

AN EMPIRICAL STUDY ON THE RELATIONSHIP BETWEEN CREDIT RATING AND BANKS' PERFORMANCE: EVIDENCE FROM AN EMERGING MARKET

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Abstract

This paper provides new empirical evidence with respect to the influence of banks' long- and short-term credit ratings and their volatility performance in the emerging market of Pakistan covering 10-year analysis and a unique and comprehensive data set derived from a sample of Islamic and conventional banks with Islamic windows. The purpose of this paper is to examine the nature of the relationship between Islamic banks' performance and banks' credit rating focusing on the emerging market of Pakistan over the period of 2010-2019. To achieve the describing goal, researchers use various quantitative approaches, namely the ordinary least square (OLS) and the Granger causality test. Sample consists of nine conventional banks with Islamic windows and three fully-fledged Islamic banks listed on the Karachi Stock Exchange with credit ratings assigned by the PACRA. Results reveal that banks with higher financial performance have higher long- and short-term ratings, higher GDP growth rates, lower equity to assets ratio, and are smaller in size. Results also array the existence of bidirectional Granger causality between short- and long-term ratings and ROE and a unidirectional Granger causality between trend ROE and trend short- and long-term ratings, respectively.

Keywords: Banks Performance, Credit Rating, Event Study, Islamic Banking, Risk

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1 Introduction

The banking industry has exhibited significant advancement and growth over time along with the proliferation of Islamic and conventional banking (Rashid et al., 2020). Banks are the custodian of the assets of the public and the institutions. They play key role in many diverse but integrated monetary activities like mobilization of capital, eradication of scarcity, and the allocation of municipal funds (Ayub et al., 2012). Accordingly, a country's financial and economic stability relies on the expansion of its banking sector (Deltuvaitė & Sinevičienė, 2014) and “openness of its markets to foreign capital and investment” (Ume-Farwa, 2016).

The emerging markets are considered a persuasive alternate because they stand a pace to developed markets based on their young and growing markets, economic growth, equity valuations, resources and commodity prices, demographics and portfolio diversification (Fmg Funds, 2018). Banks play a significant role in promoting economic growth of a country. For example, banking sector in Pakistan contributed nearly 74% of the total financial sector's assets and at the same time banking sector provided credit reported at 57.9% in 2018 which measured up to 55% of GDP (State bank of Pakistan, 2018; World Bank, 2018).

To face numerous challenges, such as governance, social, and environmental Pakistani banks are striving to build financial resilience. And credit rating is a critical factor that affects banks' performance. Motivated to understand the nature of the relationship between Islamic banks' performance and banks' credit rating the researchers examine the performance of banking industry in the emerging market of Pakistan over the period of 2010 - 2019 while emphasizing on the impelling performance indicators. The researchers utilize Return on Equity (ROE), a general assessor of banking sectors performance and complement it by another factor such as credit rating, which determines the banks' capacity to honour its financial obligations (Karminsky & Khromova, 2016).

The modern banking industry is categorised into conventional banking and Islamic banking sectors. In conventional banking, the primary goal is the maximization of profit based on lending models, while Islamic banking is Sharia (Islamic law) compliant, where interest-based models are strictly prohibited (Cerović et al., 2017). Conventional banking performance and effect of rating and rating changes have been extensively analyzed over the years, whereas the analysis of Islamic banking's contribution to a country's performance and effect of rating and rating changes have been scarce in the emerging market of Pakistan.

Consequently, there is a gap in the existing literature which needs specific attention. This paper addresses this gap.

