


“Predicting Islamic banks performance through CAMELS rating model”

AUTHORS

Omar Masood
Shahid Mohammad Khan Ghauri
Bora Aktan  <https://orcid.org/0000-0002-1334-3542>

ARTICLE INFO

Omar Masood, Shahid Mohammad Khan Ghauri and Bora Aktan (2016).
Predicting Islamic banks performance through CAMELS rating model. *Banks and Bank Systems*, 11(3), 37-43. doi:[10.21511/bbs.11\(3\).2016.04](https://doi.org/10.21511/bbs.11(3).2016.04)

DOI

[http://dx.doi.org/10.21511/bbs.11\(3\).2016.04](http://dx.doi.org/10.21511/bbs.11(3).2016.04)

RELEASED ON

Wednesday, 12 October 2016

JOURNAL

"Banks and Bank Systems"

FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

0



NUMBER OF FIGURES

0



NUMBER OF TABLES

0

© The author(s) 2025. This publication is an open access article.

Omar Masood (Pakistan), Shahid Mohammad Khan Ghauri (Pakistan), Bora Aktan (Egypt)

Predicting Islamic banks performance through CAMELS rating model

Abstract

This paper analyzes the performance of Islamic banks operating in Pakistan according to their financial results of the year 2015. CAMELS rating model is applied in this research. This model is based on certain financial ratios which are excerpt from values in the financial statements of banks. The authors conduct the research under the umbrella of quantitative paradigm. The authors found that 2 of the Islamic banks are showing satisfactory results, while others are on fair position. There is a need to develop financial markets for treasury operations for these banks. Results help in development of growth strategy for Islamic banks in Pakistan, as well as they might be useful to create a fair snapshot for regulators to develop growth strategy for this stream of banking.

Keywords: Islamic banking, performance, growth analysis, CAMELS.

JEL Classification: G02, G21, G32.

Introduction

Islamic banking system is actually an interest-free model, where financial dealings are based on trading (profit sharing) or leasing models. Profit sharing models include various strategies, common of which are modarbah, musharakah, bai, muzareah, joalah, musaqat, arbun, khiyar, etc.; some return-free models include qardh, amanah, wadiah, etc.; and leasing models include ijarah, etc. All financial transactions and offered services are vet and monitored by religious scholar or panel of scholars who ensure that all products and offered services are free of riba (usury), gharrar (uncertainty), maysir or qimar (gambling) (Masood and Ghauri, 2014). Unlike conventional banking principle, Shariah compliance does not allow Islamic banks to charge interest and deal doubtful financial transactions rather to perform financial transactions based on risk sharing or profit and loss sharing. This makes Islamic banks to expose higher credit risk and resulting survival of this type banks depends on adoption of effective credit risk management process. Because the loss that an Islamic bank realizes due to poor credit risk management is ultimately shifted to the depositors. On the other hand, Islamic scholars developed different loan products complying Shariah law for Islamic banks which are similar with conventional

banks replacing interest payment. A good number of empirical studies have been conducted recently focusing on banking risk management. Banks can improve performance and reduce risk only by implementing a sound risk management structure. Risk management depends on implementation of good governance practices and application of quantitative and qualitative risk management tools. Risk management practice is the function of risk identification, risk assessment, risk monitoring and control (Noman et al., 2015).

Islamic finance industry incepted since 1963 from Egypt, and formally incorporated in 1974 by establishment of a full-fledge Islamic bank in UAE. Many parts of the world have adopted this stream of banking our decades which proved to be resilient to the financial crisis in 2007-2008 (Ramzan and Ghauri, 2012). Today, London wishes to become the financial leader for Islamic finance and planned to hold Global Islamic finance conference, annually, Malaysia leads the innovation in this stream of banking with numerous products and services (Ghauri, 2012). Today, Islamic financial industry is worth more than US\$ 4 trillion world-wide (Misman et al., 2015). The biggest risk, today, is the standardization in product innovation and implementation of Islamic finance in the world (Zaidi et al., 2015).

