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Performance Assessment of Commercial Banks using CAMEL Indicators: Case Study of Pakistan

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CAMEL,ROA,CAR, Management Efficiency, Asset Quality, banks performance

ABSTRACT

The purpose of this study is to conduct an in-depth investigation to gauge whether CAMEL indicators have an impact on performance of Commercial banks operating in Pakistan. For this study, a sample of 10 Commercial banks operating in Pakistan's Banking Industry for the period 2012-2018 has been selected. Empirical results revealed that bank performance can be influenced by asset quality, earnings quality and liquidity. Capital adequacy and management efficiency has no impact on EPS (proxy for bank performance). The findings outcome is imperative to various parties who have stake in banking sector e.g. depositors, shareholders, SBP, investors etc. It can also be used as a basis to identify the areas where the banks are performing poorly and take suitable actions which would assist in sustaining and growing the banking sector of Pakistan.

INTRODUCTION

There are five key components of an economy's financial environment i.e. financial markets, money, financial instruments, financial institutions and regulations. Banks are a core component amongst different financial institutions. Being a barometer and fundamental component of financial system, banks play a crucial role in uplifting the economy of countries (Said & Tumin, 2011). According to McKinnon (1973) financial system is strongly correlated with the economic growth. Owing to the today's era of globalization and technological advances, there is intensive rivalry among banks to produce innovative products which can result in customer's satisfaction (Uppal & Kaur, 2007). Due to the noteworthy changes in the bank's operating environment as a result of deregulation and globalization, financial institutions have been emerged as efficient markets. However, these developments have also constituted some severe risks. To encounter the challenge of systematic risks,

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regulatory policies are being restructured and redesigned. For the supervisors and regulators, the key challenge is to sustain the stability and soundness of financial systems and on the other hand, they must also ensure the flexibility of financial institutions (Arora & Kaur, 2006). Therefore, all the stakeholders within the economy, including the shareholders, employees, and even the management thrive depending upon how well the banks perform. Hence, good financial performance of banking sector supports the objectives of all these stakeholders concerned.

The key to measure performance and efficiency of banking industry has been a focus of discussion in recent years. Performance looks at the ability of a bank to achieve sustainable profits, in terms of accounting (Rozanni & Rahman, 2013). The topic of banking performance measures had been researched during the period of 1980s to 1990s for the very first time. These studies used efficiency structure and market power models (Roman & Sargu, 2013). Traditionally, gauging financial performance of banks involves the use of techniques such as benchmarking, comparing results with budgets, ratio analysis, banks dividend policy or any combination of the above (Avkiran, 1997; Khan & Gul, 2012). However, with the passage of time, there was a paradigm shift in the banking industry, which urged the need to introduce such tools which can reflect all important operational factors, financial factors, qualitative judgments and financial ratios in the assessment of a financial institution's performance. United States' three banking supervisory authorities (Federal Deposit Insurance Corporation (FDIC), Office of Comptroller of Currency (OCC) & Federal Reserve had developed one of such tools in 1979, known as Uniform Financial Institutions rating Systems (UFIRS) or CAMEL Model. CAMEL is an international recognized rating system that is being used by regulatory banking authorities for rating financial institutions on the basis of six factors that are depicted by acronym i.e. capital adequacy, asset quality, management efficiency, earnings, liquidity as well as sensitivity. In November 1979, Federal Financial Institutions Examination Council (FIEC) adopted the CAMEL rating system and later on, it was adopted by NCUA in 1987 to categorize bank's overall state. The goal of this system is to apply a common approach, which is both comprehensive and directed to identify any financial or operational weaknesses. Over time, it has demonstrated to be an effective supervisory tool for assessing the stability and soundness of financial institutions and helping the practitioners to identify any underperforming financial institution.

Banks are the foundation of any economy. They channelize country's financial resources, and serve as a medium for injecting and circulating money within the economy. Money is lifeblood for any economy, and therefore it is very crucial to continuously evaluate the performances of banks (Ahmed *et al*., 2010). Quarterly performance evaluation report of Pakistan's banking sector conducted by SBP revealed that five of the major banks in Pakistan sustained losses in 2017, while the number of unprofitable banks was three in 2016. These figures depict worrisome situation for Pakistan, which needs to be, rectified (SBP, 2017).

To evaluate the performance of banks, CAMEL framework is a very constructive tool, which is used globally, and extensive research had been done on its applications in developed nations. However, unfortunately, no noteworthy relevant research has been conducted in Pakistan. The studies which are conducted in Pakistan have used CAMEL model as a ratio analysis and compare one bank with another or one sector with another (Alam, Raza & Akram, 2011: Shar, Shah & Jamali, 2010). Few other studies that have used CAMEL model but they have used old data (Kouser & Saba, 2012; Bokhari *et al.*, 2012). So far only one study investigated the influence of all of the CAMEL indicators on performance of banks in Pakistan from year 2007 to 2013 (Ishaq *et al*., 2016) but data used in this study is also old i.e. until

2013. Hence, a limited body of literature on this topic urges the need to investigate it further in the context of Pakistan.

Furthermore, CAMEL ratings of banks are only disclosed to the upper management and they are not disclosed to the public. Not having this information is detrimental to the investors and shareholders who desire to invest their funds and purchase the shares of a good bank.
The current study aims to assess the impact of capital adequacy, management efficiency, asset quality, earnings and liquidity on Pakistani banks performance.

