Are NPAs Really Interlinked with Capital, Efficiency, and Priority Sector Lending? An Empirical Study on Indian SCBs

Amarjit Singh Sethi
Former Professor-*cum*-Dean Faculty, Punjab School of Economics, GND University, Amritsar-143 005; ajss.gndu@gmail.com

and

Anu Bajaj
Assistant Professor, Department of Economics, JC DAV College, Dasuya (Dist Hoshiarpur-144 205; bajajanu1985@yahoo.in

ABSTRACT

This paper attempts to probe the prevalence, if any, of interrelationships between NPAs, capital, cost efficiency and priority sector lending among Indian scheduled commercial banks (SCBs). The study was based on secondary time series information for 22 years (from 1995-96 to 2016-17) on 18 bank-specific variables in respect of 65 banks (26 in public sector, 18 in private and 21 foreign banks). For each of the banks, *Cost Efficiency Scores* (used as an additional variable in the study) were estimated at various points in time through *SFA-basedtranslog cost function*. Besides, two dummy variables (DMYP for Private Banks and DMYF for Foreign Banks) were also considered so as to study differentials among the three types of banks. Interlinkages among NPAs, Capital Adequacy Ratio (CART), Cost Efficiency (CEFF), and Priority Sector Lending (PSTL) were examined through *simultaneous equations modelling* with *SURE* approach of estimation under panel data framework (*via* R-programming).

As per the main findings, PSTL had a direct influence on NPAs, possibly owing to higher likelihood of the loans in priority sector (specifically, agriculture & allied activities) to get transformed into NPAs. On the other hand, each of CEFF and CART induced an indirect effect on NPAs, which implied that the banks associated with severe extent of bad loans would have to incur more cost in handling and managing collection process of NPAs. Consequently, the increased cost would result in depletion of the capital as also the cost efficiency of the banks. Therefore, serious efforts need be made to somehow check the rising menace of the problem of rising NPAs.

1. **Introduction**

In order to infuse greater competition and efficiency in the banking sector, Government of India appointed *Nine Member Committee*, headed by Mr. M. Narasimham on August 14, 1991. Main thrust of the Committee was to re-examine the functioning of commercial banks and other financial institutions of the country, and to suggest measures to amend these institutions for lifting up their efficiency. Among other things, the Committee pointed out that the system of directed credit operation in the form of subsidised credit flow to priority sector[1], under-banked areas and loan *melas,etc.* disturbed the sound banking operations.

There occurs higher cost in supervising the loans given to priority sector which, in turn, reduces the efficiency of banks. As per Dhar (2007), around 20 percent of lending in the priority sector assumes the form of infected portfolio. Lately, Indian banking sector has been passing through a phase of grave problem of Non-Performing Assets(NPAs), which have been mounting continually due to a multiplicity of reasons, including large-scale frauds & scams.As on June 30, 2018, gross NPAs of the Indian banking sector were as high as 11.52% of the total assets (Ministry of Finance, GOI, 2019). The ever-rising NPAs induce serious economic and social repercussions; implicitly, the hard-earned money of the depositors and honest tax-payers is being pocketed primarily by a few black-sheep.Huge NPAs might endanger the capital adequacy[2] of the banks. Thus, it is very important to know as to how banks need to manage their counteract function of NPAs, efficiency and capital.

NPAs are expected to be interrelated with certain other bank-specific variables in a rather complex manner. Knowledge of such interrelationships might assist policy-makers to devise suitable corrective measures. Accordingly, an attempt has been made in this paper to examine the interrelationships between NPAs, capital, cost efficiency and priority sector lending among Indian scheduled commercial banks (SCBs) in the *system frame work* (through *simultaneous equations modelling*). Some of the related studies on inter-linkage between different banking variables have been reviewed in a concise manner in the following section.

1. Brief Review of the Related Literature

Lis *et al.* (2000) examined the recurring behaviour of credit of banks, loan losses and provisions for loan losses in Spain. They found that growth rate of GDP, capital adequacy ratio and size of the banks induce a negative effect on NPAs, whereas loan growth, net interest income, market power and government ownership affect NPAs in the positive manner.With the help of SUR and *two stage least squares* (2SLS) techniques, Das and Ghosh(2004) explored association between changes in risk and capital of public sector banks in India. As per the findings, size of bank had a significant and negative impact on capital, thereby implying that large-sized banks could raise their ratio of capital to risk weighted assets to a lesser extent than other banks. Further, regulatory pressure affected capital adequacy significantly negatively. Chang (2006) made an attempt to see the connection between structures, performance and conduct variables of banks in the Korean banking industry. Structure contained market size and concentration; performance was assessed through return on deposits and NPAs; and conduct was constituted by the variables like deposits, loan rates and interest margin. As per the results, NPAs had a negative association with market size, whereas the association between degree of concentration and market size was positive. Covering the period from 1995-96 through 2000-01, Das and Ghosh (2006) further investigated the relationship between capital, risk and productivity in the government owned banks in India. Results of the study revealed that capital, risk and productivity change tended to be entwined with each other. The banks having low capital showed a tendency to have lower productivity and, thus, needed a high extent of regulatory pressure. On the other hand, high productivity lead to a decline in the risk of credit and, therefore, induced a positive impact on bank capitalization. By taking the sample of European banks for the period 1992-2000, Altunbas *et al.* (2007) examined the relationship between capital, risk and cost inefficiency with the help of *Seemingly Unrelated Regression* (SUR) technique. As per his results, financial strength of the banks had a direct significant impact on reducing the risk taking. Inefficient banks held less capital than the efficient ones. Further, capital levels of co-operative banks were inversely related with risk. Through a case study (in Barak Valley of Assam state), Ahmed (2010) made an attempt to detect the inter-relationship between NPAs and priority sector advances in commercial banks. As per his observations, an increase in priority sector lending resulted in a corresponding increase in the volume of NPAs. Through simple regression analysis, he observed that credit-deposit ratio, branch expansion of banks, volume of business, percentage of overdue in priority sector and interest rate were the main factors affecting bank financing of priority sector. With the help of *Tobit simultaneous equation regression*, Karim *et al.* (2010) studied the linkage among NPAs and efficiency of banks in Malaysia and Singapore. As per their results, high NPAs had a tendency to reduce cost efficiency, and *vice versa*. The study further indicated that NPAs themselves increase due to bad management practices. Valverde *et al.* (2011) tried to examine loan growth, quality of credit and rating changes in the banking industry of Spain in the *simultaneous equations modelling framework*, using *generalized method of moments* (GMM). Their results indicated that inefficiency on the part of banks and lagged branch growth induced indirect effect on the banks' NPAs. Further, lagged ratio of provisions on loan losses to total assets was observed to have affected NPAs directly. By employing *three-stage least squares method*, Elyssiani and Zhang(2015) examined the relationship between business of "Board of Directors" and bank holding company performance and risk. To find out the effect of busy directors on the bank holding company's asset quality, he tested the effect of such directors on their NPAs (which is a measure of the asset quality). As per results of the study, the bank holding companies with more busy directors tend to have lower NPAs. The likely reason offered was that busy directors make a useful monitoring and give better guidance in recognizing quality borrowers which, in turn, promote high quality loans, thereby lowering loan loss.As per Sethi and Bajaj (2018), NPAs of the three categories of Indian SCBs were related with their size and that the nature of the relationship has undergone significant structural changes by way of the global financial crisis. During the post-crisis period, higher the size of an SCB, lower would expectedly be its NPAs.