In Pakistan, Islamic banking was implemented in 1980s through amendments in banking ordinance by State Bank (Khattak & Kashif, 2010). In the previous decade, Pakistan was considered the third country striving to implement interest-free banking globally (State Bank of Pakistan 2007). Over the last epoch, Islamic banking industry in Pakistan has shown a tremendous optimistic performance concerning balance-sheet growth (Michaels, 2017). Moreover, in 2016 Morgan Stanley Capital International (MSCI) upgrading Pakistan to emerging market status made it one of the highest return yielding markets in the world (Tierno, 2016). Being an emerging market, Pakistan received increasing attention offering an opportunity to global investors Foreign Direct Investments (FDI) and investment in financial markets (capital inflows). Based on investors' market accessibility experience along with other classification factors MSCI maintained Pakistan's status of an emerging market in 2018 (MSCI, 2018). On the other hand, Franklin Templeton reports a "widening current account deficit and shrinking foreign exchange reserves denting investor sentiments" (Sekhon & Seghal, 2018) in Pakistan¹. Along with conventional banking, Islamic banking industry in Pakistan is considered a significant factor for the development of the country's financial markets. Banking sector weighed heavily for Pakistan to be recognized as an emerging market, where "full-fledge Islamic banks" weighed 59.9 per cent and "Islamic banking branches of conventional banks" 40.1 per cent, respectively of total assets of Islamic banking industry. (SBP, 2018). In this paper, the researchers examine the causality between performance of Islamic banking sector, and short and long-term credit ratings (Hassan & Barrell, 2013).

This research makes number of contributions to the current literature. 1) Despite the dynamic nature of the topic, existing research is limited which examine empirically the impact of credit ratings on banks' performance. This paper adds to the limited research while building on some existing literature (e.g., Hassan & Aliyu, 2018; Majeed, 2021; Mansoor, 2019; Manungo, 2017; Park & Lee, 2018). (2) This paper provides a comprehensive analysis of the independent effect of credit ratings on the performance of Islamic banks as well as how banks' financial performance influences these ratings. 3) In addition to OLS, the Granger

¹ In 2021, due to non-compliance with the "MSCI market classification framework" in terms of standards of liquidity and size, Pakistan is re-classified as a frontier market although the equity market fulfils the criteria for an emerging market status (MSCI, 2021).

causality is utilized to test if past and present values of bank's performance help to predict Credit Ratings. 4) Findings provide guidance for policy makers about how banks' performance is affected by credit ratings. Specifically, the results should help different stakeholders to understand the determinants of banks' performance and the ability of these financial institutions to generate high returns for their investors.

The remaining paper is organized as following. Section 02 focuses on literature review whereas section 03 describes the data, review the factors that have a potential impact on banks' ratings, and then formulate the hypotheses. Section 04 and 05 present the empirical analysis and the conclusion, respectively.

2 Literature Review

2.1 Credit Rating in Islamic Banking in Pakistan

Theoretical fundamentals of modern Islamic banking and finance are based on proficient allocation of capital and financial decisions aimed at promoting development and stability (Hassan & Aliyu, 2018; Khan, 1986; Majeed, 2021). Correspondingly, the recent focus on the sustainable development paradigm serves as a prospect to substantiate the effect of credit rating in Islamic banking Industry (Hassan & Aliyu, 2018). Sharia governed attributes in Pakistani financial markets are reported to have a significant influence on banks' long-term credit rating (Mansoor, 2019; Masood et al., 2016). However, Sharia compliance is not considered during the rating process by the international rating agencies. According to Fitch, (2019) sharia non-compliance is considered only if it implicates the rating process. Hence, this paper extends to Pakistani financial markets the rating literature related to conventional markets. It emphasizes on the phenomena of a cause-and- effect relationship among banks' financial performance and the short- and long-term credit ratings. Short-term and long-term credit ratings represent a bank's capacity to fulfil its financial obligations (Gogas, 2014) in less than 12 months and 12 months or more, respectively.

2.2 Impact of Credit Rating on Financial Markets and Countries Growth

The banking ratings literature primarily focuses on the relationship between the short- and long-term credit ratings of a bank and its profitability and capital ratios. The multi-dimensional nature of a bank 's performance is explained by an array of performance measures (Titkoa et al., 2015). Return on Equity (ROE) is among the most frequently employed measures to ascertain a bank's profitability (Ameur & Khiri, 2013; Bikker, 2010; Hasan et al., 2012; Kosmidou & Zopounidis, 2008; Kumbirai & Webb, 2010; Ongore &

G.B.Kusa, 2013 cited from Keffala, 2019). And, credit ratings are often used as a benchmark by lending institutions to assess and compare the performance of banks (Coppens et al., 2007).