The basic goal of this study is to evaluate the performance of Commercial Banks for the period of the 2011-2017 by using CAMEL indicators. The study is an attempt to determine whether CAMEL indicators really explain the performance of Pakistan's Commercial banks and to gauge which indicators has a noteworthy impact on Commercial Banks' EPS and which indicators has less or no influence on banks performance. The results of this study will be of particular interest to State Bank of Pakistan as it may assist them in determining if the Commercial banks are following its BASEL II regulations. The findings of the present study will facilitate and benefit all those individuals (e.g. Shareholders, investors, depositors) who want to deposit and invest their funds. The study will provide them valuable insight about key aspects, which influences banks performance and CAMEL ratings of different Commercial banks. By considering the research findings, they can decide a good option for investment too. Banking institutions may benefit from the findings of this study by analyzing the area where they are lagging behind. In other words, they can find out the root cause of their poor performance (whether it is due to poor asset quality, inefficient management, inadequate capital etc). Furthermore, banking institutions can better understand which CAMEL indicators really explain their performance and which of them has no impact on their EPS. In addition, managers of banking institutions may benefit from the findings of this study by devising banking survival and growth strategies. Conclusively, all those individuals who have any stake with the bank's profitability may benefit from the current study. Those individuals can be investors, customers, regulators, taxpayers, depositors, bank's staff, managers or politicians. The current study tried to bridge the literature and knowledge gap and contribute to the body of literature by identifying those indicators, which really explains the Pakistani banks' performance.

Literature Review

One of the essential determinants of economic growth is banking industry; because it transfers the funds from surplus units to the deficit economic units of the economy (Levine, 2005). Being an essential pillar of economy, it is very important to evaluate the financial health and performance of banks periodically (Roman & Sargu, 2013). Banks' capacity for producing sustainable profits is the key concept of banks performance (European Central bank, 2010). In literature, various measures are being used to gauge the performance of banks; return on equity, return on assets, Tobin's Q and Net Interest Margin are generally used to measure the banks performance. Ratio analysis, comparison of performance with budget, benchmarking are traditionally used to measure banks financial performance (Golin, 2001; Avkiran, 1997). CAMEL framework is one of the most widely used tools by practitioners, regulators and banks management to determine the overall financial and operational health of banks (Rozanni, & Rahman, 2013). Under the CAMEL model, composite rating is attributed to each financial institution which is derived by assessing and rating five fundamental components of a financial institution's operations and financial factors including; capital adequacy, asset quality, management capability,

earnings efficiency and liquidity (The United States. Uniform Financial Institutions Rating System 1997). Under this system, each banking institutions subject to on-site examination is evaluated based on five critical dimensions relating to the bank's operations & performance (Sahajwala & Van den Bergh, 2000).

Capital adequacy denotes the relationship among risk weighted assets and equity; it gauges the institution's capability in absorbing the loan losses (Sarker, 2005). Different ratios can be used to calculate the capital adequacy of banks; it includes net worth protection, CAR and leverage ratio (Kabir & Dey, 2012). For determining capital-adequacy, various parameters have been used by different researchers as shown in table 1.

Table 1: *Parameters used to analyze Capital adequacy in the literature*

Author(s)	**Performance measures**
Mishra & Aspal, 2013	Government Securities/Total investments; debt/equity ratio; Capital/RWA and advances/ assets
Mulualem, 2015; Hamdu et al, 2015; Dang, 2011	leverage ratio; Capital/RWA
Tefaye, 2014; Ermias, 2016; Anteneh et al, 2013.	Advances to assets; CAR and Debt/ Equity ratio
Olweny & Shippo, 2011	Total Equity/ Total Assets
Ishaq et al, 2016	Total Deposit/ Total Equity
Babar & Zeb, 2011; AIA, 1996 Sarwar & Asif, 2011	Capital Adequacy ratio; Equity capital/ Assets

Source: developed by authors

H_1: There is a significant impact of Capital adequacy on financial performance of banks.

For rating a bank, another key parameter of CAMEL model is termed as Asset Quality (The United States. Uniform Financial Institutions Rating System 1997). Overall risk, which is linked with various assets kept by an organization, comes under asset quality. Banks use this factor in determining how many of their assets are on financial risk and the degree of provisions they must maintain for delinquent loans (Baral, 2005). Different ratios have been used in literature to gauge the quality of assets as shown in table 2.

Table 2: *Parameters used to analyze Asset Quality in the literature*

Author(s)	**Performance measures**
Ishaq et al, 2016	NPL/ Advances; NPL/ Equity
Anteneh et al, 2013; Tesfaye, 2014; Ermias, 2016	Total investments/ Total Assets; Net NPA/ total assets; Gross NPA/ Net advances
Ghazavi et al, 2018	Loans/ Assets; NPL/ Gross loans; Fixed Assets/ Assets Bearing Assets/ Assets Specific provision reserve/ NPL
Biswas, 2014; Majumder, 2016	NNPA/ assets; Total investments/ assets; NNPA/ Net advances; % change in NPAs.

H_2: There is a significant impact of Asset quality on financial performance of banks.

One of the indispensable variables for determining a financial institution's success is termed as management efficiency. Management efficiency is defined as the capability of bank's management to produce the utmost revenue from existing earning assets (The United States. Uniform Financial

Institutions Rating System 1997). It refers to their ability in controlling the costs of bank (Pasiouras *et al*., 2006). Many scholars have used different indicators to gauge the quality of banks management as indicated in table 3.

