

Determinants of Bank Asset Quality and Profitability

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Abstract

Banking sector plays a key role in the development of an economy. Bank insolvency is a significant problem in many countries all over the world. This study is to perform statistic examining and analyzing to find out the effect of bank specific indicators which comprise of Bank asset, capital adequacy ratio, cost of funds, return on Assets, credit to deposit ratio, bank credit growth rate, operating expenses to total assets and macroeconomic factors which comprise of GDP, inflation, exchange rate, bank lending rate, saving growth rate, index of industrial production and market capitalization growth rate. The study is used secondary source of data, based on the panel data analysis of 25 Pakistani commercial banks with 225 observations for the period of 2006 to 2014. It is a single country study. Ordinary Least Square (OLS) is an appropriate model used to examine the determinants of non-performing asset and profitability. The findings of the study show that bank assets, cost of fund, credit to deposit rate, bank lending and exchange rate have statistically significant impact on non-performing assets. This study also investigates the effect of determinants on profitability. Capital adequacy ratio, gross non-performing asset, credit to deposit ratio and bank asset also have significant impact on banks profitability. The results of this study indicate that bank managers should emphasize the management of assets in order to reduce the level of non-performing assets with prudential norms to improve profitability.

Keywords: asset quality, non-performing asset, bank-specific factors, macroeconomic factors

Introduction

A well-developed financial system supports economic growth. The function of financial system is to support the flow of funds from savers

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to borrowers (Goldsmith, 1969). An efficient financial system always show improvements in profitability, increasing level of funds flowing from savers to borrowers and better services for consumers. Lending and borrowing is a main business of commercial banks. Banks work on the principal of accepting deposits of money from the depositors for the purpose of lending or investment. Receiving deposits involves no risk instead of lending always involves much risk because there is no certainty of repayment. These are always critical to the whole financial system (Podder&Al Mamun, 2004;Franklin & Elena, 2008).Banking industry is sensitive towards credit risk or non-performing assets in all over world. It has been reported that non-performing asset is widely used as a measure of asset quality in banks and regarded as the primary cause of bank failure (Guy& Lowe, 2011;Samad, 2012). Because of high NPA, the financial instability of banks arises, which reduces economic growth and revenue of bank (Saba,Kouser&Azeem, 2012; Baselga-Pascual&Orden-Olasagasti, 2015).Many researches on the cause of bank failures find that asset quality is a statistically significant predictor of bankruptcy (Barret *et al.*, 1994;Bhattarai, 2016). Non-performing assets are those assets which are 90 days or above or no longer accruing interest (Alton & Hazen, 2001; Fofack, 2005; Boudriga&Jellouli, 2008; Joseph, *et al.*, 2012; Dimitrios, Helen& Mike, 2016).Lending interest income is the main earning of bank operation (Agu and Okoli, 2013).Banks all activities depend on money that causes an array of risks such as credit risk, operational risk, exchange rate risk countermarket risk and market risk (Ali, Akhtar&Sadaqat, 2011; Washington, 2014), which affect the survival and success of banks (Ali, Akhtar&Sadaqat, 2011).NPAcauses the operational risk and also an indicator of operational performance (Muneeret *et al.*, 2013). NPAs and profitability are two parameters perform by banks to measure the efficiency of credit risk (Fainstein&Novikov, 2011). Similarly, it has been reported that credit risk is commonly measured by using gross non-performing asset to the gross loan amount (Delis, *et al.*, 2011; Tehulu&Olana, 2014).NPA is a disease for any bank which directly affects two main components of the banks responsible for overall efficiency of any bank i.e. the liquidity and profitability. Continuously decline in profitability due to increase in NPAs would ultimately expose the viability of the bank (Swamy, 2015).Now day's banks are very alert in extending loans because of mounting non-performing assets.High level of NPA indicates poor

