

Cyclical Behavior of Public and Private Sector Banks: A Comparative Study of Non-performing Assets

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Abstract

This study examines the cyclical behavior of both the public and private sector banks in India with a focus on non-performing assets. The motivation behind this study is to find out whether non-performing assets of public sector banks and private sector banks in India exhibit procyclical behavior. Pearson correlation coefficient results suggest countercyclical behavior of gross non-performing assets and current state of economy in both public and private sector banks. The study also employed multiple regression analysis which shows that all bank specific variables have significant effect on gross non-performing assets in public sector banks while macroeconomic variables are found to be insignificant in presence of bank specific variables. In case of private sector banks, current state of economy is found to be significant in presence of bank specific variables with negative sign. In another model, which includes only macroeconomic variables, economy wide fluctuations and inflation are found significant in both public and private sector banks in India.

Keywords: Non-performing assets, procyclicality, economic cycle, public sector bank, private sector bank

Introduction

Banks are the financial institutions which have the core function of accepting deposit and granting loans and advances. They provide loans and advances to borrowers and generate interest income to banks. Hence, loans and advances are called assets of a bank. When such assets generate interest income to banks, they are called standard assets. What happens when such assets fail to generate interest income to banks? There are borrowers who default on making interest payments and/or installment of the principal to the banks for certain reasons. Such assets move into the category of non-performing assets. Non-performing asset (NPA) is defined as the credit/loans and advances facility in respect of which the interest and/or installment of the principal has remained past due for a specified period of time. With a view to moving towards international best practices and to ensure greater transparency, it has been decided on 31 March 2004 to adopt the '90 days' overdue norm for identification of NPA (Reserve Bank of India, 2006).

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Asset quality of banks is an important indicator of the financial health of banks. Non-performing assets is an indicator of poor asset quality of banks. High level of NPA indicates poor asset quality which in turn indicates fragility of financial health of banks. Moreover, recent economic crisis in 2007-2012 has highlighted the issue of procyclicality in banking system. Banks are said to behave in procyclical manner when their actions tend to reinforce the momentum of underlying economic cycles (Gonzales, 2009). There are banking indicators which move along with economic cycle (procyclical) and some indicators which move in opposite direction to economic cycle (countercyclical). During economic boom, banks become excessively optimistic, expect lower NPA, do less loan loss provisioning and lend more and more, while in economic recession, banks become excessively pessimistic, lend less and do more loan loss provisioning and worry about increased level of NPA. Thus non-performing assets induce the procyclicality of bank credit if it shows negative relationship with gross domestic product because during economic downturn, non-performing assets increases, requires additional provisioning. This, in turn, correspondingly curtails bank's ability to extend loans and thus, bolster the procyclicality of bank lending (Samantaraya, 2007). This paper examines the cyclical behavior of non-performing assets in both the public and private sector banks to understand whether non-performing assets induce procyclicality or not. This study also contributes to the existing body of knowledge of procyclicality and is different from previous studies in a way that there is no study conducted earlier which has compared the cyclical behavior of non-performing assets of two major bank groups- public sector banks and private sector banks in India. In some previous studies also, the analysis was done either on the overall data of schedule commercial banks or only on public sector banks.

Theoretical Background

Many research studies have been conducted on non-performing assets owing to its importance in the survival of banks (Saba, Kouser, & Azeem, 2012). There are many factors which have an impact on non-performing assets of banks. These factors are broadly categorized into bank specific factors and macroeconomic factors. In bank specific factors, loan maturity, type of lending (whether it is secured lending or unsecured lending), and intermediation cost are important. While in macroeconomic factors, current state of economy, business cycle fluctuations, interest rate, and inflation are important (Rajan & Dhal 2003; Misra & Dhal, 2010). In this section, an attempt is made to review some relevant literature so as to understand what has already been done on the above discussed areas and thus to give a deep insight into and a clear perspective on the overall field.