Table 3: *Parameters used to analyze Management efficiency in the literature*

Author(s)	**Performance measures**
Ishaq *et al*., 2016	Gross advances/ Total deposits; Admin expenses/ Interest income;
Olweny & Shipo, 2011	Operating-Expenses/ Asset; Operating-cost/ net-operating income
Chandani *et al*., 2014	Returns per employee; debts/ deposits ratios
Ghazavi *et al*., 2018	NII/ Net income NII/ Noninterest expenses NIPE Net Income per branch Saving+ current deposits/ total deposits
Poghosyan & Cihak, 2011	Personal expenses/ average assets
Babar & Zeb, 2011; AIA, 1996 Sawrar & Asif, 2011	Loan growth rate; assets growth rate; Earnings growth rate

H_3: There is a significant impact of Management Efficiency on financial performance of banks.

Another variable for measuring bank performance is earning ability, which depicts the quantity as well as trend in earning and reflects the factors that impact earnings sustainability (Uniform Financial Institutions Rating System 1997. The ability of a bank to earn on a regular basis and to sustain it in future is referred as earnings ability (Nag & Khatik, 2014). It gauges the profitability of banks and describes the growth of "future earning capacity" (Ahsan, 2016). The study is using two earning indicators ROA and ROE as proxy to assess earning ability based on literature since most of studies have measured earning by using ROA and ROE as earning indicators (Ledhem & Mekidiche, 2020; Yildirim & Ildokuz, 2020) Table 4 depicts the measures used by scholars in literature to measure earning quality.

Table 4: *Parameters used to analyze Earnings quality in the literature*

Author(s)	**Performance measures**
Ishaq et al, 2016	ROA ROE Interest Income/ Total Assets
Olweny & Shipo, 2011	Operating cost/ Operating income
Nassreddine et al, 2013	Cost/ Assets
Golin, 2001	Operating cost/ Net-operating income
Christopoulos et al, 2011 Ledhem & Mekidiche, 2020 Yildirim & Ildokuz, 2020 Zarrouk et al., 2016 Alharbi, 2017	ROA and ROE
Ghazavi et al, 2018	NIM; NNI/ Assets; NI/ Equity; Noninterest expense/ (Non-Interest Income+ NII)
Babar & Zeb, 2011; Sawrar & Asif, 2011	NIM; ROE; ROA and cost/ income ratio

H_4: There is a significant impact of ROA (Earnings quality indicator) on financial performance of banks.

H_5: There is a significant impact of ROE (EQ indicator) on financial performance of banks.

Bank's capability to fulfill its financial obligations is measured through liquidity ratio. Generally, those banks are considered safe and sound which possess a larger amount of liquid assets; it will permit them to fulfill sudden withdrawals (Uniform Financial Institutions Rating System 1997). Table 5 below depicts the measures used to assess liquidity in literature.

Table 5: *Parameters used to analyze liquidity in the literature*

Author(s)	**Performance measures**
Bokpin, 2013	Quick ratio; cash ratio; current ratio working capital ratios
Ishaq et al, 2016	Cash ratio
Ghazavi et al, 2018	Gross loans/ Deposits; Liquid Assets/ total assets; Liquid Assets/Total Foreign Liabilities
Babar & Zeb, 2011; Sarwar & Asif, 2011	Total loans/ customer deposits customer deposits/ assets

H_6: There is a significant impact of liquidity on financial performance of banks

Performance measurement is a process traditionally used for quantification of efficiency as well as effectiveness of a firm's actions (Neely et al, 19950. Banks' capacity in producing sustainable profits is termed as bank performance (Liu et al, 2011). Some of the drivers for banks' profitability and financial performance are Net Interest Margins, cost to income ratio, business model, regulations and Non-Performing loans. In literature, there are different bank performance measures as explained in table 6.

Table 6: *Parameters used to assess bank performance in the literature*

Author(s)	**Performance measures**
Omar & Mugabe, 2016	NIM, ROE & ROA
Ishaq et al, 2016	EPS
Rostami,2015	Tobin's Q
Zafar et al, 2017	Efficiency ratio (Noninterest expenses/ total operating income)

Keeley, (1988) was one of the first scholars to explore the topic of CAMEL rating system. By using the capital adequacy indicator of this model, he tried to investigate whether insufficiently capitalized banks of 1980s can be influenced by regulators to increase their capital. By using different measures of capital regulator pressure, his results indicated that they were influenced by the regulators demands for more capital and they responded to those demands of regulatory authorities (Keeley, 1988). Muhmad and Hashim (2014) evaluated the financial performance of Malaysian's foreign and local banks through CAMEL model. They took five years data (2008- 2012) and run the regression analysis. According to the results, only LQ, CA, AQ and EQ had a strong impact on Malaysian banks performance. ME was found to have no effect on Malaysian bank performance. Ishaq et al (2016) assessed the performance of Pakistan's ten commercial banks by using CAMEL framework. They took seven years data (2007- 2013) and run the regression and correlation analysis. According to the results, AQ, CA and ME had significant negative correlation with performance of commercial banks. Furthermore, EQ and LQ had a meaningful positive effect on performance of Pakistani banks.

Sarwar and Asif (2011) assessed the soundness of Pakistan's banking industry based on CAMEL tool. He took a sample size of six commercial banks and did the analysis for the recent 3 years of sample banks. According to the results, performance of the chosen banks was satisfactory. They got the ratings between 2 to 3 and none of them got the ratings between 4 to 5, which shows that their performance was satisfactory. Tom (2012) investigated the impact of CAMEL indicators on efficiency of Kenya's

Commercial banks. He used five years data (2007- 20111) and took the sample size of 37 Kenyan banks. He utilized MLR technique to analyze the data. According to the findings, LQ, EQ and CA were negatively related with efficiency ratio. Moreover, AQ and ME were positively related with efficiency ratio. Sathyamoorthi et al (2017) assessed the performance of Botswana's commercial banks through CAMEL tool. He took 5 years data (2011-15) and a sample size of 3 banks. The findings suggested that CA, AQ, ME and EQ has no meaningful impact on EPS. Only bank's liquidity situation has a meaningful effect on EPS.