Table 1. Industry progress and market share in Pakistan (SBP Islamic Banking Quarterly Bulletin, 2016)

	Industry progress (Rs. In Billions)			Growth (YoY)			Share in industry		
	Mar-15	Dec-15	Mar-16	Mar-15	Dec-15	Mar-16	Mar-15	Dec-15	Mar-16
Total assets	1.302	1.610	1.625	28.20%	27.90%	24.80%	10.40%	11.40%	11.40%
Deposits	1.122	1.375	1.336	28.70%	28.50%	19.00%	12.20%	13.20%	12.90%
Total Islamic banking institutions	22	22	22						
Total no. of branches	1.597	2.075	2.082						
Islamic banking windows	922	1.050	1.064						

© Omar Masood, Shahid Mohammad Khan Ghauri, Bora Aktan, 2016.

Omar Masood, Ph.D., Professor of Islamic Banking and Finance, Quaid-i-Azam School of Management Sciences, Quaid-i-Azam University Islamabad Quaid-i-Azam University, School of Management Sciences, Islamabad, Pakistan.

Shahid Mohammad Khan Ghauri, Regional Operations Manager, Sonier Bank Limited, Pakistan.

Bora Aktan, Ph.D., Associate Professor of Finance, University of Bahrain, College of Business Administration, Kingdom of Bahrain and Future University in Egypt, Faculty of Commerce and Business Administration, New Cairo, Egypt.

In Pakistan, Islamic banking industry has acquired above 11.4% share in assets and 13.2% share in deposits in overall banking industry. SBP has been designated 2nd ranked worldwide among central banks, who have promoted Islamic banking in their country. SBP has laid down a strategy plan for all financial sector of Pakistan for its conversion into Islamic mode. Further, a high profile steering committee is developed to monitor this strategy plan (SBP Islamic Banking Quarterly Bulletin, 2016).

This paper analyzes the performance of Islamic banks operating in Pakistan based on their financial results of the year 2015, which helps in development of growth strategy for Islamic banks, as well as to create a fair snapshot for regulators to develop growth strategy for this stream of banking. The rest of the paper is organized as follows: next section reviews the existing literature, second heading demonstrates the methodology, and third heading section presents the analysis and findings. Final heading section concludes with short recommendation and practical implication.

1. Background

Islamic banks manage profit distribution management mechanism for returns to deposits (third party funds). Banks' financial characteristics and market share constitute the prospect theory. Low market share with high deposits cause high uncertainty of returns, resulting in drawing reserves for competitive returns, whereas income is low. Effectiveness of deposits and age do not confirm the theory. Assets' composition doesn't support or restrict profit distribution management (Wafaretta, Rosidi and Rahman, 2016). Various studies on banks' profitability concluded that there is a significant positive association between the return on equity and the level of interest rate, bank concentration, government ownership, risk and inflation, whereas bank size has insignificant impact. Some researchers used ROA for performance (profitability) analysis, but major drawback is the existence of off-balance-sheet assets. It is required to consider other internal factors like financial structure which shows that how banks assets are financed and the capacity of the bank to cover the loss. The credit risk is another important internal factor, as it exhibits the loss probability because of the failure of the debtor to fulfill its obligation (Petria, Capraru and Ilnatov, 2015). Few bank specific variables significantly influence credit risk. Post financial crisis 2007-2008, risk management in Islamic finance is the hot topic, and various researchers experimented different internal and external factors affecting on risk management (Misman et al., 2015). Changes in banks' capital adequacy ratio (CAR) under different stress scenarios and examine the results by comparing conventional banks to Islamic banks and found

that Islamic banks suffer more sensitive to sudden changes in exchange rates and increased non-performing loans. However, this sensitivity is in regards to capital adequacy, not profit (Hassan, Unsal and Tamer, 2016). Another study examines the impact of managers' leadership styles on subordinates' performance. The impact of leadership styles on employee performance outcomes is explored theoretically and tested empirically in the Pakistani banking sector. Finding of this study reveals that there exists a significant relationship between transformational leadership and employee performance outcomes. However, laissez-faire leadership style showed negative relationship with employee performance outcome in terms of effectiveness, and employee satisfaction. Banking industry in Pakistan is prone to numerous challenges including employee turnover (Asrar-ul-Hag and Kuchinke, 2016).

