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Determinants of Non-Performing Assets: A Review of Literature

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This study gives an extensive review of the literature on the determinants of Non-Performing Assets (NPAs). This study classifies the existing research literature into empirical and theoretical studies. A qualitative research approach is employed in this research. This research study examines 51 research papers published between 1989 and 2018 in top journals and 1 report by Reserve Bank of India (RBI).Based on the theoretical literature, the findings show that borrowers who are unemployed and with low incomes are more prone to their credit default. Empirical literature study substantiates the findings that growth in real gross domestic product (GDP) lowers the NPA level significantly while there is significant increase in the NPAs with the increase in unemployment rate. It was also found that the relationship of the interest rate, inflation rate, real effective exchange rate and CAR with the NPAs is ambiguous. The result also concludes that the decreased cost efficiency is negatively related with expected bad loans supporting the hypothesis of bad management.

Keywords: Bank specific factors; Determinants; Literature Review; Macroeconomic Factors; Non-Performing Assets.

Introduction

An effective and efficient financial system is the backbone for the socio-economic development of the country. The fundamental indicator which is generally used to evaluate the soundness and financial health of the banking system is the level of Non-Performing Assets (Boudriga, Taktak, & Jellouli, 2009). As per RBI (2015), "A non performing asset (NPA) is a loan or an advance where interest and/ or instalment of principal remain overdue for a period of more than 90 days in respect of a term loan…..An asset, including a leased asset, becomes non-performing when it ceases to generate income for the bank."NPA is inevitable in the banking sector and it cannot be abolished completely (KK & Pillai, 2013). As the banks increase the lending of credit to the borrowers and there is credit growth, the probability of occurrence of NPAs also increases. Thus NPAs increases with the increase in advances or loans. Piling up of NPAs is the major cause of banking crisis which had further made many banks insolvent (Barr & Siems, 1994; Hou, 2007). Deterioration in the loan portfolio and bank asset quality is the major cause of problems in the banking sector. Banks' profitability is adversely affected by the inflating NPAs in the form of loss of interest income on loans and provisioning for defaulted loans. NPAs not only causes bank failure but also results in economic degradation. NPAs hamper economic growth and lower the economic efficiency (Hou, 2007). Thus it is important to control NPAs and managed them effectively which cannot be done until and unless their determinants are known and controlled. Various previous research studies have identified determinants of NPAs as both macroeconomic and bank specific factors that potentially affect the NPA level. The theoretical literature is very limited but the empirical studies have grown over the years.

Macroeconomic variables and their volatility play a vital role in the occurrence of banking crisis. Unfavourable macroeconomic environment with high inflation rate, high interest rate, high unemployment rate and low growth rate triggers banking crisis (Demirguc-Kunt & Detragiache, 1998; Llewellyn, 2002). The adverse macroeconomic environment cause increase in non-performing assets resulting in insolvency and finally failure of banks (Barr & Siems, 1994; Demirguc-Kunt, 1989; Hou, 2007; Whalen, 1991). Bank-specific factors also cause defaulting of advances resulting in rise in NPAs (Abid, Ouertani, & Zouari-Ghorbel, 2014; Chaibi & Ftiti, 2015; Dhar & Bakshi, 2015; Dimitrios, Helen, & Mike, 2016; Louzis, Vouldis, & Metaxas, 2012). The macroeconomic factors are beyond the control of banks regulators while bank specific

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factors can be controlled and managed by the banking authorities.

As per our awareness, there is scanty research that analyzes the existing empirical and theoretical studies on the determinants of Non-Performing Assets. Hence we make an attempt to give an extensive review of the literature, which is divided into empirical and theoretical literature. A qualitative research approach is employed in this research. This research study examines 51 journal articles published between 1989 and 2018 in top journals and 1 report by Reserve Bank of India (RBI).Based on the theoretical literature, the findings show that borrowers who are unemployed and with low incomes are more prone to their credit default. Empirical literature study substantiates the findings that growth in real GDP lowers the NPA level significantly while there is significant increase in the NPAs with the increase in unemployment rate. It was also found that the relationship of the interest rate, inflation rate, real effective exchange rate and CAR with the NPAs is ambiguous. The result also concludes that the decreased cost efficiency is negatively related with expected bad loans supporting the hypothesis of bad management.