Aguenaou et al. (2017) investigated the financial performance of Moroccan banks through CAMEL model. They used eleven years data (2004-14) and a sample of six BVC listed banks. The results stated that ME has a negative relation with bank efficiency. The impact of AQ, EQ, CA and LQ on banks efficiency is positive; EQ having the weak impact and CA having the utmost impact on efficiency of Moroccan banks. Kouser and Saba (2012) utilized CAMEL approach to analyze the financial performance of Islamic, Mixed and Conventional banks in Pakistan, for the time period 2006-10. For this purpose, four Islamic banks (pure), six mixed banks (conventional banks having Islamic windows) and four conventional banks were chosen. For comparing the means of these banks' categories, ANOVA test was used. Then, trend analysis had been conducted to compare the three categories graphically. The results demonstrated that Islamic banks possess superior AQ and sufficient capital as compared to conventional and mixed banks. Their management is also efficient and competent as compared to conventional banks. However, earnings of mixed banks were more than the other two categories. Gul, Awan and Ahmad (2015) conducted a comparative study of Islamic and conventional Banks using different ratios to evaluate the performance of banks in Pakistan. By using CAMEL framework, Zafar et al (2017) assessed the effect of CAMEL indicators on performance of Pakistani banks. They used thirteen years data (2000-12) and a sample of 15 KSE listed banks. By employing regression model, random and fixed effects model, the study reported that the large banks of Pakistan are the top performers and efficient while the small banks lagged behind. GLS method revealed that EQ, AQ and LQ are significant predictors of bank performance. Based on literature theoretical framework for current study has been developed as follow in figure 1:

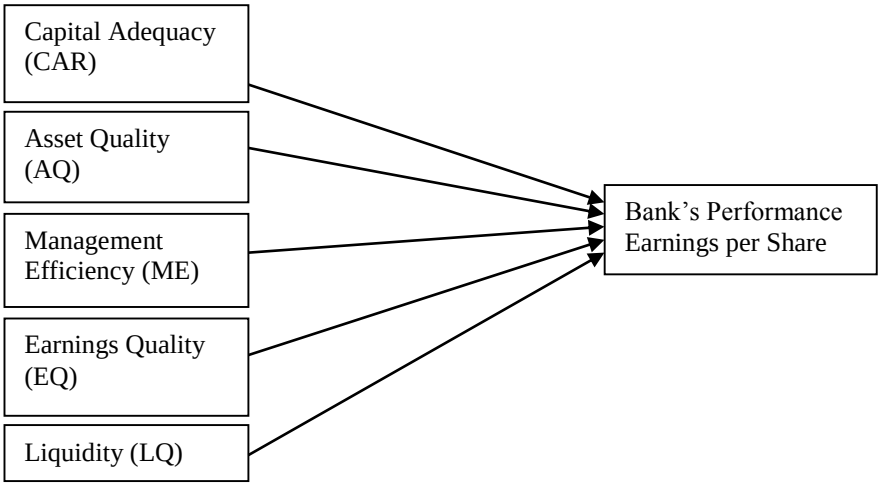

Figure 1: *Theoretical Framework of the Study*

In this particular theoretical framework, AQ, CAR, ME, EQ and LQ are independent variables and EPS is a dependent one. It has been derived from studies conducted by Jha and Hui (2012), Nagamani and Williams (2015) and Kouser and Saba (2012).

Research Methodology

Quantitative research method is used in this study. Descriptive and analytical research design is being adopted in the current study to gauge the performance of Pakistani commercial banks. Furthermore, it is a hypothesis testing study wherein the effect of CAMEL indicators on commercial bank's performance is studied in the Pakistani context. Secondary data are gathered from the Annual Reports of the ten chosen banks for time period (2012-18). Later on, the data were used for descriptive statistics and regression analysis by using Eviews 8 software. *Deductive research approach* is being used in the study as hypothesis are being formulated on the basis of previously existing theories and gathered data in order to test the theorized hypothesis by using various analysis techniques. "Non-probability sampling" is being employed in the study.

The population for this study is the banking industry of Pakistan. It consists of thirty-five commercial banks in Pakistan's banking sector. The sample frame of study comprises of commercial banks, which are working in Pakistan. The sample of this study consists of 10 Commercial banks. In the present study, panel regression has been used to examine the impact of CAMEL variables on the financial performance of commercial banks.

Following is the regression equation of the study:

$$EPS_{it} = \alpha_0 + .599CAR_{it} - 16.301AQ_{it} - .211ME_{it} + 77.521ROA_{it} + 2.122ROE_{it} - 1.842LQ_{it} + u + \varepsilon$$

In the above equation, α_0 is the intercept, u is "between entity error" and ε is "within entity error".

Where:

EPS_{it}= Earnings per share of i^{th} bank at "t" time.
α_0 = Constant of the regression model
CAR_{it}= Capital Adequacy of i^{th} bank at "t" time.
AQ_{it}= Asset Quality of i^{th} bank at "t" time.
ME_{it}= Management Efficiency of i^{th} bank at "t" time.
EQ_{it}= Earnings Quality of i^{th} bank at "t" time.
LQ_{it}= Liquidity of i^{th} bank at "t" time.
α = intercept
u ="between entity error"
ε = "within entity error"

In order to observe strength of relation between CAMEL variables and bank performance, correlation analysis has been employed. This study has used Pearson correlation analysis. It indicates strength, direction and significance of the relation between all variables. Symbol "r" denotes the correlation coefficient and it ranges from -1 to +1.