Islamic banks adhere to 54% of the attributes addressed in the CGDI (Corporate Governance Development Index). This composite index construction uses information on six important corporate governance mechanisms, namely board structure, risk management, transparency and disclosure, audit committee, Sharia supervisory board and investment account holders. Corporate governance has a higher level of importance and assumes a crucial role, since banks mobilize public savings, depend on public trust and have more diverse stakeholders. The poor governance of banks has resulted in the failure of banks during crises, as well as financial scandals. Islamic banks have had a similar experience of collapse as conventional banks and have been also exposed to corporate governance failures. The failures have occurred due to the board of directors' collusion with the top management, audit failures, the lack of consideration for minority shareholders' interest and the excessive risk-taking by management. With regards to these failures and since Islamic banks are exposed to additional risks (relating to Mudaraba investment account, risk of Sharia incompliance) compared to conventional banks, an important challenge for an Islamic bank is to improve the quality of its corporate governance. Corporate governance from an Islamic perspective can be described as a system that has a critical goal which is to preserve stakeholder's rights that might be exposed to any type of risk as a result of organization's actions (Srairi, 2015). The life cycle theory of consumption developed by Franco Modigliani and Richard Brumberg in early 1950s, and further extended by Lawrance in 1995, explains that probability of default depends on the GDP, unemployment rate and inflation rate (macroeconomic factors) and the amount of loan taken (bank-specific factor).

Many studies have utilized the GDP, unemployment rate and inflation rate as the independent variables in their study (Haryono, Ariffin and Hamat, 2016). Another study on performance analysis of Islamic banks in Pakistan found that strength of risk management practices generally has a significant negative impact on profitability; within the risk management practices, risk policy and environment does not have statistically significant influence on profitability; the strength of branch network is strongly positively associated with the profitability; growth in the economy and increase in interest rates generally lead to greater profitability; and advances and investments with respect to profitability depicted insignificant relationship, which may be attributed to high non-performing financing of certain banks and low yield on GOP ijara sukuks (Zubairi and Ahson, 2015).

The performance and accountability of boards of directors and effectiveness of governance mechanisms continue to be a matter of concern. Focusing on differences between conventional banks and Islamic banks, examined the effect of (1) Shariah supervision boards, (2) board structure and (3) CEO-power on performance. It is observed that Shariah supervision boards positively impact on Islamic banks' performance when they perform a supervisory role, but the impact is negligible when they have only an advisory role. The effect of board structure (board size and board independence) and CEO power (CEO-chair duality and inter-

nally recruited CEO) on the performance of Islamic banks is overall negative (Mollah and Zaman, 2015).

2. Methodology

A research design is the structure for investigation and way of finding out the answer of research question. We conduct this research under the umbrella of quantitative paradigm through CAMELS rating model which is essential to assess the soundness of financial institutions through rating system which is used by federal and state regulators, usually known as CAMELS rating system. This system was adopted by national Credit Union Administration NCUA in Oct 1987 (Christopoulos, Mylonakis and Diktapanidis, 2011). CAMELS methodology adopted by North America Bank to know the financial and managerial reliability of commercial lending institutions. To examine the CAMELS system, information is required from different sources such as financial statements, funding sources, macroeconomic information, budget and cash flow projection, staffing/operation. This model assesses the overall condition of the bank, its strengths and weaknesses (Canbas, Cabuk and Kilic, 2005). CAMELS stand for Capital adequacy, Asset quality, Management, Earning, Liquidity, and Sensitivity to market risk. CAMELS rating system is to be evaluated on the scale of one to five rating in ascending order (Christopoulos, Mylonakis and Diktapanidis, 2011).