The remaining discussions in the paper are as following. Section 2 assesses the theoretical literature on the determinants of Non-Performing Assets. Section 3 analyzes the empirical literature on the determinants of Non-Performing Assets. Section 4 gives the conclusion and the policy recommendations.

Determinants of Non-Performing Assets: The Theoretical Literature

The theoretical literature on the determinants of Non-Performing Assets remains very limited. Determinants identified in some of the previous research studies are macroeconomic variables such as unemployment rate, current income of borrower and lending rate or interest rate in the life-cycle consumption model.

Lawrence (1995) in this study examined a life-cycle consumption models and put forward the probability of consumer default. This model stated that borrowers who are unemployed and with low incomes are more prone to their credit default because of their inability to service their debt. In addition the riskier customers are charged with higher interest rate by the banks.

This Lawrence's life-cycle consumption model was supported by Rinaldi and Sanchis-Arellano (2006) giving an assumption that broker borrows for investing in real financial assets. They also concluded that current income, lending rate and unemployment rate influenced the chances of default. Unemployment rate is closely associated with the uncertainty regarding future income.

Determinants of Non-Performing Assets: The Empirical Literature

This section reviews the empirical literature on the determinants of Non-Performing Assets. Table 1 presents the empirical literature on the determinants of Non-Performing Assets.

Table 1 the empirical literature on the determinants of Non-Performing Assets.

Authors	Country	Methodology	Macroeconomic variables	Bank-specific variables	Findings
Ali and Daly (2010)	Australia and USA	1. Macroeconomic credit model 2. Credit risk logit regression	1. GDP 2. Short-term interest rate 3 .Industrial production 4. Total debt as Debt-to-GDP ratio		1. GDP is highly significant and negatively related with the level of NPAs in both the economies. 2. In Australian economy, the industrial production and short-term interest rate has insignificant and negative relationship with the NPAs but they were insignificant indicator in case of US economy. 3. Debt-to-GDP ratio has extremely significant and positive relation with the credit risk.
Fainstein and Novikov (2011).	Estonia	1. Vector Error Correction Model	1. Real GDP growth 2. Loan portfolio growth 3. Real estate market changes 4. Unemployment rate		1. Real GDP growth impacts the level of NPAs. 2 Loan portfolio growth results in growth in NPAs. 3 The real estate market growth rate results in growth in level of NPAs. 4 Growth in the unemployment rate results in increase in NPAs.

Authors	Country	Methodology	Macroeconomic variables	Bank-specific variables	Findings
Figlewski, Frydman, and Liang (2012)	USA	Cox hazard regression model	1. Unemployment rate 2. Inflation 3. NBER recession indicator 4. Chicago Fed National Activity Index 5. Real GDP growth 6. Industrial production growth 7. Change in Consumer Sentiment 8. Interest rate 9. Stock market performance 10.Corporate credit spreads 11. Total default rate of corporate bonds	1. Intial rating 2. Current rating 3. Recent upgrade or downgrade 4. Years since first rated.	1. Real GDP growth gives an extremely significant adverse impact on the upgrade intensity. 2. High inflation and high unemployment rate both are effectively related with the lowering in the upgrade intensity. 3. Default intensity of the recently rated firm is less as compared to a seasoned firm of the similar rating group.
Louzis et al. (2012)	Greece	Dynamic panel data	1. GDP 2. Unemployment 3. Public debt 4. Interest rates	1. Management quality	1. The real GDP growth rate, lending rate, public debt and the unemployment rate strongly impact the NPAs. 2. Management quality affect the credit risk.
Castro (2013)	Greece, Ireland, Portugal, Spain and Italy (GIPSI)	Dynamic panel data model	1. GDP 2. Unemployment rate 3. Interest rate 4. Stock price 5. Housing prices 6. Real effective exchange rate 7. Credit growth		1. Growth in real GDP reduces the NPA level 2. Fall in the unemployment rate lowers the NPA level 3. Increase in interest rate increases the credit risk 4. With the credit growth the probability of default also increases 5. Rise in the stock price reduces the credit risk 6. Increase in Housing prices reduces the credit risk 7. Increase in real effective exchange rate increases the non performing loans 8. During the recent financial crisis period the credit risk also increases.
Abid et al. (2014)	Tunisia	Dynamic panel data methods	1. Inflation rate 2. Real GDP growth rate 3. Real lending rate (RLR)	1. Bad management	1. Inflation rate, real GDP growth rate and the real lending rate (RLR) have strong influence on the NPAs 2. Bad management was one of the key reasons of future bad debts
Agrawal and Maheshwari (2014)	India	1. Logistic regression 2. Multiple discriminant analysis techniques	1. Stock market sensitivity 2. CPI sensitivity		1. Stock market sensitivity had a signicant positive impact on the chances of default 2. CPI sensitivity had a significant negative effect on the defaulting probability of the firms.
Yurdakul (2014)	Turkey	1. General-to-specific modelling methodology 2. Co-integration and error correction 3. Residual-based tests for cointegration	1. Growth rate 2. Interest rate 3. Inflation rate 4. Foreign exchange rate 5 Unemployment rate 6. ISE-100 index 7. M2 money supply		1. Increase in interest rate increases the credit risk 2. Increase in inflation rate increases the credit risk 3. Increase in foreign exchange rate increases the credit risk 4. Increase in unemployment rate increases the credit risk 5. Increase in money supply increases the credit risk 6. growth rate decreases the credit risk 7. ISE index decreases the credit risk