As is evident, not many studies have been conducted regarding the inter-connection of NPAs with different banking variables in India during the recent past under the *simultaneous equation modelling approach*. A few of the earlier studies have probed the inter-linkage between risk, capital and productivity. However, in the present study, we have tried to focus on as to whether NPAs, capital, and efficiency, along with priority sector lending, are inter-connected with each other, or not. Accordingly, the present analysis is expected to make anaddition to the existing knowledge.

2. Database

The study was based on secondary time series information for 22 years (from 1995-96 to 2016-17) on 18 bank-specific variables in respect of 65 banks (26 in public sector, 18 in private and 21 foreign banks; enlisted in Appendix 1). The variables considered were: Non-Performing Assets (NPAS), Credit-Deposit Ratio (CRDP), Profit per Employee (PPEM), Return on Assets (RTAS), Percentage of Interest Expended as a Ratio of Net Interest Margin (NITP), Business per Employee (BPEM), Employees per Branch (EPBR), Capital Adequacy Ratio (CART), Cost-to-Income Ratio (CTIN), Other Income as a Ratio of Total Assets (OITA), Provisions and Contingencies as a Ratio of Total Assets (PCTA), Operating Expenses as a Ratio of Total Assets (OETA), Priority Sector Advances as a Ratio of Total Assets (PSTL), Business per Branch (BPBR), Deposit per Employee (DPEM), Return on Equity (ROEQ), Net Interest Income as a Ratio of Total Assets (NITA) and Operating Profit as a Ratio of Total Assets (OPTA).For each of the banks, *Cost Efficiency Scores* (CEFF, used as an additional variable in the study) were estimated at various points in time through *SFA-basedtranslog cost function*. Besides, two dummy variables (DMYP for Private Banks and DMYF for Foreign Banks) were also considered so as to study differentials among the three types of banks. Data compilation was made primarily from various official publications of the Reserve Bank of India.

3. Methodological Framework

Interlinkages among NPAs, capital, cost efficiency, and priority sector lendingwere examined under system framework through *simultaneous equations modelling*.Estimation of the equations was carried out through *Seemingly Unrelated Regression Estimation* (SURE)approach (due to Zellner, 1962) by duly supplementing it with the *instrumental variables approach* (as proposed independently by Theil, 1953 and Basemann, 1957). The entire analysis was performed, in the panel data framework, in three stages: (1) Concomitants of each of the four important bank-specific variables[*viz.,* Non-performing Assets (NPAS), Capital Adequacy Ratio (CART), Cost Efficiency (CEFF) and Priority Sector Lending (PSTL)] were determined through*step-down multiple regression analysis*; (2) Using the concomitants, the system of four equations was appropriately formulated, so that *identifiably conditions* gotsatisfied (thereby allowingestimation of the equations); and (3) Intercorrelation matrix among residuals of the equations was generated, so as to have a picture of the appropriateness of the system of equations.

In the light of the identified concomitants of the bank-specific variables, the formulated system of simultaneous equations was:

$$\begin{aligned} NPAS = {} & \beta_{10} + \beta_{11}CRDP + \beta_{12}NITP + \beta_{13}RTAS + \beta_{14}CTIN + \beta_{15}BPEM + \beta_{16}CEFF \\ & + \beta_{17}PCTA + \beta_{18}OITA + \beta_{19}OETA + \beta_{110}EPBR + \beta_{111}BPBR + \beta_{112}DPEM \\ & + \beta_{113}CART + \beta_{114}DMYP + \beta_{115}DMYF + u_1 \end{aligned} \qquad \cdots (3.1)$$

$$\begin{aligned} CART = {} & \beta_{20} + \beta_{21}CEFF + \beta_{22}EPBR + \beta_{23}PSTL + \beta_{24}NPAS + \beta_{25}DMYP \\ & + \beta_{26}DMYF + u_2 \end{aligned} \qquad \cdots (3.2)$$

$$\begin{aligned} CEFF = {} & \beta_{30} + \beta_{31}OPTA + \beta_{32}CART + \beta_{34}NITP + \beta_{35}NPAS + \beta_{36}BPEM + \beta_{37}PPEM \\ & + \beta_{38}DMYP + \beta_{39}DMYF + u_3\text{; and} \end{aligned} \qquad \cdots (3.3)$$

$$\begin{aligned} PSTL = {} & \beta_{40} + \beta_{41}NITP + \beta_{42}BPBR + \beta_{43}CART + \beta_{44}EPBR + \beta_{45}CTIN + \beta_{46}OITA \\ & + \beta_{47}NPAS + \beta_{48}DMYP + \beta_{49}DMYF + u_4 \end{aligned} \qquad \cdots (3.4)$$

where β_{ij}s represent unknowns of these structural equations, while u_is represent residual terms associated with the equations.

It is worthwhile to mention that these functional relationships between different sets of variables did not solely have econometric foundation, but also had a sound theoretical footing, as well (as discussed in Section 4).

In order to ensure as to whether the model was properly *identified* or not, we made a check for both *order* and *rankconditions* of each of the equations separately (which are the rules to ensure estimability). Following Gujarati (2006), the order condition states that in a model with M simultaneous equations, for an equation to be identified, the number of pre-determined variables excluded from the equation must not be less than the number of endogenous variables included in that equation *less* one. That is,

$$K - k \geq m - 1$$

where, M stands for the number of endogenous variables in the model (*i.e.*, the number of simultaneous equations); m for the number of endogenous variables appearing in a given equation; K for the number of pre-determined variables in the model (including the intercept term); and k for the number of predetermined variables in a given equation. If K – k exactly matches with m – 1, then the given equation will be *just identified*, but if K – k exceeds m – 1, then the same is *over identified.*

As per the rank condition, in a model containing M equations in M endogenous variables, an equation is identified if and only if *at least* one non-zero determinant of order (M – 1) can be constructed from the coefficients of the variables (both endogenous and predetermined) excluded from that particular equation but included in the other equations of the model.

