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## **Non-performing assets and profitability of Indian banks: an econometric study**

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**Abstract:** The diminishing profitability of the Indian banking industry is owing to added stressed assets, wilful defaulters, and loss making assets depict massive bleeding of their balance sheets. The after effects can be now seen through the regulators implementing strictest vigilance, follow up with the banks, recovery measures such as Bankruptcy laws 2016, corporate debt restructuring (CDR), high provisioning, and heavy pecuniary penalties to the defaulters. The authors have estimated bank specific, macroeconomic determinants of the non-performing loans and their impact on the banking profitability. Multivariate panel data analysis for 35 Indian public and private sector banks over the period 2007-2016 has been done using panel data through fixed effect regression and modified ordinary least square and system GMM approach has been deliberated. Detailed estimation results in public vs. private sector banks have been given the conclusion. The NPA management in PSU banks needs attention as it affects the efficiency and profitability exponentially.

**Keywords:** bank credit; corporate debt structuring; CDR; the securitisation and reconstruction of financial assets and enforcement of security interest act; SARFAESI; asset quality review; AQR; panel data regression.

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## **1 Introduction**

The banking industry has undergone a sea change after the first phase of economic liberalisation in 1991 and hence credit management. While the primary function of banks is to lend funds as loans to various sectors such as agriculture, industry, personal loans, housing loans, etc. However, banks have become very cautious in extending loans and are under a phase of loan consolidation primarily due mounting non-performing assets (NPAs) in recent times. As per the prudential norms suggested by the Reserve Bank of India (RBI), a bank cannot book interest on an NPA on accrual basis. In other words, such interests can be booked only when it has been actually received. Therefore, this has become what is called as a 'critical performance area' of the banking sector as the level of NPAs affects the profitability of a bank.

In the wake of the financial reforms undertaken by the Government of India based on the Narsimhan Committee report I and II, prudential norms were introduced by Reserve Bank of India to address the credit monitoring process being adopted and pursued by the banks and financial institutions. To strengthen further the recovery of dues by banks and financial institutions, Government of India promulgated The Recovery of Debts Due to Banks and Financial Institutions Act, 1993 and The Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act (SARFAESI Act), 2002.

### *1.1 Non-performing asset*

An asset, including a leased asset, becomes a NPA when it ceases to generate income for the bank. An NPA is a loan or an advance where:

- 1 Interest and/or instalment of principal remain overdue for a period of more than 90 days in respect of a term loan.
- 2 The account remains 'out of order' in respect of an overdraft/cash credit.
- 3 The bill remains overdue for a period of more than 90 days in the case of bills purchased and discounted.
- 4 The instalment of principal or interest thereon remains overdue for two crop seasons for short duration crops.
- 5 The instalment of principal or interest thereon remains overdue for one crop season for long duration crops.

- 6 The amount of liquidity facility remains outstanding for more than 90 days, in respect of a securitisation transaction undertaken in terms of guidelines on securitisation dated 1 February 2006.
- 7 In respect of derivative transactions, the overdue receivables representing positive mark-to-market value of a derivative contract, if these remain unpaid for a period of 90 days from the specified due date for payment.

In case of interest payments, banks classify an account as NPA only if the interest due and charged during any quarter is not serviced fully within 90 days from the end of the quarter.

### *1.2 Categories of NPAs*

Banks classify NPAs further into the following three categories based on the period for which the asset has remained nonperforming and the realisability of the dues:

#### *1 Substandard assets*

With effect from 31 March 2005, a substandard asset is the one, which has remained NPA for a period less than or equal to 12 months. Such an asset has well defined credit weaknesses that jeopardise the liquidation of the debt and are characterised by the distinct possibility that the banks will sustain some loss, if deficiencies are not corrected.

#### *2 Doubtful assets*

With effect from 31 March 2005, an asset is classified as doubtful if it has remained in the substandard category for a period of 12 months. A loan classified as doubtful has all the weaknesses inherent in assets that were classified as substandard, with the added characteristic that the weaknesses make collection or liquidation in full, – on the basis of currently known facts, conditions and values – highly questionable and improbable.

#### *3 Loss assets*

A loss asset is one where loss has been identified by the bank or internal or external auditors or the RBI inspection but the amount has not been written off wholly. In other words, such an asset is considered uncollectible and of such little value that its continuance as a bankable asset is not warranted although there may be some salvage or recovery value. (RBI Master Circular, <https://www.rbi.org.in>).