Authors	Country	Methodology	Macroeconomic variables	Bank-specific variables	Findings
Beck, Jakubik, and Piloiu, (2015)	75 Countries	Panel data analysis.	1. Real GDP growth 2. Share prices 3. Exchange rate 4. Lending interest rate		1. Real GDP growth was the most important factor which impacted non-performing assets ratios 2. Decrease in exchange rate increases NPAs 3. Decrease in stock prices negatively impacted bank asset quality 4. Lending interest rates effect bank asset quality of central bank
Chaibi and Ftiti (2015)	France and Germany	Dynamic panel data	1. GDP growth 2. Inflation rate 3. Interest rate 4. Unemployment rate 5. Exchange rate	1. Loan loss provisions 2. Cost inefficiency 3. Leverage 4. Solvency ratio 5. Non-interest income 6. Size 7. Bank profitability	1. Except the inflation rate, all other macroeconomic factors like interest rate, GDP growth, unemployment rate and exchange rate have an intense impact on the NPAs of both economies 2. The French market is more prone towards bank-specific factors in comparison to Germany, which depicted that type of economy also effect the NPAs 3. Credit risk in a market-based economy is higher in comparison to bank-based economy.
Dhar and Bakshi (2015)	India	Panel data analysis technique		1. Net interest margin to total assets 2. Capital adequacy ratio 3. Sensitive sector advances 4. Credit-Deposit Ratio 5. Ratio of Unsecured Loans to Total Loans 6. Ratio of Priority Sector Advance 7. Profit Per Employee 8. Return on Assets 9. Investment-Deposit Ratio	1. The net interest margin has a significant negative impact on the gross NPA ratios 2. Capital adequacy ratio has a significant negative impact on the gross NPA ratios 3. Sensitive sector advances has a statistically significant positive relationship with gross NPA ratio
Otasevic (2015)	Siberia		1. Exchange rate 2. Business cycle 3 CPI inflation 4. Interest rates 5. Real GDP growth		1. Exchange rate devaluation causes deterioration in the quality of loan portfolio. 2. Collapsing business cycle cause deterioration in the quality of loan portfolio. 3. CPI inflation negative effect on credit risk 4. Growth in real GDP reduces the NPA level 5. Household loan portfolios are susceptible to variations in the short-run interest rates
Dimitrios et al. (2016)	Euro-area	Generalized Method of Moments (GMM)	1. Unemployment rate 2. Growth rate	1. Management skills 2. Risk preferences	1. Unemployment and growth rate have an intense impact on the bad loans. 2. Bank specific factors like management skills and risk preferences account for future NPLs.

