years starting from 2008–2009 to 2018–2019. Panel OLS, Spar line chart and Trend analysis to fulfill the objective and uses the variables, total asset, total advances, cost of funds, capital adequacy ratio, ratio of term loans to total advances, non-performing assets, return on assets, return on equity and liquidity.

**I. Spar line chart:** The trend of a particular variable can be presented using a spar line chart.



**II. Panel OLS regression model:** The relation between Capital infusion, Competitiveness (Low-cost fund, Asset Quality) and stability (capital adequacy and liquidity) is checked using panel OLS.

The model is given by:

$$Y_{it} = a + b X_{it} + u \tag{3}$$

Where:

i = 1 to 21, i.e., no of banks under study period and,

t = 1 to 10, i.e., no of years,

Y= Total asset, Total advances, Cost of funds, Capital adequacy ratio, Ratio of term loans to total advances, Non-Performing Assets, Return on Assets, Return on Equity, Liquidity,

X = Capital infusion and u is the error term.

**VARIABLES USED**

**Table 2.** Presents the areas of study, names, and definitions of the dependent and control variables

Areas of Study	Variable	Variable name	Variable Proxy
<i>Dependent variables</i>			
1. Stability	Liquidity Capital adequacy	Liquid assets/Total assets, Capital adequacy ratio	Liquidity, CAR
2. Competitiveness	Cost of Funds Asset quality	Spread, Total Assets, Total Advances, Ratio of term loans to total advances, Non-Performing Assets	COF, NPA, Term loan
3. Profitability	Return on Assets Return on Equity	Net income /total assets, Net Income/ Shareholder's Equity	ROA, ROE
<i>Control variable</i>			
4. Capital Infusion	Fresh Capital	Capital Infusion	CI

Source: author's description of variables.

### EMPIRICAL ANALYSIS AND DISCUSSION

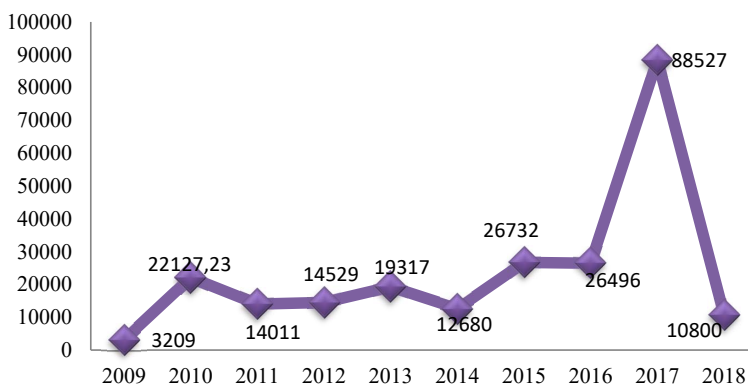
**Table 3.** Provides the time series data for Capital Infusion from 2008–2009 to 2018–2019 (Rs. In Crores)

Banks Name	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Sparkline
Allahabad bank	0	670	0	0	400	320	690	451	1500	1790	
Andhra Bank	0	1173	0	0	200	120	378	0	2990	2019	
Bank of Baroda	0	2461	0	850	550	1260	1786	0	5375	0	
Bank of India	0	1010	0	809	1000	0	3605	2838	9232	0	
Bank of Maharashtra	0	940	470	406	800	588	394	300	3173	0	
Canara Bank	0	0	0	0	500	570	947	745	4865	0	
Central Bank of India	450	2253.19	676	2406	1800	1617	535	1980	5158	0	
Corporation Bank	0	309	0	204	450	0	857	508	2187	0	
Dena Bank	0	539	0	0	581	140	407	1046	3045	0	
Indian bank	0	0	0	0	400	280	0	0	0	0	
Indian Overseas Bank	0	1054	1441	1000	1200	0	2009	2651	4694	2157	
Oriental Bank of Commerce	0	1740	0	0	150	0	300	0	3571	0	
Punjab National Bank	0	184	655	1248	500	870	1732	2112	5473	2816	
Punjab & Sind Bank	0	0	0	140	100	560	0	0	785	0	
Syndicate Bank	0	633	0	0	200	460	740	776	2839	0	
State Bank of India	0	0	7900	3004	2000	2970	5393	5681	8800	0	
UCO Bank	450	1613	48	681	2023	0	935	1925	6507	0	
Union Bank of India	0	793	0	1114	500	111	1080	541	4524	0	
United Bank of India	300	558	0	100	700	800	480	1026	2634	0	
Vijaya Bank	0	1068	0	0	1450	0	220	0	1277	0	
IDBI Bank	0	3119.04	810	555	1800	0	2229	1900	7881	0	