### *1.3 Reasons behind NPA*

- default of a loan intentionally – wilful defaulters
- frequent shuffle of government policies leading to NPA
- customer has taken the loan for non performance of business
- most of the loan sanctioned for agricultural purposes
- negligent pre-enquiry by the bank for sanctioning the loan to a customer

- poor follow-up and supervision
- diversion of funds.

#### *1.4 Effects of NPA on banks and FIs*

- continuous draining of profit
- negative impact on goodwill
- adverse growth of equity value
- restricted cash flow by bank due to provision of fund created against NPA.

#### *1.5 Gross NPA and net NPA*

*Gross NPA* is an advance which is considered irrecoverable, for which the bank has made provisions, and which is still held in banks' books of account.

*Net NPA* is obtained by deducting items like interest due but not recovered, part payment received and other income kept in suspense account from gross NPA.

In India, when the loan is sanctioned against any security, provision has to be created. Further, Indian Banks have to make a 100% provision which is treated as a 'doubtful' advance, while in some countries; it is 50% or just 75%. According to the RBI, "reduction of NPAs in the Indian banking sector should be treated as a national priority item to make the system stronger, resilient and geared to meet the challenges of globalisation. It is necessary that a public debate is started soon on the problem of NPAs and their resolution."

#### *1.6 Tools for rehabilitation of NPA's*

##### *a Corporate debt restructuring*

The eligible cases of corporate affected by internal or external factors with fund based and non fund based outstanding of Rs. 10 crores and above from the financial system in standard/sub-standard/doubtful categories are referred to corporate debt restructuring (CDR) Cell for revival through restructuring of debts under CDR mechanism.

##### *b Recovery through govt. agencies*

For the purpose of recovery in non-performing borrowal accounts, services of government official such as district collector, Tehsildar, Revenue Recovery Officers, etc. wherever available, are availed fully at the prescribed rate of fees under respective State Recovery Act, so that dues are recovered as early as possible.

##### *c Recovery through Securitisation and Reconstruction of Financial Assets and enforcement of Securities Interest Act- 2002(SARFAESI ACT-2002)*

The SARFAESI ACT-2002 is a handy tool available with the secured creditors to deal with the defaulters. Field functionaries should make effective use of the rights of enforcement of security interest as provided in the Act for quicker resolution of NPAs.

d *Recovery through legal action – debt recovery tribunals*

Where SARFAESI ACT-2002 is not applicable or where banks dues are not fully recoverable through action under SARFAESI Act, legal action is initiated immediately without loss of further time. In terms of recovery of debts due to Banks and Financial Institutions act, 1993, debt recovery tribunals have been established to adjudicate claims involving an amount of Rs. 10 Lacs and over in respect of amounts due to Banks/FIs. The remedies under SARFAESI Act and DRT Act are complementary to each other and can be taken simultaneously.

e *Transfer/sale of financial assets to securitisation companies/ reconstruction companies*

SARFAESI aCt2002 provides also for sale of financial assets (NPAs) by banks/FIs to asset reconstruction companies (ARCs). Sale of NPAs is an important mechanism available to lenders for quicker resolution of NPAs proving difficult of recovery and cleansing the balance sheet.

f *Sale of NPAs to other banks/financial institutions/NBFCs*

Besides selling their NPAs to ARCs, Banks are now allowed by RBI to resolve their NPAs by sale to other banks/FIs/NBFCs.

## Others

- *Recovery camps*: in case of accounts under small segment the platform of Recovery camps is used by the field functionaries with proper spade work. Banks take necessary action for holding bank Adalats/recovery camps periodically. For on-spot decision on OTS proposals received in such recovery camps, participation of officials from controlling offices may be ensured.
- *Lok Adalats and Lok Nayalayas*: there is no appeal allowed for decisions in Lok Adalats. The amount of NPA should not be more than Rs 20 Lacs.
- *Rin Mukti* and mega Rin Mukti shivirs be organised for the settlement of NPA cases below Rs 10 lacs.
- *S4A*: the S<sub>4</sub>A is RBI's latest attempt to try and chip away at the mountain of stressed loans smothering Indian banks. The scheme tries to strike a compromise between banks with problem accounts and corporate defaulters of the non-wilful variety, by converting a portion of large loan accounts into equity shares, or a distressed company to be eligible for S<sub>4</sub>A, the RBI has laid down three conditions. The project must be operating and already generating cash. The total loans to the entity should be ₹500 crore or more. The lending banks are required to hire an independent agency to evaluate how much of the debt is 'sustainable'. For the loan to be eligible for S<sub>4</sub>A, at least 50% of it should be 'sustainable'.
- *SDRs*: while RBI's earlier ideas to resolve bad loans such as strategic debt restructuring (SDR) required banks to oust existing promoters, S<sub>4</sub>A allows the incumbent management to continue, as long the default is not wilful.

