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# THE IMPACT OF MACROECONOMIC VARIABLES ON THE PROFITABILITY OF COMMERCIAL BANKING IN PAKISTAN

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## Abstract

The research was conducted to determine the impact of macroeconomic variables on the profitability of commercial banking in Pakistan over the period from 2007 to 2016. The quarterly data was used. The five major banks of Pakistan were selected to collect the data. Exchange rate, interest rate, inflation rate and money supply were used as independent variables and ROE used as dependent variable. The unit root and ARDL model techniques were used to analyze the data and it was concluded that money supply has positive and insignificant relation with ROE, inflation has negative and insignificant relation with ROE, exchange rate has negative and significant relation with ROE and interest has negative and significant relation with ROE.

**Keywords**: Commercial banking, ROE, Macroeconomic, Profitability, money supply

## Introduction

### Industry brief

Every country of the world has its identity due to its socio-cultural features or economic distinctions. Economic wealth and sound economy is the sign of flourishing in these days. Similarly, economic soundness is only result of positive relation of external factors to gain definite ambitions by efficient blending of resources. Banking industry is a significant part of financial sector for efficient management of financial resources across the world. The Banking division goes about as the life blood of present trade exchange and business to furnish them with a noteworthy wellspring of back. This expanding marvel of globalization has made the idea of effectiveness more critical both for the non-money related and budgetary foundations and banks are the piece of them. Banks to a great extent relies upon focused advertising methodology that decides their prosperity and development. The modalities of the managing an account business have changed a ton in the new thousand years contrasted with the manner in which they used to be in the years (Hussain & Bhatti, 2010).

The banking regulation act 1949 defines banking as “accepting for the purpose of lending and investment, deposits of money from the public repayable on demand or otherwise and withdraw able by cheque, draft, order or otherwise”. Banking industry in Pakistan occupy a wide spectrum of financial establishments, like commercial banks, specialized banks, national saving schemes, insurance companies, development finance institution, investment banks, stock exchanges, corporate brokerage houses, leasing companies, discount houses, microfinance institutions and Islamic banks. They propose

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a whole range of packages of products and services on both assets and liability side. Commercial banks are the dominant players of the banking industry.

The Pakistan banking industry consist of total 35 banks (SBP website). The majority of banking business of Pakistan depends on the six major banks namely:

- Habib bank limited
- National bank of Pakistan
- United bank limited
- Bank alfalah limited
- Allied bank limited
- MCB bank limited

To be more specific these banks collectively make up more than 57 percent of deposits and 53 percent of advance in the economy, Raymond Michaels (2017).

The Pakistan banking industry is regulated by the central bank (SBP), which governs local banks under its ambitious rules and regulations. The huge potential exists in the banking sector. The 195 million of populations has only 43 million number of accounts which is very less amount. The limited access to the technology in the country, large size of unbanked rural population and avoidance of banks due to religious concerns could be the reasons behind this large difference. With the numbers showing a positive picture in terms of balance sheet growth for banks the past decades have been excellent to banking industry. To quote a few from 2009 to 2016,

- Total assets increased from 6516 billion to 15134 billion.
- Deposits increased from 4786 billion to 11092 billion.
- Lending increased from 3240 billion to 5025 billion.
- Investment increased from 1737billion to 7625 billion.

Moving on to the sectors performance, 2017 may be a rough year for banks, as their interest margins take a hit. This is because back in the June/July period of 2016, a very large chunk of government securities matured, Raymond Michaels (2017). These were the long-term investments that banks bought back in 201-12, when the interest rates were very high, earning effective yields of 9 to 14 percent on such securities. Now, given the fact that a very large chunk of these securities have actually matured and have left the market, it is expected that net-interest margins of banks will take a hit in 2017, and NFI (non-funded income) will also go down due to decreased unrealized gains of securities earning higher returns than what is being offered in the market. However, earnings will still remain in check as a lot of banks have been cleaning up their balance sheets these past years. Limited provisioning expenses will strengthen the future outlook of the banking sector as gross domestic product (GDP) growth remains strong, in the 5-percent range, Raymond Michaels (2017).

