# Analyzing the individual effect of determinants effecting the financial performance of banks using camels model

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**Abstract:** The aim of this study is to empirically examine the bank-specific, financial, and macroeconomic determinants of performance in Islamic and conventional banks of Pakistan. To do this, we first constructed the Financial Performance Index (FPI) based on CAMELS' ratios and then run the computed index on the said determinants. We have used an unbalanced annual panel data covering the period 2010-2015. We also show that the impact of Gross Domestic Product (GDP), Real Interest Rate (RIR) and Political Stability (PS) on performance is insignificant for both types of banks. Bank managers should focus on controlling overheads and operating costs to improve performance because, according the empirical results presented in the study, both of these variables are negatively related to the FPI. Our results suggest that improvements in overall management practices and new standards in operating efficiency and financial risk management are essential to enhance performance of banks.

**Key words:** *Conventional banks; Islamic Banks; GLS Regression*

## 1. Introduction

Banking sector during last couple of decades has many considerable revolutions. The revolutions in the banking industry bring effectiveness in operations and competition environment of banking. Through 1997 Pakistan's banking sector facing broad, difficult and also aching procedure. For advancement of savings, investment and growth in such institutes is economically strong and imitating their relations tightly with the original sector. Even though reforms, symbols of enhancement are observable it is not possible to predict complete banking sector performance till the end. It is complicated to straighten out signs of development due to the different factor's concurrent nature. The first formal startup of banking sector started during the British colonialism in Asia. After the 1947's independence from British, the banking sector of Pakistan grows efficiently and expands widely. The main and the 1st bank commenced in Pakistan was State bank of Pakistan. Since 1997, Pakistan's banking sector facing an inclusive, composite and aching procedure. In mid-60's, efforts for converting the economy in to Islamic were started. Nevertheless, the conversion of commercial banking in to Islamic banking a major effort was done in the mid 80's. Banking companies ordinance was modified to increase the transactions free of interest and promote the non interest based activities, also given a specific time span for the conversion of interest based system into interest free based system in 1962. The purpose of Islamic banking is it practical application by developing the Islamic economies and Islamic banking processes are according to Sharia rules (Islamic law). A

Conventional bank is fiscal institute which assists as an instrument for transmission of currency and as an economic intermediate. The main purpose of commercial banks is to provide financial services to customers and social stability and economic growth insurance. Conventional banking system provides various forms of loans and credits to its consumers, including an overdraft facility, credit cash, discounting bill, cash on call etc. State Bank of Pakistan (SBP) is the main bank for measuring the commercial bank's performance and provision of rule and regulations which are necessary for commercial banks for minimum capital requirements and keeping banks reserves.

## 2. Literature review

There are number of empirical studies in which researchers have used different statistical techniques to evaluate the performance of banking sector, such as ratio analysis, CAMEL model and regression analysis.(Rashid & Jabeen, 2016) evaluates the performance determinants of banks including bank specific, financial and macro-economic determinants. For this purpose, they first constructed the FPI based on CAMELS' ratios and run computed index on the said determinants.(Al-Tamimi & Hussein, 2010) analyzed performance of UAE commercial and Islamic banks for the time of 1996-08. His calculation regarding bank performance is through ROE and ROA. He measured a number of independent variables, such as GDP, bank size, concentration, liquidity, financial development indicator, cost, and no of branches.(Hassan & Bashir, 2003) measured the performance of Islamic banks for the time of 1994-

