

# KEY PERFORMANCE INDICATORS FOR PUBLIC SECTOR BANKS IN PAKISTAN:

## AN APPLICATION OF EXPLORATORY FACTOR ANALYSIS

Muhammad Akbar Saeed<sup>1\*</sup> and Faisal Afzal Siddiqui<sup>2</sup>

<sup>1</sup>Department of Management Science, Bahria University-Karachi Campus, Stadium Road, Karachi, Pakistan

<sup>2</sup>Head, Research Department, Business Research Consultants, Karachi, Pakistan

\*For Correspondence; Tel. +92-21-111-111, Email: [m.akbar.saeed@gmail.com](mailto:m.akbar.saeed@gmail.com)

**ABSTRACT:** For an efficient allocation of scarce resources in an economy, the banking system of a country plays a crucial role. If the banking system is efficient, then the allocation of resources is also accomplished in an efficient manner, which ultimately results in the creation of a healthy economy. Gauging the efficiency of the banking system can be accomplished through several techniques. One such technique is based on the Key Performance Indicators (KPIs). The purpose and scope of KPI formulation is highly dependent on the situation and objectives. KPI literature on business segments other than banking is abundant. In the context of KPIs for banks, there is a dearth of literature. This research is an attempt to fill the void in particular for the Pakistani commercial banking sector and further in the context of the government sector banks. At present, the total number of state-owned commercial banks is five with a total market share of 20% of total assets, which is quite important considering the role and responsibilities of the government. As such the possible KPIs have been identified for the government-owned banks in Pakistan through the application of Exploratory Factor Analysis (EFA) on a large number of financial ratios of the banking sector. The analysis resulted in a convergence of the financial ratios into four distinct segments, which can be termed as the possible KPIs for public sector banks in Pakistan.

**Keywords:** Banks, Efficiency Analysis, Exploratory Factor Analysis, KPIs, Financial Ratios.

### INTRODUCTION

The banking sector of Pakistan comprises of 34 institutions as on June 30, 2019. The grouping is; private sector-20, public sector-5, foreign-5, and specialized-4. The names of the five government-owned banks which is the focus of this study are, the National Bank of Pakistan, Bank of Punjab, Bank of Khyber, Sindh Bank, and First Women Bank. Together these five state-owned banks have a market share of 20%, whereas the private sector banks possess 75.4%, foreign banks 3.3% and the specialized institutions 1.3% [1]. It can be seen that nearly one-fifth of the total market share pertains to the government sector and hence its critical importance to the country is quite visible.

For an efficient allocation of scarce resources in an economy, the banking system of a country plays a crucial role. If the banking system is efficient, then the allocation of resources is also accomplished in an efficient manner, which ultimately results in the creation of a healthy economy [2]. Gauging the efficiency of the banking system can be accomplished through several techniques. One such technique is based on the Key Performance Indicators (KPIs). The purpose and scope of KPI formulation are highly dependent on the situation and objectives [3]. KPI literature on business segments other than banking is abundant. In the context of KPIs for banks, there is a dearth of literature. This research is an attempt to fill the void in particular for the Pakistani commercial banking sector and further in the context of the government sector banks.

In academic literature, performance evaluation of organizations is a regular feature [4]. Because of their critical importance to the economy, performance evaluation, performance measurement, productivity measurement and efficiency analysis of banking institutions is an on-going phenomenon [5]. From the perspective of societal benefits efficient operations of organizations is vital as it promotes high quality in output associated with low prices along with innovation. Resources both financial as well as non-financial

are automatically attracted by efficient institutions. Another important dimension to be added in this context is the transmission of the monetary policy of the government. The strength and the swiftness of the monetary policy transmission automatically become stronger with the prevailing efficient banking environment.

Efficiency measurement practices require details of an individual bank's output prices (rate of interest on loans) and facts about the cost of deposits and other banking products. Such details are not publicly available, which becomes a constraint in the analytical process [6]. This paper focuses on the process to pick up the KPIs for the government sector banks in Pakistan. The main tool utilized in this context is termed "Exploratory Factor Analysis (EFA)".