In the third phase, *SUR method* was adopted for estimation of the system of equations, outlined in brief as follows:

Seemingly Unrelated Regression (SUR) Method of Estimation

Suppose, we have a generalized form of a system of structurally related linear regression equations, wherein each of the equations has its own endogenous variable as well as different set of exogenous explanatory variables. In fact, we are faced with a situation where the disturbance terms of the equations are likely to be contemporaneously correlated, because the unconsidered factors that influence the disturbance term in one equation probably influence the disturbance terms in other equations, too. If we simply ignore such an association among the disturbance terms and proceed to estimate the equations individually (through OLS technique), then the estimators will be *inefficient*. However, estimation of all the equations simultaneously through *generalised least squares* (GLS) technique, wherein the variance-covariance structure of the disturbance terms is duly taken into account, is known to provide us with efficient estimators (Green, 2000; Henningsen and Hamann, 2012). Such an estimation procedure is what is called *Seemingly Unrelated Regression* (SUR) method, developed originally by Arnold Zellner (1962).

Basic Linear SUR model

Consider a system of G equations:

$$Y_i = X_i\beta_i + u_i;\ i = 1, 2, \ldots, G \qquad \cdots (3.5)$$

where, for the i^{th} equation, Y_i is a $T \times 1$ vector of observations on the dependent variable Y; X_i is $T \times k_i$ matrix of the non-stochastic regressors; β_i is $k_i \times 1$ vector of the unknown regression coefficients; and u_i is the $T \times 1$ vector of unknown disturbance terms. The number of observations (T) are assumed to be the same for all the G equations.

The *stacked* system of equations may be expressed as:

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_G \end{bmatrix} = \begin{bmatrix} X_1 & 0 & \cdots & 0 \\ 0 & X_2 & \cdots & 0 \\ \vdots & & \ddots & \vdots \\ 0 & 0 & & X_G \end{bmatrix} \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_G \end{bmatrix} + \begin{bmatrix} u_1 \\ u_2 \\ \vdots \\ u_G \end{bmatrix}$$

Or, in a more compact form as:

$$Y = X\beta + u \qquad \cdots (3.6)$$

where Y is a $GT \times 1$ vector of the dependent variables; X is an $MT \times k$ matrix of the regressors; β is $k \times 1$ vector of the unknown regression coefficients; and u is the $GT \times 1$ vector of unknown disturbance terms $\left(k = \sum_{i=1}^{G} k_i \right)$.

Disturbance terms across the observations are assumed to be unassociated, so that

$$E(u_{it}u_{js}) = 0 \ \forall\ t \neq s,$$

where i and j indicate the equation numbers, and t and s denote the observation numbers. However, we duly allow for contemporaneous correlation, so that

$$E(u_{it}u_{jt}) = \sigma_{ij}$$

Thus, variance-covariance matrix of all the disturbance terms will be

$$\Omega = E(uu') = \Sigma \otimes I_T \qquad \cdots (3.7)$$

where $\Sigma = \left[\sigma_{ij}\right]$ is the contemporaneous disturbance covariance matrix; $\otimes$ is the Kronecker product; and I_T is an identity matrix of dimension T.

If all the regressors were exogenous, then the system of equations given in (3.6) could be operationally estimated by the *generalised least squares technique* (due to Aitken, 1935)

$$\hat{\beta} = (X'\hat{\Omega}^{-1}X)^{-1}X'\hat{\Omega}^{-1}Y \qquad \cdots (3.8)$$

As per Takada, *et al.* (1995), its estimated variance-covariance matrix is given by

$$\text{Est.Cov}(\hat{\beta}) = (X'\hat{\Omega}^{-1}X)^{-1} \qquad \cdots (3.9)$$

where $\hat{\Omega} = S \otimes I_T$ is a consistent estimator of Ω; $S = \left(\left(s_{ij}\right)\right)$;

$$s_{ij} = \frac{1}{T} Y_i' \left[I - X^*(X^{*\prime}X^*)^{-1}X^* \right] Y_j \qquad \cdots (3.10)$$

and X^* is the $T \times k^*$ matrix of the k^* distinct regressors.

However, if the equations contain endogenous variables (as in the present study), then the corresponding regressors are likely to be associated with disturbance terms $[\textit{i.e.}, E(u_i'X_i) \neq 0]$. In such a situation, we need to supplement the SUR estimation with 2SLS or 3SLS techniques with *instrumental variables.* The instrumental variables (Z_i) for each equation can either be different or the same for all equations. But, what is required is that these must not be correlated with the disturbance terms of the corresponding equation $[\textit{i.e.}, E(u_i'Z_i) = 0]$. At the first stage, the estimated values of the regressors (to be used as *instruments*) are obtained as:

$$\hat{X}_i = Z_i(Z_i'Z_i)^{-1}Z_i'X_i \qquad \cdots (3.11)$$

Then the estimator for β and its estimated variance-covariance matrix can be obtained respectively from (3.8) and (3.9) above by replacing X through $\hat{X}$, where

$$\hat{X} = \begin{bmatrix} \hat{X}_1 & 0 & \cdots & 0 \\ 0 & \hat{X}_2 & \cdots & 0 \\ \vdots & & \ddots & \vdots \\ 0 & 0 & & \hat{X}_G \end{bmatrix} \qquad \cdots (3.12)$$

4. Results and Discussion

At the outset, we made an examination on the fulfilment of order condition (Table 4.1) for the simultaneous equations as specified in formulations 3.1 through3.4. A glance at the table reveals that for the first equation on Non-performing Assets (NPAS), the number of exogenous variables excluded for the equation (*i.e.,* K – k) was 2, which exactly matched with the number of endogenous variables appearing in the equation *less* one (*i.e.,* m – 1). Thus, the equation wasexactly identified. A further perusal of the table reveals that the requisite *order* condition, *viz.,* of K – k ≥ m – 1, gotsatisfied in respect of each of the other three equations as well. In fact, these equations were over-identified. Fulfilment of the rank conditions for the different equations was similarly examined by following Gujarati (2006).

Table 4.1. An Examination of Order Condition (WithM = 4 and K = 15) for the Simultaneous Equations

Equation No.	Equation for	k#	m	K – k	m – 1	Nature
1.	NPAS	13	3	2	2	*Just Identified*
2.	CART	3	4	12	3	*Over Identified*
3.	CEFF	6	3	9	2	*Over Identified*
4.	PSTL	7	3	8	2	*Over Identified*

Definitions of M, K, m and k are given in Section 3 above.

On the whole, we may say that, as per the order and rank conditions, each of the four equations stood estimable.