Variables

In order to analyze the CAMEL indicators (CAR, AQ, ME, EQ and LQ) of the chosen commercial

banks, following ratios have been employed are depicted in following table:

Table 7: Variables and their measures

Variable	Ratios/ measures/	Symbol	Expected Sign
Capital Adequacy ratio	$\text{CAR} = \frac{\text{Tier I} + \text{Tier II}}{\text{Risk Weighted Assets}}$	CAR	+
Asset Quality	$\text{AQ ratio} = \frac{(\text{NPLs} - \text{Specific Provision Reserve})}{\text{Total Advances}}$	AQ	-
Management Efficiency	$\text{Management Efficiency ratio} = \frac{\text{Management expenses}}{\text{Sales}}$	ME	-
Earnings Quality	$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$	EQ	+
	$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholder's Equity}}$		+
Liquidity	$\text{LQ ratio} = \frac{\text{Gross Loans}}{\text{Deposits}}$	LQ	-

Data Analysis and Results

Descriptive Statistics

Table 8 reports the descriptive statistics of the current study.

Table 8: *Descriptive statistics (N=70)*

	AQ	CAR	EPS	LQ	ME	ROE	ROA
Mean	.025	.155	9.245	.555	.352	.163	.012
Median	.019	.152	5.115	.531	.348	.175	.010
Maximum	.126	.243	32.55	.783	.523	.299	.031
Minimum	.003	.105	-5.9	.337	.232	-.319	-.015
Std. Dev.	.023	.034	8.765	.107	.063	.087	.008
Skewness	2.263	.740	.753	.509	.417	-2.420	.049
Kurtosis	9.449	2.811	2.564	2.265	2.884	14.428	4.305
CV (SD/Mean)	.883	.219	.948	.193	.178	.535	.619

In order to analyze the data, 70 observations are used for this specific study. The average asset quality ratio was 0.025 with a highest figure of 0.126 and a lowest figure of 0.003. Its middle value was found to be 0.019. The maximum value in CAR is 0.105 and the minimum value is 0.243, with the average value of 0.155. Its middle value was 0.152. The average EPS was 9.245 and it has a minimum value of -5.9 and a maximum value of 32.55. The middle value of EPS was 5.115. The maximum value in Liquidity ratio is 0.783 and the minimum value is 0.337 with the average value of 0.555. Its middle figure was 0.531. Furthermore, 0.523 is the maximum value in management efficiency and 0.232 is the minimum value; it has a mean value of 0.352. Its middle value was 0.348. The maximum and minimum values in ROE are 0.299 and -0.319 respectively, with the average value and middle value of 0.163 and 0.175 respectively. The average ROA was 0.012 with the lowest figure of -0.015 and a highest figure of 0.031. Its middle value was found to be 0.010. In order to analyze the standard deviation of the variables, coefficient of variation has been calculated. All of the values of CV are less than 1 which indicates that

there is less variation and dispersion of data from the mean. Skewness values of ROA are approximately equal to 0 which suggests that it is symmetrical. Skewness value of AQ, CAR, EPS, LQ and ME are larger than zero and it demonstrates a positive skewness (right tail) of the distribution. For ROE, its value is less than 0 and it depicts the negative skewness (left tail) of the distribution. AQ, ROA and ROE are leptokurtic and peak curved (kurtosis values >3); CAR and ME are mesokurtic and are normally distributed (kurtosis value=3); EPS and LQ are platycurtic and they are flatted curve (kurtosis values < 3).

Jarque- Bera test has been applied to convert the data into normal distribution. In this test, the null hypothesis is that the data is normally distributed and the alternative hypothesis is that it's not normally distributed. If its probability is less than 5% then the alternate hypothesis will be accepted and the null will be rejected and vice versa. In CAR, EPS, ROE and AQ, p-value of Jarque- Bera is less than 5% so the alternate hypothesis will be accepted; these variables are not normally distributed. These variables will be converted into normal distribution by applying log on them in Eviews. [LCAR= log (CAR), LEPS= Log (EPS), LROE= Log (ROE), LAQ = Log (AQ). In LQ, ME, ROA, p-value is more than 5% so the null hypothesis has been accepted i.e. they are already normally distributed

Correlation analysis

Correlation coefficient as illustrated in table 9 is employed to gauge the direction and strength of linear association and relationship between the EPS and CAMEL indicators, for seven years period.

Table 9: *Covariance analysis (N=70)*

Probability	AQ	CAR	EPS	LQ	ME	ROA
AQ	1					
CAR	.069	1				
EPS	-.638	.368	1			
LQ	.109	-.607	-.494	1		
ME	.330	-.073	-.491	.056	1	
ROA	-.338	.547	.793	-.413	-.493	1
ROE	-.449	.273	.658	-.315	-.369	.820

Considering table 9 the r-value of AQ with EPS is -0.638; it demonstrates that there's a strong negative correlation between them. Its negative sign illustrates that as NPLs to total advances ratio increases, EPS tends to decrease. The r-value of CAR with EPS is 0.368 and it signifies that there's a weak positive association among them. Its positive sign illustrates that as CAR ratio increases; EPS is likely to increase. The r-value of ME with EPS is -0.491 and it explains that there's a moderate negative association between them; as management expenses to sales ratio increases then EPS is most likely to decrease. The correlation coefficient of LQ with EPS is -0.494 and it reveals that the relationship between them is moderately negative. Its negative sign displays that increase in gross loans to deposits ratio will result in decrease in EPS. The r-value of ROA with EPS is 0.793 and it shows that there's a strong positive relationship between them; as ROA increase, EPS is most likely to increase. Similarly, there's a strong positive association between ROE and EPS and increase in ROE is likely to enhance the EPS. All p-values are less than 5% significant level of 2-tailed correlation which denotes that the

confidence level of correlation values' significance is 95%.

