Original Research Paper

Volume - 11 | Issue - 12 | December - 2021 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Economics

EXPLANATORY POWER OF BANK SPECIFIC AND MACROECONOMIC VARIABLES AS DETERMINANTS OF NON- PERFORMING LOANS : EVIDENCE FROM INDIAN BANKING SECTOR

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ABSTRACT Deterioration of assets quality reduce the profitability and efficiency, impair social welfare and financial destabilize the banking system as a whole. Aim of the paper is to investigate the determinants of Non-Performing Assets in selected Indian scheduled commercial banks by taking both banks specific and macroeconomic variables. Results of Fixed effect and PCSE model find that bank behavior plays a crucial role in maintaining the NPAs. Size of bank and NPAs has positive association that reflects that large banks are inefficient in maintaining lower NPAs, might be due to higher concentration ratio as compared on the smaller ones. Bad management hypothesis, aggressive lending and diversification are proved to be crucial factor for the change in problematic loans. Among macroeconomic variables; Fiscal deficit ratio and Inflation have strong impact on non-performing assets.

KEYWORDS : Non-Performing Assets, Bank Specific variables, Macroeconomic variables, Fixed Effect Model

1: INTRODUCTION

NPA adversely affects the profitability, liquidity, efficiency, solvency, asset quality, capital adequacy, confidence of investor, shareholder and depositors, more over it becomes a threat to soundness and health of financial institutions. It can also be defined as a "financial pollution" (Ghosh, 2015). Bad assets cease to generate income for the bank when loan assets are either partly or fully not recovered. Effective NPA resolution mechanism cannot get succeed if deep root cause of it are not analysed properly Objectives of this paper are to investigate the determinants of bad assets in selected Indian scheduled commercial banks by taking both banks specific and macroeconomic variables.

This article is organized into five sections; first one describes the introductory part followed by review of existing literatures in second section. Section 3 includes the methodology that is used for analysis; Section 4 describes data analysis and comparisons with earlier studies. The last section describes the conclusion part.

2: Review of Literature

Many literatures based on Indian context documented GDP as one of the important factors having adverse impact of growth on bad loans (Das and Ghosh, 2007;Swamy, 2012; Prasanna et al., 2014;Roy, 2014;Reddy, 2015;Patra and Padhi, 2016;Samantaraya, 2016;Sopan and Dutta, 2018; Mohanty et al., 2019). Some article based on foreign countries supported this relationship (Espinoza and Prasad, 2010;Ahmad and Bashir, 2013;Ghosh, 2014;Kanayake and Azeez, 2015;Rajha, 2016;Waqas et al, 2017;Mazreku et al., 2018;Szarowska, 2018; Wood and Skinner, 2018).

The positive impact of unemployment on GNPA ratio (Klein, 2013;Prassana et al., 2014; Ghosh, 2015;Dimitrios et al., 2016;Patra and Padhi, 2016; Waqas et al., 2017; Mazreku et al., 2018; Szarowska, 2018; Wood and Skinner, 2018). Inflation has negative relation with NPAs (Ahmad and Bashir, 2013; Kanayake and Azeez, 2015; Rajha, 2016; Mazreku et al., 2018; Szarowskav, 2018).

The negative relation is reported by Ahmad and Bashir (2013) and Wood and Skinner (2018) suggesting increasing lending rate could cause reduction in loan growth that eventually reduces bad assets. Past growth of lending increase NPA (Klein, 2013). Return on Assets (profitability) is expected to have negative sign with NPAs (Prasanna et al., 2014; Reddy, 2015; Patra and Padhi, 2016; Samanataraya, 2016; Kadanda and Raj, 2018; Bawa et al., 2019; Ramesh, 2019) in the context of Indian Banks and also for foreign countries(Ghosh, 2015; Kanayake and Azeez, 2015; Dimitrios et al., 2016; Wood and Skinner, 2018). High credit culture or any positive deviation of bank's CrDR from that of Industry level could be favorable that helps to reduce NPAs (Ranjan and Dhal, 2003; Swamy, 2012; Mohanty et al., 2019; Ramesh, 2019).Size and NPA carry a strong and negative sign (Ranjan and Dhal, 2003; Waqas et al., 2017) in the context of foreign countries and for some Indian literatures (Swamy, 2012; Reddy, 2015 and Sopan and Dutta, 2018). ROE had negative relation with NPA(Klein, 2013; Prasanna et al., 2014;Dimitrios et al., 2016; Waqas et al., 2017;Wood and Skinner, 2018; Mohanty et al., 2019