There are studies conducted by Rajan and Dhal (2003) and Misra and Dhal (2010) in India in which the researchers identified both the bank specific and the macroeconomic factors of non-performing assets. Rajan and Dhal (2003) found that horizon of maturity of credit, better credit culture, and favorable macroeconomic and business conditions lead to lowering of NPAs. The result suggests negative relationship between macroeconomic factors and NPA. In one more study, Biabani, Gilaninia, and Mohabatkah (2012) found significant relationships between collaterals, bounced check, credit background of customers, duration of loans payment and average of account quantity with non-performing loans. In India, Misra and Dhal (2010) further analyzed the procyclicality of NPA and found that cyclical output and lagged GDP growth rate had inverse relationship with NPA. The negative and significant relationships between GDP and NPAs are also confirmed by Fofack (2005) in Sub-Saharan Africa, by Farhan, Sattar, Chaudhry, and Khalil (2012) in Pakistan and by Messai and

Jouini (2013) in a research on Italy, Greece and Spain. Messai and Jouini (2013) also stated that the provision increases with NPA.

In Baltic States, Fainstein and Novikov (2011) suggested changes in GDP offer significant reason for the growth of non-performing loans. Likewise, strong association of real GDP growth on the level of NPA is suggested by Louzis, Vouldis, and Metaxas (2011) and Saba et al. (2012) in US banking. Similarly, Mileris (2012), in a research in 22 EU countries, found that NPL depends on macroeconomic changes in the country. In Pakistan, Ahmad and Bashir (2013) found that GDP and inflation had significant association with non-performing loans. Likewise in central, eastern and southern Europe, Klein (2013) found that lower Euro growth led to high NPA. Klein (2013) further found that high inflation led to high NPL. Further, in a study on Albanian Banking system, Shingjergji and Shingjergji (2013) found a positive relationship between growth of loans and NPL. They, however, found a negative relationship between GDP and NPL. In addition, Bertay, Demirguc-kunt and Huizinga (2012) found that public banks reported high NPA during economic upswings.

From the above literature review, bank specific and macroeconomic variables are identified and included in the study for understanding the cyclical behavior of NPA and to examine the impact of these variables on NPA in public and private sector bank group in India. Most of the reviewed studies found a negative association between GDP and NPA. It indicates that during economic upswing, NPA decreases whereas during economic contraction, NPA increases. Against this backdrop, questions emerge – Does NPA of banks in India share the same negative association with GDP? How does NPA move during economic cycle? From the above literature review, it is clear that there are no studies conducted in India to find out the association of NPA of public sector banks and private sector banks with economic cycle. The above points present a gap in the studies done earlier. This gap becomes an objective for the research in this study.

Research Objectives

1. To study the cyclical behavior of public sector bank group and private sector bank group in India with a focus on non-performing assets.
2. To study the correlation between non-performing assets and current state of economy in the public and private sector bank groups.
3. To study the correlation between non-performing assets and economy wide fluctuations in the public and private sector bank groups.
4. To study the impact of bank specific factors and macroeconomic factors on non- performing assets in the public and private sector bank groups.

Methods

Following the existing literature review, the analysis is focused on testing whether NPA shows cyclical pattern. The sample includes bank data – group wise of schedule commercial banks of India which are taken from “*Statistical Tables Relating to Banks in India*”(1999-2013) and “*Trends &Progress of Banking in India*” (1999-2013) published by the Reserve Bank of India. The annual data are taken for the period 1999-2013. The following four bank groups are selected for the study:

1. SBI Bank Group
2. Nationalized Bank Group
3. Indian Private Sector Bank Group
4. Foreign Private Sector Bank Group

In this paper, a comparative study has been made on procyclical behavior of NPA between public sector banks and private sector banks. SBI Bank Group and Nationalized Bank Group together constitute the Public Sector Bank Group. Likewise, Indian Private Sector Bank Group and Foreign Sector Bank Group together constitute the Private Sector Bank Group. There are 56 observations in total; 28 observations in the case of Public Sector Bank Group and 28 Observations in the Private Sector Bank Group.

Theoretical Framework

A panel data model has been developed for the study. The model considers the following quantitative variables – non-performing assets, credit inclination, loan maturity, unsecured lending, cost condition, interest return on assets, economy wide fluctuation and current year's GDP. Non-performing assets is used as dependent variable, and the rest are independent variables.