Conventional banks are interested in credit ratings because probabilities of default are a worthy input in all types of risk assets, specifically lending derivatives advanced by banks (Cantor et al., 1997; Elton et al., 2004; Hull et al., 2004). Credit ratings serve as a frontier for the creditworthiness of an entity. They are the representation of the credit strength of an issuer and demonstrate the ability of an institution to fully and punctually meet its debt obligations (Matthies, 2013). Credit rating information being issued by the rating agencies, assist creditors lending choices while minimizing information asymmetry about debtors' financial stability (Park & Lee, 2018).

Teixeira et al., (2014) and Cavallo et al., (2013) emphasize on the significance of credit ratings for an investor through evidence. The eminence of financial system reflects the ability of a country to mobilize its savings and efficiently allocating its capital allocation while diversifying the risk. Therefore, credit ratings significantly affect foreign direct investment (Borensztein et al., 1998). Wheeler and Mody (1992) differentiate among the “developed and developing recipients” and argue that for the developing countries the quality of institution is more critical in comparison to developed countries. The reason is that the developed countries present superior institutional infrastructure. The credit ratings issued by dominant rating agencies like Standard & Poor's and Moody's are crucial to international investors investing in corporate debts in search of higher returns in emerging markets.

The reasons for this gesture are; (a) emerging markets offer a lower financial information in comparison to developed markets, (b) the certification of debt eligibility for international investors in emerging markets is not possible due to lack reliable financial institutions; (c) in emerging markets it is not permissible for many foreign institutional investors to capitalize speculative-grade bonds, and (d) for financial regulations, ratings, supervision and capital adequacy rules are implied by the regulators of banks (Murcia et al., 2014). The frontier markets demonstrate a similar pattern to emerging markets in terms of international financial integration and vulnerability to fluctuations in international financial markets (Abidi et al., 2019).

Pottier (1998) developed a model from ratings and rating changes while employing Logistic regression method. He reported significant improvement based on combining ratings and rating changes in the predictive ability in comparison to the application of financial

ratios. Credit rating is considered as a degree of a country's investment system. A rating encompasses relevant risk factors deemed significant by rating agencies. Cantor and Packer (1996) find that “per capita income, GDP growth, inflation, external debt, level of economic development and default history” determine a country’s portfolio. For private issuers like a country’s banks, the credit ceiling² serves as a measure of highest achievable credit rating. Furthermore, both downgrade and upgrade have impact on inflows and outflows in downgraded countries and developed countries. For example, Gande and Parsley (2004) reported that the downgrade news displays a significant association with capital outflow in the downgraded countries. While Kim and Wu (2011) report significant influence of credit ratings on the international bank flows in developed markets.

Previous studies have investigated the impact of the credit rating on financial markets. They find negative credit ratings have stronger impact on the institutional reputation compared to the positive ones. Downgrade news impacts a country's financial markets, equity, bond, credit default swap and currency exchange markets, while signifying the spill overs to other countries. On other hand, a bank’s performance is not impacted significantly by the upgrade news (Afonso et al., 2012; Alsakka & Gwilym, 2012; Dichev & Piotroski, 2011; Fatnassi & Hasnaoui, 2014; Ferreira & Gama, 2007). Credit ratings allow a simple insight into an emerging markets political, economic, and financial situation (Erdem & Varli, 2014; Manungo, 2017). The rating methodologies have also changed post financial crisis and the rating agencies emphasize on evolving methods, economic growth, sovereign and event risk, and currency internationalization (Amstad, 2015). Kim and Wu (2008) based on analysis of 51 emerging markets report increase in capital inflow due to foreign currency long-term rating. However, he observes an insignificant effect of short-term rating on financial market and capital inflow.