- *Bankruptcy laws*: bankruptcy is a legal status usually imposed by a court, on a firm or individual unable to meet debt obligations. India's new bankruptcy bill attempts to create a formal *insolvency resolution process (IRP)* for businesses, either by coming up with a viable survival mechanism or by ensuring their speedy liquidation. The bill envisages a new regulator – *the insolvency and bankruptcy board of India*.
- *BIFR/AAIFR*: a sizeable amount of NPA portfolio is not getting resolved due to proceeding undergoing with BIFR/AAIFR. If the proceedings are unduly delayed, the bank should immediately seek permission from BIFR for filing claim with DRT. In all eligible cases, the banks may proceed under the provisions of the SARFAESI Act-2002. In case of consortium lending, the meeting of the consortium members should be immediately called for approval of 75% of the secured creditors so as to proceed under the provision of the SARFAESI Act-2002.

**Table 1** SMA and its types

<i>SMA sub-category</i>	<i>Basis for classification</i>
SMA-NF	Non-financial (NF) signals of incipient stress
SMA-1	Principal or interest payment overdue between 31–60 days
SMA-2	Principal or interest payment overdue between 61–90 days

g *Corrective action plan to seize increasing NPAs*

Early recognition of stress and setting up of central repository of information on large credits (CRILC) before a loan account turns into an NPA, banks need to identify developing stress in the account by creating a new sub-asset category, i.e., 'special mention accounts'. SMA sub-categories as mentioned in Table 1.

RBI to set up a central repository of information on large credits (CRILC) to collect, store, and disseminate credit data to lenders:

- Banks are advised that as soon as an account is reported by any of the lenders to CRILC as SMA-2, they should mandatorily form a committee to be called Joint Lender's Forum (JLF) if the aggregate exposure (AE) of lenders in that account is 100 crores or more.
- The RBI suggested infusion of more equity into their companies by corporate and transfer of their holdings to a security trustee or an escrow arrangement till the turnaround of the company.
- The Indian Bank's association (IBA) would prepare a master JLF agreement and operational guidelines for JLF which could be adopted by all lenders.
- The JLF may explore various options to resolve the stress in the account. The intention is not to encourage a particular resolution option but to arrive at an early and feasible solution to preserve the economic value of the underlying assets as well as the lender's loans. The options under corrective action plan (CAP) by the JLF would generally include:

- a *Rectification* – obtaining a specific commitment from the borrower to regularise the account so that the account comes out of SMA status or does not slip into the NPA category, within a specific time period acceptable to the JLF without involving any loss or sacrifice on the part of the existing lenders.
  - b *Restructuring* – the possibility of restructuring the account if it is prima facie viable and the borrower is not a wilful defaulter. At this stage, commitment from promoters for extending their personal guarantees along with their net worth statement supported by copies of legal titles to assets may be obtained along with a declaration that they would not undertake any transaction that would alienate assets without the permission of the JLF.
  - c *Recovery* – once the first two options at a and b above are seen as not feasible, due recovery process may be resorted to. The JLF may decide the best recovery process to be followed among the various legal and other recovery options available with a view to optimising the efforts and results.
- While JLF formation and subsequent corrective actions would be mandatory in accounts having AE of 100 crore or above, in other cases also the lenders would have to monitor the asset quality closely and take corrective action for effective resolution.
  - For accounts with AE of 500 crores and above. Techno economic viability study and restructuring package would have to be subjected to an evaluation by an independent evaluation committee (IEC) of experts. The IEC would be required to give its recommendation in these cases to the JLF within 30 days.