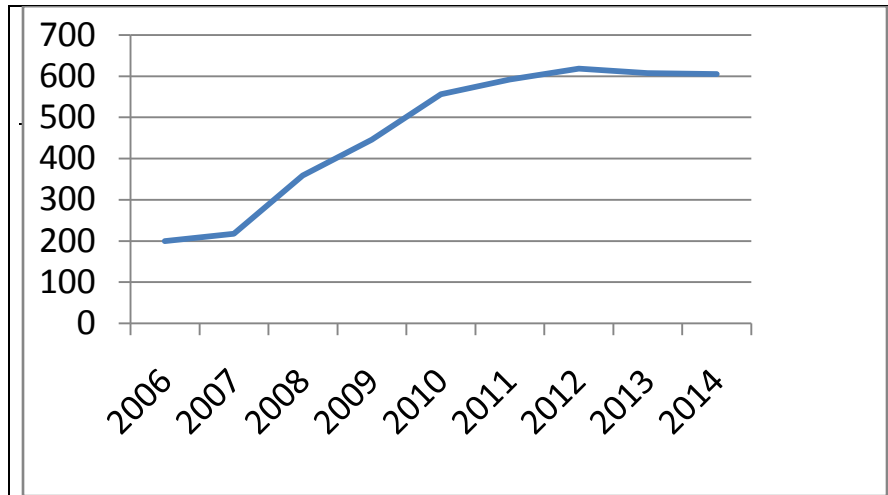


Figure: 1 Trend in Non-performing assets

asset quality that reduce bank's strength and growth which in turn indicates fragility of financial health of banks in developed and undeveloped country (Chaibi&Ftiti, 2015; Durafe& Singh, 2016).Although the banking system in Pakistan has not been experience notable banking crises, as compare to other banks in the world but the issue concerning NPAs have come up particularly in view of the comparatively high levels of NPAs of Pakistan banks as well as of the other countries. Therefore, there is need to an empirical examination conjoining the profitability analysis as well.For this purpose, it is essential to identify and understand the determinants (both macro-economic and bank specific) of NPAs. The given figure 1 shows the trend of mounting NPAs from 2006 to 2014 in Pakistan's banks.The objective of this studyis to held empirical analysis of the determinants of bank asset quality management and profitability in the context of Pakistan banking. Further, it also analyzes the impact of NPAs on profitability.

Review of Literature

Literature has been argued that financial deterioration and default risk usually is influenced by several factors, which are including external (i.e. macro-economic variables) and internal (i.e. bank specific variables) factors. The reasons of internal factors are management improper decisions and lack of technologies. On the other hand external or macroeconomic factors are not controllable by management of banks and are caused by external matters like government policies and decisions.

Macro-economic Determinants of Asset Quality

Previous literature related to the major economies has confirmed that macroeconomic conditions matter for asset quality management.

GDP

GDP growth rate is considered as an indicator of a country's standard of living. With regard to macroeconomic factors, Roman and Bilan (2015) conducted research in EU countries over the 2000 to 2013 period and find that GDP has negative impact on NPAs. It has been reported that borrowers can improve their debt servicing capacity with high growth rate of GDP (Poudel, 2013) and is expected to have negative impact on NPAs (Muneeret *et al.*, 2013). Economy that has negative growth rate in GDP, borrowers are unable to pay their debt which in turn the high level of NPAs (Ofori-Abebrese, Pickson & Opare; 2016). Shingjergji (2013) conducted research in Albanian banking system and find a positive association between GDP growth rate and NPAs. Poudel (2013), Alexandri and Santoso (2015), Ouhibi and Hammami (2015) find no influence of GDP growth rate on NPAs.

H1. *GDP has significant impact on non-performing assets of commercial banks in Pakistan.*

Inflation

There has been also found no relation between inflation and NPAs (Ali & Iva, 2013; Makri, *et al.*, 2014; Roman and Bilan, 2015). But it is contrary to the findings of Klein (2013); Prasanna (2014), who suggest that inflation has positive impact on NPAs, meaning that an increase in inflation will follow by an increase of NPAs. Higher inflation can make debt servicing capacity poor by reducing the real income of borrowers because wages are stick (Klein, 2013). Washington (2014) examined the effects of macroeconomic variables on credit risk in Kenyan commercial banks. The finding reveals negative significant association of inflation and NPAs. It is possible to make debt servicing easier by higher inflation because higher inflation reduces the real value of outstanding loan (Klein, 2013). According to Poudel (2013) during the period of high inflation, bank not willing to disburse long term loan and they intend to lend in the assured sector of economy. So banks become more selective about lending process which in turn reduces NPAs. Moreover, Ali and Iva (2013), Gezu (2014), Alexandri and Santoso (2015), Gambo, Abdul-Rahman and Ibrahim (2017) not find any significant relationship between inflation and NPAs.