2001. They found that both internal (overheads, liquidity, leverage ratios, earnings, and fund management ratio) and external factors (GDP per capita, taxation, financial indicators, and real interest rate) have significant impacts on returns and effectiveness of banks. They concluded that the profitability of banks would increase with capital and loans to assets ratios.(Choon, Thim, & Kyzy, 2012) investigated the banks' performances in Malaysia examining several internal as well as external indicators. They used ROA and ROE as performance indicators. Their conclusion considers key factors liquidity and concentration but their relationship with performance of banks is significant for the examined period. (Zeitun, 2012) examined the impact of cross country possession, bank-specific variables, and macroeconomic indicators on the GCC region's Islamic and conventional banks performance. They examined the data for the period of 2002-2009. He found that the size of bank has a positive and significant impact on the performance of the Islamic banks. Smirlock (1985) showed a statistically significant and positive relationship with the size and profitability.(Demirgüç-Kunt & Huizinga, 2000) imply the level of affecting the banks' profitability by various financial, legal and other factors (e.g. corruption) affect bank's portability is closely linked to firm size. (Molyneux & Thornton, 1992) identifies significant and negative relationship of liquidity with profitability. In contrast, (Bourke, 1989) shows opposite results, although impact of credit risk is simply negative with profitability. (Miller & Noulas, 1997) The fact must be kept in account while explaining the results towards high risk loans more financial institutions is exposed. For example, Bourke (1989) and Molyneux and Thornton (1992) shows relationship between profitability and better quality management as positive. (Bourke, 1989) analyze that liquidity and profitability are positively correlated. Yet, higher returns could be earned through investing in the liquid assets. (Molyneux & Thornton, 1992) examined the performance of bank in eighteen countries for the duration of 1986-89. They concluded that positive correlation lies between government owned and ROE, level of interest rates and bank concentrations in each country."(Halkos & Salamouris, 2004) give proof from Greek. Banks with larger assets are earning more yields. (Bikker, 1999) concluded that relationship of size and profitability of European banks is positive. There exists negative correlation of inflation and bank performance. Naceur and Goaied (2001) Analyze the determinants of Tunisian banks performance for the duration of 1980 to 1995. They concluded that labor and capital productivity; high level of deposit accounts relative to assets, and finally, reinforced equity have positive effect on the performance of banks. (Guru, Staunton, & Balashanmugam, 2002) show proof from Malaysia. They examined the determinants affecting the performance of banks and their profitability of Malaysian banks. Data is used from 1986 to 1995. Their internal factors are capital adequacy, liquidity

and management expenses. While external determinants are ownership, Firm size and external economy. Their results show bank's profitability is significantly affected by management expenses. Contrary to that, inflation had a positive impact on bank performance. Ahmed and Khababa (1999) Examine the performance of banks of Saudi Arabia. For profitability measures, they use ROE and ROA and EPS percentage change. Size of bank and the risk of business are the key determinants of bank's performance as they found. (Eichengreen & Gibson, 2001) concluded that profitability is positively affected by the size of bank. While, due to bureaucracy the effect of size could be negative. (Akhtar, Ali, & Sadaqat, 2011) investigated the effect of bank specific determinants on the profitability of banks for the time duration of 2006-2009 by using different multivariate models. Their conclusion was that capital adequacy and gearing ratio has a statistically significant impact and is positively correlated with the performance of bank.

## 3. Methodology

For this study, "CAMELS" model is performance evaluation tool in banking industry and to predict the future and relative risk. This study examines the empirical factors of bank performance by taking bank-specific, macroeconomic, and financial indicators as independent variables and financial performance index is considered as a dependent variable. The structure of financial performance index is divided into three steps:

*Standardized value $S_{ijt} = [(\beta_{ijt} - \mu_{jt})/\sigma_{jt}]$* (1)

Where $\mu_{jt}$ represents mean of sample, $\sigma_{jt}$ represents standard deviation of CAMELS parameter ($j_{th}$ indicator) at time t, and $\beta_{ijt}$ indicates individual CAMELS ratio for a particular time of bank t. Standardization is a normal distribution having standard deviation 1 and mean 0 and the key purpose for standardizing the variables is to get by combining the different scales variables to individual scale variable. Next, the FPI of each performance parameter is constructed by calculating standardized value of individual ratio in CAMELS parameters with recommended weights. Every parameter is allocated a specific weight. Specially, weights are allocated by considering the gain earned by the bank and significance of the factors in CAMELS parameters including asset quality, earnings, capital adequacy, and sensitivity to risk as these variables help in efficiency, growth and productivity of banks. Although management and liquidity are allocate slighter weight because high liquidity moderates profitability of banks. Additional information on performance parameters and their characteristics can be found in (Rashid & Jabeen, 2016)**.** Following (Abbas, Tahir, & Rahman, 2012) we constructed equations to merge standardized value of each ratio of each CAMEL's parameter. Specifically, CAMEL's parameters for each bank are calculated as follows:

*Capital adequacy:* $CA_{it} = W_{1it} S_{1it} + W_{2it}S_{2it} + W_{3it}S_{3it}$
*Asset quality:* $AQ_{it} = W_{1it}S_{1it} + W_{2it}S_{2it}$
*Management:* $MT_{it} = W_{1it}S_{1it} + W_{2it}S_{2it} + W_{3it}S_{3it}$
*Earnings:* $ES_{it} = W1_{it} S_{1it} + W_{2it}S_{2it} + W_{3it}S_{3it}$
*Liquidity:* $LY_{it} = W1_{it} S_{1it} + W_{2it}S_{2it} + W_{3it}S_{3it}$
*Sensitivity to risk:* $RK_{it} = W_{1it}S_{1it} + W_{2it}S_{2it}$"

where $S_{it}$ is a standardized value of CAMELS' parameter of $i^{th}$ bank at time t, while, $W_{it}$ is the prescribed weight for any bank at time t. FPI of each bank for each year is calculated through capital adequacy ($CA_{it}$), asset quality ($AQ_{it}$), management ($MT_{it}$), earnings ($ES_{it}$), liquidity ($LY_{it}$), and sensitivity to risk ($RK_{it}$). Finally, we calculate the FPI for $i^{th}$ bank as follows:

$$FPI_i = \alpha_{j1}CA_{it} + \alpha_{j2}AQ_{it} + \alpha_{j3}MT_{it} + \alpha_{j4}ES_{it} + \alpha_{j5}LY_{it} + \alpha_{J6}RK_{it} \qquad (2)$$

Where $\alpha_j$ is the prescribed weight for banks $i^{th}$ at time t. $CA_{it}$, $AQ_{it}$, $MT_{it}$, $ES_{it}$, $LY_{it}$, and $RK_{it}$ are the CAMELS' performance parameters for $i^{th}$ bank at time t.

After calculating the FPI for each bank included in the sample for each year we model the bank performance as follows.

$$FPI_{it} = f \; (bank \; variables, \; financial \; indicators, \; macroeconomic \; indicators)$$

For estimation purpose, we write the equation (1) as follows:

$$FPI_{it} = \beta o + \beta_1 OVHD_{it} + \beta_2 RSV_{it} + \beta_3 SZE_{it} + \beta_4 OE_{it} + \beta_5 DPST_{it} + \beta_6 PROF_{it} + \beta_7 Mktcap_{it} + \beta_8 Mktconc_{it} + \beta_9 FFRED_{it} + \beta_{10}GDP_{it} + \beta_{11}RI_{it} + \beta_{12}PLINST_{it} + \varepsilon_{it} \qquad (3)$$

Where FPI is Financial performance index for i bank and time t. constant is β0 and β1, β2, β3, β4, β5, β6, β7, β8, β9, β10, β11, and β12 are slope coefficients, although $\varepsilon_{it}$ is an error term with zero mean and finite variance. Bank specific variables include reserves (RSV), operating efficiency (OE), overheads (OVHD), deposits (DPST), bank size (SZE), and Profitability (PROF). Financial variables include market capitalization (MCAP) and market concentration (MCON), and financial freedom (FFRED) and macro-economic variables are gross

domestic product (GDP), the real interest rate (RI), and political instability (PLINST).

## 4. Data and sample

The secondary annual data is consisted of 2010-2015 it includes all Islamic and conventional banks (excluding small and govt. banks) is used in empirical analysis of study. For data collection we look into the Financial Statement Analysis of Banking Sector collected from SBP. SCS Trade and PSE websites are used for annual stocks information. The data on macroeconomic variables are collected from The Global Economy, SCS Trade, & World Bank database. In this research study we have applied different methods for the purpose of getting our results. The data used in this study is Panel Data. We used linear regression, Fixed and Random Effects. Further, we have applied Hausman test which interprets the suitable model for our Tests between Fixed and Random Effects.

## 5. Results

We have constructed overall panel regression for showing the relationship of dependent variable with the independent variables. To find out which effect is suitable for our data we have applied Durbin-Wu-Hausman test and choose fixed test for our data based on the results. After that I have find out the individual effects of determinants on the dependent variables by examining them individually. At the end I have compare the performance of Islamic and conventional banks' determinants by applying regression.

Table 1 represents CAMELS model variables. Capital Adequacy has insignificant relationship with the dependent variables Financial Performance Index. Assets Quality also shows insignificant relationship with the FPI. However, Management Quality represent significant relationship having P-value less than 0.05%. Moreover, Earnings and Liquidity illustrate insignificant relationship with the dependent variable. Sensitivity to Risk has P-value less than 5% which refers towards significant relationship between the dependent and independent variable.