Next, we carried out estimation of the four equations through both OLS and SURE techniques. The idea was to see as to whether any gain could be achieved through the latter technique *vis-à-vis the* former one. It may be reiterated that SURE methodology was duly supplemented with the instrumental variables technique; each of the four endogenous variables (*viz.,* NPAS, CART, CEFF and PSTL) were regressed, in turn, upon all the 15 exogenous variables appearing in the system, and their estimated values (represented respectively by ZNPA, ZCRT, ZCEF and ZPST) as obtained through the correspondingregression equations were used as their instruments. It may also be mentioned that for the SUR estimation, the optimal solution was obtained through*iterative* approach, wherein the underlying criterion lay in the minimisation of covariability among residual terms of the *four* equations. As per the approach, convergence was realised after as many as 75 iterations. The primary results obtained through the two approaches on predictive powers of the four equations, as also on the nature and extent of association among residual terms associated with the equations are given respectively in Tables 4.2 and 4.3.

A glance at the Table 4.2 reveals that the values of R^2, associated with the SURE technique were, in general, higher than those associated with the OLS technique. The equation corresponding to CART was the only exceptional case wherein the R^2 value (= 0.2924) for the OLS technique was marginally higher than that (=0.2886) for the SURE technique. For instance, for the equation corresponding to NPAS, the computed value of R^2 for SURE technique was 3.2 percent more (0.351 *versus* 0.319) than that for the OLS technique. Although this gain of 3.2 percent may sound to be small, yet keeping in view a very large number (=1414) of the associated degrees of freedom, improvement of even such a magnitude may not be ignorable. We may thus say that, in general, the predictive powers of the equations as estimated through the SURE technique were better than those estimated through the OLS technique. Furthermore, the extents of covariabilty among residuals

Table 4.2. Summary Table on the Primary Computations Obtained Through the OLS and SURE Techniques

Equation No.	Equation for	N	DF	OLS		SURE	
				R^2	$\bar{R}^2$	R^2	$\bar{R}^2$
1.	NPAS	1430	1414	0.3189	0.3095	0.3510	0.3420
2.	CART	1430	1423	0.2924	0.2885	0.2886	0.2847
3.	CEFF	1430	1421	0.3006	0.2955	0.3175	0.3126
4.	PSTL	1430	1420	0.1288	0.1217	0.1412	0.1342

Table 4.3. Matrices of Intercorrelation Coefficients among Residuals Associated with the Simultaneous Equations

Equation for	OLS				SURE			
	NPAS	CART	CEFF	PSTL	NPAS	CART	CEFF	PSTL
NPAS	1.0000	0.1089*** (< 0.0001)	0.5281*** (<0.0001)	-0.0007 NS (0.9815)	1.0000	0.1025*** (< 0.0001)	0.2376*** (<0.0001)	0.0210 NS (0.4856)
CART	0.1089*** (< 0.0001)	1.0000	-0.2561*** (<0.0001)	-0.4431*** (<0.0001)	0.1025** (< 0.0001)	1.0000	-0.0221 NS (0.4630)	-0.0714* (0.0176)
CEFF	0.5281*** (<0.0001)	-0.2561*** (<0.0001)	1.0000	0.0355 NS (0.2384)	0.2376*** (<0.0001)	-0.0221 NS (0.4630)	1.0000	0.0454 NS (0.1315)
PSTL	-0.0007 NS (0.9815)	-0.4431*** (<0.0001	0.0355 NS (0.2384)	1.0000	0.0210 NS (0.4356)	-0.0714* (0.0176)	0.0454 NS (0.1315)	1.0000

Source: Own Computations

Figures within parentheses indicate p-value; ***: Significant at 0.1% level; **: Significant at 1% level; * : Significant at 5% level; NS: Non-Significant

associated with the four equations, as estimated through the SURE technique, were, in general, smaller in magnitude in comparison to those estimated through the OLS technique (Table 4.3). For instance, such a correlation coefficient in respect of the equations for CART and CEFF was -0.256 (highly significant) for OLS but only -0.022 (non-significant) for SURE. Similarly, correlation coefficient in respect of the equations for CART and PSTL was -0.443 (highly significant) for OLS but only -0.071 (just significant) for SURE. Ideally speaking, the residuals from different equations of the system are required to be unassociated. Thus, on the whole, the estimators provided by the SURE technique could be regarded to be superior to those provided by the OLS technique, not only from the angle of improved predictive power but also from that of their efficiency and consistency. The subsequent discussion, therefore, will be confined to the estimators obtained through the SURE technique only.

SUR Estimation for Non-performing Assets:

In respect of Non-performing Assets, the detailed results through the SUR estimation(involving instrumental variables)have been presented in Table4.4. As per the table, the explanatory power of the credit risk equation was 35.1 percent. In the equation, Cost Efficiency (CEFF) and Capital Adequacy (CART) of banks had a significantly negative

Table 4.4. SUR Estimates of System of Equations: Endogenous Variable – NPAS

Explanatory Variable	Estimated Coefficient (b_i)	Estimated S.E of b_i	t-ratio for b_i	p-value for t-ratio
Constant	22.9654***	1.0641	21.5813	< 0.0001
CRDP	-0.0700***	0.0086	-8.1173	< 0.0001
NITP	-0.0564***	0.0137	-4.1133	< 0.0001
RTAS	-0.2370**	0.0872	-2.7176	0.0067
CTIN	0.9924***	0.1354	7.3283	< 0.0001
BPEM	-0.0039***	0.0007	-5.3889	< 0.0001
ZCEF	-7.9324***	1.0671	-7.4333	< 0.0001
PCTA	0.6195***	0.1441	4.2999	< 0.0001
OITA	-0.8470***	0.1973	-4.2926	< 0.0001
OETA	0.3126·	0.1708	1.8303	0.0675
EPBR	-0.0965***	0.015	-6.4151	< 0.0001
BPBR	0.0024*	0.001	2.2798	0.0228
DPEM	-0.0011^{NS}	0.0009	-1.2837	0.1995
ZCRT	-0.0955***	0.0165	-5.798	< 0.0001
DMYP	-0.6571^{NS}	0.7411	-0.8866	0.3755
DMYF	11.7750***	0.9734	12.0963	< 0.0001
R^2 = 0.3509***; $\bar{R}^2$ = 0.3420; F for R^2 (at 15 & 1089 d.f.) = 39.247; p-value for F ≅ 0				

Source: Own Computations

***: Significant at 0.1% level; **: Significant at 1% level ; * : Significant at 5% level; ·: Significant at 10% level; ^{NS}: Non-significant

impact on NPAs. Apart from these variables, Credit-Deposit Ratio (CRDP), Business per Employee(BPEM), Employees per Branch (EPBR), Other Income as a Ratio of Total Assets (OITA), and Return on Assets (RTAS) also showed a significant negative effect on NPAs. On the other hand, Cost to Income Ratio (CTIN), Provisions and Contingencies (PCTA), Business per Branch (BPBR), and Operating Expenses (OETA) showed asignificant direct effect on NPAs. Deposits per Employee (DPEM) was the only variable to have failed to show significant effect on NPAs.