Evaluation of bank performance based on public data is undertaken on the basis of a large number of ratios. The question arises that what are the key performance indicators among these? This paper identifies the small number of indicators based on the Exploratory Factor Analysis Technique. Performance improvement plans require measurement of performance which can be classified as; a key result indicator, a performance indicator, or a key performance indicator. KPIs signify a group of certain dimensions of performance of an organization considered to be serious and important for its present and forthcoming accomplishments. In the context of the evaluation of performance and its measurement, the use of KPIs is quite popular. In the formulation of strategic maps, the KPIs are used along with the balanced scorecard methodology.

### LITERATURE REVIEW

Because of the importance of banks in the economy, their performance evaluation and efficiency analysis attract the interest of academicians to a very large extent. Besides, the central bank, financial market analysts, and bank management are also keenly interested in such evaluation processes. There are different approaches to measuring

performance such as; financial ratio analysis, analysis of production, data envelopment analysis (DEA), Delphi analysis, Analytical Hierarchical Process (AHP), and Balanced Score Card (BSC) [4].

Bos and Bikker [7] advocate a methodology which has been described as comprehensive by them for bank performance evaluation. The lengthy framework has been covered in several chapters of the book which outlines the theoretical context for a profit-maximizing bank along with empirical models, their assumptions and test results on selected samples are also presented. The use of a balanced scorecard has finally been recommended by the authors for adoption by the evaluators of bank performance.

The specific EFA technique in the context of banking has been applied for banks in Sri Lanka [8]. The study is based on primary data collected from senior officers of the bank through a questionnaire that reflected the designated variables numbering twenty-one. The questions covered financial as well as non-financial aspects of bank performance and the five-point Likert scale was used to record the responses. The sample covered private sector banks located in the north-eastern provinces of Sri Lanka. The factors which were identified by the EFA methodology included both financial as well as non-financial aspects such as ROA, ROE, Customer Satisfaction, the effectiveness of Equipment and so on.

EFA technique has been applied to extract KPIs in the context of private sector banks in Pakistan [9]. The research investigated data of the top ten private sector banks selected on the basis of their total assets. Their financial ratios numbering twenty-eight were evaluated through the EFA technique which resulted in the identification of four categories into which all of the financial ratios were absorbed. These four categories or factors were named by the authors as; Coverage (Interest), Coverage (Assets), Efficiency (Deposits), and Efficiency (Loans).

Through a mix of the balanced scorecard technique and a strategy map formulation Wu [10] discovered that the most relevant banking performance indicators were customer satisfaction and their retention rate along with the performance in sales. The basis of this research was with

reference to a mix of several indicators pertaining to financial aspects, customers and banking processes.

The impact of market structure on efficiency and performance has been the subject of interest of academics under the domain of two popular theories namely the Structure-Conduct-Performance theory and the Efficient Structure paradigm [11]. A large body of research exists under the above domain with arguments for and against regularly being put up by the researches [12].

To sum up, it can be inferred that the performance evaluation of banks is a popular topic to be researched. There are a few theories in this context that become the basis of investigations. The dimensions most often being investigated are financial, customers, processes, employees, and market structure. The list of items within each of these is numerous. Moreover, the impact of environmental factors is also a part of such investigations.

This research paper attempts to find the KPIs of the state-owned banks of Pakistan from a large number of financial indicators that are already computed and publicly available.

#### RESEARCH DESIGN

The study sample consists of all of the five state-owned commercial banks in Pakistan as of June 30, 2019. The data has been obtained from secondary sources, primarily from the published annual reports of the banks and also from the publications of the Central Bank. The sample period is from 2006 – 2018 that is thirteen years. Exploratory Factor Analysis (EFA) has been used as the main statistical tool to discover the latent relationship amongst a large number of variables, and then to extract them and assimilate them into a few most useful from these large numbers. The well-known software package SPSS version 23 was used to conduct the analysis.

The following Table-1 contains the list of a large number of financial (variables) ratios that have been used in this context. The nature of these variables is quantitative and pertains to the ratio level. The alphabetical code used in the SPSS software to denote these variables is also mentioned in the table. Table-2 gives out the Descriptive Statistics for these variables.

