Impact of Non -Performing Assets on Stock Market Performance of listed bank stocks in India An empirical assessment of how the two stocks – NPA and Share are related

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Abstract: *An asset, including a leased asset, becomes non-performing when it ceases to generate income for the bank and is then termed as Non-Performing Asset (NPA). RBI has defined NPA as a credit facility in respect of which the interest and / or installment of principal has remained 'past due' for a specified period of time as stipulated by RBI.*

NPA is an important parameter in the analysis of financial performance of a bank as it results in higher provisioning requirements and thus decreasing margin. It affects liquidity and profitability, in addition to posing threat on quality of asset and survival of banks. It points out the credit risk of the banks. It emerged about 25 years ago in our banking sector, sending disappointing signals on the sustainability of affected banks. At present, Public Sector Undertaking Banks (PSU) are facing more problems than Private Sector Banks (PrSB). A mounting level of NPAs in the banking sector can severely affect the economy in many ways. If NPAs are not properly managed, it can cause financial and economic degradation which in turn signals an adverse investment climate. Researchers have investigated many factors and dimensions which influence NPA level in banks vis interest rate deregulation, reserve requirements, barriers to entry in the industry, prudential norms and risk based supervision, bank size, credit rating and macroeconomic shocks which influence NPA level in banks. However, not much work seems to have been done for assessment of impact of NPA on stock market performance of the banks.

This paper looks at an empirical analysis of the entire universe of 39 listed banks (comprising 24 PSU Banks and 15 PrSB) and attempts to find correlation between NPA levels and stock market performance of listed banks for past 15 years. It also considers impact of other internal factors like provisions, advances, net profit after tax, business per employee, profit per employee and other factors which may influence the stock market performance of the banks. Statistical findings are presented on the basis of multiple regression analysis. The research effort is based on secondary data appearing in RBI reports, database related to NPAs and annual reports of banks.

Keywords: *Liquidity, Non-Performing Assets (NPA), Private Sector banks, Provisions, Public Sector Banks, Stock market*

I.   Introduction:

Indian banking sector, an important pillar of Indian economy, plays a vital role in its growth. To cope up with industrialization and ever changing conditions Indian banks try to put best effort to meet the demand while managing their businesses. RBI classifies banks into Public Sector Banks (PSB) and Private Sector Banks (PrSB).

In this paper, an attempt has been made to estimate relationship between stock market performance of Indian bank stock with their NPA levels and other factors, using multiple regression analysis. This paper looks to find out the extent to which these factors influence banks' stock performance.

II.   Literature Review:

Souvik Kumar Ghosh et al (2014) studied interrelation between GDP at factor cost with Business Growth & NPA position of PSBs using from 2009 to 2013.They found that GDP or economic and market conditions have a direct impact on bank's business and the asset quality.

Ashis Satpathy et al (2015) empirically tried to examine both macroeconomic and microeconomic (bank-specific) factors responsible for the rising NPA levels in the Indian banking sector. PSBs, PrSBs and also

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foreign banks. The data for study is taken from 2005 to 2013 and Panel Data Model is used as methodology. The analysis of the macroeconomic and microeconomic factors (bank-specific factors) for different bank sectors showed that macroeconomic factors play a major role in the determination of NPA levels in Indian banks, while fiscal deficit, growth in GDP of India and an increase in balance of trade help in reducing the NPA levels of banks, inflation leads to increase in NPA levels. The bank-specific factors also have significant impact on the bad assets levels of PSBs, while PrSB are immune to some of these factors.

Ashly Lynn Joseph and Dr. M. Prakash (2014) have done a study on analyzing the NPA Level in PSB and PrSB. This study was done to find out trend in NPA level, the internal and external factors that contributes to NPA and to suggest the various measures for proper management of NPA in banks.After analyzing the asset quality of banks, they found out that NPAs are draining the capital of the banks and weakening their financial strength. There is a need for more proactive action by banks especially PSB to have a reasonable and well-structured NPA management policy where prevention of formation of NPA receives an utmost priority.

K.K. Siraj and P. Sudarsanan Pillai (2013) have focused on identifying relative efficiency of different bank groups in managing their NPA. The indicators like Gross NPA (GNPA), Net NPA (NNPA), Additions to NPA, Reductions to NPA and Provisions towards NPA has been taken for the evaluation of trend in movement of NPA of different bank groups. These indicators were also compared with selected micro-performance indicators of banks. The study is important due to its critical explanation of the success of NPA management in the period from 2001-11.To sum up the findings, a ranking based on NPA indicators rate NB at the top in management of NPA, followed by SBIA, Foreign Banks and PrSB.