Table 1
Description of Variables

S. No.	Name of the variable	Defined as	Literature
1	Non-performing asset (GNPA)	Gross NPA to gross advances	Rajan and Dahl, 2003; Misra and Dhal, 2010
2	Credit inclination (CI)	Bank credit to bank deposit ratio	Rajan and Dhal, 2003; Misra and Dhal, 2010
3	Loan maturity (LM)	Bank's term loan to banks total loan	Rajan and Dhal, 2003; Misra and Dhal, 2010
4	Unsecured lending (USL)	Unsecured loans to total loans	Misra and Dhal, 2010
5	Cost condition (CC)	Intermediation cost to total assets	Misra and Dhal, 2010
6	Interest return on assets (IRA)	Actual interest income to total assets	Misra and Dhal, 2010
7	Economy wide fluctuations (EWF)	Actual GDP (in logarithm scale) less its trend component (using Hodrick-Prescott trend)	Misra and Dhal, 2010
8	Current year's GDP (CYG)	GDP at factor price cost at constant price	Rajan and Dhal, 2003; Fofack, 2005; Misra and Dhal, 2010; Louzis et al., 2011; Saba et al., 2012; Farhan et al., 2012;
9	Inflation adjusted by GDP deflator (IAGD)	Inflation adjusted by GDP deflator	

In order to identify the variables having high explanatory power and influential impact on NPA, multiple regression method is applied. The method is used to establish a meaningful relationship between NPA and different economic and financial variables. Moreover, correlation and multiple regression analyses are used to determine the nature and the strength of relationship between dependent variable against bank specific and macroeconomic variables.

Table 2

Description of Models

Model 1: Quantitative Variables Considered as Explanatory Variables
Panel Data Regression Model
Statistically the equation can be written as follows:
$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + u$
Model 2: Quantitative Variables Considered as Explanatory Variables
Panel Data Regression Model
Statistically the equation can be written as follows:
$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + u$
Model 3: Quantitative Variables Considered as Explanatory Variables
Panel Data Regression Model
Statistically the equation can be written as follows:
$Y = a + b_6X_6 + b_7X_7 + b_8X_8 + u$

Where,

Y= Non Performing Assets

a = constant

b1 to b8 = Regression coefficients for respective variables.

X1 = Credit Inclination (CI)

X2= Loan Maturity (LM)

X3=Unsecured Lending (USL)

X4=Cost Condition (CC)

X5=Interest Return on Asset (IRA)

X6=Economy Wide Fluctuations (EWF)

X7=Current Year's GDP (CYG)

X8 = Inflation Adjusted by GDP Deflator (IAGD)

u = Error Term

Hypothesis

The main aim of this study is to analyze the cyclical behavior of non-performing assets. After extensive literature review, the study considered four objectives and each objective has distinct hypothesis.

Hypothesis for Objective 1

H_{a1}: There is cyclical behavior observed in public sector banks and private sector banks in India with a focus on non-performing assets.

Hypothesis for Objective 2

H_{a2}: There exists correlation between gross non-performing assets and current year's GDP in public sector bank group and private sector bank group.

Hypothesis for Objective 3

H_{a3}: There exists correlation between Gross non-performing assets and economy wide fluctuations in public sector bank group and private sector bank group.

Hypothesis for Objective 4

H_{a4}: There is significant impact of CI, LM, USL, CC, IRA, CYG and EWF on GNPA in public sector bank group and private sector bank group.

Results

Multiple regression analysis and Pearson correlation coefficient are applied to the following bank group categories to determine the nature and strength of relationships between dependent and independent variables.

Public Sector Bank Group

1. Model 1 with CI, LM, USL, CC, IRA, CYG and EWF.
2. Model 2 with CI, LM, USL, CC and IRA.
3. Model 3 with CYG, EWF and IAGD.

Private Sector Bank Group

1. Model 1 with CI, LM, USL, CC, IRA, CYG and EWF.
2. Model 2 with CI, LM, USL, CC and IRA.
3. Model 3 with CYG, EWF and IAGD.