Composite rating of CAMELS model is categorized from 1 to 5 and reflects as in Table 2.

Table 2. Composite range of CAMELS rating (Heldek, 2010; Wirnkar and Tanko, 2008; Sarker, 2006)

Rating	Composite range	Description	Meaning
1	1.00-1.49	Strong	<ul style="list-style-type: none"> ◆ Basically sound in every respect ◆ Findings are of minor nature and can be handled routinely ◆ Resistant to external economic and financial disturbances ◆ No cause for supervisory concern
2	1.5-2.49	Satisfactory	<ul style="list-style-type: none"> ◆ Fundamentally sound ◆ Finding are of minor nature and can be handled routinely ◆ Stable and can withstand business fluctuations well ◆ Supervisory concerns are limited to extent that findings are corrected
3	2.50-3.49	Fair	<ul style="list-style-type: none"> ◆ Financial, operational or compliance weaknesses ranging from moderately severe to unsatisfactory ◆ Vulnerable to the onset of adverse business conditions ◆ Easily deteriorate if actions are not effective in correcting weaknesses ◆ Supervisory concern and more than normal supervision to address deficiencies
4	3.50-4.49	Marginal	<ul style="list-style-type: none"> ◆ Immoderate volume of serious financial weaknesses ◆ Unsafe and unsafe conditions may exist which are not being satisfactory addressed ◆ Without corrections, these conditions could develop further and impair future viability ◆ High potential for failure ◆ Close supervision surveillance and a definite plan for correcting deficiencies
5	4.50-5.00	Unsatisfactory	<ul style="list-style-type: none"> ◆ High immediate or near term probability failure ◆ Severity of weaknesses is so critical that urgent aid from stockholders or other financial sources is necessary ◆ Without immediate corrective actions, will likely require liquidations, merger or acquisition

For sample selection of the banks for our research, we used criteria sampling method, that is, a type of non-probability sampling. All 6 Islamic banks

are listed in a sample. Financial data of these sample banks are extracted from annual reports 2015.

Table 3. Key values related to sample banks (all values in Million Rs except branches)

Bank name	Branches	Total assets	Total equity	Deposits	Financing	Profit after tax
AlBaraka Bank	135	86.932	6.273	71.644	47.644	240
Bank Islami	317	174.130	11.189	153.058	69.576	(196)
Burj Bank	74	17.675	4.326	12.636	6.788	(399)
Dubai Islamic Bank	200	157.0193	7.976	136.743	104.953	430
MCB Islamic Bank	6	10.107	9.984	38	973	48
Meezan Bank	551	531.850	26.347	471.821	207.569	5.023

Source: banks annual report (2015).

3. Analysis and discussion

As discussed above, CAMELS rating model is applied in this research. This model is based on certain financial ratios which are excerpt from values in the financial statements of banks. The ratios are applied on the data from the financial statements of 2015. Financial closing of banks in Pakistan stands on December 31st every year. Data are observed from the audited financial statements of sample 6 banks.

CAMELS rating model is based on six kinds of financial ratios. All six components of CAMELS rating model are rated on the basis of following criteria on the scale of 1 to 5. Component having rating 1 shows strong position, while rating 5 indicates worst position of a bank in the particular component. Each component has a well thought out scale of rating based on the prevailing financial and economic conditions (Demanyk and Hassan, 2010). This rating model was first used by National Credit Union Administration (NCUA) in 1987 and has been updated in 1994 which was later used by number of researchers to evaluate financial institutions (NCUA, 1987). This rating model was also used by US Government through Emergency Economic Stabilization Act of 2008 (Heldek, 2010). Key ratios of CAMELS rating system to evaluate the rating for different banks are:

3.1. Capital adequacy. It determines the ability of the bank to meet with obligation on time and other risks such as operational risk, credit risk, etc. (Christopoulos, Mylonakis and Diktapanidis, 2011).