H2. *Inflation has significant impact on non-performing assets of commercial banks in Pakistan.*

Exchange Rate

According to Farhan, *et al.*, (2012), Castro (2013) there is positive and statistical significant relationship between exchange rate and NPAs. An

appreciation in exchange rates can adversely affect the loan payment capacity of export oriented firms (Fofack, 2005;) and it can positively affect the loan payment capacity of those borrowers who borrow in foreign currency (Muneeret al., 2017). Different findings, there is no relationship between exchange rate and NPAs because borrowers lend money in local currency so that the exchange rate conversion between local currency and US dollars does not affect the NPAs (Washington, 2014).

H3. *Exchange Rate has significant impact on non-performing assets of commercial banks in Pakistan.*

Bank Lending Rate

Bank lending rate is a determinant that has statistical significant and positive impact on NPAs (Asari, et al., 2011; Ali and Iva 2013; Washington, 2014; Nadham&Nahid, 2016; Ofori-Abebrese, et al., 2016). It is the cost of borrowed funds. Banks charge high interest rate because of perceive higher risk default (Nadham&Nahid, 2016; Tsumake, 2016). This situation attracts bad borrowers, therefore, increasing chances of loan default or NPAs (Nadham&Nahid, 2016).

H4. *Bank Lending Rate has significant impact on non-performing assets of commercial banks in Pakistan.*

Saving Growth Rate

According to Swamy (2015) high savings level in the economy explain the economic surplus available, which is directly proportional to the debt paying capacity of the borrowers of the banking sector. Prasanna (2014) and Swamy (2015) have been found that higher growth in savings associated with lower NPAs.

H5. *Saving Growth Rate has significant impact on non-performing assets of commercial banks in Pakistan.*

Market Capitalization Growth Rate

It has been explained that in a growing economy capital market attract many investors (Swamy, 2015) and reflect outlook on firm's profitability and improved the financial health of borrowers which may tends to decrease the levels of NPAs (Bofondi&Ropele, 2011). Prasanna (2014) and Swamy (2015) find no any significant relationship between MCAP and NPAs.

H6. *Market Capitalization growth rate has significant impact on non-performing assets of commercial banks in Pakistan.*

Bank Specific Determinants of Asset Quality

The performance of loans cannot be determined by macroeconomic factors. Factors that are specific to each individual bank also have a measurable effect on NPAs.

Bank Asset

Bank size is represented by total assets. Bank asset is one of the factors that have been observed to be related with NPAs. The explanation provided by the literature for this relationship is that, banks with large size have diversified loan portfolio and capability to absorb impaired loans (Dietrich & Wanzenried, 2011; Tehulu & Olana, 2014) because diversification decreases NPAs (Louzis, *et al.*, 2012). On the contrary, Abidet *et al.*, (2014) have been found positive impact of bank asset on NPAs. Alexandri and Santoso (2015) suggested that bank asset is not associated with NPAs.

H7. Bank assets have significant impact on non-performing assets.

Capital Adequacy Ratio

Capital adequacy ratio is considered a determinant because well capitalized banks are not involved in attaining risky activities and bringing down the level of NPAs (Swamy, 2015; Fajar & Umanto, 2017) while banks with low capital is likely to increase their loan portfolio, whereas this decision will increase the NPAs in future. Abidet *et al.*, (2014) find negative relationship between capital adequacy ratio and NPAs. Makri, *et al.*, (2014) argued that banks with high capital adequacy ratios are involved in high risk activities which create risky loan portfolio and in turn high NPAs. On other hand, Ganić (2014), Tehulu & Olana, (2014), Alexandri and Santoso (2015), Fajar and Umanto, (2017) find no relationship between CAR and NPAs.

H8. Capital adequacy ratio (CAR) has significant impact on non-performing assets.

Cost of Fund

Cost of fund is also considered a determinant because it causes of significant strategic decision in the area of bank lending. Swamy (2015) find statistical significant negative relationship between cost of fund and NPAs. It indicates that banks are very cautious and choosy in their lending thus leading to decrease in NPAs.

H9. Cost of Funds (COF) has significant impact on non-performing assets.

Return on Assets

This ratio shows that how efficiently bank management utilized its assets to earn profit. Ahmad and Bashir (2013), Alexandri and Santoso (2015) found positive significant impact of ROA on the level of NPAs. In order to increase the short term earnings, bank management portray wrong picture of the borrowers. Borrowers start lending from banks and invest in the less profitable projects. Because of wrong forecasting of

borrowers, returns on investment are not according to their expectation which reduce the ability of repayment thus leading to the growth in NPAs. The poor quality of management resulted in poor asset management process that contributes to the high level of NPAs. The contrary suggestion declares that ROA has negatively impact NPAs because efficient banks with strong profitability has less constrained to granting risky loans (Messai&Jouini, 2013). As suggested by Ganić (2014) this study has yielded different results, asserting that ROA has no any significant relationship with NPAs.