Public Sector Bank Group

As shown in Table 3, negative and significant correlation coefficient between GNPA and CYG of public sector banks indicates GNPA and CYG to have countercyclical behavior. The result suggests that state of economy has an impact on GNPA of public sector banks in India. Therefore, the second hypothesis (H_{a2}) is not rejected. Correlation coefficient between GNPA and EWF of public sector banks doesn't show significant correlation. Therefore, the third hypothesis (H_{a3}) is rejected.

Table 3

Pearson Correlations of GNPA, CYG & EWF of Public Sector Bank Group

		1	2
1	GNPA		
2	CYG	-.53**	
3	EWF	.28	.17

Note: N = 28; ** p < .01

Table 4 presents the results of multiple regression analysis of public sector bank group. Model 1 exhibits estimated panel data regression equation, in which credit inclination, loan maturity and unsecured lending have significant and negative impact on GNPA. Credit inclination which is defined as credit to deposit ratio has significantly negative effect ($\beta = -.06$), implying that borrowers attach considerable importance to relatively more credit (customer) oriented banks (Rajan & Dhal, 2003). Likewise, loan maturity is significantly negative ($\beta = -.17$) on GNPA implying higher term loans induce lower NPAs. Unsecured lending also has significantly negative ($\beta = -.16$) effect on GNPA, indicating loans are granted to borrowers with higher credit worthiness. Cost conditions and interest return on asset have significant and positive impact on GNPA in public sector bank group. Cost condition has positively significant ($\beta = 2.43$) impact on GNPA, which implies that increase in cost incurred by banks passed on to the borrowers results in an increase in GNPA. Interest return on asset is also significantly positive ($\beta = 1.02$) on GNPA implying that increase return on asset by bank is actually a cost incurred to borrowers. Return to banks increases in the form of interest income which is earned from borrowers where increase in interest income indicates increase in cost to borrowers leading to increase in GNPA of banks. Economy wide fluctuations and current year's GDP both are insignificant. Therefore, the fourth hypothesis (H_{a4}) in case of CI, LM, USL, CC and IRA is not rejected, while in case of CYD and EWF, it is rejected.

Table 4

Results of Multiple Regression Analysis of Public Sector Bank Group

Variables	Model 1	Model 2	Model 3
Constant	6.39	7.23	20.77**
CI	-.06**	-.06*	
LM	-.17**	-.16*	
USL	-.16**	-.16*	
CC	2.44**	2.61*	
IRA	1.02**	.90*	
EWF	4.37		53.71**
CYG	-.13		-.99*
IAGD			-1.34**
R^2	0.99	0.98	0.89
Adjusted R^2	0.99	0.98	0.87
Durbin Watson	2.58	2.72	2.14
N	28	28	28
F	314.83**	341.50*	64.20**

Note: Dependent Variable: GNPA; ** $p < .01$

In Model 2, the regression analysis result shows that all variables included in the model have significant impact on GNPA of public sector bank group. Similarly, credit inclination has significant and negative impact ($\beta = -.06$) on GNPA of public sector bank group, implying that borrowers attach considerable importance to relatively more credit (customer) oriented banks (Rajan & Dhal, 2003). Furthermore, loan maturity also shows significant and negative impact ($\beta = -.16$) on GNPA of public sector bank group implying higher term loans induce lower NPAs. Likewise, unsecured lending also

has significant and negative impact ($\beta = -.16$) on GNPA of public sector bank group implying that loans and advances are granted to borrowers with higher credit worthiness. Cost condition has significant and positive impact ($\beta = 2.61$) on GNPA. This implies that increase in cost incurred by banks passed on to the borrowers results in increase in GNPA. Interest return on asset also shows significant and positive impact (beta coefficient .90) on GNPA of public sector bank group. Increase in interest income indicates that cost to the borrower increases which leads to increase in GNPA of the banks. Therefore, the fourth hypothesis (H_{a4}) in case of CI, LM, USL, CC and IRA is not rejected.