3.2. Assets quality. Quality of banks assets is related to the left side of its balance sheet. Usually top management of the bank is concerned mostly with quality of the loans they provided to their customers, as it provides earnings to the bank. Assets quality and loan quality are two words that have same meaning, but most often they are used interchangeably. Quality of the assets as its affects both cost to the banks and economies of scales for the bank (Chauhan, Ravi and Chandra, 2009). Assets that have low quality usually have higher possibility to become non-performing

assets. Non-performing assets are usually bad debts that are in default or they are near to be in default. There is no specific standard for the banks across the globe that elaborates which assets to be included in non-performing loans, but, in Pakistan, those which are in default for more than three months are included in non-performing loans (Burki and Niazi, 2010). Lower asset quality ratio shows higher performance of the bank.

3.3. Management. It is difficult to determine the sound performance of management of the bank. For individual institution, it is not a quantitative factor, it is, primarily, qualitative factor. However, to determine the soundness of the management, we took the ratio which is management expenses/total deposits. The lower the ratio the better is for bank, since it shows that management has good ability to handle the bank operations (Fethi and Pasiouras, 2010).

3.4. Earning. It is necessary for the banks to generate sufficient earning to stay in the market for a longer period of time, to make shareholders satisfied, protect and improve its capital (Perera, Skully and Wickramanayake, 2007). ROA avoids the volatility of earnings linked with unusual items, and measures the profitability of the bank. The higher the ratio, the greater is the profitability. ROE shows the efficiency of the bank, that how the bank uses its own capital in an efficient manner (Christopoulos, Mylonakis and Diktapanidis, 2011).

3.5. Liquidity management. To well manage liquidity of the financial institutions such as banks is a prime objective of its management. Liquidity is ability of a firm to convert its financial assets into cash most rapidly or in a quick succession or we can say availability of the funds to pay off all its financial obligations when they become due.

3.6. Sensitivity to market risk. Earnings and capital of financial institutions can be adversely affected by changes in exchange rate, interest rate, equity price or commodity price. Many financial institutions consider changes in interest rates as market risk.

Table 4. Evaluation under CAMELS rating system

	Component	Ratio	Weight	1	2	3	4	5
C	Capital adequacy	CAR = Tier I ¹ + Tier II ² / Risk weighted Assets*100	20%	> 11%	8% - 11%	4% - 8%	1% - 4%	< 1%
A	Assets quality	Total Non Performing Assets -Provision Non Performing Assets /Advances *100	20%	< 1.5%	1.5% - 3.5%	3.5% - 7%	7% - 9.5%	> 9.5%
M	Management	Administrative expenses/total earning *100	25%	≤ 25%	30% - 26%	38% - 31%	45% - 39%	≥ 46%
E	Earnings (ROA)	NP ³ / average total assets	15%	> 1.5%	1.25% - 1.5%	1.01% - 1.24%	0.75% - 1%	< 0.75%
	Earnings (ROE)	NP / average equity capital		≥ 22%	17% - 21.99 %	10% - 16.99%	7% - 9.99%	≤ 6.99%
L	Liquidity (L1)	Advances / Deposits	10%	< 60%	60% - 65%	65% - 70%	70% - 80%	> 80%
	Liquidity (L2)	Circulating Assets / Total Assets		< 60%	60% - 65%	65% - 70%	70% - 80%	> 80%
S	Sensitivity	Total securities / Total assets	10%	> 80%	71% - 80%	65% - 70%	60% - 64%	< 60%

Table 5. CAMELS rating applied to sample banks (financial year ended December 2015)