H10. Return on assets has significant impact on non-performing asset of commercial banks in Pakistan.

Credit Growth

Growth in credit is a factor sometimes called loan growth implies credit expansions by banks that can determine the emergence of NPAs. Rapid growth of credit happens because of reducing interest rates (Keeton, 1999) and also poor credit standard of loan screening which lead to an increase of NPAs (Keeton, 1999; Klein, 2013). As suggested by Louzis, *et al.*, (2012), Vatansever and Hepsen (2013), Ofori-Abebrese, *et al.*, (2016) credit growth rate does not have significant effect to explain NPAs. Other findings by Ganić (2014), Tehulu&Olana (2014), Swamy(2015) and Yam (2016) suggested that growth in credit negatively impact NPAs. It indicates that banks have better risk management procedures and technology and higher credit standards which may end up lower levels of NPAs. The findings also reveal that credit growth support by economic growth because of borrowers invest into profitable projects and can pay loan due to their sufficient earnings and hence decrease the levels of NPAs.

H11. Bank credit growth has significant impact on non-performing assets of commercial banks in Pakistan.

Operating Expenses to Total Assets

In the bank, operating expenses are considered in term of related resources for credit deployment and recovery. This variable is expected to provide information on the impact of banks operating costs on their profitability (Muneeret *et al.*, 2017). It is measured by non-interest expenses to total assets.

H12. Operating expenses to total assets has significant impact on non-performing assets of commercial banks in Pakistan.

Determinants of Profitability

GDP

GDP has direct affect on demand and supply of deposits and loans and thus influence bank's profitability. Positive growth of GDP results in

high profitability (Nisar, *et al.*, 2015). Moreover, in some study this relationship proved to be statistically insignificant (Kiganda, 2014).

H13. *GDP has significant impact on profitability of commercial banks in Pakistan.*

Bank Asset

Several researches examine the effect of bank asset on bank profitability. It is measured as the natural logarithm of total assets. Banks with more assets have diversified portfolio which has positive impact on profitability (Swamy, 2015). Different findings, it does not mean that higher diversified portfolio leads into increased profits because of scale inefficiencies.

H14. *Bank asset has significant impact on profitability of commercial banks in Pakistan.*

Capital Adequacy Ratio

Capital adequacy ratio is another important factor that measures financial strength of banks and represents the ability of banks that how much non-performing loans absorb. Findings by Ongore and Kusa (2013) and Nisar, *et al.*, (2015) suggested that CAR has positive significant impact on profitability.

H15. *Capital adequacy ratio (CAR) has significant impact on profitability of commercial banks in Pakistan.*

Cost of Fund

Cost of fund is a determinant of profitability that measures the impact of bank management's efficiency over banks profitability. Theoretically, the cost of fund increases the gross margin which in turn decreases the bank's profitability. Bank can increase profitability with its excellent managerial efficiency to collect low cost fund from depositors. As expected by Nisar, *et al.*, (2015), Islam and Nishiyama (2016) there is a negative relationship between cost of fund and profitability. However the study conducted in Switzerland found that COF has no relationship with the performance of banks (Dietrich & Wanzenried, 2011).

H16. *Cost of Funds (COF) has significant impact on non-performing assets of commercial banks in Pakistan.*

Gross Non-Performing assets

This is another determinant that portrays bank's ability to keep the risk of loan repayment by the debtor. NPAs not just stop interest earning but also provisioning against NPAs is reflected in the income statement which has negatively impact on bank profitability (Gyamerah & Amoah, 2015; Kristianti & Yovin, 2016). Islam and Nishiyama (2016) suggested that GNPA is not associated with profitability.

H17. *GNPA has significant impact on profitability of commercial banks in Pakistan.*

Material and Methods

Data

There is used panel data consisting of 25 commercial banks in the Pakistan banking sector from 2006 to 2014 with 225 observations. All data for this research based on secondary data. The sources for data regarding bank specific variables are collected from “Financial Statement analysis of the Financial Sector 2006-14” given State Bank of Pakistan (SBP) and respective bank website. Whereas macroeconomic variables are collected from the World Bank’s database.