### *1.6.1 Accelerated provision*

In cases where banks fail to report SMA status of the accounts to CRILC or resort to methods with the intent to conceal the actual status of the accounts RBI may prescribe accelerated provisioning as appended below for these accounts and/or other supervisory actions. The current provisioning requirement and the proposed accelerated provisioning in respect of such non performing accounts are as under.

#### *Provisioning*

The primary responsibility for making adequate provisions for any diminution in the value of loan assets, investment or other assets is that of the bank managements and the statutory auditors. The assessment made by the inspecting officer of the RBI is furnished to the bank to assist the bank management and the statutory auditors in taking a decision in regard to making adequate and necessary provisions in terms of:

##### *1 Loss assets*

Loss assets should be written off. If loss assets are permitted to remain in the books for any reason, 100% of the outstanding should be provided for.

##### *2 Doubtful assets*

- 100% of the extent to which the advance is not covered by the realisable value of the security to which the bank has a valid recourse and the realisable value is estimated on a realistic basis.

- In regard to the secured portion, provision may be made on the following basis, at the rates ranging from 25% to 100% of the secured portion depending upon the period for which the asset has remained doubtful.

<i>Period for which the advance has remained in 'doubtful' category</i>	<i>Provision requirement (%)</i>
Up to one year	25
One to three years	40
More than three years	100

With a view to bringing down divergence arising out of difference in assessment of the value of security, in cases of NPAs with balance of Rs. 5 crore and above stock audit at annual intervals by external agencies appointed as per the guidelines approved by the Board would be mandatory in order to enhance the reliability on stock valuation. Collaterals such as immovable properties charged in favour of the bank should be got valued once in three years by valuers appointed as per the guidelines approved by the board of directors.

### 3 *Substandard assets*

- 1 Provision of 15% on total outstanding should be made without making any allowance for ECGC guarantee cover and *securities available*.
- 2 The 'unsecured exposures' which are identified as 'substandard' would attract additional provision of 10%, i.e., a total of 25% on the outstanding balance. However, in view of certain safeguards such as escrow accounts available in respect of infrastructure lending, infrastructure loan accounts which are classified as sub-standard will attract a provisioning of 20% instead of the aforesaid prescription of 25% (RBI Master Circular, <https://www.rbi.org.in>).

### *Wilful defaulters and non-cooperative borrowers*

- The provisioning in respect of existing loans/exposures of banks to companies having director/s (other than nominee directors of government/financial institutions brought on board at the time of distress), whose name/s appear more than once in the list of wilful defaulters, will be 5% in cases of standard accounts; if such account is classified as NPA, it will attract accelerated provisioning as indicated in the table above.
- With a view to discouraging borrowers/defaulters from being unreasonable and non-cooperative with lenders in their bonafide resolution/recovery efforts, banks may classify such borrowers as non-cooperative borrowers 2, after giving them due notice if satisfactory clarifications are not furnished. Banks will be required to report classification of such borrowers to CRILC.

### *Refinancing of project loans*

- Banks are advised that if they refinance any existing infrastructure and other project loans by way of take-out, even without a pre-determined agreement with other banks, and fix a longer repayment period, the same would not be considered as restructuring if the following conditions are satisfied:
  - a Such loans should be ‘standard’ in the books of the existing banks, and should not have been restructured in the past.
  - b Such loans should be substantially (60% or more of the outstanding loan by value) taken over from the existing financing banks/FI’s.
  - c The repayment period should be fixed by taking into account the life cycle of the project and cash flows from the project.

### *Sale of financial assets to securitisation company (SC)/reconstruction company (RC)*

- A financial asset may be sold to the SC/RC by any bank/FI where the asset is reported as a financial asset reported as SMA – a by the bank/FI to the CRILC.
- Banks can reverse the excess provision on sale of NPA if the sale is for a value higher than the NBV to its Profit and Loss account in the year the amounts are received. Further, as an incentive for early sale of NPAs, banks can spread over any shortfall, if the sale value is lower than the NBV, over a period of two years. This facility of spreading over the shortfall would however be available for NPAs sold up to 31 March 2015 and will be subject to necessary disclosures.