3: Data and Methodology

Table-1: Summary of selected Variables

Bank Specific Variables	Obs	Mean	Std. Dev.	Min	Max
Gross Non-Performing Assets to Gross Advances (GNPA) **Unsecured Advances to Total Advances Ratio**	665	4.56	5.38	.01	46.88
(Unadv)	672	24.83	20.85	.01	93.24
Operating Expenses to Total assets (OPE)	675	1.90	1.13	.26	25.33
Cash - Deposit Ratio (CDR)	674	6.91	3.73	1.06	40.65
Investment - Deposit Ratio (IDR)	674	47.66	72.05	14.54	1533.32
Credit - Deposit Ratio (CrDR)	674	87.04	53.58	1.20	660.06
Priority Sector Advance Ratio (PSA)	672	33.07	8.70	7.72	66.7
Net Interest Margin (NIM)	675	3.03	1.01	.13	7.34
Non Interest Income Ratio (NII)	675	1.40	1.07	-.44	16.63
Return on equity (ROE)	675	8.42	12.74	-85.92	31.37
Business per employee(BPE)	675	1711.47	1622.89	148.51	11508
Capital Adequacy Ratio (CAR)	675	18.25	16.39	8.5	277.45
log of Total assets (SIZE)	675	4.68	.90	2.20	6.59
Return on assets (ROA)	675	164.97	72.83	1	312
Profit per employee (PEE)	675	228.65	125.70	1	444
Macroeconomic Variables					
Annual GDP growth rate (GGDP)	675	7.191	.80	4.1	9.7
Stock Market Index (Nifty 50)SMI	675	3.77	.184	3.40	4.06
Scheduled Commercial Bank Credit Growth Rate (SCBCRGR)	675	15.986	.98	6.1	30.95
Average Lending Rate for the Borrowers (LEN)	675	10.48	2.22	7.67	14.12
Fiscal Deficit Ratio (FDR)	675	4.36	1.10	2.5	6.6
Inflation rate (INF)	675	7.02	2.80	3.4	12.4
Unemployment rate (UNEMP)	675	5.62	.41	5.27	7.11
Index of Industrial Product (IIP)	675	5.46	4.07	-.8	15.5
Marker Capitalisation Ratio (MCR)	495	74.64	11.53	55.2	96

Source-Author's compilation

Table1 shows the summary statistics of bank specific and macroeconomic variables. Gross NPA ratio has minimum value 0.01 (foreign bank) and maximum 46.88(Public sector Banks). Return on Assets and Profit per employee had minimum value one. Diversification and Return on Equity were having negative minimum values. Mean and standard deviation of Business per Employees are very high. Market Capitalization ratio has higher mean and standard deviation. Industrial Index has negative minimum.

The Bank specific and macroeconomic (unbalanced) data are taken for forty five India scheduled commercial banks from RBI website and World Bank.. Variables such as GNPA ratio is considered as dependent one. Both macroeconomic and bank specific variables are taken as independent variables. Fisher's ADF test shows except Business per Employee and Inflation, all other variables are found to be stationary at level. After first difference, both these variables became stationery. For Panel data regression fixed effect is appropriate for all the eight models, as per Hausman test and F-statistic. To capture panel data problems such as heteroskedastic, auto-correlation and correlated across panels, Panel Corrected Standard Error (PCSE) model is considered (Hoechle, 2007). Bank specific variables and some of the macro economic factors (Fiscal Deficit Ratio, unemployment and Inflation) are same in all seven models (Model-2 to Model-8) but macroeconomic factors having high collinearity are used interchangeably across all models.

The fixed Effect Model (FE) assumes the individual bank's heterogeneity to be constant over the selected time period (fifteen years) for each bank

$$Yi,t=\alpha i,t+\beta Xi,t+\mu i+\varepsilon i,t$$

Where,

Yi,t is GNPAit for i-th bank/cross section (i=1,2,….45) and (t=1,2,….15)

α=common intercept and β=slope coefficient of independent variables

Xi,t= bank specific variables for i-th bank at a particular period of time(t-th year)

μi=fixed effect or unobserved effect for the i-th bank(i=1,2,…45),

εi,t=observation specific error term for i-th bank at a particular period of time(t-th year,t=1,2,…15)