Research Variables and Measurement

To examine the determinants of NPAs and profitability the previous literature suggest both bank specific and macroeconomic variables. Table 1 presents the measurements that are used to operationalise the study variables.

Table 1. Research Variables and Measurement

Variable	Measures	Notation
Gross Domestic Product	GDP growth (annual %)	GDPGR
Inflation	Inflation consumer prices (annual %)	INFLA
Exchange Rate	Dollar exchange rate	ER
Bank Lending Rate	Lending interest rate %	LR
Saving Growth Rate	Gross saving growth	SVGR
Market Capitalization Growth Rate	Stock market capitalization, percent of GDP	MCAP
Bank Asset	LOG (Asset)	ASSET
Capital Adequacy Ratio	Total Equity / Total Asset	CAR
Cost of Funds	Interest Expenses / Total Deposit	COF
Return on Assets	Net Profit after Tax / Total Assets	ROA
Operating Expenses to Total Assets	Non-interest Expenses / Total Assets	OER
Bank Credit Growth	Total Loans / Total Assets	CREDGR

Model Specification

In order to explain the determinants of NPAs and profitability there is used the ordinary least squares model (OLS). The most of existing studies have shown that OLS is an appropriate model to describe the determinants of NPAs (Poudel, 2013; Ganić, 2014) and profitability (Kristianti&Yovin, 2016).It can be written as:

$$Y = \alpha + \beta X + \varepsilon$$

The objective of study here is to identify and analyze the determinants of non-performing assets and profitability. The following regression equation is designed for a panel regression analysis.

Education and Information Management (EIM 2017)

$$\text{GNPAit} = \alpha + \beta_1 \text{GDPGRt} + \beta_2 \text{ERt} + \beta_3 \text{MCAPt} + \beta_4 \text{LRt} + \beta_5 \text{IIPGRt} + \beta_6 \text{INFLAt} + \beta_7 \text{SVGRt} + \beta_8 \text{ASSETit} + \beta_9 \text{CARit} + \beta_{10} \text{CDRit} + \beta_{11} \text{COFit} + \beta_{12} \text{ROAit} + \beta_{13} \text{CREDGRit} + \beta_{14} \text{OERit} + \epsilon_{it}$$

..... (eq 1)

Where:

GNPAit = Gross non-performing assets of bank 'i' in year t

GDPGRt = Gross domestic product growth rate in year t

ERt = Exchange rate in year t

MCAPt = Market Capitalization Growth Rate in year t

LRt = Bank Lending Rates in year t

IIPGRt = Index of Industrial Production in year t

INFLAt = Inflation rate in year t

SVGRt = Saving Growth Rate in year t

ASSETit = Bank asset of bank 'i' in year t

CARit = Capital adequacy ratio of bank 'i' in year t

CDRit = Credit to deposit or loan ratio of bank 'i' in year t

COFit = Cost of fund of bank 'i' in year t

ROAit = return on assets for bank 'i' in year t

CREDGRit = Credit growth of bank 'i' in year t

OERit = Operating expenses to total assets of bank 'i' in year t

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}$ and β_{14} are estimated coefficient of explanatory variables and ϵ_{it} explains unexplained residual.

To test the hypothesis and identify the impact of macroeconomic and industry specific determinants on profitability of the commercial banks in Pakistan the following regression model are estimated:

$$\text{ROAit} = \alpha + \beta_1 \text{GDPGRt} + \beta_2 \text{ASSETit} + \beta_3 \text{CARit} + \beta_4 \text{CDRit} + \beta_5 \text{COFit} + \beta_6 \text{GNPAit} + \epsilon_{it}$$

..... (eq 2)

Where:

ROAit = return on assets for bank 'i' in year t

GDPGRt = Gross domestic product growth rate in year t

ASSETit = Assets of bank 'i' in year t

CARit = Capital adequacy ratio of bank 'i' in year t

CDRit = Credit to deposit or loan ratio of bank 'i' in year t

COFit = Cost of fund of bank 'i' in year t

GNPAit = Gross non-performing assets of bank 'i' in year t

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are estimated coefficient of explanatory variables it explains unexplained residual.