In Model 3 of Table 4, three macroeconomic variables are included viz. economic cycle fluctuations, current year’s GDP and inflation adjusted by GDP deflator, to examine their effect on GNPA. All three macroeconomic variables are significant at 5%. More specifically, current year’s GDP has negative impact ($\beta = -.99$) on GNPA implying that increased economic activity leads to lower financial distress of borrowers and thus lower NPAs for banks (Rajan & Dhal, 2003). Inflation adjusted by GDP deflator has negative impact ($\beta = -1.34$) on GNPA of public sector bank group; implying borrowers might shift to other sources of funds when loans and advances from banks become dearer. Similarly, economy wide fluctuation is showing significant and positive impact ($\beta = 53.71$) on GNPA. This indicates that more fluctuations around a trend component in economic activity lead to financial distress in borrowers resulting in higher NPA. Thus, the fourth hypothesis (H_{a4}) in case of CYG, EWF and IAGD is not rejected.

Private Sector Bank Group

In Table 5 below, Pearson correlation coefficient values of private sector banks indicate that there exists significant and negative correlation between GNPA and CYG. That means when CYG increases, GNPA decreases and vice-versa. The result suggests that the state of economy has an impact on GNPA of private sector banks in India. Therefore, the second hypothesis (H_{a2}) is not rejected. Pearson correlation coefficient of private sector banks further indicates that there is no significant correlation between GNPA and EWF. Thus, the third hypothesis (H_{a3}) is rejected.

Table 5
Pearson Correlation of GNPA, CYG& EWF of Private Sector Bank Group

Variable	1	2
1 GNPA		
2 CYG	-.54**	
3 EWF	.24	.17

Note: ** $p < .01$

Table 6 shows the result of multiple regression analysis of private sector bank group. In Model 1, both bank specific factors and macroeconomic factors were included to assess the impact on GNPA, however, with certain model revision. First differences of unsecured lending, cost condition and interest return on asset were taken to remove multicollinearity problem observed in the model. The result shows credit inclination to have negative and significant ($\beta = -.13$) impact on GNPA of private sector bank group at 5 % level of significance. Borrowers attach considerable importance to relatively more credit (customer) oriented banks (Rajan & Dhal, 2003). Cost condition is having positive and significant ($\beta = 3.95$) impact on GNPA at 5 % level of significance. Therefore, an increase in cost incurred by banks passed on to the borrowers increases GNPA. Interest return on asset shows negative

impact ($\beta = -.98$) on GNPA. For macroeconomic variables, CYG is significant ($\beta = -.49$) and has negative impact on GNPA, implying that increased economic activity leads to lower financial distress of borrowers and thus, lower NPAs for banks (Rajan & Dhal, 2003). Economy wide fluctuation is insignificant with positive impact on GNPA of private sector bank group. Therefore, the fourth hypothesis (H_{a4}) in case of CI, CC, IRA and CYG is not rejected while in case of LM, USL and EWF, it is rejected.

In Model 2, bank specific factors were included and their impact was observed on GNPA. The model was revised using the first differences of unsecured lending, cost condition and interest return on asset to remove multicollinearity in the model. The result shows that credit inclination is having negative and significant impact ($\beta = -.17$) on GNPA. Loan maturity also indicates negative and significant impact on GNPA ($\beta = -.06$) implying higher term loans induce lower NPAs. Likewise, cost condition has positive and significant impact ($\beta = 4.74$) on GNPA at 5 % level of significance. This implies that increase in cost incurred by banks passed on to the borrowers results in increase in GNPA. Rests of all variables are insignificant. This way, the fourth hypothesis (H_{a4}) in case of CI, LM, and CC is not rejected while in case of IRA and USL, it is rejected.

Table 6
Multiple Regression Analysis of Private Sector Bank Group

Variables	Model 1	Model 2	Model 3
Constant	18.66**	20.38**	12.28**
CI	-.13**	-.17**	
LM	-.02	-.06*	
USL	-.08	-.18	
CC	3.95**	4.74*	
IRA	-.98**	-.76	
EWF	13.83		27.46**
CYG	-.49**		-.59**
IAGD			-.68**
R^2	0.85	0.73	0.76
Adjusted R^2	0.79	0.66	0.74
Durbin Watson	1.50	1.59	1.19
N	28	28	28
F	15.23**	11.25**	26.09**