By giving the low level of discount rates, due to large number of non-performing loans banks are now expected to go back to their lending businesses. The maturity of such a large chunk of high yielding investments will mean a greater inflow

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Volume 1, Issue 1, Page 71-90, June 30, 2020

of funds in to the business and shows the strong macroeconomic situations of the market, most of the business will b eager to involve their selves in it to expands in this time period. Favourable economic policies will ensure that banks do have most of lending left in them.

The china Pakistan economic corridor (CPEC) is also expected to have some impact on the banking industry as increased amount of infrastructure development means that the banking industry will grow. Although the lending exposure of CPEC is only limited to HBL, UBL and Chinese banks. The impact of such infrastuctural growth will ensure life easier for banks in the future.

**Background**

Banks profitability usually measured by return on assets and return on equity ratios. Macroeconomic variables that effect these ratios included inflation rate, real interest rate, real gross domestic product, imports and exports of country. The economic development of Pakistan is usually based on commercial banking sector and the development is affected by external factors. During the pass decades Pakistan banking sector facing financial stability challenges due to variations in the economic factors.

On this topic wide range of work has been done in the foreign literature, Teddy Donat Otambo (2014), Evans Ovamba Kiganda (2014), Christine Nanjala Simiyu and Lessah Ngile (2015), Johannes (2015), Yulita Wulandari, Musdholifel and Suhal Kusairi (2017) etc gives justifications of macroeconomic factors towards the banking profitability. In Pakistan only Sara Kanwal and Muhammad Nadeem (2013), Muhammad Bilal, Saeed, Gul and Akram (2013) have done research on this topic.

**Justifications**

The research findings would dispense to improvement and understanding of macroeconomic factors influencing the commercial bank's profitability in Pakistan. The policy makers will pay attention and will find the study significant as a benchmark of policy formulation, which can be significantly applied for better regulations for the banking industry.

Although there are many studies found out that significant impact of economic factors on banking profitability, but less literature indicates clearly that which macroeconomic factors are more relevant to be regarded as factors that significantly affecting the banking profitability and how these variables behave in affecting the banking profitability.

The results of the study will also be significant to commercial banks stakeholders, finance students, researchers, academicians, scholars, finance professionals, government agencies and economic policy makers.

**Research Problem**

"Banking profitability" plays an important role for smoothing financial market and it is important to enhance economic growth. Although there are many studies found out that significant impact of economic factors on banking profitability, but less literature indicates clearly that which macroeconomic factors are more relevant to be regarded as factors that significantly affecting the banking profitability and how these variables behave in affecting the banking profitability. So, the statement of the problem in this study is,

"To identify the influence of macroeconomic factors on the profitability of commercial banks in Pakistan".

**Research Questions**

The research questions are:

1. How does the exchange rate influence the commercial bank's profitability in Pakistan?
2. How does the inflation rate influence the commercial bank's profitability in Pakistan?
3. How does the interest rate influence the commercial bank's profitability in Pakistan?
4. How does the money supply influence the commercial bank's profitability in Pakistan?

**Research Objectives**

The research objectives are:

1. To identify the impact of exchange rate on the commercial bank's profitability in Pakistan.
2. To identify the impact of inflation rate on the commercial bank's profitability in Pakistan.
3. To identify the impact of interest rate on the commercial bank's profitability in Pakistan.
4. To identify the impact of money supply on the commercial bank's profitability in Pakistan.

Overall the objective of this study to find out the impact of macroeconomics indicator on baking profitability in Pakistan.

**Scope of the study**

The study is to identify the impact of money supply, inflation rate and Interest rate and exchange rate on commercial banks profitability in Pakistan over the period from 2007 to 2017. The study will choose 5 banks from where the data will be collected.

ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 1, Issue 1, Page 71-90, June 30, 2020

## Limitations

Might the unavailability of data will be facing during data collection because usually the research have used quarterly data but in Pakistan very few banks have quarterly data on their websites most of the banks upload only annual reports.

## Literature Review

### Inflation rate

In financial matters, the inflation rate is an estimation of expansion, the rate of increment of a value list ((in this case: consumer price index). It is the rate of progress in costs level after some time

S. kamal and M. Nadeem (2013) identified macroeconomic determinants of profitability in the Pakistan banking sector over the years 2001 to 2011 using the sample of 30 commercial banks in Pakistan. The determinants were identified by using pooled ordinary least square method. They take strong positive relationship with ROA, ROE and EM. GDP have insignificant positive relationship with ROA and insignificant negative relationship with ROE and EM and inflation have negative impact on ROA, ROE and EM.