4: Data analysis and Comparison

Table: 2 Result Of Fixed Effect Model

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Unadv	-0.084***	-0.084***	-0.084***	-0.0839***	-0.084***	-0.084***	-0.084***	-0.051***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OPE	0.360	0.368	0.385	0.361	0.368	0.364	0.370	0.177
	(0.309)	(0.298)	(0.278)	(0.308)	(0.299)	(0.304)	(0.297)	(0.603)
CDR	0.090**	0.0863**	0.086**	0.090**	0.086**	0.081*	0.092**	0.0164
	(0.040)	(0.049)	(0.049)	(0.041)	(0.049)	(0.070)	(0.047)	(0.689)
CrDR	-0.020***	-0.019***	-90.02***	-0.019***	-0.019***	-0.019***	-0.019***	-0.015***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IDR	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.001
	(0.435)	(0.290)	(0.293)	(0.300)	(0.290)	(0.265)	(0.308)	(0.443)
PSA	0.083***	0.077***	0.079***	0.076***	0.077***	0.076***	0.077***	0.0686***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
NIM	0.338	0.398*	0.396*	0.388	0.398*	0.403*	0.391*	0.644***
	(0.150)	(0.091)	(0.093)	(0.100)	(0.091)	(0.087)	(0.097)	(0.001)
NII	0.565***	0.509**	0.484**	0.547**	0.510**	0.498**	0.520**	1.095***
	(0.007)	(0.016)	(0.026)	(0.012)	(0.016)	(0.019)	(0.015)	(0.000)
ROE	-0.215***	-0.215***	-0.218***	-0.212***	-0.215***	-0.216***	-0.214***	-0.199***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CAR	0.018*	0.020*	0.021**	0.020*	0.020*	0.021**	0.020*	0.0091
	(0.087)	(0.052)	(0.049)	(0.056)	(0.052)	(0.046)	(0.055)	(0.268)
ROA	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***	-0.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PPE	-0.0005	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0018*
	(0.678)	(0.888)	(0.901)	(0.877)	(0.890)	(0.882)	(0.900)	(0.083)
BPE	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003
	(0.468)	(0.374)	(0.374)	(0.351)	(0.374)	(0.382)	(0.376)	(0.200)
SIZE	0.185	0.659	1.084	0.240	0.594	0.851	0.402	-1.910**
	(0.713)	(0.247)	(0.247)	(0.760)	(0.463)	(0.210)	(0.649)	(0.042)
FDR		-0.243*	-0.279**	-0.237*	-0.246*	-0.236*	-0.3006	-0.812***
		(0.051)	(0.046)	(0.058)	(0.054)	(0.061)	(0.123)	(0.000)
UNEMP		-0.388	-0.314	-0.456	-0.397	-0.333	-0.421	-0.092
		(0.220)	(0.358)	(0.165)	(0.224)	(0.319)	(0.200)	(0.768)
INF		0.152*	0.140*	0.179**	0.153*	0.160**	0.150*	0.2119***
		(0.053)	(0.086)	(0.037)	(0.055)	(0.046)	(0.058)	(0.005)
SMI			-1.150					
			(0.568)					
LEN				-0.086				
				(0.436)				
ScbCrGr					-0.004			
					(0.909)			
GGDP						0.052		
						(0.602)		
IIP							-0.027	
							(0.704)	
MCR								-0.004
								(0.685)

Source: Author's computation.

Where, Table represents coefficient and probability value *** reflects the coefficient is statistically significant at 1% significance level, ** denotes significant level at 5% and * represents significance level at 10%.