Source: computed from RBI (Statistical Table Relating to Banks in India).

Table 3 provides the time series data for Capital Infusion from 2008–2009 to 2018–2019. The trend of Capital infusion in all 21 banks is provided in the Spar line chart; the chart clears the variation in capital infusion for various periods starting from 2008–2009 to 2018–2019. The sparline shows that the majority of the injection happened from 2012–2013 to 2016–2017. The reason may be Basel III implementation process started in India during 2013 and it ended in 2019 for further strengthening of bank capital and attaining global standards. During the study period total capital infusion in State Bank of India tops with Rs. 35748 crores, followed by Bank of India Rs. 18494 and IDBI Rs. 18294.04 crores. From the bottom side the Indian Bank Rs. 680 crores are the lowest infused banks followed by Punjab & Sind Bank Rs. 1585 crores and Vijaya Bank Rs. 4015. The infusion has been done based upon the need and the performance of the banks. The sparline chart of Table 1 except four banks namely Allahabad Bank, Andhra Bank, Indian Overseas Bank and Punjab National Bank remaining banks show decline in infusion because the financial year 2018–2019 there is no infusion carried out on those banks and the government is proposing for more infusions in the coming years.

**Chart 1.** Total Capital Infusion for 21 PSB (2009–2018)



Source : authors’ depiction of various capital infusion.

Chart 1 presents the line chart of total Capital infusion from 2008–2009 to 2018–2019. A gradual movement of the variable can be viewed since 2008–2009 from the graph, but a sharp rise from Rs. 26496 to Rs. 88527 can be observed in 2017 and a sudden fall from Rs. 88527 to Rs.10800 in 2018. The sud-

den drop in the capital infusion due the introduction of eligibility criteria set by the issuing authorities. However, it is expected that more recapitalization funds will be thrown to the Public Sector Banks Government of India strongly believing and initiating more rescue packages to strengthen Public Sector Banks in the coming years. Hence a relative growth rate from 2 percent in 2017 to -0.9 percent is found in 2018. The overall linear growth rate<sup>2</sup> for the 10 years is calculated to be 15 percent (growth rate in Y for an absolute change in X).

The output of competitiveness and stability indicators on Capital infusion is presented in panel A of table 3, the overall output as well as the individual bank output is also provided. From table 3, it is clear that the panel OLS for all the 21 banks (overall) together is good. The CI has a significant and negative impact on capital adequacy ratio and term loan and for the rest of the variables has positive and significant effect. The reason for the negative impact of capital adequacy ratio is because Basel II has fixed 8 percent as minimum capital adequacy ratio (CAR) globally, but the RBI has fixed it as 9 percent for the Indian scheduled commercial banks. So obviously during the study period, almost all the PSBs are having above 12 percent as Capital adequacy ratio well above the RBI limit. Hence, there is no need for the PSBs to use capital infusion to further strengthen their capital adequacy position. And also, the term loans having negative impact on capital infusion may be because of huge increase in Non-Performing Assets (NPA). Thus, the banks may effectively use capital infusions to reduce the strains already in the bank balance sheet or may be less demand for the loans the reason can be that the study period 2008–2009 to 2018–2019 covers the recession period. 2008–2009 shaken the western world and it slowly travelled late 2013–2014 to the Asian markets. Still its replication is there in the developing nations. Hence, there is a lesser chance of further creation of assets, especially term loans. For the individual banks, the Models B, C and F are best (where most of the banks significantly contribute to this).