Results and Discussions
Descriptive Statistics

Table 2. Summary of Descriptive Statistics

Variable	Mean	Std. Dev	Minimum	Maximum
GNPA	0.122414	0.1017616	0.00	0.6305
ASSET	8.167523	0.5554161	6.60	9.2711
CAR	0.12565	0.134127	-0.02	0.9174
COF	0.084267	0.1087925	0.0002	0.9724
ROA	0.003863	0.019882	-0.07	0.0372
CREDGR	0.506802	0.1177494	0.1436	0.8262
OER	0.029879	0.0134903	0.0001	0.0941
GDPGR	3.843333	1.566559	0.36	5.82
INFLA	11.088889	4.0996092	7.2	20.3000
ER	82.31	14.8160085	60.27	101.63
LR	12.882222	1.2412531	10.99	14.54
SVGR	20.777778	1.6214093	17.00	23.0000
MCAP	22.273333	10.1160697	13.70	46.11
N = 225				

Descriptive statistics gives initial indication of variables that can be used in regression analysis. In this study four measures of descriptive statistics are minimum value, maximum value, mean and standard deviation. Table 2 presents the mean, minimum value, maximum value and standard deviation of all performance measures of the banks in Pakistan. The descriptive statistics in table 2 indicate that all variables are normally distributed. The standard deviation represents the amount of deviation from the mean. The higher value of standard deviation indicates greater spread of data, smaller the standard deviation the more accurate future predictions because there less variability. In descriptive table 2, mostly all variables have smaller standard deviation which indicates that variables do not deviate much from mean and are more accurate for future predictions.

The average gross non-performing asset (GNPA) for the sample as a whole is 12.24% of loans written off as NPAs. The minimum of zero percent of loans written off but the maximum of 63.05% is worrying while the standard deviation of 0.1017616 is under spread of mean value. An average of bank asset (size) over the sample period is 8.167523, with a minimum size of 6.60 and maximum size of 9.2711%. The average CAR of 12.56% shows that Pakistani banking sector is stable due to adequate capital with respect to total assets. The average cost of fund is 8.42% which is reasonably low because a large portion of

Pakistani commercial bank's deposits are current and interest free. As far as profitability ratio concerned, ROA records a minimum of -0.07 and maximum of 3.72% with a mean value of 0.003863 and standard deviation is 0.0198 which indicates that the profitability variation between selected commercial banks of Pakistan is very small. The average CREDGR is 50.68% shows that commercial banks in Pakistan funding 50.68% of their total assets with minimum and maximum of 14.36% and 82.62% respectively. Similarly, funding cost of Pakistan commercial banks has average 8.42% from saving of depositors with minimum value is 0.0002 and 0.9724 is maximum value of the given data set.

On the external variables, the average of GDPGR is 3.8% with maximum economic growth of 5.82%. Mean value of INFLA over the sample period is 11.08% with minimum value 7.2% and maximum value 20.3% which implies that inflation rate in Pakistan during the study period remains somewhat unstable. It can be said that saving growth level in Pakistan economy is very good as shows by average value of 20.777778 for SVGR, with minimum and maximum value of 17.00 and 23.0000 respectively for the study period. With respect to ER and LR the average of 82.31% and 12.8% respectively. The Pakistan Stock Exchange Market (MCAP) reveals an average of 22.273, there is a minimum of 13.70 and a maximum value of 46.11 for the period of study.

Correlation Matrix

The Pearson correlation matrix has been computed for the research variables. Correlation between dependent and independent variables is given in Table 3 which shows the low level correlation among research variables. It also reports that variables are free from the multicollinearity problem.

Findings and Discussion

This section represents the linear regression results to examine the determinants of NPAs and profitability of commercial banks in Pakistan. Table 4 reports the result of the OLS regression analysis for eq (1). The value of R-squared (R^2) in the model is 0.558, which demonstrate that 55.8% of the variation in the dependent variable (GNPA) is explained by the independent variables of the model. The Durbin-Watson = 1.956 that is approximately close to 2 and show that there is no problem of serial correlation (Muneer *et al.*, 2017).