**Table 1:** Camel model

| FPI | Fixed effect: | | | | GLS Random: | | | |
|---|---|---|---|---|---|---|---|---|
| | Co-Eff. | Std. Err. | T | P>\|t\| | Co-Eff. | Std. Err. | T | P>\|z\| |
| CA | 8.03e-08 | 7.82e-08 | 1.03 | 0.307 | 6.25E-08 | 8.54E-08 | 0.73 | 0.465 |
| AQ | 0.0073629 | 0.0317715 | 0.23 | 0.817 | 0.0156828 | 0.0336428 | 0.47 | 0.641 |
| MQ | 0.1977558 | 0.007897 | 25.04 | 0.000 | 0.1881038 | 0.0084471 | 22.27 | 0.000 |
| EARN | 0.2243674 | 0.1541551 | 1.46 | 0.148 | 0.2776519 | 0.168486 | 1.65 | 0.099 |
| LIQ | 0.088652 | 0.1154326 | 0.77 | 0.444 | 0.473401 | 0.1259507 | 0.38 | 0.707 |
| SENS | 0.205451 | 0.0142839 | 14.38 | 0.000 | 0.2090243 | 0.0153901 | 13.58 | 0.000 |
| Cons | 2.81971 | 0.344094 | 81.95 | 0.000 | 2.843616 | 0.0737691 | 38.55 | 0.000 |
| F= | 0.0000 | | | | Chi-sq= | 0.0000 | | |
| R-sq= | 0.0170 | | | | R-sq= | 0.0204 | | |

**Table 2:** Bank specific determinants

| FPI | Fixed effect | | | | GLS Random effect: | | | |
|---|---|---|---|---|---|---|---|---|
| | Co-Eff. | Std. Err. | T | P>\|t\| | Co-Eff. | Std. Err. | T | P>\|z\| |
| OH | 1.236 | .662 | 0.34 | 0.736 | 3.884 | 2.325 | 1.67 | 0.095 |
| RES | 3.545 | 0.725 | 4.88 | 0.000 | 2.781 | 0.419 | 6.63 | 0.000 |
| SIZ | -8.514 | 3.345 | -2.54 | 0.012 | -4.636 | 1.313 | -3.53 | 0.000 |
| DEP | -0.071 | 0.103 | -0.69 | 0.491 | -0.013 | 0.054 | -0.25 | 0.804 |
| OPEFF | -0.161 | 0.2087 | -0.78 | 0.440 | -0.303 | 0.117 | -2.57 | 0.010 |
| PROF | -11.296 | 5.889 | -1.92 | 0.058 | 9.870 | 3.169 | 3.11 | 0.002 |
| Cons | 19.528 | 9.511 | 2.05 | 0.042 | 9.870 | 3.169 | 3.11 | 0.002 |
| R-sq= | 0.304 | | | | 0.566 | | | |
| F= | 0.000 | | | | 0.000 | | | |

Bank specific variables include Overheads, Reserves, Size, Deposits, Operating Efficiency and Profitability. The relationship between these independent variables and dependent variable (FPI) is based on their P-value.

Overheads represent insignificant relationship with the dependent variables. Second, Reserves shows a significant relationship with FPI. However, Size along with Deposits and Operating Efficiency are insignificant variables. Profitability in both results shows significant relationship with the dependent variables.

Financial determinants include Market Capitalization and Market Concentration both variables. The both variables have significant P-value which shows significant relationship with the dependent variable Financial Performance Index. Increase in one unit of MCAP will bring 2.1 % decrease in FPI.

Macro-Economic determinants include Real interest Rate (RIR), Political Stability (PS) and Gross Domestic Product. All of these variables are representing insignificant relationship with the Financial Performance Index. Increasing one unit in GDP will bring 2.1% decrease in FPI (Financial Performance Index). RIR will change FPI 0.03% negatively if one unit of RIR increases. While, Political Stability (PS) will bring -011% decrease in FPI by increasing one unit in it.