Regression Analysis

As the data has both time series and cross sectional features so panel data regression is employed in the present study. All of the three models of panel data regression have been estimated, as shown below.

Pooled OLS Regression Model

In Pooled OLS regression, all 70 observations are pulled together and the regression model is run, ignoring the time series and cross sectional nature of data. By pooling the ten banks together, it rejects the heterogeneity which may be present among the chosen commercial banks. It assumes that all commercial banks of Pakistan are similar. In this model, all of the variables must be normally distributed so normalized values of independent and dependent variables are used. The regression equation is as follows:

EPS= 0.831- 0.636CAR - 0.391AQ - 2.530ME + 77.989ROA + 0.319ROE - 2.502LQ

Table 10: *Pooled OLS regression (N= 70)*

Dependent Variable: EPS
Method: Panel Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	.831	1.619	.513	.609
CAR	-.636	.526	-1.210	.231
AQ	-.391	.098	-3.987	.000
ME	-2.530	1.307	-1.935	.057
ROA	77.989	18.534	4.208	.000
ROE	.319	.272	1.173	.245
LQ	-2.502	.846	-2.958	.004

R-squared	.794	Mean dependent var	1.675
Adjusted R-squared	.775	S.D. dependent var	1.179
S.E. of regression	.559	Akaike info criterion	1.772
Sum squared resid	19.743	Schwarz criterion	1.997
Log likelihood	-55.026	Hannan-Quinn criter.	1.861
F-statistic	40.514	Durbin-Watson stat	.707
Prob(F-statistic)	.000		

As per table 10, the coefficient of CAR is -0.636, which denotes that EPS decreases by 0.636 units if CAR increases by one unit. Its p-value is more than 5% (significance level) so it indicates that CAR has insignificant impact on EPS. Its t-value is less than 1.96 so it also points out that CAR has insignificant influence on EPS and it is not relevant to the regression. In case of AQ, the sign of coefficient is negative which depicts that EPS reduces by 0.391 units if AQ increases by one unit. Its p-value is less than 5%, which implies that AQ has a noteworthy impact on EPS. Its t-value, 3.987, is also more than 1.96, which confirms the considerable influence of AQ on EPS. The coefficient of ME is -

2.530264 which implies that EPS is decreased by 2.530264 units if ME increases by one unit. Its p-value is approximately equal to 5% so it can be deduced that there is a considerable influence of ME on EPS. Its t-value (1.935) is also approximately equal to 1.96 so it confirms the noteworthy impact of management efficiency on EPS. The coefficient of ROA and ROE are positive and it infers that EPS increases by 77.98 and 0.31 units if ROA and ROE increases by one unit, respectively. P-value and t-value of ROA is significant so it infers that ROA has a meaningful impact on EPS. However, ROE's p-value and t-value are insignificant so there is no influence of ROE on EPS. The coefficient of LQ is negative which means that EPS is decreased by 2.50 units if loans to deposits (LQ) increase by one unit. R-squared is greater than 50% and it depicts that the regression equation is successful in forecasting EPS. Overall model is significant since the value of f-stats is more than 4 and its corresponding p-value is also significant. In other words, CAMEL indicators jointly can influence the dependent variable, EPS. The value of D-W stat is less than 2 and it demonstrates the existence of serial correlation. Therefore, Pooled OLS regression model can't be taken as this model ignores the cross sectional and time series characteristics of the data so these results can't be accurate.

Fixed Effect Regression Model

Fixed effect model permits for heterogeneity among the chosen banks by letting them to have their own intercept value. It assumes that all the commercial banks must be individual. Its regression equation is as follows:

$$EPS = 0.599CAR - 16.302AQ - 0.211ME + 77.521ROA + 2.122ROE - 1.842LQ + \alpha + u$$

In the above regression equation, α is the intercept for every bank (entity) and error term is denoted by u.

Table 11: *Fixed effect regression model (N=70)*
Dependent Variable: EPS, Method: Panel Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.481	.554	4.477	.000
CAR	.599	1.811	.331	.742
AQ	-16.302	1.697	-9.608	.000
ME	-.211	.672	-.313	.755
ROA	77.521	16.781	4.619	.000
ROE	2.122	.956	-2.219	.031
LQ	-1.842	.544	-3.388	.001
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	.979	Mean dependent var	1.675	
Adjusted R-squared	.973	S.D. dependent var	1.1798	
S.E. of regression	.193	Akaike info criterion	-.252	
Sum squared resid	2.017	Schwarz criterion	.262	
Log likelihood	24.823	Hannan-Quinn criter.	-.048	
F-statistic	167.860	Durbin-Watson stat	2.117	
Prob(F-statistic)	.000			