Idier et al. (2011) evaluated the bank equity volatility, tail market risk and bank financial structure. A panel of 65 large US commercial banks has been analyzed over the period 1996-2010 using regression analysis. The study found that profitability, asset quality, interbank loans and bank size are important variables affecting their sensitivity to market risk significantly.

Makkar and Singh (2013) examined the stock return behavior of two Indian commercial banks SBI and ICICI Bank during the period of financial turmoil. The study found that stock price of ICICI Bank was more affected by the recent crisis compared to that of SBI. The main reason for the relatively less impact of the crisis on SBI stock prices is its public ownership.

Shveta Singh and Anita Makka (2014) have tried to empirically examine the relationship between the stock returns volatility and crisis in the Indian banking sector taking Bankex stock index as a proxy of stock prices of Indian commercial banks. Bankex index consists of major PSU and PrSB listed on BSE (90% of the Indian banks are listed on BSE). The time series data of closing stock prices for nine years was collected on daily basis from January 1, 2004 to December 31, 2012. The study found that Indian stock market has been significantly affected by the news of recession in the US stock market. There exists a significant difference in the stock returns of banks and its volatility between pre- and post-crisis periods.

Tanupa Chakraborty (2010) concluded that the relationship between stock return volatility and the application of fair values in the banks' investment portfolio over the time period April 1994-March 2008 has no significant impact on the volatility of banks' stock returns.

Deepti Sahoo and Pulak Mishra (2012) have examined the structure-conduct-performance relationships in Indian banking sector. They found out that strong inter-linkages exist amongst structure of the market, conduct of banks and their financial performance. While there was direct dependency of market share on its market size, selling efforts, asset base and past financial performance, as well as selling efforts of these banks varied directly with market share, asset base, and financial performance. On the other hand, returns on assets of a bank directly depended on the market share, but inversely with its asset base and selling efforts.

Roopam Kothari and Narendra Sharma (2009) have studied the performance of banking stocks vis-a-vis S&P CNX Nifty in the period starting from July 2007 to June 2008.They found out that the banking sector has been severely affected by the upswings and the downswings in the Indian stock market over a period of one year under study as Banking and finance industry are largely dependent on confidence amongst the investors and the depositors but its sustainability comes with the sound economic fundamentals, per capita income, consumption patterns in the country, GDP growth rate, etc.

Research Gap

Looking to the literature review, lot of research has been done to understand reasons of rising NPA in Indian banks, influence of microeconomic and macroeconomic factors on NPAs and impact of NPA on banks' business, its management and overall efficiency. Some work has also been done to analyze banks' stock

performance over the years. However, there appears to be not much research on estimating linkages between NPA and bank stock market returns.

Therefore, this gap has been identified and is explored in the present study of "Impact of Non - Performing Assets on Stock Market Performance of listed bank stocks in India-An empirical assessment of how the two stocks – NPA and Share are related".

Research Objective
1. To find the relationship between NPA levels and stock market performance of all listed banks for past 10 years.
2. To find the impact of other internal factors like Provisions, Advances, Net Profit After Tax, Business Per Employee, Profit Per Employee and other market factors on stock market performance of all listed banks for past 15 years.

III. Research Hypotheses

Stock market performance of bank is captured by market capitalization of bank (MCAP). Information pertaining to bank mcap is readily available and it obviates the need to look at share prices and no./ denomination of face value of shares. Percentage changes to mcap have been obtained on a year-on-year basis as the analysis is with annual rests. Data relating to all variables has been transformed to reflect percentage changes in the variable during the year e.g. percentage change of NPA level and percentage change in market capitalization is considered. Similar treatment is given to other internal factors / variables like Provisions, Advances, NPAT (net profit after tax), BPE (Business per employee, PPE (profit per employee) and EMCAP (i.e. residual market cap obtained after deducting the combined market cap of all banks for the relevant year).

Since the key input data is represented as percentage change over the value of the previous year, in a way, the coefficients obtained through the different regression equations represent the partial elasticities of bank stock MCAP to chosen variables. Hence estimated / obtained regression coefficients may be read as – the regression coefficient denotes the variable partial elasticity of bank mcap.