**Table 3:** Financial determinants

| FPI | Fixed Effect | | | | Random Effect | | | |
|---|---|---|---|---|---|---|---|---|
| | Co-Eff. | Std. Err. | T | P>\|t\| | Co-Eff. | Std. Err. | T | P>\|z\| |
| MCAP | -2.104 | 0.862 | -2.44 | 0.016 | -0.017 | 0.120 | -1.42 | 0.157 |
| MCON | 2.080 | 0.862 | 2.41 | 0.017 | 0.010 | 0.030 | 0.35 | 0.725 |
| Cons_ | 8.483 | 1.960 | 4.33 | 0.000 | 3.665 | 0.576 | 6.36 | 0.000 |
| F= | 0.0427 | | | | 0.3621 | | | |
| R-sq= | 0.0793 | | | | 0.0718 | | | |

**Table 4:** Macro-economic determinants

| | Fixed Effects: | | | | GLS Random Effect: | | | |
|---|---|---|---|---|---|---|---|---|
| FPI | Co-Eff. | Std. Err. | T | P>\|t\| | Co-Eff. | Std. Err. | T | P>\|z\| |
| GDP | 2.109 | 7.380 | 0.29 | 0.776 | 2.220 | 7.438 | 0.30 | 0.765 |
| RIR | -0.031 | 0.070 | -0.45 | 0.653 | -0.033 | 0.071 | -0.48 | 0.635 |
| PS | -0.117 | 1.141 | -0.19 | 0.850 | -0.116 | 1.149 | -0.10 | 0.919 |
| F-Stat | 0.5703 | | | | 0.5138 | | | |
| R-Sq | 0.1372 | | | | 0.1372 | | | |

## 6. Conclusion

This paper uses banks panel data to analyze the effects of financial, macroeconomic and bank specific determinants for financial performance of conventional and Islamic banks. The financial performance index (FPI) is developed based on the CAMELS parameters. Several multivariate models were estimated to quantify the effects of performance determinants. In order to check the robustness of the results, different macroeconomic variables are considered. Our first purpose of this study was to examine the determinants affecting the Islamic and conventional banks financial performance. For this purpose, we have examined and shown the results of determinants. To check whether we should apply random or fix effect we have applied Durbin–Wu–Hausman test which allows us to guess between both tests. Secondly, we want to match the performance of Islamic and conventional banks by applying the tests and we have find out many significant and insignificant variables in both banks. In some areas Islamic banks lacks while in some other areas conventional banks need to improve them. Having insignificant ratio means both banks need to improve it in order to protect depositors and promote the stability and efficiency of financial. Similarly, Reserves and Size in both banks shows significant value which means both banks have good reserves of deposits in state banks plus currency that is physically held in bank vaults and have sufficient assets to meet any uncertainty. Overall we have find out that Capital Adequacy, Assets Quality, Deposits, Operating Efficiency, Profitability, Market Capitalization, Market Concentration, GDP, RIR And Political

Stability have insignificant relationship with Dependent Variable FPI. They are not causing the required effect. Management Quality, Earnings, Liquidity, Sensitivity to risk, Overheads, Reserves and Size are the significant variables and statistically are affecting the dependent variable FPI. The results we present in this study have several implications for bank management, investors, customers, and policymakers. It also helps in understanding how macroeconomic conditions affect the performance of banking sector. The empirical analysis carried out in this study also provides an opportunity to academia, bank management, and practitioners to understand how different bank-specific variables, financial indicators, and macroeconomic factors affect the financial performance of Islamic and conventional banks differently. Bank managers may focus on controlling overheads and operating costs to improve performance because, according the empirical results presented in the study, both of these variables are negatively related to the FPI. Islamic banks should align their practices with Maqasid al-Shariah to magnify the effectiveness of the Islamic financial system and advance the excellence of services offered. Limitations of foreign investment can be another potential cause. Foreign investments are difficult to come about for Islamic banks due to ban of Riba and Usury, and Islamic banks have to gift their personal share of returns to investors to save from taking out risk. In opinion of displaced commercial risk, some Islamic banks influence to be enforced to contribute a portion of their yield share to the saving and investment deposit accounts in an struggle to hold them, when commercial bank's rates exceeds from the profits of Islamic banks. Future researches need to investigate how newly developed financial instruments are in agreement with Maqasid al-Shariah and how the methods of aligning bank practices to Shariah principles affect performance and progress of Islamic banks.

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