Table 3: Panel Corrected Standard Error Of Eight Models

Dependent variable-GNPA								
Variables	***Model 1***	***Model 2***	***Model 3***	***Model 4***	***Model 5***	***Model 6***	***Model 7***	***Model 8***
Unadv	-0.0407***	-0.0405***	-0.0414***	-0.0415***	-0.0410***	-0.0404***	-0.0415***	-0.0241***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.041)
OPE	-0.2128	-0.2627	-0.2646	-0.2364	-0.2562	-0.2789	-0.2477	-0.1550
	(0.493)	(0.400)	(0.396)	(0.453)	(0.412)	(0.376)	(0.431)	(0.736)
CDR	0.0319	0.0300	0.0310	0.0398	0.0317	0.0279	0.0398	0.0145
	(0.415)	(0.400)	(0.390)	(0.276)	(0.373)	(0.443)	(0.299)	(0.693)
CrDR	-0.0149***	-0.0142***	-0.0142***	-0.0146***	-0.0142***	-0.0142***	-0.0144***	-0.0127***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
IDR	0.0019	0.0021	0.0022	0.0022	0.0022	0.0022	0.0021	0.0019
	(0.292)	(0.226)	(0.202)	(0.215)	(0.209)	(0.210)	(0.231)	(0.352)
PSA	0.0615***	0.0572***	0.0556***	0.0555***	0.0565***	0.0567***	0.0563***	0.0559***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
NIM	0.3884*	0.4571**	0.4539**	0.4246*	0.4577**	0.4663**	0.4359*	0.2754
	(0.079)	(0.043)	(0.044)	(0.058)	(0.042)	(0.039)	(0.054)	(0.288)
NII	0.2387	0.2036	0.2314	0.2364	0.2103	0.2124	0.2197	0.6338**
	(0.180)	(0.238)	(0.197)	(0.184)	(0.229)	(0.219)	(0.208)	(0.046)
ROE	-0.1868***	-0.1893***	-0.1866***	-0.1849***	-0.1875***	-0.1910***	-0.1874***	-0.1728***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CAR	0.0159**	0.0174**	0.0173**	0.0168**	0.0174**	0.0179**	0.0173**	0.0089
	(0.024)	(0.013)	(0.014)	(0.015)	(0.014)	(0.011)	(0.013)	(0.251)
ROA	-0.0104***	-0.0103***	-0.0103***	-0.0101***	-0.0103***	-0.0103***	-0.0102***	-0.0118***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
PPE	-0.0002	0.0000	-0.0001	-0.0001	-0.0001	0.0000	0.0000	-0.0015*
	(0.800)	(1.000)	(0.897)	(0.925)	(0.947)	(0.963)	(0.974)	(0.076)
BPE	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.987)	(0.899)	(0.937)	(0.900)	(0.912)	(0.887)	(0.924)	(0.918)
SIZE	0.2328	0.3428	0.2894	0.2639	0.2935	0.3627	0.2864	0.9391***
	(0.544)	(0.359)	(0.476)	(0.508)	(0.457)	(0.342)	(0.478)	(0.006)
FDR		-0.3393***	-0.3126***	-0.3094***	-0.3823***	-0.3327***	-0.4709***	-0.4493***
		(0.002)	(0.006)	(0.004)	(0.000)	(0.002)	(0.002)	(0.006)
UNEMP		-0.1141	-0.2252	-0.2878	-0.2543	-0.0813	-0.2066	-0.1212
		(0.608)	(0.313)	(0.174)	(0.231)	(0.723)	(0.357)	(0.637)
DINF		0.2047***	0.2330***	0.2520***	0.2260***	0.2081***	0.2092***	0.2035***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
SMI			1.2735					
			(0.343)					
LEN				-0.1370*				
				(0.063)				
ScbCrGr					-0.0328			
					(0.215)			
GGDP						0.0320		
						(0.669)		
IIP							-0.0502	
							(0.271)	
MCR								0.0069
								(0.537)

Source: Author's computation.

Where, *** represents coefficient is statistically significant at 1% significance level, ** denotes significant level at 5% and * represents significance level at 10%.

Some banks specific variables such as Unsecured advance ratio, Credit Deposit Ratio, Priority sector advance ratio, Net Interest Margin, Return on equity ,Return on assets, Capital adequacy ratio and two macroeconomic variables that are inflation and fiscal deficit ratio are significant and have maintained the same direction in all the models as reported in fixed effect model. Diversification (NII), Profit per employee and Size are also significant in Model-8 but now total asset is negatively influencing the bad assets. Large sized banks with huge assets size used to make aggressive lending and failed to manage their asset portfolio that supports the "Too-big-to-fail" impact on total assets.

5: CONCLUSION

Unbalanced panel data set from 2005-06 to 2019-20 consists of 45 selected Indian Commercial Banks. Variables such as GNPA ratio is considered as dependent one. The Panel regression is conducted by using fixed effect model and PCSE mode that capture heteroskedasticity, autocorrelation and cross sectional dependency present in the data. In this paper bad management hypothesis, aggressive lending and diversification are proved to be crucial factor for the change in problematic loans. Bank specific or internal factors can be controllable to avoid defaults. Higher fiscal deficit is good for the economy when government expenditure is towards more productive assets. Inflation constraint the disposable income of households, so debt repayment gets affected adversely.

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