Authors	Country	Methodology	Macroeconomic variables	Bank-specific variables	Findings
Upadhyaya and Roy (2017).	India	1. Correlation analysis 2. Granger causality test 3. Panel regression	1. GDP growth 2. Exchange rate		1. Growth in real GDP reduces the NPA level 2. Negative relationship between Real effective exchange rate and NPAs
Szarowska (2018)	Central and Eastern European (CEE) countries	1. Panel regression with fixed effects analysis	1. Unemployment rate 2. GDP growth 3. Exchange rate 4. Inflation rate 5. Lending interest rate 6. Debt to GDP		1. Rise in unemployment rate by 1% point lead to elevation in NPA ratio by 0.54% point. 2. GDP growth, exchange rate and inflation rate negatively impact the NPAs. 3. Lending interest rate and crisis has positive impact on the level of NPAs.

Table 1 presents the empirical literature on the determinants of Non-Performing Assets.

Based on the empirical literature on the determinants of Non-Performing Assets discussed above in Table 1, commonly identified macroeconomic variables are interest rate, unemployment rate, inflation rate, exchange rate and real GDP growth rate whereas commonly identified bank-specific factors are capital adequacy ratio, measured cost efficiency or bad management practices. Let us discuss each one of them as follows:

GDP

Salas and Saurina (2002) in their research study observed that the real GDP growth rate has a significant adverse effect on the bad debts. This finding was supported by Fofack (2005) who also concluded that macroeconomic volatility results in accumulation of problem loans. Jesus and Gabriel (2006)supported the findings given by Fofack (2005) and Salas and Saurina (2002). They also concluded that the business cycle is linked with credit cycles. Similar findings were given by Dash and Kabra (2010),Khemraj and Pasha (2009),Messai and Jouini (2013). They stated that GDP growth results in more income generation which improves the borrowers' debt servicing capability. Similarly Nkusu (2011) also concluded that adverse macroeconomic conditions result in elevation in NPA level. In the similar vein some more researchers also concluded that growth in real GDP lowers the NPA level significantly (Bohachova, 2008; Bonfim, 2009; Cifter, Yilmazer, & Cifter, 2009; Kattai, 2010 ;Quagliarello, 2007).

Blaschke, Jones, Majnoni, and Peria (2001) analyzed the impact of GDP growth and the business cycle on credit risk and quality of loan portfolio. Similarly Quagliariello (2007) analyzed that influence of business cycle on new bad debts.

Inflation rate

Fofack (2005) concluded that inflationary pressures increase the NPA level. In the similar vein Tirapat and Nittayagasetwat (1999) also concluded that there is a significant positive relationship between chances of default and CPI sensitivity which was contrary to the findings of Tsai, Lee, & Sun (2009) who concluded that NPA level reduces with higher rate of inflation as there is stronger economy and higher consumer demand. But contrary to the findings of all above researchers Khemraj and Pasha (2009) found that inflation is not an important determining factor of NPAs in Guyanese banks

Interest rate

Many researchers concluded that interest rate has a positive significant effect on the non-performing assets and increase in the interest rate cause escalation in the NPA level (Bofondi & Ropele, 2011; Khemraj & Pasha, 2009; Messai & Jouini, 2013). In the similar vein Nkusu (2011) also stated that increase in the interest rate cause significant increase in the credit risk. Fofack (2005) observed that the real interest rate is important determinant of NPAs. In support of these findings some researchers concluded that the increase in interest rate reduces the debt servicing capacity of the firm and hence leading to increase in the level of NPAs (Bonfim, 2009; Figlewski et al., 2012).

Unemployment rate

Messai and Jouini (2013) in their study examine that unemployment rate has a significant positive impact on NPAs and concluded that with the increase in unemployment rate, NPAs also increases.

Exchange rate

Khemraj and Pasha (2009) concluded that real

effective exchange rate is positively related with NPAs and increase in real effective exchange rate cause elevation in the level of NPAs. Shijaku and Ceca (2011) observed that in foreign currency lending exchange rate is considered as the important determining factor of credit quality.

Capital adequacy ratio

Rajaraman and Vasishtha (2002) observed the significant relationship between NPAs and capital adequacy ratio. Vallabh, Bhatia, & Mishra(2007) stated that capital adequacy ratio is positively related with the bad loans of public sector banks while negatively related with bad loans of private sector banks. Some researchers concluded that CAR and NPAs are negatively related to each other (Sinha, 2006; Poghosyan & Cihk, 2011; Zoubi & Al-Khazali, 2007).