Table 4. Results of Multiple Regression Analysis

Dependent Variable: GNPA					
Independent Variables	Coefficient (β)	Std. Error	t	Significance (p)	
GDPGR	1.388	0.051	1.754	0.081	
ER	0.292	0	4.217	0.000	*
MCAP	0.852	0.008	1.025	0.307	*
LR	0.206	0.014	3.253	0.012	*
INFLA	0.757	0.021	0.886	0.377	
SVGR	0.083	0.004	1.767	0.079	
ASSET	0.121	0.012	2.029	0.042	*
CAR	0.017	0.038	0.338	0.736	
COF	0.733	0.252	2.726	0.007	*
ROA	-0.597	0.351	-8.703	0.000	*
CREDGR	0.105	0.054	1.677	0.095	*
OER	-0.207	0.473	-0.434	0.665	

$R^2 = .558$, F value = 42.335 (p=.000), N = 225

**significant if $p \leq 0.01$ (hypothesis accept)

*significant if $p \leq 0.05$ (hypothesis accept)

Note: GNPA (gross non-performing asset), ASSET (bank assets), CAR (capital adequacy ratio), COF(cost of fund), ROA (return on asset), CREDGR (bank credit growth), OER (operating expenses to total assets), GDPGR(gross domestic product growth rate), INFLA (inflation), ER(exchange rate), LR(bank lending rates), SVGR(saving growth rate), MCAP(Market capitalization growth rate).

The macroeconomic determinant Exchange rate has positive significant impact on NPAs at 1% significance level with coefficient($\beta=0.292$ and p value=0.000).The result explains that for one unit change exchange rate, there will be .292 unit changes in NPAs in the same direction while keeping other things constant. This result support Farhan, *et al.*, (2012), Castro (2013) who finds similar results. The result suggest that increase in exchange rate i.e. appreciation of foreign currencies against the local currency and borrowers face difficulty because of the high prices of imported inputs which has affect the prices of their final products sold locally. This phenomenon directly hit the borrowers' repayment capacity which increases NPAs.

The regression result of GDP shows the coefficient $\beta=1.388$ estimatesis positive but statistically not significant relationship between GDP growth and NPAs which is consistent(Poudel, 2013; Alexandri&Santoso, 2015; Ouhibi&Hammami, 2015).

The bank lending rates have positive significant relationship with NPAs at 5% significance level. The beta coefficient of the estimate shows that every one unit increase in lending rate increases NPAs by 0.206 units. A probable interpretation of this that commercial banks in Pakistan charge more cost of borrowed funds which in turn decrease borrowers' payment ability and causes of mounting NPAs. Loan holders with increased burden of high lending rates on their fixed income will lead to defaulting of loans. This result is supported by (Asari, *et al.*, 2011; Ali & Iva, 2013; Washington, 2014; Nadham&Nahid, 2016; Ofori-Abebrese, *et al.*, 2016). The regression result suggests that inflation has a positive but not significant relation with NPAs. This seems to be consistent with the results of (Ali and Iva, 2013; Gezu, 2014; Alexandri and Santoso, 2015; Gambo, Abdul-Rahman and Ibrahim, 2017).

Market capitalization growth rate indicates the Pakistan stock market and also show the financial health of loan holders. In this study there is no significance relationship between MCAP and NPAs. The findings support the earlier study of (Prasanna 2014; Swamy, 2015).

Bank specific determinant ASSET has positive impact on NPAs at 5% significance level. The beta coefficient of this variable indicates that 1 unit increase in ASSET increases NPAs by 0.121 which is consistent with (Abidet *et al.*, 2014). A plausible explanation of this finding is that Pakistanis commercial banks with more assets do not have diversified risk portfolio or banks provide funds in riskier projects to achieve the development programs of country. But on the other hand banks do not have better risk management strategies and technology for efficiently collecting, processing and analyzing any information regarding funding.

Capital adequacy ratio serves as a buffer to absorb losses arising from different risks and occurrence of uncertain macroeconomic events. In this study there is no relation between CAR and NPAs. The result is similar with the findings of (Ganić, 2014; Tehulu&Olana, 2014; Alexandri&Santoso, 2015; Fajar&Umanto, 2017). With respect to CREDGR has not significant impact on NPAs. This result is in same direction with previous research by (Louzis, *et al.*, 2012; Vatansever&Hepsen, 2013; Ofori-Abebrese, *et al.*, 2016). The both results simply that non-performing assets are not responsive to changes in CAR and CREDGR of commercial banks in Pakistan.

Cost of fund has positive and significant impact on NPAs in commercial banks of Pakistan at 1% significance level. There is a 0.733 unit's change in NPAs for one unit change in COF while keeping other things constant. This result is highlighted that Pakistanis commercial banks are not using effective strategic decision in lending or loan sanctioning.

Consequently, it can lead to higher growth of NPAs. The finding is also inconsistent with (Swamy, 2015; Muneer et al., 2016).