Negative and significant impact of capital adequacy ratio on credit risk variable (*i.e.*, NPAS) is in line with the findings of Das and Ghosh (2006). Capital adequacy ratio signifies the margin of safety available to both depositors and creditors against their risk-weighted assets faced by banks. The indirectrelation between the two implies that if a bank is able to maintain high capital adequacy, then its power to fight against losses (in terms of NPAs) increases. Similarly, the finding on significant negative impact of cost efficiency on asset quality is also supported by the existing literature (Berger and Young, 1997; Karim *et al.,* 2010). Poor asset quality (in terms of bad loans) forcesbanks to increase outlays towards collection of such loans, thereby lowering cost efficiency. According to Ranjan and Dhal (2003), too, credit-deposit ratio (which is considered as a measure of credit orientation) induces an indirect impact on NPAs. Borrowers (*i.e.,* customers) give a high degree of importance to relatively more credit-oriented banks. Thus, enhanced crediting has a pulling-down effect on NPAs of banks.The negative relationship between NPAs and RTAS is also in the line with the available literature (Boudriga, *et al.,* 2009a; Louzis *et al.,* 2010). The RTAS is considered as a measure of profitability of banks;low profitability tends to raise the incidence of bad loans. The direct impact of PCTA on NPAs could be taken to imply that the banks having high NPAs tend to make improvement in their asset quality rather than give out more credit. So, the banks have to raise provisioning for loan loss,thereby resulting in a decreasein their income (Hou and Dickinson, 2007). The positiveimpact of each of OETA and CTIN on NPAs could be taken to imply that severity of bad loans is directed towards an increase in expenses of the bank, because more manpower and resources are needed for credit deployment and making recoveries. This again is supported by Berger and Young (1997), Fofack (2005), Bodla and Verma (2006). Further, higher the BPBR and BPEM, higher are expected to be the NPAs; the reason could be that sometimes, bank employees pre-set their targets to expand their business. With the motive of expanding business, they occasionally would make crediting to undeserving borrowers, thus resulting into faulty loans.

It may be added that the coefficient for the dummy variable for private banks (DMYP) was statistically non-significant, whereas that for the foreign banks (DMYF) was positive and highly significant (Table 4.4). As to what it implies is that, on an average, the intercept term for NPAs among private banks (compared to that for public sector banks) was similar. But such an intercept term for foreign banks (again compared to that for public sector banks) was much larger.

SUR Estimation for Capital Adequacy Ratio:

Conventionally, capital adequacy ratiois viewed as a meaningful yardstick for the strength ofa financial system. As per our computations, explanatory power of the equation for CART was 28.9 percent. Here, it was found that Cost Efficiency (CEFF) and Priority Sector Lending (PSTL) affected capital adequacy in a direct manner, whereas Employees per Branch (EPBR) and Bad Loans (NPAS) affected capital adequacy indirectly (Table 4.5). Positive relationship between capital adequacy and cost efficiency implied that banks which are highly capitalised(and are,therefore,considered to be the safer ones) tend to be associated withhigher cost efficiency. This, of course, is in line with what Jiang observed in2008. Further, as per our computations (Table 4.5), negative influence of NPAs on capital

Table 4.5. SUR Estimates of System of Equations: Endogenous Variable – CART

Explanatory Variable	Estimated Coefficient (b_i)	Estimated S.E of b_i	t-ratio for b_i	p-value for t-ratio
Constant	4.8242**	1.4227	3.3908	0.0007
ZCEF	9.9321***	1.4622	6.7924	< 0.0001
EPBR	-0.1751***	0.0135	-12.9448	< 0.0001
ZPST	0.1314***	0.0265	4.9651	< 0.0001
ZNPA	-0.1018**	0.0312	-3.2863	0.0010
DMYP	-0.6952NS	1.0410	-0.6679	0.5003
DMYF	21.9623***	1.1333	19.3799	< 0.0001
R^2 = 0.2886***; $\bar{R}^2$ = 0.2847; F for R^2 (at 6 & 1098 d.f.) = 74.239; p-value for F ≅ 0				

Source: Own Computations

***: Significant at 0.1% level; **: Significant at 1% level ; * : Significant at 5% level; ·: Significant at 10% level; NS: Non-significant

adequacy ratio implied that banks having high NPAs would endanger solvency status of the banks. It provides an incentive to banks to move towards riskier portfolio, so that the capital base of banks could be increased (Berger and Young, 1997; Das and Ghosh, 2006). As regards the magnitude and nature of the effect of dummy variables, the picture was broadly the similar one as observed in case of the equation for NPAs.

SUR Estimation for Cost Efficiency:

As per the SUR estimation for cost efficiency (Table 4.6),a multiplicity of the variables, like Operating Profit as a ratio of Total Assets (OPTA), Capital Adequacy Ratio (CART), Interest Expended as a ratio of Net Interest Margin (NITP), Business per Employee (BPEM) and Profit per Employee (PPEM) induced a significant positive effect on CEFF. However, NPAs induced a significant negative effect on the study variable. The negative association between CEFF and NPAs implies that the banks with high amount of bad loans will have to spend more money in handling and managing the collection process of NPAs. The so-incurred expenditure is grossly unproductive in nature, thereby lowering cost efficiency. This finding is in agreement withBerger and Young (1997), Altunbas *et al*. (2000), Fan and Shaffer (2004), and Girardone *etal.* (2004). The positive linkage between Cost eEfficiency (CEFF) and capital adequacy ratio (CART) implies that the banks which are well capitalized, are more cost efficient in comparison to those which are less capitalised (Hussein, 2003; Ayadi, 2013; and Mghaieth and Mehdi, 2014). The positive impact of each of Operating Profits as a ratio of Total Assets (OPTA) and Net Interest Margin (NITP) on cost efficiency could imply that the banks having high interest income and higher profits would be more cost efficient (Kunt *et al*., 2000; Mohan, 2005; Das, 2013). Further, thebanks having higher profits might invest more on skilled personnel (by giving them higher wages)