Osamwonyi and Michael (2014) studied the effects of macroeconomic factors on the profitability of listed commercial banks in Nigeria over the years 1990 to 2013.Pooled ordinary least method was used to analyzed the data. Three variables were taken to identify the effect included GDP, Interest rate and inflation rate. It was identified that GDP have positive relation with return on equity( ROE), interest rate and inflation rate have negative relationship with ROE.

Sheefeni (2015) identified the macroeconomic determinants of profitability among commercial banks in Namibia over the years from 2001 to 2014. Four methods were used to analyzed the data included techniques of unit root, cointegration, impulse response function and forecast error variance decomposition method. They concluded results through factors GDP, inflation rate and interest rate and it was concluded that these factors have significant influence on the profitability of commercial banks.

M.Bilal, Saeed, Ali Gul and Akram(2013) determined the impact of bank specific and macroeconomic factors on profitability of commercial banks in Pakistan over the year from 2007 to 2011. ROA and ROE were considered as dependent factors while real GDP, industry production growth rate and inflation were considered as macroeconomic factors or independent factors. Descriptive statistic, correlation and regression analysis techniques were used to analyzed the data. It was concluded that industry production growth rate has positive and significant relation with return on assets and return on equity, real gross domestic production has negative but significant relation with return on asset and return on equity and inflation rate has negative and insignificant relationship with return on assets and return on equity.

W.khan, M.shahid, R. bari, W. anam, M.shahzad, S.siddique(2014) determined the impacts of inflationary trends on bank's performance in Pakistan. They considered only Bhawalpur banks due to time constraint. Inflation was considered as independent variable and ROA and ROE considered as dependent variables and concluded that there is significant relation between inflation rates and banking profitability.

**Exchange rate**

In finance, an exchange rate is the rate at which one currency will be exchanged for another. It is also regarded as the value of one country's currency in relation to another currency

Simiyu and Ngile(2015) determine the effects of macroeconomic factors on the profitability of commercials banks listed in the Nairobi securities exchange over the years from 2001 to 2012. Fixed effect model was used to analyzed the data. Three variables were used to check the effect included GDP, Exchange rate and interest rate and it was analyzed that GDP have positive but insignificant effect on profitability (ROA),interest rate have significant negative relation with ROA and exchange rate have positive significant relation with ROA.

Ongeri (2012) identified the effects of macroeconomic variables on the financial performance of non-bank financial institution in Kenya over the years from 2004 to 2013.corelation, regression and SPSS software were used to identified the results. variables used are inflation, currency exchange growth rate, average quarterly interest rate and quarterly GDP growth rate. It was concluded that return on assets( ROA) has strong positive relation with currency exchange growth rate and weak positive relationship with GDP, inflation and average quarterly interest rate.

**Interest rate**

Interest rate is the sum charged, communicated as a level of central, by a bank to a borrower for the utilization of benefits. Loan costs are normally noted on a yearly basis known as annual percentage rate (APR).

Khan and Sattar (2014) identified the impact of interest rate changes on the profitability of four major commercial banks in Pakistan over the year from 2008 to 2012. Pearson correlation method is used to identify the results. Interest rate was considered as independent variable and bank profitability was dependent variable and it was concluded that there is a strong positive correlation between interest rate and bank profitability it means that if the value of interest rate increases the value of bank profitability will also increase.

Ngure (2014) determined the effects of interest rate on financial performance of commercial banks in Kenya over the period from 2009 to 2013. SPSS version 21 (anova) is used to check the significance level. interest rate and bank size were used as independent variables and ROA was dependent variable and it was concluded that there is significant relationship between interest rate and ROA

ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 1, Issue 1, Page 71-90, June 30, 2020

Malik, Khan, Khan and Khan (2014) identified the interest rates impact on banks profitability. The regression model was used to identify the results. Interest rate was considered as independent variable and ROA and ROE was considered as dependent variables and it was concluded that the interest rate has more effects on return on asset and return on equity.