#### T

TABLE – 1: DESCRIPTION OF RATIOS (VARIABLES)

CODE	RATIO	DESCRIPTION
A	Spread Ratio	Interest Income / Interest Earned
B	Interest Ratio	Interest Expense / Interest Income
C	Interest Margin (Net)	(Interest Income – Interest Expense) / Total assets
D	NIM-TA	Interest Income (Net)/ Total Assets
E	Equity Ratio	Equity to Total Assets
F	Liability Ratio	Liabilities (Total) to Total Assets
G	Return on Assets	Net Profit / Total Assets
H	Cash Flows to PAT	Cash Flows (Operating) / Net Profit
I	Admin Exp to Non Int I	A E / Non Interest Income
J	Non-Int-Inc to TA	Non-Markup Income / Total Assets
K	NPLs to Gr Advances	Non-Performing Loans / Advances (Gross)
L	Prov-NPLs to NPLs	Provisions / Non-Performing Loans
M	Deposits to Equity	Deposits / Equity
N	Prov-NPLs to Adv.	Provisions – NPLs / Advances (Gross)
O	Deposits to Assets	Deposits / Assets
P	Adv. To TA	Advances (Net of Provisions) / Total Assets
Q	Adv. To Bower-Dep	Advances / (Borrowings + Deposits)

R	L T Inv. To Tot. Assets	Investments / Total Assets
S	Loans to Deposits	Gross Loans Extended / Deposits
T	Adm.Exp. To PBT	Administration Exp. / Profit Before Tax
U	Non-Int-Exp to Tot-Inc	Non-Interest-Expen. / Total-Incm.
V	Cash-To-Total-Assets	Cash / Total-Assets
W	Net Profit per share	Net-Profit / Number of Shares issued and outstanding
X	Net Profit to Equity	Net-Profit / Equity
Y	Book-Value-Per-Share	Equity / Number of Shares issued
Z	NPLs to Equity	Non-Performing-Loans / Equity

**TABLE -2:  
DESCRIPTIVE STATISTICS**

	<u>N</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std. Deviation</u>
Spread	60	-.03	.75	.3955	.15916
Net_Interest_Margin	60	.00	.07	.0292	.01332
ROE	60	-1.99	2.35	.0528	.50558
ROA	60	-.05	.03	.0059	.01477
Non_Interest_Income_TO_Tot al_Assets	60	.00	.03	.0121	.00666
Net_Int_Incom_TO_T_A	60	-.10	.06	.0200	.02607
Int_Exp_TO_Int_Incom	60	.25	1.03	.6044	.15918
Admn_Exp_TO_PBT	60	-7.70	216.92	5.2192	28.10560
Admn_Exp_TO_Non_Int_Inc	60	-7.70	15.81	2.6278	3.03433
EPS	60	-19.02	24.01	3.3928	7.18542
Cash_TO_Total_Assets	60	.03	.20	.0921	.04042
Invest_TO_Total_Assets	60	.12	.69	.3965	.13249
Advances_TO_Total_Assets	60	.15	.71	.4021	.10872
Deposits_TO_Total_Assets	60	.34	.91	.7569	.10297
Total_Liab_TO_Total_Asset	60	.78	.98	.8963	.04538
Gross_Advances_TO_Dep.	60	.23	.93	.5877	.12524
Gross_Adv_to_Borrow_Dep	60	.19	.87	.5200	.13739
NPL_TO_Gross_Advances	60	.00	.52	.1431	.11255
Prov_NPL_TO_Gross_Adv	60	.00	.20	.0796	.06089
NPLs_TO_Equity	60	-11.06	73.45	1.6500	9.93605
Writeoff_TO_NPLs_Prov	60	-.04	1.00	.2120	.26933
Provision_NPLs_TO_NPLs	60	.00	794.18	14.0628	102.42597
Equity_Ratio	60	-.03	.23	.0885	.05067
BVPS	60	-13.45	90.71	25.4655	25.51744
Total_Deposits_TO_Equity	60	-42.45	375.80	14.3368	49.12995
Cash_Oprns_TO_PAT	60	-329.66	111.84	.8027	50.00362

**EXTRACTION OF FACTORS**

Exploratory Factor Analysis is a statistical technique that discovers the latent relationship between the variables and then converges that relationship into a smaller number of factors. Statistics of the pertinent extracted factors are presented below. This convergence resulted in the identification of four components (factors). This four store nearly 65.4 % of the total variance explained by the technique. The eigenvalues for these factors is greater than one. Less meaningful information is conveyed by a

particular factor if its eigenvalue is found to be less than one. The number of factors to be extracted can also be pre-specified to the software. In case a smaller number is not specified prior to running the software, then the software extracts the best possible factors which in this case would have been seven. Rotation of the factors was also undertaken through the varimax (orthogonal) rotation methodology. The results are shown in the following Table-3 and Table-4.