Table 4.6. SUR Estimates of System of Equations: Endogenous Variable – CEFF

Explanatory Variable	Estimated Coefficient (b_i)	Estimated S.E of b_i	t-ratio for b_i	p-value for t-ratio
Constant	0.5649***	0.0191	29.5517	< 0.0001
OPTA	0.0172***	0.0034	5.0424	< 0.0001
ZCRT	0.0003^{NS}	0.0004	0.7482	0.4552
NITP	0.0015***	0.0003	3.8738	0.0001
ZNPA	-0.0056***	0.0005	-10.3795	< 0.0001
BPEM	0.0001***	0.0001	-5.2386	< 0.0001
PPEM	0.0018***	0.0003	5.0909	< 0.0001
DMYP	0.2358***	0.0175	13.445	< 0.0001
DMYF	0.0801***	0.0197	4.0609	< 0.0001
R^2 = 0.3175***; $\bar{R}^2$ = 0.3126; F for R^2 (at 8 & 1096 d.f.) = 63.733; p-value for F ≅ 0				

Source: Own Computations

***: Significant at 0.1% level; **: Significant at 1% level ; * : Significant at 5% level; ·: Significant at 10% level; NS: Non-significant

and towards improvement in technology with the expectation that this increased cost would resultin higher gains in future (Asimakopoulos*et al.*, 2008). Each of Business per Employee (BPEM) and Profit per Employee (PPEM) are indicators of management efficiency. Business per employee points towards the productivity of human resource of the bank and is, therefore, considered as a valid instrument for assessing the efficiency of the work-force towards creation of business for the bank. Similarly, profit per employee is reflective ofthe surplus earned per worker. Higher the business and profit per employee, higher wouldbe the capital base of the bank, thereby raising the banks'capacity to face the unanticipated risk.

Highly significant values of the coefficients of each of DMYP and DMYF (Table 4.6) implies that on an average, the cost efficiency of each of private and foreign banks was perceptibly larger than that of public sector banks.

SUR Estimation for Priority Sector Lending:

In respect of the priority sector lending, the corresponding results from SUR estimation have been put in Table 4.7. A perusal of the table clearly reveals that in the context of Indian scheduled commercial banks, interest expended as a ratio of Net Interest Margin (NITP), Business per Branch (BPBR), Capital Adequacy Ratio (CART), Cost-to-Income Ratio (CTIN) and Gross Non-Performing Assets (NPAS) had a significant direct impact on priority sector advances whereas, on the other hand, Employees per Branch (EPBR) influencedthe study variable negatively. The direct relation between Business per Branch (BPBR) and priority sector lending is well-supported by the existing literature. More the geographical spread of branches of a bank, higher will the business per branch of the banks and,

Table 4.7. SUR Estimates of System of Equations: Endogenous Variable – PSTL

Explanatory Variable	Estimated Coefficient (b_i)	Estimated S.E of b_i	t-ratio for b_i	p-value for t-ratio
Constant	30.3470***	0.9209	32.9514	< 0.0001
NITP	0.1048***	0.0169	6.1666	< 0.0001
BPBR	0.0043***	0.0009	4.3846	< 0.0001
ZCRT	0.0831***	0.0205	4.0489	< 0.0001
EPBR	- 0.0849***	0.0165	-5.1463	< 0.0001
CTIN	0.2055^{NS}	0.1743	1.1786	0.2390
OITA	0.3504·	0.1862	1.8823	0.0601
ZNPA	0.0616*	0.0276	2.2353	0.0256
DMYP	-2.1346*	0.8622	-2.4758	0.0134
DMYF	-9.0544***	1.1321	-7.9979	< 0.0001
$R^2 = 0.1412^{***}$; $\overline{R}^2 = 0.1342$; F for R^2 (at 9 & 1095 d.f.) = 20.004; p-value for F $\cong$ 0				

Source: Own Computations

*****: Significant at 0.1% level; **: Significant at 1% level ; * : Significant at 5% level; ·: Significant at 10% level; ^{NS}: Non-significant**

consequently, more will be the lending in priority sector. Further, the positive relation between CTIN and PSTL explains that more the lending in priority sector, higher would be the cost (in relation to income) borne by the bank. It has been remarked (Nathan, 2013) that cost of executing priority sector lending (or direct credit programming) is much higher than the turnover earned from these activities which, in reciprocation, depresses the net profits of the banks. If the loan extended towards priority sector becomes NPA, then a large chunk of banks' profits are allocatedfor providing cushioning against the bad loans, therebyincreasing cost borne by the banks compared to their returns. The direct relation between NPAs and priority sector lending is also supported by Biswas and Deb (2004) and Nathan (2013). It may be elaborated that high level of NPAs due to priority sector lending occurs because of agriculture sector, which is the primary constituent of priority sector. Because of heavy dependence of Indian agriculture on rains god and large-scale fragmentation of land holdings, farmers generally become unable to re-pay loans to the banks. Furthermore, they are not able to repay the loans within the stipulated time frame (of 90 days), because the cycle of agriculture from planting a crop to its reaping and selling at reasonable price generally exceeds the time limit.As a result, the loan availed by the farmers becomesNPA for the bank.Thus, some relaxation in the time limit for loans in priority sector needs be granted. We may, however, emphasise that the usual practice of resorting to blanket loan-waivers by governments from time-to-time may be politically correct (from the angle of vote-catching strategy), but could be highly undesirable from economics point of view. Rather, if at all such loan-waivers are to be allowed (from the point of view of social welfare), these need be assessed in a judicious manner, so as to allow relief to only deserving and needy people, therebyeasing out the burden on the banks. Next, as has already been mentioned, capital adequacy ratio is a useful parameter indicating banks' soundness. The banks associated with high capital adequacy ratio are considered to be safer ones, because the capital reserves can provide cushion against the unanticipated losses faced by the banks. In case a bank is sound on its capital reserves, it can afford to extend more loans in the priority sector (Nathan, 2013). Finally, as regards the direct relationship between NITP and PSTL, we may say that banks give loans with the obvious motive of earning profits. Thus, if the loans given to priority sector are returned back to banks in the timely manner, then their income gets enhanced, thereby motivating the banks to extend more loans in the sector in a perpetual manner.

A further glance at Table 4.7 on the magnitude and signs of regression coefficient of DMYP (= - 2.135, significant at 5% probability level) and DMYF (= - 9.054, significant at 0.1% probability level) clearly reveals that the priority sector lending in private banks, in general, and foreign banks, in particular, was lower than that in public sector bank. Such an observation, of course, is understandable, because each of private and foreign banks are known to be profit-oriented, whereas (in comparative terms) public sector banks are obliged to be welfare-oriented.

The above discussion based upon the findings throughseemingly unrelated regression estimation is a clear indicative of the presence of both backward and forward linkages between NPAs, Efficiency and Capital amongIndian SCBs.