Data has been analyzed from different perspectives in this paper. Accordingly, following 8 models have been derived, representing the different categories / types of banks contained in the data.
1. All banks, pooled data for the period of observation.
2. All PSU Banks,
3. All NB,
4. All SBIA,
5. Other Public Sector Bank (IDBI)
6. All Private Banks,
7. all banks pre-financial crisis, and
8. all banks post financial crisis.

In all the models, the following standard hypotheses have been tested for significance.

HO1: There is no relationship between % change in MCAP of banks and % change in GNPA.
HA1: There is a relationship between % change in MCAP of banks and % change in GNPA.
HO2: There is no relationship between % change in MCAP of banks and % change in NNPA.
HA2: There is a relationship between % change in MCAP of banks and % change in NNPA.
HO3: There is no relationship between % change in MCAP of banks and % change in Provisions.
HA3: There is a relationship between % change in MCAP of banks and % change in Provisions.
HO4: There is no relationship between % change in MCAP of banks and % change in Advances.
HA4: There is a relationship between % change in MCAP of banks and % change in Advances.
HO5: There is no relationship between % change in MCAP of banks and % change in NPAT (net profit after tax).
HA5: There is a relationship between % change in MCAP of banks and % change in NPAT (net profit after tax).
HO6: There is no relationship between % change in MCAP of banks and % change in BPE (Business per employee).
HA6: There is a relationship between % change in MCAP of banks and % change in BPE (Business per employee).
HO7: There is no relationship between % change in MCAP of banks and % change in PPE (Profit per employee).
HA7: There is a relationship between % change in MCAP of banks and % change in PPE (Profit per employee).

HO8: There is no relationship between % change in MCAP of banks and % change in EMCAP (Total equity market capitalization excluding market capitalization of banks).

HA8: There is a relationship between % change in MCAP of banks and % change in EMCAP (Total equity market capitalization excluding market capitalization of banks).

IV. Research Design

Methodology and data collection:

Data collection – The study is based on secondary data pertaining to the period 2001-15. The secondary data pertaining to banks was sourced from annual reports of banks, database like Ace Analyzer, Capital Line. Market related data is sourced from BSE database available in public domain. Data has been obtained for all listed banks for which information was available. Analysis of data has been done using multiple regression.

V. Findings and Analysis

All banks – pooled data

TABLE 1- Regression Test Results for All Banks

Parameter	Coefs	P-value	H0	HA
Gross NPA	0.17	0.115	Can't Reject	
Net NPA	**-0.11**	**0.021**	Reject	**Accept**
Provisions	-0.03	0.589	Can't Reject	
Advances	**0.18**	**0.007**	Reject	**Accept**
NPAT	0.01	0.316	Can't Reject	
BPE	0.00	0.837	Can't Reject	
PPE	0.04	0.075	Can't Reject	
EMCAP	**0.64**	**0.000**	Reject	**Accept**

As per the regression result market capitalization of all banks has a relation with Net NPA, Advances and EMCAP (remaining market capitalization of equity market).The final estimated equation to show the relation ignoring the constant term is

MCAP = - 0.11 * NET NPA + 0.18 * ADVANCES + 0.64 * EMCAP   -------- (1)

Listed Public sector banks

TABLE 2- Regression Test Results for All PSU

Parameters	Coefs	*P*-value	H0	HA
Gross NPA	0.24	0.515	Can't Reject	
Net NPA	**-0.12**	**0.012**	Reject	**Accept**
Provisions	0.20	0.528	Can't Reject	
Advances	0.04	0.881	Can't Reject	
NPAT	**0.05**	**0.036**	Reject	**Accept**
BPE	0.00	0.075	Can't Reject	
PPE	0.01	0.749	Can't Reject	
EMCAP	**0.68**	**0.000**	Reject	**Accept**

As per the regression result MCAP of all PSU Banks has a relation with Net NPA, NPAT and EMCAP (remaining MCAP of equity market). The final estimated equation to show the relation ignoring the constant term is

MCAP= - 0.12 * NET NPA + 0.05 * NPAT + 0.68 * EMCAP   --------- (2)