Performance ratio, ROA, has been found significant and negatively associated with NPAs at 1% significance level. The beta coefficient of the estimate shows that every one unit increases in ROA decreases NPAs by -0.597 units while keeping other things constant. The results support by (Messai & Jouini, 2013). This finding implies that bank managers have less pressure in creating income from credit activities because of strong profitability. It explains that Pakistanis banks are not engage in riskier lending projects.

Table 5 reports the result of the OLS regression analysis for eq (2) to examine the impact of macroeconomic and bank specific variables on bank profitability. Whereas ROA is a dependent variable and GDP, bank asset, capital adequacy ratio, cost of fund and GNPA are explanatory variables. The value of R-squared (R^2) in the model is 0.538, which indicates that all these 5 predictor variables combined explain 53.8% of the variance in the dependent variable (ROA). The Durbin-Watson = 1.956 that is approximately close to 2 and show that there is no problem of serial correlation.

Table 5. Results of Multiple Regression Analysis

Dependent Variable: ROA

Independent Variables	Coefficient (β)	Std. Error	t	Significance (p)	
GDPGR	0.088	0.001	1.771	0.078	
ASSET	0.402	0.002	8.385	0.000	*
CAR	0.363	0.034	9.771	0.000	*
COF	-0.692	0.043	-2.951	0.004	*
GNPA	-0.466	0.01	-8.871	0.000	*

$R^2 = .538$, F value = 42.335 ($p = .000$), N = 225

**significant if $p \leq 0.01$ (hypothesis accept)

*significant if $p \leq 0.05$ (hypothesis accept)

Note: GNPA (gross non-performing asset), ASSET (bank assets), CAR (capital adequacy ratio), COF (cost of fund), ROA (return on asset), GDPGR (Gross domestic product growth rate).

The present study finds no statistical evidence that GDP has impact on ROA. This seems to be consistent with result of (Kiganda, 2014). However, ASSET has significant impact on ROA at 1% significance level which indicates that commercial banks in Pakistan

have diversified portfolio which directly reflect on banks profitability. Bank ASSET has a positive coefficient of 0.402.

Capital adequacy ratio has significant positive relationship with profitability of commercial banks in Pakistan. The beta coefficient of this variable indicates that 1 unit increase in CAR increases ROA by 0.363 which is consistent with (Ongore & Kusa, 2013; Nisar, *et al.*, 2015). This result explains that banks with high CAR can withstand unexpected losses or NPAs which in turn increase profitability of commercial banks in Pakistan.

Cost of fund seems to negatively affect commercial banks profitability in Pakistan at 1% significance level. This result shows the excellent managerial efficiency of Pakistani commercial banks that banks are collected funds from depositors at cheapest rate which increases the bank's profitability. This finding is also supported by (Nisar, *et al.*, 2015; Islam & Nishiyama, 2016).

Gross non-performing asset which is measure of asset quality has significant impact on bank performance. Coefficient of GNPA ($\beta = -0.466$, $P = 0.000$) in regression presents a negative and significant relationship between profitability and weakness of asset quality. Indeed, this finding is consistent with the empirical findings of (Gyamerah & Amoah, 2015; Kristianti & Yovin, 2016).

Final Conclusion

This paper examines how bank specific and macroeconomic factors affect asset quality and profitability of commercial banks in Pakistan over the period from 2004 to 2016. Commercial banks of Pakistan face this problem of NPAs from 2004–2016 (see figure 1). It has been explained that bank management in favorable macroeconomic conditions leads to better asset quality.

The level of NPAs is high with all banks and banks are expected to bring down their NPAs. Bank's management can improve asset quality by using good credit appraisal procedures. Banks grow in size (ASSET) lead to high NPA, bank management liable to control the NPA owing to efficiency in their management. Among the macroeconomic determinants, ER and LR have positive significant impact on NPAs. It concludes that a rise in lending rates increase the real value of loan holders which making debt servicing more expensive.

Maintaining profitability is a challenge to commercial banks in Pakistan especially in a highly competitive era. Investigating the macroeconomic and bank specific factors of profitability for commercial banks in Pakistan, it has been found that capital adequacy ratio influences profitability positively. It demonstrates the internal strength of Pakistani banks to support losses during crises periods.

In this research the researcher notices that GNPA have negative impact on profitability. It can be deduced that bank management trying to overcome on NPA with prudential norms, to improve profitability.

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