According to table 11, the coefficient of CAR is 0.599 and it depicts that EPS increases by 0.59

units if CAR is increased by one unit. Its p-value and t-value is less than 5% and 1.96 respectively, which signifies the insignificant influence of CAR on EPS. AQ's coefficient is -16.302; if AQ is increased by one unit then EPS decreases by 16.30 units. Its p-value is less than 5% and it is a sign of meaningful influence of AQ on EPS. Its t-value is also significant (9.60> 1.96) which also confirms its noteworthy impact on the dependent variable. ME has a negative relationship with EPS; If ME is increased by one unit then EPS decreases by 0.211 units. However, its p-value and t-value is less than 5% and 1.96, which demonstrates that it has no statistically significant influence on EPS. Furthermore, EPS increases by 77 and 2 units if ROA and ROE are raised by one unit, respectively. Both of these earnings quality variables are statistically significant as their p-values and t-values are more than 0.05 and 1.96. LQ's coefficient is -1.842; if loans/deposits are enhanced by one unit then it leads to decrease in EPS by 1.84 units. Its p-value is less than 0.05, which signifies that there's a meaningful influence of LQ on EPS. Its t-value also confirms its statistically meaningful impact on EPS. The R-squared value is 97% and it's very close to 1; hence it means that the regression fits entirely and perfectly. In other words, the regression equation is successful in estimating the dependent variable, EPS. Overall model is significant and camel variables together can affect the EPS, as the f-stats value is more than 4 and its corresponding p-value is also statistically significant.

Random Effect Regression Model

It assumes that all commercial banks have a common mean value for the intercept. Its regression equation is as follows:

EPS= 0.599CAR - 16.302AQ - 0.211ME + 77.521ROA + 2.122ROE -1.842LQ + α + u + ε

In the above equation, α is the intercept, u is "between entity error" and ε is "within entity error".

Table 12: *Random effect regression model (N=70)*

Dependent Variable: EPS
Method: Panel EGLS (Cross-section random effects)
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.619	.575	4.555	.000
CAR	.334	1.785	.187	.852
AQ	-16.866	1.656	-10.187	.000
ME	-.266	.664	-.401	.690
ROA	84.169	15.937	5.281	.000
ROE	2.457	.915	-2.686	.009
LQ	-2.005	.529	-3.790	.000
	Effects Specification			
			S.D.	Rho
Cross-section random			.592	.904
Idiosyncratic random			.193	.096
	Weighted Statistics			
R-squared	.776	Mean dependent var		.205

Adjusted R-squared	.754	S.D. dependent var	.387
S.E. of regression	.192	Sum squared resid	2.318
F-statistic	36.329	Durbin-Watson stat	1.851
Prob(F-statistic)	.000		
	Unweighted Statistics		
R-squared	.777	Mean dependent var	1.674
Sum squared resid	21.349	Durbin-Watson stat	.353

By analyzing the coefficient value in table 12, it can be illustrated that EPS is enhanced by 0.334 units, if CAR is increased by one unit i.e. there's a positive relationship among them. However, it's not statistically significant since the p-value (0.85) is more than 5%. Its t-value, 0.187, is also less than 1.96, which substantiates that there's an insignificant influence of CAR on the EPS. The coefficient of AQ is -16.866; If AQ is increased by one unit then EPS is reduced by 16.86 units. Its p-value (0.000) and t-value (10.18) are statistically significant and it suggests that AQ has a meaningful influence on EPS. ME's coefficient is -0.266 i.e. EPS is decreased by 0.26 units if management efficiency ratio is increased by one unit. However, its results are not statistically meaningful as its p-value is more than 5% and t-value is also less than 1.96. Therefore, ME has no influence on EPS according to this model. LQ indicators, ROA and ROE, have a positive association with EPS; If ROA is increased by one unit then EPS rises by 84 units. Similarly, EPS is increased by 2.4 units if ROE is increased by one unit. They are statistically significant as their p-values are less than 0.05 and t-values are more than 1.96. It can be inferred that Liquidity indicators has a meaningful impact on EPS. Furthermore, LQ's coefficient is -2.00 i.e. there is a negative association among them. Its p-value and t-value are significant therefore it can be demonstrated that liquidity has a meaningful influence on EPS. The regression equation is successful in predicting EPS as the value of r-squared (77%) is more than 50%. Overall model is significant as the f-stats value is more than 4 and its p-value is also statistically significant.

Hausman test

In order to choose between random or fixed effect models, hausman test is run where:

Ho= Random effect is suitable.
Alternative hypothesis= Fixed effect is suitable

If the probability of chi-sq stats is less than 5% then alternate hypothesis will be accepted and null will be rejected and vice versa (Green, 2008). By analyzing the test summary as shown in table 13, it can be observed that the p-value is not statistically significant. Therefore, null hypothesis is accepted and alternative is rejected. In other words, random effect is suitable so its results will be analyzed for hypothesis testing of the present study.

Table 13: *Hausman test (N=70)*

Correlated Random Effects - Hausman Test
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.

Cross-section random	5.065336	6	.5355

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
CAR	.599	.334	.094	.388
AQ	-16.302	-16.866	.138	.128
ME	-.211	-.266	.011	.589
ROA	77.521	84.169	27.617	.206
ROE	-2.122	-2.457	.077	.228
LQ	-1.842	-2.005	.016	.194

Cross-section random effects test equation:
Dependent Variable: EPS
Method: Panel Least Squares
Sample: 2011 2017
Periods included: 7
Cross-sections included: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.481	.554	4.477	.000
CAR	.599	1.811	.331	.742
AQ	-16.301	1.697	-9.608	.000
ME	-0.211	.672	-.313	.755
ROA	77.521	16.781	4.619	.000
ROE	-2.122	.956	-2.219	.031
LQ	-1.842	.544	-3.388	.001

Effects Specification

Cross-section fixed (dummy variables)

R-squared	.979	Mean dependent var	1.674
Adjusted R-squared	.973	S.D. dependent var	1.179
S.E. of regression	.193	Akaike info criterion	-.252
Sum squared resid	2.017	Schwarz criterion	.262
Log likelihood	24.823	Hannan-Quinn criter.	-.0479
F-statistic	167.860	Durbin-Watson stat	2.117
Prob(F-statistic)	.000		

Hypothesis testing

In accordance with the random effect model displayed in table 12, the proposed hypothesis can be tested. H1: There is an impact of Capital adequacy on financial performance of banks.
The regression findings rejected the hypothesis H1 as its p-value (0.8520) and t-value (0.1874) aren't

statistically meaningful.