Nationalized Banks

TABLE 3- Regression Test Results for All NB

Parameters	Coefs	P-value	H0	HA
Gross NPA	-0.22	0.092	Can't Reject	
Net NPA	0.04	0.686	Can't Reject	
Provisions	0.06	0.058	Can't Reject	
Advances	0.88	0.853	Can't Reject	
NPAT	0.00	0.172	Can't Reject	
BPE	**-0.06**	**0.003**	Reject	**Accept**
PPE	0.01	0.766	Can't Reject	
EMCAP	**0.55**	**0.000**	Reject	**Accept**

As per the regression result MCAP of all nationalized banks has a relation with BPE (Business per employee) and EMCAP (remaining MCAP of equity market). The final estimated equation to show the relation ignoring the constant term is

MCAP= - 0.06 * BPE + 0.55 * EMCAP --------- (3)

State Bank of India and Associates

TABLE 4- Regression Test Results for All SBIA

Parameters	Coefs	P-value	H0	HA
Gross NPA	0.13	0.125	Can't Reject	
Net NPA	-0.18	0.321	Can't Reject	
Provisions	0.10	0.094	Can't Reject	
Advances	0.01	0.250	Can't Reject	
NPAT	0.08	0.248	Can't Reject	
BPE	0.27	0.233	Can't Reject	
PPE	0.01	0.393	Can't Reject	
EMCAP	**0.59**	**0.000**	Reject	Accept

As per the regression result MCAP of all SBI and associate banks has a relation with EMCAP (remaining MCAP of equity market) only. The final estimated equation to show the relation ignoring the constant term is

MCAP= + 0.59 * EMCAP --------- (4)

Other Public Sector banks

TABLE 5- Regression Test Results for Other Public Sector Banks

Parameters	Coefs	P-value	H0	HA
Gross NPA	-0.47	0.060	Can't Reject	
Net NPA	0.04	0.788	Can't Reject	
Provisions	**0.36**	**0.021**	Reject	Accept
Advances	0.01	0.499	Can't Reject	
NPAT	0.05	0.277	Can't Reject	
BPE	0.51	0.525	Can't Reject	
PPE	0.01	0.985	Can't Reject	
EMCAP	0.50	0.059	Can't Reject	

As per the regression result MCAP of all other public sector banks (IDBI which was classified as other PSB) has a relation with Provisions only. The final estimated equation to show the relation ignoring the constant term is

MCAP = - 1.2 * PROVISIONS --------- (5)

However the significance F for regression is more than 0.05, which shows high chance of random result. Incidentally, it was observed over long periods that there was no substantial change in stock price of IDBI Bank stocks, despite movements in equity market, either upwards or downwards. This is in a way corroborated by the analysis.

5.2.6 Private Sector Banks

TABLE 6- Regression Test Results for All Private Banks

Parameters	Coefs	P-value	H0	HA
Gross NPA	-1.84	0.694	Can't Reject	
Net NPA	0.48	0.926	Can't Reject	
Provisions	1.51	0.826	Can't Reject	
Advances	**1.17**	0.000	Reject	Accept
NPAT	0.48	0.638	Can't Reject	
BPE	-1.25	0.794	Can't Reject	
PPE	-0.22	0.078	Can't Reject	
EMCAP	**0.84**	0.000	Reject	Accept

As per the regression result MCAP of listed private banks has a relation with Advances and EMCAP (remaining MCAP of equity market). The final estimated equation to show the relation ignoring the constant term is

MCAP = + 1.17 * ADVANCES + 0.61 * EMCAP --------- (6)

The above equation suggests that stock performance of bank stock is positively related to Advances and positively to EMCAP. This is possibly due to the fact that leading PrSBs are working somewhat more efficiently than other banks and hence respond more to market forces.

Pre-crisis (year < 2009) for all banks

TABLE 7- Regression Test Results for All Banks (Pre Crisis)

Parameters	*Coefs*	*P-value*	H0	HA
Gross NPA	2.07	0.115	Can't Reject	
Net NPA	**-0.12**	**0.021**	Reject	**Accept**
Provisions	-2.04	0.589	Can't Reject	
Advances	**-1.11**	**0.007**	Reject	**Accept**
NPAT	0.81	0.316	Can't Reject	
BPE	-1.33	0.837	Can't Reject	
PPE	0.00	0.075	Can't Reject	
EMCAP	**1.09**	**0.000**	Reject	**Accept**

As per the regression result MCAP of all banks pre crisis has a relation with Net NPA, Advances and EMCAP (remaining MCAP of equity market). The final estimated equation to show the relation ignoring the constant term is

MCAP = - 0.12 * NET NPA - 1.11*ADVANCES + 1.09 * EMCAP --------- (7)

The above equation suggests that stock performance of bank stock is negatively related to NNPA and Advances, and positively to EMCAP. A higher than market return would perhaps indicate that banks were considered to be better performers, possibly because they were regulated. The negative relationship with Net NPA is understandable, however, the negative relationship with advances is somewhat intriguing. Perhaps indicating that market players expected banks to be very cautious in increasing advances, and hence when advances increased, the market responded unfavorably.