The overall significance of the model which is given by the F- value is significant at 1% level. R2 which indicates how well the Sample regression line fits the data ranges from 20 percent to 85 percent for Model A to G. except Model A and E, the other Models are satisfactory. (Model B, C and F are best for the value of R2 is around 85 %).

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<sup>2</sup>  $\ln CI = \beta_1 + \beta_2 \text{ trend}$ ; here  $\beta_2$  measures the constant proportional or relative change in CI for a given absolute change in the value of time (trend).

**Table 4.** The output of competitiveness and stability indicators on Capital infusion (Independent variable: Capital Infusion (CI), Dependent variable: Bank specific variables)

PANEL A	Model A	Model B	Model C	Model D	Model E	Model F	Model G
Bank /function	Liquidity =f(CI)	Total asse- t=f(CI)	Advances =f(CI)	Costfund =f(CI)	Capa_ratio =f(CI)	Termloan =f(CI)	Npa=f(CI)
Overall	0.0003 (0.009)*	203.3 (0.009)*	106.29 (0.02)*	-8.4E-05 (0.004)*	-0.00021 (0.00)*	0.0003 (0.10)	30.893 (0.00)*
Andhra Bank	-0.12524 (0.898)	3630646 (0.000)*	2101430 (0.00)*	0.404417 (0.137)	0.620438 (0.254)	-7.97544 (0.00)*	-19780.8 (0.432)
Bank Of Baroda	1.549079 (0.115)	2927762 (0.00)*	1798786 (0.00)*	-1.28851 (0.00)*	1.834349 (0.001)*	-8.97424 (0.00)*	-9550.21 (0.706)
Bank Of India	0.460166 (0.642)	-656645 (0.374)	-405149 (0.367)	-0.63051 (0.023)*	0.282331 (0.608)	-10.0634 (0.00)*	2057.518 (0.936)
Bank Of Mahara- shtra	-0.82578 (0.398)	2674770 (0.000)*	1560539 (0.001)*	0.05172 (0.849)	0.279676 (0.607)	10.6054 (0.00)*	-28060.2 (0.266)
Canara Bank	-1.72047 (0.079)	990075.5 (0.175)	480557.2 (0.279)	0.429133 (0.115)	0.947067 (0.083)	0.75638 (0.727)	20117.4 (0.425)
Central Bank Of India	0.920506 (0.351)	60642.26 (0.934)	-11621.7 (0.979)	0.458822 (0.096)**	-0.08314 (0.88)	10.7703 (0.00)	-32013.4 (0.209)
Corporation Bank	-0.53694 (0.582)	-476112 (0.513)	-351810 (0.427)	0.390075 (0.152)	0.745715 (0.171)	-2.79096 (0.198)	-13619.6 (0.588)
Dena Bank	-0.21919 (0.822)	1495097 (0.041)*	795034.5 (0.074)**	0.148348 (0.585)	-0.0909 (0.867)	-1.89476 (0.381)	-30035.1 (0.233)
Indian Bank	-1.57587 (0.108)	812658.4 (0.265)	440959.9 (0.32)	0.000932 (0.997)	1.334193 (0.015)*	1.87381 (0.387)	-11964.5 (0.635)
Indian Overseas Bank	-0.33799 (0.731)	239336.4 (0.744)	131951.6 (0.76)	0.47021 (0.087)**	0.49105 (0.037)*	-2.31178 (0.289)	-9480.5 (0.708)
Oriental Bank Of Commerce	-0.47483 (0.626)	-708730 (0.33)	-480080 (0.279)	0.643932 (0.019)*	0.470284 (0.387)	3.68647 (0.089)*	-8201.94 (0.744)
Punjab National Bank	-0.85477 (0.384)	548404.7 (0.453)	422367.5 (0.343)	-0.55058 (0.045)*	0.892472 (0.103)	-7.59709 (0.001)*	43476.84 (0.087)**
Punjab And Sind Bank	-1.20339 (0.218)	3484554 (0.00)*	2132317 (0.00)*	0.78716 (0.004)*	0.4286 (0.431)	15.6981 (0.00)*	-23464.1 (0.352)
Syndicate Bank	0.739714 (0.449)	450874.3 (0.535)	183402.2 (0.679)	-0.22157 (0.415)	0.25543 (0.638)	21.5139 (0.00)*	-18159.1 (0.471)
State Bank Of India	-1.23121 (0.238)	-307474 (0.692)	-151079 (0.749)	-0.38828 (0.181)	1.920762 (0.001)*	-0.905 (0.695)	114647.4 (0.00)*