Bank	Capital adequacy		Assets quality ratio		Management quality		Earnings efficiency				Liquidity				Sensitivity to market risk	
	CAR	Rating	AQR	Rating	MQR	Rating	EE1	Rating	EE2	Rating	L1	Rating	L2	Rating	Sens.	Rating
AlBaraka Bank	14.54	1	2.45	2	285.88	5	0.45	5	6.68	5	66.50	3	18.77	1	17.57	1
Bank Islami	12.34	1	2.63	2	-758.31	1	-0.20	5	-3.02	5	45.46	1	49.66	1	35.19	1
Burj Bank	18.06	1	0.16	1	-162.14	1	-1.44	5	10.45	5	70.52	4	13.78	1	20.32	1
Dubai Islamic Bank	9.75	2	0.57	1	286.58	5	0.55	5	9.23	4	76.75	4	18.96	1	11.79	1
Meezan Bank	10.98	2	0.11	1	75.62	5	1.74	1	33.65	1	43.99	1	42.37	1	14.46	1
MCB Islamic Bank	182.41	1	0.00	1	134.92	5	0.53	5	0.53	5	2582.05	5	81.20	5	6.17	1

Source: author's calculation.

Components rating analysis

1. Capital adequacy rating (CAR). State Bank of Pakistan (regulator central bank) has set minimum CAR as 14% along with the minimum capital requirement (MCR) of Rs 10 billion. Table 5 reflects that CAR of AlBaraka Bank and Burj Bank meet criterion, while Bank Islami, Dubai Islamic Bank and Meezan Bank are below standard, and MCB Islamic Bank has an abnormal value. Bank Islami has amalgamated another bank (KASB Bank) in 2015 under a special scheme, due to which its results for the year 2015 are somewhat abnormal, whereas MCB Islamic Bank is established in the year 2015, and due to closure for the books of first year, some of its ratios are reflecting abnormal results.

2. Assets quality rating. Management of the banks is usually concerned with the quality of their assets due to its vital role in profitability. Banks having large amount of non-performing assets usually need to maintain larger provisions. Table 5 reflects AlBaraka Bank and Bank Islami has achieved 2 rating, while rest of the sample banks are at 1. This rating reflects strength and vision of credit risk department of bank.

3. Management quality rating. Bank Islami and Burj Bank reflect 1 rating due to their negative profitability (i.e., net loss). Bank Islami has resulted loss due to acquired KASB Bank, while Burj Bank is facing negative MCR outlook for last 2 years. Rest of all sample banks are rated 5. This rating reflects efficient management in expense controls.

4. Earnings quality rating. EE1 rating of all banks is 5 except Meezan Bank which is rated as 1. EE2 rating of Dubai Islamic Bank is 4, while Meezan Bank is 1 rating, while rest of the banks are rated 5. Meezan Bank has reflected abnormally high profits during the year, thus, its rating are reflected very good.

¹ Tier I Capital = common stock + preferred stock + retain earnings.

² Tier II Capital = undisclosed reserves+ subordinate term debt + general provision, revaluation reserves.

³ NPBT: Net Profit before Tax.

5. Liquidity management ratings. Liquidity management rating of MCB Islamic Bank is 5 due to extra-ordinary funds parked with other banks, while Bank Islami and Meezan Bank are rated as 1 in both L1 and L2, due to good management with circulating assets.

6. Sensitivity to market risk rating. Sensitivity to market risk shows exposure of the bank assets to the risk associated with its investment in the marketable securities. All banks reflected good results due to very limited scope of investment opportunity available in Pakistan financial industry for Islamic banks.

Table 6. Analysis of CAMELS and credit ratings

Bank	CAMELS rating	Credit rating		
		Short	Long	Agency
AlBaraka Bank	2.90	A1	A	JCR-VIS
Bank Islami	1.80	A1	A+	PACRA
Burj Bank	1.75	A2	A-	JCR-VIS
Dubai Islamic Bank	2.88	A1	A+	JCR-VIS
Meezan Bank	2.20	A1+	AA	JCR-VIS
MCB Islamic Bank	3.00	A1	A	PACRA

Source: SBP annual report (2015).