2.3 Research Hypothesis Building on Existing Literature

The discussion above identified gaps in existing literature to examine the presence of a bidirectional (causal) relationship between banks’ performance and credit ratings while using the banks’ micro- and macroeconomic factors as control variables which impact the performance. The “*growth led finance*” hypothesis states that a high rate of economic growth

² A credit ceiling is the maximum allowed percentage increase of the stock of prespecified types of bank assets over a given time period. Its value is usually set in reference to the stock of the regulated assets at the end of some base period (Farahbaksh and Sensenbrenner, 1996, p. 5)

leads to promoting financial development (Robison, 1952). Another school of thought proposes the presence of a “feedback or bi-directional” relationship between banks performance (ROE) and its short-term and long-term credit ratings. It further implies that the short-term and long-term credit ratings significantly affect the financial performance of the bank on a short and long run basis and vice versa.

Correspondingly, Siddiqui and Shoaib (2011) found that banks size is vital in the determination of banks profitability in Pakistan. They use ROE as a measure of profitability. In Pakistan, Adam (2014) reports a direct and significant relationship between banks size, the leverage ratio, and banks’ investment in assets while measuring performance. On the contrary, Nuhiu, Hoti, and Bektashi, (2017) reported an insignificant effect of GDP on banks financial performance. Hence, to reconcile the ratings and growth explanation for banks’ performance, this paper tests the following hypotheses in the context of regression analysis: **H1:** Ceteris Paribus, short and long-term credit ratings significantly affect the financial performance of the bank.

Granger causality is among the evolved definitions of exogeneity in Modern Econometrics (Asghar, 2008) where the null hypothesis is X does not cause Y, the procedure is repeated by “swapping variables” to investigate if Y Granger causes X (Kumar, et al., 2011)”. Thus, having four possible outcomes: (a) no causal relationship between X and Y; (b) unidirectional causality from X to Y; (c) unidirectional causality from Y to X; (d) bidirectional causality (X causes Y and Y causes X)” (Mukherjee et al., 1998). Hence, the causal relationship among banks performance and short-term credit ratings is identified by testing the hypotheses; **H2:** Banks short-term credit ratings Granger cause banks short term performance (ROE) and **H3:** Banks’ short-term performance (ROE) Granger cause banks short-term credit ratings.

The relationship between banks long-term credit ratings and banks long term performance is identified by testing the hypotheses **H4:** Banks long-term credit ratings Granger cause banks long term performance (ROE) and **H5:** Banks long term performance (ROE) Granger cause banks long-term credit ratings.

Long run financial performance (based on 120 months) is function of short run credit rating (less than 1 year) and long-term credit rating (more than 1 year). Trend ROE is based on 120 observations. For trend ratings this paper covers 10 years data or 120 months. Long-term ratings are based on 2 years ratings (since by definition they must be more than 1 year). While short term ratings are monthly data. To examine the relationship between banks’ long

run financial performance based on full sample period- 2010 through 2019 (moving forward the term “trend” will be referred to as a synonym for “long run” or interchangeably) and its credit ratings, in short and long run, the subsequent hypotheses will be tested.

H6 Banks trend ROE has a significant positive effect on banks trend short term credit ratings whereas **H7** tests the reverse effect of H6 by proposing that banks trend short term credit ratings have a significant effect on banks trend ROE. The long run relationship is being validated by H8 and H9 to test. **H8** proposes that the bank’s trend ROE has a significant positive effect on banks trend long term credit ratings and **H9** proposes that banks trend long term credit ratings have a significant positive effect on banks trend long term performance (ROE).

To identify the validity of implications of the above discussed ‘‘alternative’’ hypotheses, the researcher will be adopting the following methodology.