**Table 4.** The output...

PANEL A	Model A	Model B	Model C	Model D	Model E	Model F	Model G
UCO Bank	-0.76426 (0.437)	1376361 (0.061)*	921093.8 (0.04)*	0.04923 (0.857)	0.71748 (0.191)	7.30930 (0.001)*	-35181 (0.166)
Union Bank Of India	-1.40753 (0.151)	-493319 (0.498)	-415383 (0.349)	0.02214 (0.935)	-0.00659 (0.99)	-6.60381 (0.003)	-2214.88 (0.93)
United Bank Of India	0.366379 (0.707)	-405263 (0.578)	-307450 (0.488)	0.105081 (0.699)	-0.09023 (0.868)	17.1068 (0.00)	-26277.2 (0.297)
Vijaya Bank	-0.49951 (0.609)	1.53E+07 (0.000)*	9482910 (0.00)*	0.668739 (0.015)*	0.530739 (0.329)	4.90822 (0.024)*	-30427.1 (0.227)
IDBI Bank Limited	-1.38931 (0.167)	-211938 (0.774)	-129493 (0.773)	0.849849 (0.002)	0.73323 (0.184)	22.3949 (0.00)	-28387.4 (0.267)
Allahabad Bank	6.83 (0.00)*	1369070 (0.00)*	901856.8 (0.00)*	6.34 (0.00)*	11.91 (0.00)*	52.91 (0.00)*	33134 (0.00)**
R <sup>2</sup>	20%	84%	85%	51%	23%	84%	66%
F	2.01*	42.02*	44.02*	8.58*	2.43*	40.88*	15.69*

p-value within parenthesis

\* significant at 1% level

\*\* significant at 5% level

Source : authors' calculation.

**Table 5.** The output of bank profitability indicators on Capital infusion  
(Independent variable: Capital Infusion (CI),  
Dependent variable: Bank profitability indicators)

Panel B				
Bank /function	ROA=f(CI)	ROE=f(CI)	CI=f(ROA)	CI=f(ROE)
Overall	0.0001 (0.00)*	-0.003 (0.00)*	-1396.33 (0.00)*	-75.99 (0.00)*
Andhra Bank	0.219572 (0.342)	3.928663 (0.351)	374.5917 (0.552)	367.1264 (0.562)
Bank Of Baroda	0.30581 (0.188)	5.576048 (0.188)	1102.955 (0.081)**	1105.648 (0.082)**
Bank Of India	0.37233 (0.113)	3.325035 (0.436)	1704.743 (0.007)*	1448.018 (0.023)

Table 5. The output...