**TABLE-3**  
**Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.268	27.953	27.953	7.268	27.953	27.953
2	4.576	17.602	45.555	4.576	17.602	45.555
3	3.034	11.668	57.223	3.034	11.668	57.223
4	2.137	8.219	65.441	2.137	8.219	65.441
5	1.885	7.252	72.693			
6	1.399	5.382	78.075			
7	1.103	4.242	82.317			
8	.993	3.819	86.136			
9	.904	3.479	89.614			
10	.678	2.607	92.222			
11	.573	2.204	94.425			
12	.372	1.431	95.856			
13	.300	1.154	97.010			
14	.239	.921	97.931			
15	.187	.718	98.649			
16	.107	.411	99.059			
17	.090	.347	99.406			
18	.056	.214	99.620			
19	.041	.156	99.776			
20	.026	.101	99.878			
21	.021	.081	99.958			
22	.005	.018	99.976			
23	.004	.016	99.992			
24	.002	.007	99.999			
25	.000	.001	100.000			
26	1.511E-006	5.813E-006	100.000			

Extraction Method-Principal Component Analysis

**TABLE-4**  
**Rotated Component Matrix**

Indicators/ Variables	Components			
	Interest Coverage	Assets Coverage	Deposits Effectiveness	Advances Efficiency
Spread	.831			
Net_Interest_Margin	.812			.435
ROE	.433		.743	
ROA	.694			-.428
Non_Interest_Income_TO_Total_Assets		.490		
Net_Int_Incom_TO_T_A	.736	-.484		
Int_Exp_TO_Int_Incom	-.832			
Admn_Exp_TO_PBT				
Non_Int_Exp_TO_Total_Incom				.787
Admn_Exp_TO_Non_Int_Income				.636
EPS	.786			-.426
Cash_TO_Total_Assets	.623	.444		
Invest_TO_Total_Assets		-.910		
Advances_TO_Total_Assets		.934		
Deposits_TO_Total_Assets		.662		
Total_Liab_TO_Total_Assets	-.505			-.376
Gross_Advances_TO_Deposits		.804		
Gross_Adv_TO_Borrow_Deposits		.952		
NPL_TO_Gross_Advances	-.589			
Prov_NPL_TO_Gross_Adv	-.433			
NPLs_TO_Equity			.802	
NPLs_Writeoff_TO_NPLs_Prov		.413	-.411	

Extraction Method – Principal Component Analysis

Rotation Method – Varimax with Kaiser Normalization

Rotation converged in 10 iterations

## GROUPING OF FACTORS

Four categories have been identified under the rotated component matrix. These four categories impound the latent relationships amongst the twenty-six variables which are the focus of this study. The names assigned to these four are based on the common characteristics of the different variables. The names of the four along with their brief description follow.

### 1. Mark-up/Interest Coverage

Under this category, there are eleven variables with factor loading ranging from 0.832 to 0.433. The list of variables included in this category are; NIM, Spread, ROE, ROA, Net Interest Income to Total Assets, Interest Expense to Interest Income, EPS, Cash to Total Assets, Total Liab. to Total Assets, NPLs to Gross Advances, Provisions on NPLs to Gross Advances. Out of the total, this group accounted for 27.95% of the total variance.

### 2. ASSETS COVERAGE

This group accounts for 17.6% of the total variance explained through the analysis. It also includes 9 variables including; Non-Interest Income to Total Assets, Net-Interest-Income to Total Assets, Cash to Total Assets, Investments to Total Assets, Loans and Advances to Total Assets, Gross Advances to Deposits, and Gross Advances to Borrowings plus deposits.