S.jawaid and A. haq (2012) identified the effect of interest rate, exchange rate and their volatilities on stock prices evidence from banking industry of Pakistan. Cointegration test was used to identify the results and it was concluded that there is insignificant negative long run relationship between exchange rate and short-term interest rate with stock prices.

Otambo(2016) identified macroeconomic factors that effects on financial performance of commercial banks in Kenya banking sector over the years 2006 to 2015.data collected from financial reports of banks. The determinants were identified by using SPSS software. They take four variables GDP, inflation rate, Exchange rate and interest rate. The study indicates that there is strong relationship between macroeconomic factors and financial performance of banks. Interest rate and exchange rate have negative effects on Return on asset (ROA) and inflation rate and GDP have positive effects on ROA.

**Money supply:**

The aggregate sum of cash available for use or in presence in a nation. ILLO (2011), determined the impact of macroeconomic variables on the financial performance of commercial banks in Kenya over the period from 2002 to 2010, GDP, ER, M3, INF and lending rate were used as independent variables and ROA was used as dependent variables quarterly data was used and data analyzed by using ordinary pooled least squared method and it was concluded that GDP positively corelated with ROA, ER, M3 INF and lending rates are negatively co related with ROE.

Lina Tu (2012) studied the impact macroeconomic factors on banking industry stock return in china from the year 2007 to 2012 using the sample of 16 commercial banks in china. The determinants were identified by using generalized least square model. Four variables were taken included inflation rate, exchange rate, money supply and interest rate. By testing through these variables, it was identified that inflation and money supply have positive but insignificant relation with banking industry stock return, interest rate have negative but significant relation.

**Research Methodology**

**Research Design**

This research is quantitative base. This study will use time series empirical analysis. Time series empirical analysis has two methods for data analysis Unit root test and ARDL test. The independent variables are Inflation rate, exchange rate, Interest rate and money supply and the dependent variable is ROE. Data will be collected during the 2007 to 2017.

**Data Collection**

The study will use secondary data external factors in getting data for analysis exchange rate, inflation rate, money supply and interest rate. The data will be collected of independent variable from state bank's website and the data of dependent variable from the websites of Bank Al-Habib, MCB, HBL, UBL and bank Alfalah. The period of the study for which data was obtained focused on 10-year period between 2007 to 2017.

**Data Analysis**

Data analysis is the task of using arithmetic and rational methods to define, demonstrate, condense, review and assess data. We will use these methods Unit Root and ARDL test to analyze the data (Sheefani , 2015; Touny , 2014).

**Unit Root Test**

To make the data stationary unit root test is used. Being stationary shows that the variables have no mean and constant variance. Any arrangement that contains one or more characteristics root that are equal to one is called unit root test. It contains the simplest unit root model is AR (1) model, below

$Y_t = øy_{t-1} + \epsilon_t$

**Augment dickey-fuller test:**

To determine if a variable is stationary to the dickey-fuller test is used . to control this problem of autocorrelation in the basic DF test, this can be augmented by adding various lagged dependent variables. It will produce following test

**Phillips-Ouliaris test:**

Phillips-oaliaris is residual based unit root test. This test is to determined null hypothesis of no cointegration against the alternative hypothesis of presence of cointegration.

**ARDL model:**

**Bound test:**

Bound test is used to find out the long run relation among the variables. Bound test can be check by f-test value. The value should be greater than upper critical bound.

**Short run and long run relation**

The short run relation found the error correction term which shows the speed of adjustment to the long run equilibrium and long run relation shows that independent variables may have significant relation with depended variable or not.

ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 1, Issue 1, Page 71-90, June 30, 2020

**Descriptive statistics**

Statistical techniques such as mean median or std. dev that interpret the given data(sample) but do not give result of properties of population from which the sample was given.

**Diagnostic test**

**Normality test**

Normality test is used to test the data is normally distributed or not normality is check by jarqua bera test.

**Serial correlation:**

Serial correlation is also known as autocorrelation which means that the error term of current year in depend on the previous year.

**Heteroscedasticity**

Heteroscedasticity means the variance of error term are nonconstant and different for all observation.

**Multicollinearity**

Multicollinearity is used to find out the correlation or relation between the independent variables.