Extracted from our findings, CAMELS rating is compared with credit rating of financial institutions, which resulted in that CAMELS rating gives bit different snapshot, as compared with credit rating. Table 6 reflects that comparison in transparency. Credit ratings of sample banks are observed from annual report 2015 published by State Bank of Pakistan.

Conclusion

Consolidated financial analysis of banks reflects a different picture, as depicted by credit rating agencies, although their criterion is quite varied from CAMELS rating system. Still, time and again questions have been raised regarding the credibility and reports given by the credit rating agencies. Hence, it is concluded that all of the banks are showing good progress in Pakistan banking sector, however, there is a big room available for growth of these banks. CAMELS rating

reflect that Bank Islami, Burj Bank and Meezan Bank are showing satisfactory position, while rest of the other banks are showing fair position. Depth analysis reflect that due to limited availability of secondary market for Islamic banks in Pakistan, growth of these banks is limited and there is a strong need to develop funds and commodity market for Islamic banks in Pakistan.

Recommendations

Regulators should devise a monitoring threat over credit rating agencies, as their drafted reports are not reliable from managerial performance perspectives. Secondly, regulators may define their own assessment criteria to monitor risk management practices in banks. Islamic banks should be encouraged to operate and expand in Pakistan, as there is a religious, as well as market aspect of growth for these banks.

References

- Asrar-ul-Haq, Muhammad and K. Peter Kuchinke. (2016). Impact of leadership styles on employees' attitude towards their leader and performance: Empirical evidence from Pakistani banks, *Future Business Journal*, 2, pp. 54-64.
- Babar, H.Z. and G. Zeb. (2011). CAMELS rating system for banking industry in Pakistan. *Masters thesis*. Umeå University, Sweden.
- Burki, A.A. and G.S.K. Niazi. (2010). Impact of financial reforms on efficiency of state-owned, private and foreign banks in Pakistan, *Applied Economics*, Vol. 42, Issue 24, pp. 3147-3160.
- Canbas, S., A. Cabuk and S.B. Kilic. (2005). Prediction of commercial bank failure via multivariate statistical analysis of financial structures: the Turkish case, *European Journal of Operational Research*, 166 (2), pp. 528-546.
- Chauhan, N., V. Ravi and D. Karthik Chandra. (2009). Differential evolution trained wavelet neural networks: Application to bankruptcy prediction in banks, *Expert Systems with Applications*, 36 (4), pp. 7659-7665.
- Christopoulos, A.G., J. Mylonakis and P. Diktapanidis. (2010). Could Lehman Brothers Collapse Be Anticipated? An Examination Using CAMELS Rating System, *International Business Research*, 4 (2), (doi:10.5539), pp. 11-19.
- Demyanyk, Y. and I. Hasan. (2010). Financial crises and bank failures: a review of prediction methods, *Omega*, 38 (5), pp. 15-324.
- Fethi, M.D. and F. Pasiouras. (2010). Assessing bank efficiency and performance with operational research and artificial intelligence techniques: A survey, *European Journal of Operational Research*, 204 (2), pp. 189-198.
- Ghauri, Shahid Muhammad Khan. (2012). *SUKUK - the Islamic bonds: Risks and Challenges*. Germany: LAMBERT Academic Publishing.