### *Purchase/sale of non-performing financial assets to other banks*

- The new guidelines permit the banks to sell their NPAs to other banks/FIs/NBFCs (excl SCs/RCs) without any initial holding period. However, the non-performing financial asset should be held by the purchasing bank in its books at least for a period of 12 months before it is sold to other banks/ FI’s/NBFCs. It is clarified that the extant prudential norms on asset classification of such assets in the books of purchasing banks/FIs/NBFCs will remain unchanged.

### *Debt recovery tribunals (DRTs) and other recovery infrastructure*

- Additional DRT benches at centres with large backlogs may be created. A separate bench for speedy disposal of SARFAESI related cases may be established in DRTs.
- Currently security registration, especially registered mortgages, is done at district level and central registry of securitisation asset reconstruction and security interest of India (CERSAI) is generally used to register equitable mortgages. The government mandate to register all types of mortgages with CERSAI will have to be strictly enforced among banks and NBFCs.

*Board oversight*

- The board of directors should take all necessary steps to arrest the deteriorating asset quality in banks and should focus on improving the credit risk management system. Early recognition of problems in asset quality and resolution envisaged requires the lenders to be proactive and make use of CRILC as soon as it becomes functional.
- Boards should put in place a policy for timely providing of credit information to and access of credit information from CRILC, prompt formation of JLFs, monitoring the progress of JLFs and periodical review of the above policy.
- The boards of banks should put in place a system for proper and timely classification of borrowers as wilful or/and non-cooperative. Further, boards should review the accounts classified as such.

**2 Review of literature**

A lot of studies have been conducted on the issue of NPA Management in Indian Banks, following is the review of few literatures about the NPA practices and management conducted for Banks in India.

Dutta (2014) studied the growth of NPA in the public and private sector banks in India, and analysed sector wise NPAs of the commercial banks using secondary data and various reports (trend and progress of banking in India, report on currency and finance, economic surveys of India) issued by RBI. Analysis suggested that NPAs as a measure constraints for lower profit.

Patel (2015) in their study titled 'A study on NPAs Management with reference to public sector banks, private sector banks and foreign banks in India' evaluated NPA management of various public sector, private sector and foreign banks over the year 2009–2013. It also uses ordinary least square (OLS) method to estimate gross NPA for the year 2014. The findings of the paper reveals that percentage of gross ratio to gross advances is increasing for public banks and estimated of gross NPA for year 2014 is more for public bank as compared to private and foreign banks. The Anova test concludes that ratio of Gross NPA to Gross Advances for public sector, private sector and foreign banks do not have significant difference between 2009 to 2013.

Bamoriya and Jain (2013) in their research paper 'NPA and select key financial heads: an empirical study of commercial banks of India using multiple regression modeling' analyses impact of key financial heads on NPA of scheduled commercial banks of India for effective management of NPAs by using multiple regression modelling. The paper reveals that total assets and total deposits had significant impact of NPA level. Banking sector is an indispensable financial service sector where threat of increase in NPAs affects the liquidity and profitability of banks.

Ranjan and Dhal (2003) this paper explore an empirical approach to the analysis of the Indian commercial banks' nonperforming loans by regression analysis. The empirical analysis evaluates as to how the NPLs are influenced by three major sets of economic and financial factors, i.e., terms of credit, bank size induced risk preferences and macroeconomic shocks.

Rai (2012), the paper made an effort to evaluate the operational performance of the selected commercial banks, and the NPA Trends and issues, also the measures taken for

managing the NPAs like reformulation of banks “credit appraisal techniques, establishment of monitoring department, etc.

Ibrahim and Thangavelu (2014) in their research paper ‘A study on the composition of NPAs of scheduled commercial banks in India’ provides an insight about the concept of NPAs, components of loan assets of commercial bank in India with reference to public sector, private sector and foreign bank. The data used in the paper is secondary and the study is diagnostic and exploratory in nature. The findings of the study reveal that the commercial banks have significantly improved their working performance in the areas of NPAs.

Rajeev and Mahesh (2010) in their paper ‘Banking sector reforms and NPA: a study on Indian commercial banks’ examines the trends of NPAs in India from various dimensions and recognises that self monitoring and proper regulation has been effective in reducing NPAs to a great extent. It also discusses the role of joint liability groups and self help groups in enhancing the loan recovery rate. The findings of the paper show that there is improvement in the recovery rate.