### 3. DEPOSIT EFFECTIVENESS

This is the third category identified in the study. It has links to only three variables, which are; Return on Equity, NPLs to Equity, and Non Performing Loans Write Off to Provisions against NPLs. This covers 11.67% of the total variance.

### 4. EFFICIENCY OF LOANS AND ADVANCES

A total of five variables are covered under this fourth factor. These include; Net Interest Margin, Return on Assets, Non-Interest Expense to Total Income, Administration Expenses to Non-Interest Income, and Earnings per Share.

## CONCLUSIONS

This research paper has attempted to identify the latent relationship existing between the large numbers of financial ratios totaling twenty-six pertaining to the government sector commercial banks in Pakistan. The research sample included all of the government-owned banks in Pakistan, which is presently five. These five banks have a total market share of 20% of the total assets of the banking sector, which is quite important considering the role and responsibility of the government. The sample period covered was thirteen years from 2006 to 2018. The statistical tool of Exploratory Factor Analysis was applied in this regard which resulted in the categorization of all of the variables into four factors that have been named in accordance with the characteristics of the respective variables. These four factors impounded a cumulative variance of 65.4% of the total variance explained by the technique. Considering the order of their importance, the four factors are; (1) Mark-up/Interest Coverage, (2) Assets Coverage, (3) Deposits Effectiveness and (4) Efficiency of Loans and Advances. These four categorizations may be regarded as the Key Performance Indicators for the Public

Sector Commercial Banks in Pakistan. This study is based on secondary data and no research questionnaire was used to measure customer-related aspects such as customer satisfaction. Hence the results are different from the studies undertaken by Balasundaram [8] and by Wu [10]. However, the findings of the current study are similar in nature for the findings of [10].

## REFERENCES:

- [1] State Bank of Pakistan, "Financial Sector Analysis 2014-2018." State Bank of Pakistan, 2019.
- [2] F. S. Mishkin, *The Economics of Money, Banking and Financial Markets*, 11th ed. Pearson, 2016.
- [3] D. Parmenter, *Key performance indicators: developing, implementing, and using winning KPIs*. Hoboken, N.J: John Wiley & Sons, 2007.
- [4] A. Neely, "The evolution of performance measurement research: Developments in the last decade and a research agenda for the next," *International Journal of Operations & Production Management*, vol. 25, no. 12, pp. 1264–1277, Dec. 2005.
- [5] P. Taticchi, F. Tonelli, and L. Cagnazzo, "Performance measurement and management: a literature review and a research agenda," *Measuring Business Excellence*, vol. 14, no. 1, pp. 4–18, Mar. 2010.
- [6] F. Pasiouras, *Efficiency and productivity growth: modelling in the financial services industry*. Chichester, West Sussex: John Wiley & Sons, 2013.
- [7] J. Bos and J. Bikker, *Bank Performance: A Theoretical and Empirical Framework for the Analysis of Profitability, Competition and Efficiency*, vol. 20082244. Routledge, 2008.
- [8] N. Balasundaram, "Determinants of Key Performance Indicators of Private Sector Banks in Srilanka - An Application of Exploratory Factor Analysis," *The Annals of the Stefan Cel Mare, University of Suceava. Fascicle of the Faculty of Economics and Public Administration*, vol. 9, no. 2(10), pp. 9–17, 2009.
- [9] A. Saeed and F. A. Siddiqui, "Uncovering Key Performance Indicators for Private Sector Banks in Pakistan: An Application of Exploratory Factor Analysis," *J Bus Fin Aff*, vol. 06, no. 01, 2017.
- [10] H.-Y. Wu, "Constructing a strategy map for banking institutions with key performance indicators of the balanced scorecard," *Evaluation and Program Planning*, vol. 35, no. 3, pp. 303–320, Aug. 2012.
- [11] T. H. Hannan, "Foundations of the Structure-Conduct-Performance Paradigm in Banking," *Journal of Money, Credit and Banking*, vol. 23, no. 1, p. 68, Feb. 1991.
- [12] M. ul H. Khan and M. N. Hanif, "Empirical evaluation of 'structure-conduct-performance' and 'efficient-structure' paradigms in banking sector of Pakistan," *International Review of Applied Economics*, pp. 1–15, Sep. 2018.