Panel B				
Bank /function	ROA=f(CI)	ROE=f(CI)	CI=f(ROA)	CI=f(ROE)
Bank Of Maharashtra	-0.18201 (0.431)	-1.84467 (0.661)	-5.09941 (0.994)	111.0832 (0.86)
Canara Bank	0.190725 (0.409)	2.915806 (0.489)	560.9095 (0.373)	518.7708 (0.412)
Central Bank Of India	-0.20484 (0.381)	-2.57131 (0.546)	766.2015 (0.228)	866.1791 (0.174)
Corporation Bank	0.12234 (0.596)	2.499065 (0.553)	210.4773 (0.738)	229.8988 (0.716)
Dena Bank	-0.09945 (0.667)	0.201309 (0.962)	2.608278 (0.997)	158.0325 (0.802)
Indian Bank	0.392174 (0.091)***	2.087073 (0.62)	273.0826 (0.667)	-118.368 (0.851)
Indian Overseas Bank	-0.25392 (0.275)	-4.17322 (0.325)	466.1437 (0.463)	510.8717 (0.423)
Oriental Bank Of Commerce	-0.03384 (0.883)	-1.51201 (0.719)	94.47896 (0.881)	28.09025 (0.965)
Punjab National Bank	0.39165 (0.093)**	6.221442 (0.142)	1263.123 (0.046)*	1195.353 (0.06)**
Punjab And Sind Bank	-0.04335 (0.851)	-0.34617 (0.934)	-260.917 (0.678)	-228.465 (0.718)
Syndicate Bank	0.007135 (0.975)	2.378996 (0.572)	142.4311 (0.821)	314.417 (0.619)
State Bank Of India	0.824113 (0.001)*	14.13658 (0.002)*	3749.076 (0.00)*	3695.589 (0.00)*
UCO Bank	-0.11114 (0.633)	0.547711 (0.897)	676.4081 (0.285)	880.5933 (0.165)
Union Bank Of India	0.253493 (0.273)	4.577183 (0.278)	733.4254 (0.245)	730.6387 (0.249)
United Bank Of India	-0.33967 (0.142)	-5.92739 (0.16)	-264.002 (0.677)	-238.244 (0.708)
Vijaya Bank	-0.05145 (0.824)	-0.0371 (0.993)	-73.1459 (0.907)	-4.14181 (0.99)
IDBI Bank	-0.09741 (0.677)	-1.43875 (0.736)	1032.455 (0.104)	1069.506 (0.094)

**Table 5.** The output...

Panel B				
Bank /function	ROA=f(CI)	ROE=f(CI)	CI=f(ROA)	CI=f(ROE)
Allahabad Bank	0.665374 (0.00)*	11.46 (0.00)*	1259.3 (0.00)*	1204.13 (0.00)*
R <sup>2</sup>	40%	35%	45%	45%
F	5.16*	4.31*	6.61*	6.48*

p-value within parenthesis

\* Significant at 1% level

\*\* Significant at 5%level

Source : authors' calculation.

From table 4 (Panel A), it is clear that the panel OLS analysis for all the 21 banks (overall) together is good, whereas all the variables are significant at 1% level. Model F is said to be better than other models, where most of the banks are having significant value. The panel OLS analysis of profitability indicators (such as ROA and ROE) as a function of Capital Infusion (CI) and CI as a function of Profitability indicators is provided in Panel B of table 5 (overall 21 banks and individual banks). The CI as a function of ROA and ROE is much better than the other models. The overall significance of the model which is given by the F- value is significant at 1% level. R<sup>2</sup> (provides an overall measure of the extent to which the variation in one variable determines the variation in the other) of this model, i.e., the goodness of fit of the regression model is 45 percent. The overall performance of the banks (21 banks together) is good and when it comes to the individual banks Allahabad Bank performs best along with State bank of India and Bank of Baroda. The reason can be that these three banks comparatively utilized the fresh capital to increase the asset size of the bank during the study period from 2008–2009 to 2018–19. In the case of other banks, it seems that a large part of the recapitalization fund has been used for managing their NPA rather than increasing the business by creating newer assets. As a result, the recapitalization fund has not helped these banks to improve their asset size, volume of business, improvement in margins and ultimately the profitability of these banks. Overall, the study result shows most of the banks benefitted from capital infusion by scoring better in some indicators or others. Overall, the impact of recapitalization on Indian PSBs was found good. In case of individual



banks, the highest impact was found in Allahabad bank, followed by State bank of India and Bank of Baroda and the impact of other banks was marginal compared to the above-mentioned Public-Sector Banks.