Joseph and Prakash (2014) in their research paper ‘A Study on analysing the trend of NPA level in private sector banks and public sector banks’ deals with the trends of NPA in banking industry, the factors that contributes to NPA raising in the banking industry and also provides suggestions to overcome the burden of NPA on banking industry. The paper reveals that compared to private sector banks, public sector bank is more in the NPA level. Public sector bank must take more care in avoiding any account becoming NPA by taking proper preventive measures in an efficient manner.

Yadav (2014), with the help of secondary data, the author in the present paper has tried to show the recent trends and its preventive measures to control NPAs in Indian banking industry.

#### 4 Methodology and data

Following the empirical literature (see Goddard et al., 2004; Sinha and Sharma, 2012; Trujillo-Ponce, 2013; Laryea et al., 2016; Sinha and Sharma, 2016), current study intended to empirically examine the impact of NPAs on the banking profitability within panel multivariate framework specifies the model as below:

$$ROA_{it} = C + \beta_1 COST_{it} + \beta_2 EQAS_{it} + \beta_3 NPA_{it} + \beta_4 HHI_{it} + \beta_5 NIM_{it} + \varepsilon_{it} \quad (1)$$

ROAA Return on Asset of  $i^{th}$  bank at time t.  $i^{th}$

COST ratio between total costs to total income of  $i^{th}$  bank at time t.

NPA ratio of NPAs to total loans and advances of  $i^{th}$  bank at time t

EQAS Ratio of equity to total income earned of  $i^{th}$  bank at time t

HHI Market concentration index of the  $i^{th}$  bank at time t

NIM Net interest margin of the  $i^{th}$  bank at time t.

$\varepsilon$  error term.

The dependent variable i.e. profitability denoted by return on assets measured as the ratio of the profit after tax to the total assets. The four independent variables being employed in the study are COST, NIM, NPA, EQAS and HHI concentration index. COST denotes

the ratio of total banking cost to the total income revealing the managerial efficiency of the bank signifying expense to revenue generated. Higher the COST value, poorer is the bank's efficiency and vice-versa. EQAS denotes the ratio of the equity to asset providing the capital soundness/strength of the banks, i.e., bank's ability to overcome technical insolvency. Higher equity to asset ratio suggests the lower dependency of the bank on external finances.

The empirical examination begins with the employing Lin and Chu (LLC) and Im, Pesaran, Shin (IPS) panel unit root test to explore the order of integration of the system variables. If the variables are found to be integrated of order one, then Kao's and Pedroni's panel cointegration test is applied to explore the possible long run equilibrium relationships among the variables followed by estimating the long run equilibrium relationship using panel fixed effect regression and system GMM. Finally, we perform panel pair wise granger causality test to explore the direction of causation among the system variables.

#### 4.1 Data

This study intends to empirically examine the impact of NPAs on the banking profitability. The firm specific data for the 35 banks collected on the annual basis has been obtained from the CMIE-Prowess database over the period March 2007 to March 2016. The selection of the period is constrained by the data availability of all banks under consideration. The data related to return on assets, total cost, total income, Net interest margin, NPAs, total equity base, total assets, and deposits have been used for empirical analysis.

#### 4.2 Analysis

Analysis begins with the examination of the stationarity of the variables as a prerequisite for cointegration and Granger causality. Results of LLC and IPS unit root tests at levels and first differenced series of the all variables under consideration has been presented in the Table 3. Results suggest that null hypothesis of a unit root cannot be rejected for LLC and IPS tests at level. However, after taking the first difference variables, both tests reject the null hypothesis at 1% significance level. Thus, study concludes that all the series are non-stationary and integrated of order one, i.e., I(1).

**Table 3** Levin, Lin and Chu (LLC), and Im, Pesaran, Shin (IPS) unit root tests results

Variables	Levin, Lin & Chu (LLC) test		Im Pesaran Shin (IPS) test		Order of integration
	Level	First difference	Level	First difference	
ROA	-0.13091	-13.5663*	5.22919	-4.42836*	I(1)
ROE	2.95038	-10.3630*	5.64543	-3.19185*	I(1)
NNPA	6.15389	-15.9163*	5.74986	1.83665**	I(1)
NIM	-0.22878	-16.2656	-0.43868	-2.16231**	I(1)
COST	-1.21480	-3.49360*	7.14180	-1.76911**	I(1)
EQAS	-0.04017	-22.2873*	-2.78582	-10.1629*	I(1)
HHI	-0.52194	-33.9559*	-6.08322	-9.08638*	I(1)

Note: \*, \*\*, and \*\*\* show statistically significant at 1, 5 and 10% level respectively.