**Analytical Model**

A responsive variable was banking profitability of commercial banks while the predictor variables were the macro-economic variables. The analytical model used in checking the interrelation of the predictor variables on the responsive variable was.

$Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+e$

Where,

Y=Financial performance of commercial banks measured by ROE.
β=Constant term (total asset)
$\beta_1$=Beta coefficient of factor I which measures the change Y to change in i.
$X_1$=Exchange rate
$X_2$=Inflation rate
$X_3$= Interest rate
$X_4$=Financial deepening
e=Error term

**Variables**

**Independent variables:**

**1.** Exchange rate
2. Inflation rate
3. Interest rate
4. Financial deepening

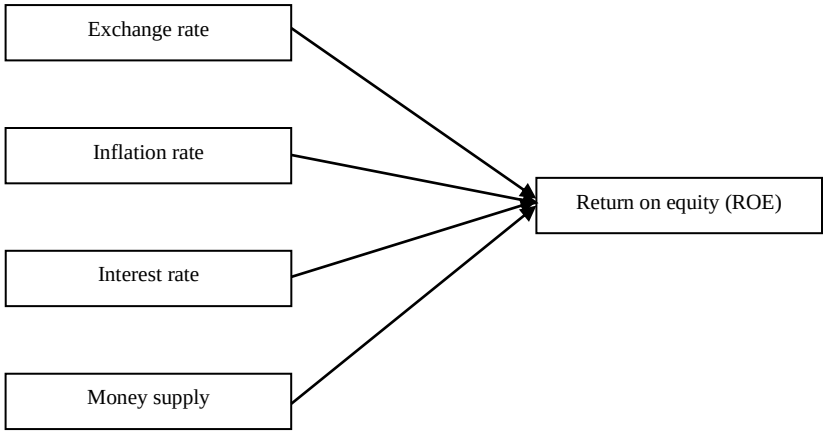
**Dependent variable**

1. ROE

**Hypotheses**

H1 = Exchange rate has significant relation with ROE.
H2 = Inflation rate has significant relation with ROE.
H3 = Interest rate has significant relation with ROE.
$H_4$ = Money supply has significant relation with ROE.

**Conceptual Framework:**



ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 1, Issue 1, Page 71-90, June 30, 2020

## Empirical Analysis

| Descriptive statistics (Table 1) | | | | | |
|---|---|---|---|---|---|
| | ROE | M2 | INT | INF | ER |
| Mean | 0.087 | 1087.261 | 10.420 | 10.102 | 88.334 |
| Median | 0.054 | 1094.955 | 9.980 | 8.985 | 88.630 |
| Maximum | 0.220 | 2072.970 | 14.010 | 23.910 | 105.770 |
| Minimum | 0.036 | 479.260 | 5.920 | 1.320 | 60.440 |
| Std. dev | 0.056 | 435.907 | 2.278 | 5.499 | 14.179 |
| Skewness | 1.079 | 0.441 | -0.323 | 0.801 | -0.663 |
| Kurtosis | 2.545 | 2.173 | 2.193 | 3.407 | 2.439 |

Above table shows the descriptive statistics. The average value measured by mean and median, while variation measured by standard deviation. ROE, M2 and INF are positively skewed while other variables are negatively skewed. The mean of ROE is 0.086, median is 0.053 and the maximum value of ROE is 0.2199 and minimum value is 0.036 and variation of ROE is 0.056. The mean of M2 is 108.261, median is 1094.955 and the maximum value is 2072.970 and the minimum value of M2 is 479.260 and std. dev 435.906. the mean of INT is 10.419, the median of INT is 9.98, the maximum value of INT is 14.010, the minimum value is 5.920 and the variation is 2. 277.The mean value of INF is 10.101, the median of INF is 8.985, the maximum value of INF 23.910, the minimum value of INF is 1.32 and the variation is 5.49. The mean value of ER is 88.33, the median value is 88.63, the maximum value of 105.77, the minimum value of ER is 60.44 and the variation of ER is 14.17.