Post crisis (year > 2008) for all banks

TABLE 8- Regression Test Results for All Banks (Post Crisis)

Parameters	*Coefs*	*P-value*	H0	HA
Gross NPA	-0.07	0.178	Can't Reject	
Net NPA	0.01	0.540	Can't Reject	
Provisions	0.01	0.338	Can't Reject	
Advances	**0.57**	**0.001**	Reject	**Accept**
NPAT	0.00	0.955	Can't Reject	
BPE	0.00	0.828	Can't Reject	
PPE	0.06	0.637	Can't Reject	
EMCAP	**0.60**	**0.000**	Reject	**Accept**

As per the regression result MCAP of all banks post crisis has a relation with Advances and EMCAP (remaining MCAP of equity market). The final estimated equation to show the relation ignoring the constant term is

MCAP = + 0.57 * ADVANCES + 0.60 * EMCAP --------- (8)

Consolidated results for all 8 models

TABLE 9- Summarized results for models

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	All Banks	**All PSU**	**All NB**	**All SBIA**	**Other PSU**	**All Private**	**All Pre Crisis**	**All Post Crisis**
Gross NPA	0.17	0.24	-0.22	0.13	-0.47	-1.84	2.07	-0.07
Net NPA	**-0.11**	**-0.12**	0.04	-0.18	0.04	0.48	**-0.12**	0.01
Provisions	-0.03	0.20	0.06	0.10	**0.36**	1.51	-2.04	0.01
Advances	**0.18**	0.04	0.88	0.01	0.01	**1.17**	**-1.11**	**0.57**
NPAT	0.01	**0.05**	0.00	0.08	0.05	0.48	0.81	0.00
BPE	0.00	0.00	**-0.06**	0.27	0.51	-1.25	-1.33	0.00
PPE	0.04	0.01	0.01	0.01	0.01	-0.22	0	0.06
EMCAP	**0.64**	**0.68**	**0.55**	**0.59**	0.50	**0.84**	1.09	**0.60**

VI.   Conclusions and policy recommendations

Based on data and analysis, as conducted above, the following can be concluded with an element of certainty. They also go towards addressing the research questions prior to the analysis.

In the above table, figures appearing in bold indicate coefficients which are significant.

- NPA (through Net NPA, OR Provision) is a factor which affects bank market capitalization. Gross NPA does not appear to impact bank market capitalization in any significant manner. NPA seems to have no impact for private banks, nationalized banks and SBIA as also for the period after the financial crisis. Absolute values of the coefficients of terms related to NPA is small compared to coefficient for equity market capitalization, hence it may be said that the relationship is significant but not very strong.

- Equity Market Capitalization has a demonstrated impact on bank market capitalization in most cases, though its impact appears to have been reduced after the financial crisis. Post crisis, it appears that market capitalization is impacted by the top line (advances) and by market swings in more or less equal measure. No other factors appear to be in play.

- Advances impacts bank market capitalization at the overall level while not impacting public sector banks, as also in post crisis scenario (though it appears that large part of this is arising from private banks).

- Some other factors have some relevance / significance in some scenarios / components.

- The study is simplistic in nature as it is based on one data point of market returns per year. The equity market is dynamic and handles correction at every available opportunity. There is a mismatch between (dates of) market announcement of results and the year end. Further, there are epochal macroeconomic / bank specific or industry specific events happening during the year, which produce spikes and lows in bank stock prices. Nevertheless, it was felt that in the long run, the equity markets would capture all the information and reflect an appropriate return. Hence, even a single data point over long periods may be a good enough predictor or returns.

Equity market investors are well informed and use a plethora of techniques for portfolio construction. However, from the above analysis we can conclude that if MCAP of banks is taken as reflection of stock market performance of banks then Advances and remaining Equity MCAP of market (excluding market capitalization of bank stocks) may be taken as a good enough indicator in the post crisis period of the Indian economy and may be used for picking bank stocks.

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