Source: Author's estimation

**Table 4** Kao's and Pedroni cointegration test results

<i>Test ↓</i>	<i>Kao cointegration test statistic</i>	<i>Pedroni cointegration test statistics</i>
ADF test statistic	-8.511642*	-----
Panel v-stat		-1.727669**
Panel rho-stat		6.081513
Panel PP-stat		-10.78529*
Panel ADF-stat		-9.618409*
Group rho-stat		7.586472*
Group PP-stat		-14.99475*
Group ADF-stat		-8.437820*

Notes: \* and \*\* shows statistically significant at 1% level respectively.

Model ROA: the cointegration among ROA, NNPA, COST, EQAS and HHI.

Source: Author's estimation

Table 4 presents Kao and Pedroni cointegration test results. The findings indicate that null hypothesis of no cointegration can not be rejected at 1% significant level for all tests. Therefore, study conclude that there is long run equilibrium relationship between variables, indicating that ROA, NIM, NPA, COST, EQAS and HHI move together in long run for the panel.

Table 5 presents the estimated results through panel fixed effects regression, fully modified ordinary least square and system GMM of the equation (1). Results indicate that NPA is having negative coefficients with significant impact on the banks profitability in models estimated using Sys – GMM. However, fixed effect regression results show positive but very low coefficients.

Net interest margin is not statistically significant at all either estimated using fixed effect or system GMM. It suggest that net interest margin though expecting to have positive association may not be showing its complete relevance during the analysis period as still banking sector in India is slightly inclined towards social welfare.

**Table 5** Selected results of panel fixed effect regression, FMOLS, AND Sys- GMM

<i>Independent variables ↓</i>	<i>Fixed effect regression</i>	<i>Panel FMOLS</i>	<i>System GMM</i>
ROA(-1)			0.078222*
C	9.5053*		
NPA	0.0168**	-0.27341*	-0.012473*
NIM	0.00018	0.002387	-0.000611
COST	-0.0969*	0.007778*	-0.079068*
EQAS	0.02712*	0.096115*	0.012207*
HHI	0.0018***	0.000223	-0.009757*
Adjusted R-squared	0.968576	0.662330	

Source: Author's estimates

Note: \* and \*\* shows statistically significant at 1% and 5% level respectively.

**Table 6** Selected results of Pair wise Granger causality test

Variables↓	ROA	NNPA	NIM	COST	EQAS	HHI	Inferences	Future course of action by banks
ROA	--	3.08556**	63.8557*	4.88611*	4.52529**	0.47513	ROA granger causes NPA, NIM, COST, and EQAS.	Banks should always need to be innovative to maintain threshold profitability in business.
NPA	11.6281*	--	19.1575*	17.4241*	0.14139	0.55764	NPA granger causes ROA, NIM, and COST.	Maintain monitoring to minimise NPA as it affects profitability, NIM and cost to income ratio adversely.
NIM	0.78874	0.18174	--	0.83201	0.23152	0.01199	-----	-----
COST	1.27666	2.70597**	44.4630*	--	2.62433***	0.63931	COST granger causes NPA, and EQAS.	If cost to income ratio increases, it will also affects equity to asset ratio as extra cost added to the banking business erodes equity base.
EQAS	5.10498*	2.15679	56.5633*	3.71323*	--	0.12424	EQAS granger causes	Banks needs to maintain higher equity to asset ratio in order to improve profitability, better NIM and threshold cost to income ratio.
HHI	0.12376	0.49301	0.23118	0.18982	0.31176	--	No significant result in any case	-----

Source: Authors' interpretation based on results obtained.

Cost to income ratio showing the revenue / managerial efficiency of the concerned banks is statistically significant estimated using both estimators. Though its moderate values suggests that one percent increase in the cost to income ratio is having adverse impact on the banking profitability up to extent of 0.0790 to 0.0969 percent. Thus, banks should always try to include ongoing technological innovations in order to minimise the business cost.