3 Data and Methodology

3.1 Data

The research inquiry is based on Islamic Banking sector of Pakistan. The researchers retrieved the data from the Pakistan Credit Rating Agency Limited (PACRA) database that contains rating information about Pakistan's banks (PACRA, 2021). Despite the potential limitations of using only PACRA's credit ratings in the analysis, such as the possibility of subjective biases in the rating process, this is still a reputable and credible source of data. Pakistan’s banking industry relies on the credit ratings assigned by PACRA which was founded in 1994 as a result of joint venture with a globally reputable fitch rating agency along with another reputable global organization, International Finance Corporation (IFC), and indigenously Lahore Stock Exchange (SBP, 2007)“. These credit ratings capture long & short-term outlook on the creditworthiness of the banks, other entities, and underlying instruments. All banks in Pakistan were required to get themselves credit rated with effect from June 30, 2001. Accordingly, banks continuously get themselves credit rated from credit rating agencies. Banks’ rating is updated from year to year, within six months from the date of close of each financial year.

The selected sample period is from 2010 to 2019. The sample consists of three fully-fledged Islamic banks and nine conventional banks having Islamic windows. The market

share of Islamic Banking Institutions (IBIs) among the overall banking Industry in Pakistan is around 18.7 per cent with an YoY asset growth of 30.6 per cent (SBP, 2021).

3.2 Methodology

3.2.1 Regression

To perform the OLS multiple regression analysis, the researchers utilize equation 1 (Eq.1) below:

$$\theta_{it} = \alpha + \beta_1 RL_{jt} + \beta_2 RS_{jt} + \beta_3 EtA_{.jt} + \beta_4 \text{Log}(A)_{jt} + \beta_5 GDP_{jt} + \beta_6 Age_{jt} + \beta_8 Typ_{jt} + \varepsilon_i \dots \text{Eq. 1}$$

Where the equity return (θ_{it}) is the dependent variable and the list of independent variables include; (RL_{jt}) the long term credit ratings assigned to bank J in period t (RS_{jt}) short-term credit ratings assigned to bank J in period t, ($EtA_{.jt}$) the equity to asset ratio for bank J in time t, ($\text{Log}(A)_{jt}$) log of total assets of bank J in time t, GDP growth rate (GDP_{jt}) in time t, banks' J age (Age_{jt}) in time t and the type of the bank J in time t (Typ_{jt}) in this case Islamic bank or conventional bank with Islamic window. ε_i is the representation of the error term which is the difference between the actual and estimated value of the dependent variable of the given independent variable values (J.B. Guerard, 2013). The regression approach is not reliable when employed on non-stationary³ variables (Brooks, 2014). This necessitates to check if the data is stationary. Hence the researchers perform a unit root and stationarity test.

3.2.2 Unit Root and Stationarity Test

Unit root test is used to examine whether the data is stationarity (Choi, 2001). The null hypothesis is based on assumption of the presence of unit root (non-stationary) in the data. The aim is to collect data for all variables and banks over the sample period; therefore, the researchers employ a balanced panel dataset. This paper tests whether the time-series variables are stationary, integrated or cointegrated of the same order (Jayakumar et al., 2018).

³ Stable data, even with some fluctuations in some time periods, is considered stationarity. If the fluctuations (volatility) are transitory, the variable attains its long-run equilibrium in the subsequent period. (Root & Lien, 2003). If so, the data would be classified as stationary. However, if the variable does not return to its long-run equilibrium, this implies absorption of shock effect (Schumacker & Lomax, 2016).

It employs the Augmented Dickey-Fuller (ADF)⁴ which is widely employed in the empirical literature.

The null hypothesis (H_0) states that "time series is non-stationary". Rejection of the H_0 would imply the time series is integrated of order zero $I(0)$ or stationary. On the other hand, if we fail to reject H_0 , and find the first difference of the time series is stationary, then it is integrated of $I(1)$. Integrated the time series would indicate there exists a long-run equilibrium relationship that between banks' ROE performance and credit rating.

3.2.3 *Granger Causality*

Granger causality test determines the relationship (causation) between two variables. In the context of this research, if past and present values of bank's performance help to predict Credit Ratings then the variable, financial performance, is said to Granger-cause, another variable, short- and long-term credit ratings.