### Diagnostic tests:

### Normality test (J-B test)

$H_0$= The data is normally distributed
$H_A$= The data is not normally distributed

| Normality test (Table 2) | | | | | |
|---|---|---|---|---|---|
| | ROE | M2 | INT | INF | ER |
| Jarque-bera | 7.705 | 2.315 | 1.691 | 4.329 | 3.278 |
| Probability | 0.021 | 0.314 | 0.429 | 0.114 | 0.194 |

ROE is not normally distributed because the p-value is 0.021 which is less than 0.05 so it indicates that ROE is not significant, Hence $H_0$ is rejected. M2 is normally

distributed because the p-value is 0.314298 which is greater than 0.05 so it indicates that M2 is significant, Hence $H_0$ is not rejected.INT is normally distributed because the p-value is 0.4292 which is not less than 0.05 so it shows that INT is significant, hence $H_0$ is not rejected. INF is normally distributed because the p-value is 0.1148 which is greater than 0.05 so it indicates that INF is significant, hence $h_0$ is not significant. ER is normally distributed because the p-value is 0.1941 which is not less than 0.05 so it indicates that INF is significant, hence $H_0$ is not rejected.

**Serial autocorrelation**

$H_0$ =There is no autocorrelation in data
$H_A$ = There is Autocorrelation in data

| **Serial autocorrelation (Table 3)** | | | |
|---|---|---|---|
| F-statistics | 0.981 | Prob. F (4, 11) | 0.457 |
| Obs*R-squared | 8.941 | Prob chi-squared | 0.063 |

There is no autocorrelation exist it means that the error term of current year is not dependent on the previous year. P-value is 0.0626 which is greater than 0.05 which is insignificant so that $H_0$ is accepted.

**Heteroscedasticity**

$H_0$ =No heteroscedasticity
$H_A$ = heteroscedasticity

| **Heteroscedasticity (Table 4)** | | | |
|---|---|---|---|
| F-statistics | 2.290 | Prob. F (18,15) | 0.055 |
| Obs*R-squared | 24.930 | Pro. Chi-squared (18) | 0.127 |
| Scaled explained ss | 3.710 | Pro. Chi-squared (18) | 0.999 |

There is no heteroscedasticity in this model because the p-value is 0.1269 which is more than 0.05 that's mean $H_0$ is accepted.

ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 1, Issue 1, Page 71-90, June 30, 2020

## Multicollinearity

| Multicollinearity (Table 5) | | | | |
|---|---|---|---|---|
| | ER | INF | INT | M2 |
| ER | 1.000 | -0.510 | -0.360 | 0.0890 |
| INF | | 1.000 | 0.790 | -0.670 |
| INT | | | 1.000 | -0.590 |
| M2 | | | | 1.000 |

Above table shows that ER and INF are weekly or negatively corelated with each other, ER and INT are also weakly or negatively corelated with each other, ER and M2 are weakly or positively corelated with each other with the value 0.088. INF and INT are also weakly or positively corelated with each other with the value 0.79, INF and M2 are weakly or negative corelated with each other. INT and M2 are weakly or negatively corelated with each other, kennedy (2008), states that correlation is high when its value is greater than 0.80 and 0.90.

## Unit root test

| Unit root test (Table 6) | | | | |
|---|---|---|---|---|
| Variables | Level | PP | ADF | PP |
| ER | 0.398 | 0.324 | 0.000 | 0.0000 |
| INF | 0.000 | 0.269 | 0.000 | 0.0000 |
| INT | 0.409 | 0.702 | 0.000 | 0.0000 |
| M2 | 0.693 | 0.066 | 0.0000 | 0.0000 |
| ROE | 0.693 | 0.000 | 0.014 | 0.0000 |

The table shows the findings of Augmented Dicky-Fuller (ADF) and Philips-Perron (PP) test statistics. The results shows that the ROE is stationary at levels implying that ROE is integrated of I (0) order and all the independent variables ER, INF, INT AND M2 are stationary at 1$^{st}$ difference implying that these variables are of order of integration I (1). The concept of being stationary and non-containing unit root shows that variables have zero mean, constant variance, and the residuals uncorrelated over time.