Measured cost efficiency/ Bad management practices

Berger and DeYoung (1997) stated that measured cost efficiency is important determinant of present and future NPAs. They stated that lowering of measured cost efficiency results in rise in future NPAs. This justification supported bad management hypothesis. In the similar line Podpiera and Weill(2008)observed that the efficiency and NPAs are related with each other supporting bad management hypothesis. They stated that there is negative relationship between decreased cost efficiency and future bad loans.Some researchers stated that cost efficiency is negatively related with the non-performing loans (Kwan & Eisenbies, 1994; Resti, 1996).

Conclusion & Policy Recommendations

After the systematic and organized review of the literature of 51 research papers on Non-Performing Assets published between 1989 and 2018 in top journals and 1 report by Reserve Bank of India (RBI), some very noteworthy findings were observed. The existing research literature was divided into empirical and theoretical studies on the determinants of Non-Performing Assets. A qualitative research approach was employed in this research. According to the theoretical literature, the findings concluded that borrowers who are unemployed and with low level of income generally default their loans as they were unable to service their debt obligations. It was also observed that lending interest rate impact the chances the credit default. The theoretical literature on the determinants of Non-Performing Assets is veryh restricted. Whereas the increasing figure of the empirical studies have investigated the effect of these bank-specific and macroeconomic factors on Non-Performing Assets. After carefully reviewing empirical literature on the determinants of Non-Performing Assets, some commonly identified macroeconomic variables were interest rate, inflation rate, unemployment rate, real GDP growth rate and exchange rate while commonly identified bank-specific factors were capital adequacy ratio, measured cost efficiency or bad management practices which impacted the level of NPAs.It was found that growth in real GDP lowers the NPA level significantly while with the increase in the unemployment rate there was significant increase in the NPA level.

It was observed that the impact of inflation rate on the NPAs was ambiguous. Some researchers concluded that there is significant positive relationship between chances of default and inflation rate while some researchers concluded that NPA level reduces with higher rate of inflation as there is stronger economy and higher consumer demand. Contrary to these findings some researchers stated that inflation is not a significant determinant of NPAs. It was observed that the impact of real effective exchange rate and interest rate on the NPAs was also ambiguous. Some researchers concluded that real effective exchange rate and interest rate are negatively related with NPAs while some observed that real effective exchange rate and interest rate are positively related with NPAs. Some researchers concluded that CAR and NPA are negatively related while some researchers concluded that capital adequacy ratio is positively related with the bad loans of public sector banks and negatively related with bad loans of private sector banks. Last but not the least some researchers stated that the decreased cost efficiency and expected bad loans are negatively related supporting the bad management hypothesis.

An effective and efficient banking system is the backbone for the socio-economic development of the country which can be only achieved when the bank asset quality of loan portfolio is maintained and level of NPAs are managed properly in the banks. This can be done effectively when the determinants of Non-Performing Assets are well known and controlled. Therefore, being aware of the determinants of NPAs is a significant measure for policy formulation and its execution. The results from this study hold significant policy repercussions. Firstly, as it was observed that growth in unemployment rate and decrease in

current income of borrowers increases the level of NPAs therefore such policies and programs must be designed by the government which increases the employment opportunities and sources of income. Secondly, as the lending interest rate influences the event of credit default thus policymakers will be able to manage the NPA level effectively if they control the lending interest rate. Thirdly, government can make effective economic growth policies which increases the overall production and level of income so that borrowers can easily service their loan. Fourthly, as inflation rate and exchange rate influence the occurrence of bad loans, therefore policymakers can formulate such policies which control the inflation rate and exchange rate. Fifthly, as CAR represent the banks' internal capacity to absorb various risks including credit risk, therefore policymakers can pay special attention to boost CAR in banks. Last but not the least as measured cost efficiency or bad management practices also play an important role in influencing NPAs, therefore banking authorities can implement such bank policies to manage measured cost efficiency of banks and enforce effective management system in banks.

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