5. Concluding Remarks and Policy Implications

Thus, each of the four structural equations was associated with highly significant value of the coefficient of multiple determination. In the system framework, each of CEFF and CART induced an indirect effect on NPAs, which could imply that the banks associated with severe extent of bad loans would have to incur more cost in handling and managing the collection process of NPAs. The increased cost will, in turn, would result in depletion of the capital as also the cost efficiency of the banks. However, PSTL was directly associated with NPAs. As per the Governmental policies (specifically in respect of Agriculture & Allied Activities), loans provided in the priority sector have an increased likelihood of getting transformed into NPAs.

As per the coefficients of the dummy variables, both Capital Adequacy Ratio and Cost Efficiency in public sector banks were significantly lower than those in private and foreign banks. However, priority sector lending in public sector banks was significantly higher than that in each of private and foreign banks. Intercorrelation coefficients among residualsobtained through the iterative SURE techniquewere observed to be substantially lower than those obtained through the OLS technique. Consequently, the estimates obtained through the SURE technique would be far more consistent, thereby providing a due justification for its adoption in the study.

Further, since Capital Adequacy Ratio is inversely related to the *Risk Weighted Assets*; therefore, in order to lower the extent of NPAs, a due check needs be made on Risk Weighted Assets which may also delimit erosion of banks' capital.

End Notes

[1]Priority Sector Lending assumes particular significance in that as per RBI Guidelines, the banks are required to provide a specified portion of their lending to a few specific sectors (like agriculture and allied activities, small enterprises, micro credit, education loan, advances to self help groups, hosing loans *etc.*). This is essentially meant for an all round development of the economy. As per the guidelines, nearly 40 per cent amount of total deposits is reserved for priority sector lending.

[2]The concept of Capital Adequacy Ratio (CAR) refers to the margin of protection available to the borrowers as well as depositors against the unexpected loans. It makes the banking system safe and strong. The concept was introduced in 1992 after the acceptance of Narsimham Committee Report. The motive behind introducing CAR was that banks should attain its competitiveness as well as achieved soundness in their operations. The Basel Capital Accord in 1988 (proposed by Basel Committee of Bank Supervision, BCBS) of the Bank for International Settlement (BIS) stressed on reducing credit risk, by setting down a minimum capital risk adjusted ratio (CRAR) of 8 percent of the risk weighted assets. The RBI guidelines on Basel II implementation were released on April 27, 2007. Under the revised regime of Basel II, Indian banks were required to maintain a minimum CRAR of 9 per cent. By following the global financial crisis of 2007-08, Basel II was replaced by Basel III, which was proposed to be phased out steadily in between 2013 and 2019, keeping CAR at 8 percent.

REFERENCES

Ahmad, Z. and M. Jegadeeshwaran (2013). "Comparative Study on NPA Management of Nationalised Banks", *International Journal of Marketing, Financial Services and Management Research, ISSN 2277 3622*, Vol.2 (8).

Altunbas, Y., M. H. Liu, P. Molyneux, R. Seth (2007). "Efficiency and Risk in Japanese Banking", *Journal of Banking and Finance*, Vol.24: 1605-28.

Asimakopoulos, I. G., S. N. Brissimis and M.D. Delis (2008). "The Efficiency of the Greek Banking System and its Determinants", *Economic Bulletin*, Vol. 30(5): 7-27.

Ayadi, I. (2013). "Determinants of Tunisian Bank Efficiency: A DEA Analysis", *International Journal of Financial Research,* Vol. 4(4): 128-39.

Basemann, R. L. (1957). "A Generalised Classical Method of Linear Estimation of Coefficients in a Structural Equations", *Econometrica*, Vol. 25: 77-83.

Berger, A .N. and R. D. Young (1997), "Problem Loans and Cost Efficiency in Commercial Banks", *Journal of Banking and Finance*, Vol.21: 1-28.

Biswas, P. K. and A. T. Deb (2004). "Determinants of NPAs in the Public Sector Banks: A Critique of Policy Reforms", IUP Journal of Bank Management, Vol. 3(3)11:41.

Bodla, B.S. and Verma, R. (2006). " Evaluating Performance of Banks through CAMEL Model: A Case study of SBI and ICICI", *The ICFAI Journal of Bank Management,* Vol. 3: 49-63.

Boudriga, A., N. Taktak, and S. Jellouli (2009a). "Bank Specific, Business and Institutional Environment Determinants of Nonperforming Loans: Evidence from MENA Countries", Paper presented at *Economic Research Forum 16th Annual Conference, Cairo.*

——— (2009b), "Banking Supervision and Nonperforming Loans: A Cross-Country Analysis", *Journal of Financial EconomicPolicy*, Vol. 1(4): 286-18.

Chang, Y.T. (2006). "Role of Non-performing Loans (NPLs) and Capital Adequacy in Banking Structure and Competition", *Economic and Social research Council, CCCP Working Paper 06-15, ISSN 1745-9648: 1-33.*

Das, A. and S. Ghosh. (2004). "The Relationsuip Between Risk and Capital: Evidence From Indain Public Sector Banks", *RBI Occasional Papers*, Issue Summer: 1-21.

Das, A. and S. Ghosh (2006). "Size, Non-Performing Loans, Capital and Productivity Change: Evidence from Indian State-owned Banks", *Reserve Bank of India, MPRA Paper No. 17396, posted 19. September 2009 15:25 UTC*: 1-16.

Das, T. B. (2013). "Net Interest Margin, Financial Crisis and Bank Behaviour: Experience of Indian Banks", *RBI Working Paper Series, WPS/DEPR* 10/2013: 1-28.

Dhar, P.K. (2007). *Indian Economy and Its Growing Dimensions* (15^{th} Ed.), Kalayani Publishers, New Delhi: 697-01.

Elyasaini, E. and L. Zhang (2015). "Bank Holding Company performance, Risk and "Busy" Board of Directors", 1-44.

Fan, L, and S. Shaffer (2004). "Efficiency versus Risk in Large Domestic US Banks." *Managerial Finance*, Vol. 30: 1-19.

Fofack, H. (2005). "Non-Performing Loans in Sub-Saharan Africa: Causal Analysis and Macroeconomic Implications", *World Bank Policy Research Working Paper 3769.*

Girardone, C., P. Molyneux, and E.P.M. Gardener,. (2004). "Analysing the Déterminants of Bank Efficiency: The case of Italian Banks", *Applied Economies,* Vol. 36: 215-27.

Green, W. H. (2000). *Econometric Analysis,* 4^{th} Ed. (Singapore: Pearson Education, Inc.).

Gujarati, D. N. (2006). *Basic Econometrics,* 4^{t} Ed. (New Deli: Tata McGraw-Hill Publishing Co Ltd.)