Equity to asset ratio as an indicator of the capital prudence of the bank suggesting that lower dependence on the external market borrowing along with better asset management. It is having statistically significant and positive impact on the profitability though its quantum is quiet low. It shows that better capitalised banks will tend to outperform poorly capitalised banks in term of overall profitability.

Further, market concentration index measured by HHI index. In Indian Perspective, markets are highly competitive as the HHI index is coming to the 0.0503. As the competition increases, profit margin usually declines. Thus, bank tends to innovative in their approach for improving market share and thus tends to increase or maintain a threshold profit level. Therefore, its significant result suggests that market completion is only having marginal to very low negative impact on the profitability of the bank.

Panel Granger causality test results have been presented in Table 6. The bidirectional causality between ROA – NPA and ROA – EQAS is present here. It suggests that profitability and NPA both affects each other in long run. If the NPA increases beyond threshold level, the Profitability will decline. Similarly, if EQAS improves beyond threshold level, the banks with better equity base will have higher profitability.

Secondly, unidirectional causality from ROA to NIM exists. It means that a bank with higher profit level will automatically improves NIM level.

## 6 Conclusions

The growth of Indian Bank's lending to priority sector is more than that of the public sector banks as a whole. In case of NPA management, the performance of Indian Bank is better than that of public sector banks as a whole. However, Indian Bank has slippages during the period of study in controlling of NPAs in the early years of the decade. Indian Bank is still not comfortable in the area of NPA management. Therefore, the management of Indian Bank must pay special attention towards the NPA management and take appropriate steps to arrest the creation of new NPAs, besides making recoveries in the existing NPAs. Timely action is essential to ensure future growth of the bank.

- Study examined the dynamics among profitability and NPA for Indian banking sector within panel data framework. Suggest that the system variables are integrated of order 1 and cointegrated in long run.
- Further, impact of NPA on profitability is statistically significant and negative in case of Sys-GMM. NIM is not significant factor in the current study affecting profitability.
- Cost to income ratio, equity asset ratio, and concentration ratio are another three factors having significant impact on banks profitability.
- Further, bidirectional causality between ROA – NPA and ROA – EQAS is present here. If the NPA increases beyond threshold level, the Profitability will decline.

Similarly, if EQAS improves beyond threshold level, the banks with better equity base will have higher profitability.

Thus, banks need to be innovative in order to maintain its higher profitability, equity to asset ratio, low NPA level, lower cost to income ratio and be competitive in nature for better future scenarios.

## **7 Recommendations**

- 1 A thorough monitoring of bank's borrowers is important to identify the symptoms of potential distress situations. Loan officers should be alert to catch the early signs of borrowers' distress, and take corrective actions to minimise the NPAs. There should be an early formation of a lenders' committee with timelines to agree to a plan for resolution.
- 2 Banks should follow the norm of 'know your customer' for identification of borrowers, guarantors and verification of their details to minimise the risk of default. Banks should look out for actual purpose of the loan required by the borrower. Banks should ensure that diversion of funds does not take place.

Loan working unit should be created for managing non-performing and underperforming loans to maximise the recovery value from a portfolio of distressed loans.

- 3 Overdue accounts should be reviewed on a regular basis to seize slippage of fresh accounts into NPA. Based on the recent trends, banks should try shifting their focus to priority sector lending for reducing the quantum of NPAs. Banks should speed up the process of disposing off the loss assets. This is because as uncertainty increases with the passage of time, there is a possibility that the recoverable value of assets reduces and cannot fetch good price.
- 4 Sound credit appraisal system should be adhered to with emphasis on reduction in Gross NPAs. While selling NPAs, banks should work out the net present value of the estimated cash flows associated with the realisable value of the available securities net of the cost of realisation. The sale price should generally not be lower than the net present value.
- 5 Recovery competition system should be extended among the staff members. The recovering highest amount should be felicitated.
- 6 Acts should be judiciously and selectively applied so that NPAs should be converted into performing assets.

## **8 Limitations**

- 1 The study is based on secondary data as published in various publications of reserve bank of India and other reports (these data are based on historical accounting concept, which ignores the impact of inflation).

- 2 The paper does not probe into NPA management or recovery of NPAs by commercial banks in order to reduce the NPA level.
- 3 The study is confined only to the selected and restricted indicators and the study is confined only for a period of 14 years, i.e., from 2000–2014.

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