## Lag Selection

| Lag selection (Table 7) | | | | | | |
|---|---|---|---|---|---|---|
| lag | Logl | LR | FPE | AIC | SC | HQ |
| 0 | -445.972 | NA | 228318.0 | 26.527 | 26.752 | 26.60 |
| 1 | -323.499 | 201.720 | 752.476 | 20.794 | 22.140 | 21.253 |
| 2 | -294.981 | 38.583 | 677.425 | 20.587 | 23.056 | 21.429 |
| 3 | -233.082 | 65.539 | 102.473 | 18.416 | 22.008 | 19.641 |
| 4 | -179.432 | 41.026* | 35.7805* | 16.731* | 21.445* | 18.338* |

This table shows the results of optimal lags. It has different criteria's like logl , LR, FPE, AIC, SC, HQ. but AIC is the appropriate criteria to select the lag and AIC criteria shows the lag is 4

## ARDL test

## Bound test

$H_0$ = No long run relationship
$H_A$ =long run relationship

| (Table 8) | | |
|---|---|---|
| Test statistics | Value | K |
| F-statistics | 33.34403 | 4 |

| Critical Value Bounds (Table 9) | | |
|---|---|---|
| Significance | LCB | UCB |
| 10% | 2.45 | 3.52 |
| 5% | 2.86 | 4.01 |
| 2.5% | 3.25 | 4.49 |
| 1% | 3.74 | 5.06 |

There are two major steps to find ARDL model. First one is to check that there is co-integration exist or not. Co-integration means long run relationship between dependent and independent variables for which f-test is used. There are two sets upper critical bound (UCB) and lower critical bound (LCB). If F-test is greater than UCB than the co-integration exists, and F-test is lower than LCB than there is no co-integration

ISSN (P): 2788-4821 & ISSN (O): 2788-483X
Volume 1, Issue 1, Page 71-90, June 30, 2020

between variables. The above table shows that the F-value is greater than upper critical bound and so it indicates that the long run relation exists between the variables.

**Long Run and Short Run relationship**

**Short Run relation**

| **Short Run relationship (Table 10)** | | | | |
|---|---|---|---|---|
| Variables | Coefficient | Std. Error | t-statistics | p-value |
| D(ROE(-1)) | 1.887 | 0.174 | 10.826 | 0.000 |
| D(ROE(-2)) | 0.967 | 0.101 | 9.524 | 0.000 |
| D(M2) | 0.000 | 0.000 | 0.824 | 0.422 |
| D(M2(-1)) | -0.000 | 0.000 | -0.455 | 0.655 |
| D(M2(-2)) | -0.000 | 0.000 | -0.669 | 0.513 |
| D(M2(-3)) | 0.000 | 0.000 | 2.961 | 0.009 |
| D(INT) | 0.004 | 0.007 | 0.641 | 0.531 |
| D(INF) | -0.001 | 0.003 | -0.413 | 0.685 |
| D(INF) | -0.003 | 0.003 | -0.852 | 0.407 |
| D(INF) | 0.007 | 0.002 | 3.098 | 0.007 |
| D(ER) | 0.003 | 0.002 | 1.486 | 0.157 |
| D(ER(-1)) | 0.003 | 0.002 | 1.128 | 0.276 |
| D(ER(-2)) | 0.004 | 0.002 | 2.020 | 0.061 |
| ECT(-1) | -3.784 | 0.237 | -15.923 | 0.000 |

The error correction term value is negative and significant which indicates that short run relation exists among the variables and 378.44% is a chance of adjustment toward the long run equilibrium in quarterly.