Henningsen, A and J D Hamann (2012). "Systemfit: A Package for Estimating Systems of Simultaneous Equations in R", R package version 0.3-1, URL http://CRAN.R-project.org/.

Hou, Y. And D. Dickinson (2007). "The Non-performing Loans: Some Bank-Level Evidences", Research Conference on Safety and efficiency of the Financial System, EU Asia-Link Programme, Asialink/ASIE/B7-3010/2005/105-139 coordinated by the University of Limoges (France) 1:34.

Hussein, K.A. (2003). "Operational Efficiency in Islamic banking: the Sudanese Experience", Working Paper No. 1, *Islamic Research and Training*, Saudi Arabia. *Institute(IRTI), IslamicDevelopment Bank,* Jeddah.

Jiang, C. (2008). "Analysis of Bank Efficiency of Chinese Commercial Banks and the Effects of Institutional Changes on Bank Efficiency", Ph. D. Thesis submitted to *Middlesex University, Landon, UK* : 1-254.

Karim, M. Z. A., S. G. Chan, S. Hassan (2010). "Bank Efficiency & Non performing Loans: Evidence from Malaysia and Singapore", *Prague Economic Paper*, Vol. 2: 118-32.

Kunt, D., E. Detragiache. and P. Gupta. (2000). "Inside the Crisis: An Empirical Analysis of Banking System in distress", *Working Paper WP/00/56, International Monetary Fund*.

Lis, S. F., J. M. Pages, and J. Saurina (2000). "Credit Growth, Problem Loans And Credit Risk Provisioning in Spain", Banco de España — Servicio de Estudios, *Documento deTrabajo* no 0018.

Louzis, D.P., A.T. Vouldis and V. L. Metaxas (2010). "Macroeconomic and Bank Specific Determinates of Nonperforming Loans in Greece's, Comparative Study of Mortgage Business and consumer Loan Portfolios", *Bank of Greece working paper* No 118.

Mghaieth, A. and I. K. E. Mehdi. (2014). "The Determinants of Cost/ Profit Efficiencies of Islamic Banks before, during and after crisis of 2007-08 using SFA Approach",*Working Paper 2014-107,* 1:34.

Mohan T.T.R. (2005). "Some Critical Issues in the Banking Sector Today", Regulation of Financial Intermediaries in Emerging Markets, Response Books, Sage Publications, 25-31.

Narasimham, M. "Report of the Committee on the Financial System ", Reserve Bank of India", 1991.

Narasimham, M. "Report of the Committee on the Financial System ", Reserve Bank of India", 1998.

Nathan (2013). "Re-Prioritizing Priority Sector Lending in India: Impact of Priority Sector Lending on India's Commercial Banks", *Economic Impact Analysis,* 1:56.

Ranjan, R. And S. C. Dhal (2003). "Non-performing Loans and Terms of Credit of Public Sector Banks in India: An Empirical Assessment", *Reserve Bank of India Occasional Papers*: Vol. 24 (3): 81-21.

RBI (2012). *Report on Trend and Progress of Banking in India*, published by Reserve Bank of India.

RBI (2013). *Report on Trend and Progress of Banking in India for the Year Ended June 30, 2013* submitted to the Central Government in terms of Section 36(2) of the Banking Regulation Act, 1949.

Sethi, A.S. and Anu Bajaj (2018), "Non-Performing Assets of Scheduled Commercial Banks in India ─ Some Analytical Revelations", *The Finance India,* Vol. 32, No. 3(September, 2018): 785-804.

Theil, H (1953). "Repeated Least-Squares Apllied to Complete Equation Systems", The Hauge: The Central Planning Bureau, The Netherlands, Mimeographed.

Valverde, S. C., D. M. Ibanez and F. R. Frenandez (2011). "Securitization Bank Lending and Credit Quality: The case of Spain", Working Paper Series, No. 1329, European central Bank, 1-42.

Zellner A. (1962). "An Efficient Method of Estimating Seemingly Unrelated Regression Equations and Tests of Aggregation Bias",*Journal of the American Statistical Association,* Vol. 57: 500-09.

Appendix-1. List of the Indian SCBs Considered in the Study

(A): Public Sector Banks (Twenty Six):

Allahabad Bank (ALB), Andhra Bank (ANB), Bank of Baroda (BOB), Bank of India (BOI), Bank of Maharashtra (BOM), Central Bank of India (CBI), Canara Bank (CNB), Corporation Bank (CPB), Dena Bank (DNB), IDBI Bank Ltd. (IDB), Indian Bank (INB), Indian Overseas Bank (IOB), Oriental Bank of Commerce (OBC), Punjab National Bank (PNB), Punjab & Sind Bank (PSB), State Bank of India (SBI), State Bank of Bikaner & Jaipur (SBJ), State Bank of Hyderabad (SBH), State Bank of Mysore (SBM), State Bank of Patiala (SBP), State Bank of Travancore (SBT), Syndicate Bank (SNB), UCO Bank (UCO), Union Bank of India (UBI), United Bank of India (UNB), and Vijaya Bank (VJB).

(B): Private Banks (Eighteen):

Axis Bank (AXB), Catholic Syrian Bank Ltd. (CSB), City Union Bank Ltd. (CUB), Development Credit Bank Ltd. (DCB), Dhanlakshmi Bank (DLB), Federal Bank (FDB), HDFC Bank (HDF), ICICI Bank (ICI), IndusInd Bank (IIB), Ing Vyasa Bank (IVB), Jammu & Kashmir Bank Ltd. (JKB), Karnatka Bank Ltd. (KTB), Karur Vyasa Bank Ltd. (KVB), Lakashmi Vilas Bank (LVB), Nanital Bank (NTB), Ratanakar Bank Ltd. (RTB), South Indian Bank (SIB), and Tamilnad Mercantile Bank Ltd. (TMB).

(C): Foreign Banks (Twenty One):

ABN Amro Bank (ABN), Abu Dhabi Commercial Bank (ADC), Bank of Bahrain & Kuwait (BBK), BNP Paribus (BNP), Bank of Nova Scotia (BNS), Bank of Amercia (BOA), Bank of Tokyo (BOT), Barclays Bank (BRC), Citibank (CIT), Credit Agricole Indosuez (CAI), DBS Bank Ltd. (DBS), Deutsche Bank (DEU), Hong Kong & Shanghai Banking Corporation (HSB), JP Morgan Chase Bank N.A. (JPM), Mashreq Bank PSC (MSH), Oman International Bank (OMN), Standard Chartered Bank (SCB), Societe Generale (SCG), State Bank of Mauritius (SMR), Sonali Bank (SNL), and The Royal Bank of Scotland N.V. (RBS).