There is no meaningful impact of CAR on banks' financial performance, in other words. It is in harmony with the studies conducted by Sathyamoorthi et al (2017), Zafar et al (2017), Bustamam and Munir (2017) and Naifer (2010). It can be linked with the capital structure's trade off theory. It highlights the benefits of debts to the equity owners. This benefit can only be availed when the tax reduction reward of possessing debt counterbalance the probable bankruptcy costs. Hence there must be an optimal capital structure through the tradeoff between equity and debt cost. In other words, merely increasing the capital base does not necessarily lead to increase in earnings and profitability of banks (Modigilani & Miller, 1963).

H2: There is an impact of Asset quality on financial performance of banks. The results of panel regression supported the hypothesis H2 since its p-value (0.000) and t-value (-10.187) are significant so study accept the hypothesis H2. In other words, asset quality has a meaningful influence on banks' financial performance, with 95% confidence level. It supports the studies conducted by Zafar et al (2017), Ishaq *et al*. (2016), Bustamam and Munir (2017) and Olweny and Shipho (2011).

H3: There is an impact of Management Efficiency on financial performance of banks. The regression results are not supporting the hypothesis H3 as its p-value (0.690) and t-value (-0.401) aren't statistically meaningful In other words, management efficiency has insignificant influence on bank's performance. It conforms to recent studies conducted by Zafar et al (2017), Sathyamoorthi et al (2017), Omar and Mugabe (2016), Bustamam and Munir (2017). H4: There is a meaningful impact of ROA on financial performance of banks. H5: There is a significant impact of ROE on financial performance of banks. The results of fixed-effect regression are supporting hypothesis H4 and H5 as their p-value (0.000 and 0.009, respectively) and t-value (5.28 and 2.68, respectively) are statistically meaningful. In other words, there is a meaningful positive influence of earnings quality indicators on banks' financial performance. It supports the studies conducted by Zafar *et al* (2017), Ishaq *et al*. (2016), Bustamam and Munir (2017).

H6: There is a significant impact of liquidity on financial performance of banks.

The regression results clearly support H6 as its p-value (0.003) and t-value (-3.79) are statistically meaningful. So, liquidity has a meaningful influence on commercial banks' performance i.e. increase in loans to deposit (signifying deteriorating level of liquidity) will cause a decrease in the EPS. It is in conformity with the studies conducted by Zafar *et al.* (2017), Liu and Pariyaprasert (2014), Ishaq *et al*. (2016), Ghazali (1999), Olweny and Shipho (2011), Sathyamoorthi *et al*. (2017) and Bustamam and Munir (2017).

Conclusion

Conclusively, the current research's aims were to investigate if the changes in CAMEL variables can cause a meaningful impact on performance of banks (denoted by EPS) To accomplish it, sample size of ten Pakistani commercial banks is taken and secondary data (2012-18) has been gathered from banks' annual audited reports and SBP's financial statements. Many statistical tools has been utilized in the research; pooled OLS regression, fixed effect model, random effect model, hausman test, descriptive analysis and correlation. The correlation analysis depicted that ROA, ROE (indicators of EQ) has a

strong positive relationship with EPS; AQ ratio has a strong negative relationship with EPS; the relationship of ME ratio ("management expenses/sales") and LQ ratio with EPS is moderately negative and CAR is weakly positively correlated with EPS. Both random and fixed effect regression models have been estimated because of panel data. After applying hausman test, it was decided to choose the random model. Random effect regression model illustrated that banks performance in Pakistan is not influenced by capital adequacy and management efficiency ratio. Earnings quality indicators, ROE and ROA, are meaningful contributors to the EPS and increase in ROA and ROE will cause an increase in the banks' earnings. Moreover, there is meaningful negative influence of liquidity ratio on EPS and it signifies that if loans/deposit ratio enhances then earnings will decline. Asset quality is also significantly contributing to EPS and increase in NPLs will make EPS decreasing.

Recommendations

It is recommended that management of banks should work by having collaboration with the policy makers as well as regulatory authorities for implementing efficient strategies which would be helpful in strengthening the vital role that is being played by capital adequacy, quality of assets, managerial efficiency improvements, adequate earnings generation and optimal liquidity amount.

Moreover, banks must use CAMEL composite ratings periodically so that they can recognize those components with their related ratios where they are lagging behind and which requires special attention. It will be useful to bank managers to conform to regulations and to undergo financial stress.

Future researchers could employ a different bank performance indicator, for example, ROA and ROE, EVA, Tobin's Q, Efficiency ratio or NIM so that performance can be represented from a different viewpoint. The present research utilized only a few main ratios from each CAMEL's factors which may not be sufficient to analyze the banks performance so future studies must employ additional ratios e.g. equity capital to assets could be used to represent capital adequacy; NIM for earnings quality; cost/ income, business per staff member could be used as a proxy for management efficiency. Researchers could also compare the Pakistan's banking industry with other banking industries in world. They could also make comparison between the Pakistan's Islamic, conventional and mixed banks. They could extend the sample to take in other financial institutions of Pakistan e.g. NBFC, Modarabah and DFIs and could also increase the sample size so that the results generalizability to the whole population can be more certain.

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