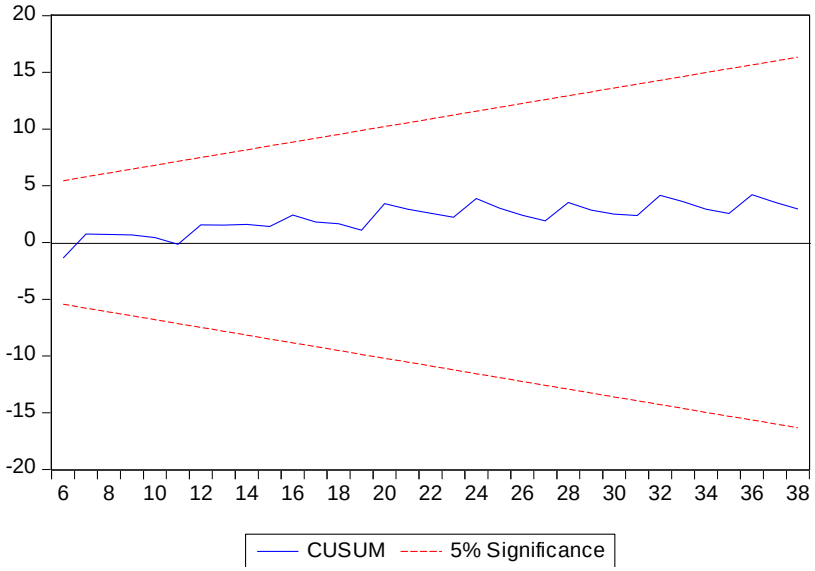
**Long Run relation**

| **Long Run relation (Table 11)** | | | | |
|---|---|---|---|---|
| Variables | Coefficient | Std. Error | t-statistics | Prob |
| M2 | 0.000 | 0.000 | 0.461 | 0.651 |
| INT | -0.003 | 0.001 | -3.214 | 0.005 |
| INF | -0.001 | 0.000 | -1.717 | 0.106 |
| ER | -0.002 | 0.000 | -7.839 | 0.000 |
| C | 0.308 | 0.022 | 13.792 | 0.000 |

ROE= 0.000005M2 – 0.003739INT -0.0014558INF – 0.002003ER

Table 5.2.1, indicating long run results of ARDL model, findings shows that there is an insignificant relationship between M2 and ROE because there p-value is greater than 0.05 which is 0.6511, INT and ROE has a negative but significant relationship between them at 5% level of significance it shows that if we increase the interest by 1 % the ROE will decrease by 0.0037% .INF has also insignificant relationship with ROE the p-value is greater than 0.05 which is 0.1065, ER has negative but significant relationship with ROE it shows that if we increase 1% in ER in this response there will be decrease of 0.002003% in ROE.

**Stability test**




To check the stability of model CUSUM test is used.The plots of cusum are not crossing the red critical lines it remains in boundary of critical area at 5% level of significance which shows that the data and all the variables are stable.

**Conclusion**

The objective of this study wat to determine the impact of macroeconomic factors on the profitability of commercial banking in Pakistan. For the determination process we use four independent variables money supply, interest rate, inflation rate and exchange and ROE as independent variables. For data collection we use sample of five major banks of Pakistan HBL, UBL, MCB, Bank al-Habib and bank Alfalah. The study was based on quarterly data covering the period from 2007 to 2016. To analyze the data we used two methods unit root and ARDL model. In unit root techniques first we check the stationary of data by ADF and PP methods. Our dependent variables ROE was stationary at level and all the independent variables ER, INF, INT and M2 stationary at 1$^{st}$ difference, that's why we sue ARDL model for further analysis. Because it is the most appropriate method when we have shortage of data or having less number of

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Volume 1, Issue 1, Page 71-90, June 30, 2020

observations. First we perform bound test to check the long run relation among the variables and the result shows that F-value is greater than upper critical bound which indicates that long run relation exist among the variables than we perform short run relation test which shows the ECT and its value is (-3.78) which is negative and its p-value is(0.000) which is significant and indicates that short run relation exist among the variables. After that we perform long run relation test it shows the relation between dependent and independent variables according to this model M2 and INF have insignificant relation with ROE M2 is positively corelated with ROE and INF is negatively corelated with ROE and interest rate and exchange rate have significant relation with ROE both are negatively corelated with ROE and the end we check the stability of model by using CUSUM test and it is concluded that the model is stable because the CUSUM line is remain inside the boundary of critical lines

**Recommendation:**

This study recommends that there is a need for policy makers to create an awareness on the role played by commercial banks in the economy of Pakistan.

It is also recommended that the commercial banks of Pakistan should upload the proper monthly and quarterly data on their websites instead of uploading only annual data.

The study concluded that inflation rate interest rate exchange rate and money supply have an impact on the profitability of commercial banking in Pakistan, so the study wishes to make some recommendations:

Commercial banking sector in Pakistan should considered macroeconomic variables such as interest rate exchange rate interest rate and money supply in their policy formulation to manage their impact on the profitability. The Pakistani government through the state bank should come up with policies that create a conducive environment for commercial banks to operate in since it will translate to economic growth of Pakistan

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