Note: Dependent Variable: GNPA; ** $p < .01$

Model 3 above includes three macroeconomic variables viz. economy wide fluctuations, current year's GDP and inflation adjusted by GDP deflator. All three variables are significant at 5 % level of significance. EWF shows positive and significant impact ($\beta = 27.46$) on GNPA. This indicates that more fluctuations around a trend component in economic activity lead to financial distress in borrowers resulting in higher NPA. Likewise, CYG has negative impact ($\beta = -.59$) on GNPA, implying that increased economic activity leads to lower financial distress of borrowers and thus, lower NPAs for banks (Rajan & Dhal, 2003). Inflation adjusted by GDP deflator also has negative and significant

impact ($\beta = -.68$) on GNPA. Inflation is used as proxy for interest rate signal. Increase in inflation results in increase in interest rate on loans and advances, implying that borrowers might shift to other sources of funds when loans and advances from banks become dearer. This way, the fourth hypothesis (H_{a4}) in case of EWF, CYG and IAGD is not rejected. In cases of both public and private sector banks, on the basis of macro-economic variables used, it was observed that there existed a cyclical relation with GNPA, hence the first hypotheses (H_{a1}) is not rejected.

Discussion, Implications and Future Research Directions

Financial system especially banking system could exacerbate the economic cycle fluctuations termed as procyclicality. Therefore, the banking variable such as non-performing assets could induce procyclicality in financial system. The previous studies indicated that during economic growth non-performing assets decreases and while in recession it shows the tendency to increase. Likewise, non-performing assets is said to exhibit procyclicality if it shows negative relationship with GDP during different phases of the economic cycle. This research is conducted with an objective to analyse the cyclical behavior of non-performing assets in public and private sector banks in India in order to know whether they exhibit procyclicality or not. In public sector banks group the Pearson correlation result confirmed the negative and significant correlation of GDP and non-performing assets. This supports the countercyclical behavior of non-performing assets during different phases of the economic cycle. Also results of multiple regression analysis in Model 3 suggest the negative and significant impact of GDP on non-performing assets. The findings indicate that when GDP increases, NPA decreases and when GDP decreases NPAs increase. The results implies that when GDP increases, increased economic activity leads to lower financial distress of borrowers and thus lower NPA for banks (Rajan & Dhal, 2003). On the contrary decreased economic activity leads to high NPA. In addition, during economic recession, banks become excessively pessimistic, lend less and do more loan loss provisions and worry about increased level of NPA. This corroborates to the fact that countercyclical behavior of NPA in public sector banks in India could induce procyclicality in the financial system by exacerbating the economic cycles. In case of private sector banks, Pearson correlation and regression analysis in Model 1 and Model 3 strongly supports the countercyclical behavior of non-performing assets suggesting that non-performing assets in private sector banks could induce procyclicality in the financial system. This implies that non-performing assets of public sector banks and private sector banks in India are sensitive to economic activity and could exhibit procyclicality in the financial system.

Public sector banks and private sector banks in India are the back-bone of Indian economy where credit to economy by banks plays a vital role in growth. The tendency of non-performing assets to exhibit procyclicality could have dampening effect on macroeconomic stability. During the downward phase of economic cycle, banks perceive high risk, and furthermore, increase in non-performing assets of banks would compel them to slow the flow of credit to economy. So instead of helping economy to come out of recession, banks would push the economy more into recession and thus exacerbating the economic cycle. The study suggests that public sector banks and private sector banks in India should be able to foresee the course of economic cycle and mitigate the effect of NPA in economy. It is imperative that central banks should take measures to control the associated risks linked to such behavior.

Future research works could include other macroeconomic variables like industrial index of production, unemployment rate, real exchange rate, and growth rate of real estate market. The study is conducted using bank group data taken from the Reserve Bank of India. The scope of this research could be extended to bank specific data or bank level data. This would result in more number of observations which could provide more specific and in-depth results. The scope of research could be extended to longer period of study which covers different phases of economic cycle. This would help to understand the behavior of different variables over the bigger economic cycle of India. The research could also be extended in comparing the procyclical behavior of India with other Asian countries like Nepal, Pakistan, Sri Lanka, China, and Bangladesh.

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