10. Haryono, Yono, Noraini Mohd. Ariffin and Mustapha Hamat. (2016). Factors Affecting Credit Risk in Indonesian Islamic Banks, *Journal of Islamic Finance*, 5 (1), pp. 12-25.
11. Hassan, M. Kabir, Omer Unsal and Hikmet Emre Tamer. (2016). Risk management and capital adequacy in Turkish participation and conventional banks: A comparative stress testing analysis, *Borsa Istanbul Review*, 16 (2), pp. 72-81.
12. Heldek, Parveen Bari. (2010). *Camels rating base*. Slideshare, hUallachain, Breandán Ó. Foreign Banks in the American Urban System of Financial Organization, *Economic Geography*, Vol. 70 No. 3, pp. 206-228.
13. Huizinga, Ash Demirgiic-Kunt and Harry. (1994). Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence, *The World Bank Economic Review*, 13 (2), pp. 379-408.
14. Majithiya, R. and A. Pattani. (2010). Rating the performance of the bank through CAMELS model. Post Diploma thesis. Tolani Institute of Management Studies, India.
15. Masngut, M. and R. Abdul Rahman. (2012). Financial Distressed: Detection Model for Islamic Banks. *Business and Social Science Research Conference*. Paris.
16. Masood, Omar and Shahid Muhammad Khan Ghauri. (2014). *The Rightful Way of Banking*. London: Cambridge Scholars Publishing.
17. Misman, Faridah Najuna, Ishaq Bhatti, Weifang Lou, Syamsyul Samsuddin and Nor Hadaliza Abd Rahman. (2015). Islamic Banks Credit Risk: A Panel Study, *Procedia Economics and Finance*, 31, pp. 75-82.
18. Mollah, Sabur and Mahbub Zaman. (2015). Shari'ah supervision, corporate governance and performance: Conventional vs. Islamic banks, *Journal of Banking and Finance*, 58, pp. 418-435.
19. NCUA. NCUA report. (1987).
20. Noman, Abu Hanifa Md., Chan Sok Gee, Che Ruhana Isa and Karim Bux Shah Sayed. (2015). A uni-variate and multivariate non-parametric analysis: distinction between conventional banks and islamic banks in credit risk management processes, *Pakistan Journal of Statistics*, 31 5, pp. 587-600.
21. Perera, S., M. Skully and J. Wickramanayake. (2007). Cost Efficiency in South Asian Banking: The Impact of Bank Size, State Ownership and Stock Exchange Listings, *International Review of Finance*, 7 (1-2), pp. 35-60.
22. Petria, Nicolea, Bogdan Capraru and Iulian Ichnatov. (2015). Determinants of banks' profitability: evidence from EU27 banking systems, *Procedia Economics and Finance*, 20, pp. 518-524.
23. Ramzan, Muhammad and Shahid Muhammad Khan Ghauri. (2012). *Islamic Banking: The Philosophy and Fundamentals*. Germany: LAMBERT Academic Publishing.
24. Sarker, A.A. (2006). CAMELS rating system in the context of Islamic banking: A proposed 'S' for Shariah framework, *Journal of Islamic Economics, Banking and Finance*, 2 (2).
25. Sarwar, A. and S. Asif. (2011). Safety & soundness of financial sector of Pakistan: CAMEL rating application, *Interdisciplinary Journal of Contemporary Research in Business*, 3 (2), pp. 624-630.
26. SBP. (2015). *Annual report*. State Bank of Pakistan, *SBP Islamic Banking Quarterly Bulletin*. State Bank of Pakistan, 2016.
27. Srairi, Samir. (2015). Corporate Governance Disclosure Practices and Performance of Islamic Banks in GCC Countries, *IJUM Journal of Islamic Finance*, 4 (2), pp. 1-17.
28. Wafaretta, Vega, Rosidi and Aulia Fuad Rahman. (2016). The impact of banks' characteristics on profit distribution management of Islamic banks, *Social and Behavioral Sciences*, 219, pp. 769-776.
29. Wirnkar, A.D. and M Tanko. (2008). CAMELS and banks performance evaluation: The way forward. *Working Paper, SSRN*.
30. Zaidi, Syed Anees Haider, Ijaz Hussain Shah, Rana Umair Ashraf, Shahid Mohammad Khan Ghauri and Ibne Hassan. (2015). Standardization of Islamic market indices, *International Journal of Commerce and Management*, 25 (2), pp. 240-256.
31. Zubairi, H. Jamal and Sarwat Ahson. (2015). Balancing Risk Management and Profitability, *Pakistan Business Review*, pp. 264-287.