**Table 6.** Effect on size of Capital infusion on banks Stability, Competitiveness and Profitability

Sl.No	Bank Name	Capital infusion category	Stability	Competitiveness	Profitability
1.	State Bank of India	High	Yes	Yes	Yes
2.	Canara Bank	Medium	No	No	No
3.	Bank of Maharashtra	Medium	No	No	No
4.	Corporation Bank	Medium	No	No	No
5.	Bank Of Baroda	Medium	Yes	Yes	Yes
6.	Bank Of India	Medium	No	Yes	Yes
7.	Central Bank of India	Medium	No	Yes	No
8.	UCO Bank	Medium	No	Yes	No
9.	Punjab National Bank	Medium	No	Yes	Yes
10.	Indian Overseas Bank	Medium	Yes	Yes	No
11.	IDBI Bank	Medium	No	Yes	No
12.	Dena Bank	Low	No	Yes	No
13.	Indian Bank	Low	Yes		Yes
14.	Oriental Bank of Commerce	Low	No	Yes	No
15.	Punjab and Sind Bank	Low	No	Yes	No
16.	Syndicate Bank	Low	No	Yes	No
17.	Andhra Bank	Low	No	Yes	No
18.	Union Bank of India	Low	No	Yes	No
19.	United Bank of India	Low	No	Yes	No
20.	Vijaya Bank	Low	No	Yes	No
21.	Allahabad Bank	Low	Yes	Yes	Yes

\* Capital Infusion Category below 1000cr – Low.

\*Above 1000 below 2000cr – Medium.

\*Above 2000cr – High.

Source: authors' calculation.

From table 6, the relationship between the size capital infusion and individual bank performance in terms of stability, competitiveness and profitability is checked, Allahabad Bank from the low infusion category performed well with all the indicators as it has positive relationship with the capital infusion. The Bank of Baroda in the medium range infusion category and the State Bank of India the high capital infusion group performs better in most of the indicators. Out of 21 banks only three banks show positive impact on capital infusion. Another important finding of the study reveals that there is no relationship between the size of the infusion and the performance of the bank. From this analysis, it is found that the impact of capital infusion largely depends on fundamentals of the bank and not wholly on the level of capital infusion.

### ■■■ CONCLUSION

The Basel III norms in its turn place the banks tougher capital requirement by introducing capital buffering and the banking regulators and central governments thought that the higher the capital, the more the banks become sounder and flexible. The purpose of recapitalization of banks does not primarily mean the relief of particular financial crisis, it has also the long-term objective to wash out the strains in the bank's balance sheet. Recapitalization of banks literature has limited studies, most of which concentrate on measuring the effectiveness of particular capital infusion programmes like Troubled Asset Relief Program (TARP), Capital Purchase Program (CPP), Seasoned Equity Offerings (SEOs) in bank lending and most particularly during the crisis period. This paper addresses the overall effect of recapitalization of Indian Public Sector banks (PSB) and it measures the capital infused banks financial health and its effect on various parameters like profitability, competitiveness and stability. According to the study, the overall effect of recapitalization of Indian public sector banks was such that out of 21 banks, 18 banks reacted positively in case of individual indicators but failed in regard to all indicators. When measuring the individual performance of banks, the recapitalization has high impact on Allahabad Bank, State Bank of India and Bank of Baroda. Moreover, the result is not similar to all banks because the deployment of the fresh capital purely depends on the managerial skills and practices of the bank. Finally, the study reveals an interesting outcome that there is no relationship between the size of the infusion and the performance of the bank. This demonstrates that the im-

pact of capital infusion largely depends on fundamentals of the bank and not wholly on the level of capital infusion. Hence, the study concludes that the capital infusion helps the banks significantly to improve the stability, competitiveness and profitability only when the banks' fundamentals are strong, combined with the deployment of fresh funds and their managerial capability.

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