The value of Granger causality tests is apparent in 2-dimensional systems with "no z_t variables". If a researcher is dealing with 2-dimensional system the Granger causality concept is relevant to test (Toda & Phillips, 1994) the null hypothesis " X_t does not Granger cause Y_t ". To test the hypothesis, an "unrestricted model" is developed where Y_t is regressed against its lagged value Y_{t-i} (Samak, et al., 2020) and X_{t-j} simultaneously and then "restricted model" is developed where Y_t is regressed only against Y_{t-i} . Joint test based on F-statistics is employed used to ascertain whether X_{t-j} has a significant contribution in the explanatory power of the unrestricted model. Finding of significant contribution results in the rejection of the null hypothesis (H_0) and this indicates that X_t is causing Y_t . On other hand, the null hypothesis that " Y_t does not Granger cause X_t " can be tested by switching X_t and Y_t (Li & Shukur, 2011) in the models (Ba et al., 2018; Robert & Daniel, 1998) ". The model of Granger causality tests can be established as following (Buiter, 1986):

⁴ Stationarity of data is required also for Granger causality, section 3.3.3

$$\theta_{it} = \sum_{j=1}^p \alpha_j \theta_{t-j} + \sum_{j=1}^p \beta_j r_{ating_{t-j}} + u_t \quad \dots \text{Eq. 2}$$

$$rating_t = \sum_{j=1}^p \eta_j \theta_{t-j} + \sum_{j=1}^p \gamma_j GDP_{t-j} + V_t \quad \dots \text{Eq. 3}$$

This paper utilizes the F-statistics for the joint hypothesis testing as following: $F = (N - k) \frac{ESS_R - ESS_{UR}}{q(ESS_{UR})}$. The statistics are distributed as F (q, N-k) (Cheung et al., 1995). Where ESS_R and ESS_{UR} are the sums of squared residuals in the restricted and unrestricted regression respectively. N is the number of observations, q is the number of parameter restrictions, and k is the number of estimated parameters in the unrestricted regression (bin Mohd, 2011; Robert & Daniel, 1998).

4 Empirical Results

4.1 Descriptive Analysis

The descriptive analysis of the variables affecting the performance of Islamic banks and conventional banks with Islamic divisions over the sample period from 2010 to 2019 is represented in Table 1. All return series have a positive mean (Bouri, et al., 2016). Shapiro-Wilk statistics show the data follows approximately normal distribution.

Table 1: Descriptive Analysis of Bank's Microeconomic Factors & GDP (2010-2019)

Variable	Obs	Mean	Std. Dev.	Min	Max	Shapiro-W
ROE	120	0.1141332	0.1434689	-0.74	0.3	0.156
Equity/Assets	120	0.0868821	0.0398634	0.046	0.251	0.097
T. Assets	120	340344.6	273986.8	639	1051814	0.083
Age	120	13.83333	7.099692	0.00	25	0.221
GDP	120	1.342514	1.908265	0.0258	5.28	0.810

Note: Type is dummy variable

Table 2 summarizes the average value of microeconomic factors and GDP percentage for the sample data, which consists of three fully-fledged Islamic banks (IB's) and nine conventional banks with Islamic divisions (CBID's). The ROE⁵ for IB's range from -3 per

⁵ ROE is a measure of the profit made for each dollar from shareholders equity and is calculated by dividing a company's annual return by shareholders equity.

cent to 17 per cent and for CBID's from -6 per cent to 26 per cent, showing higher variation. Results reveal that CBID score higher ROE values as compared to IB indicating they are more efficient in generating profits and returns for shareholders, thus have potential greater impact on country's GDP. Additionally, the higher ROEs for CBID indicate they are better in utilizing resources to generate profits. However, the higher ROE values may be due to a small equity account compared to net income (see table 2), which indicates some level of risk. Meanwhile, CBID score higher negative values indicating higher risk and they are losing more money during adverse economic situations.

The ⁶equity to asset ratio for IB's is 7 to 9 per cent and for CBID's 5 to 15 per cent. Al Baraka Bank (Pakistan) Limited is a fully-fledged Islamic bank and largest compared to other IB's and CBID's in the sample group. MCB Bank Limited is largest among the CBID's and shows second highest performance. The CBID's are also operating longer compared to the IB's, hence showing longer age.

As an additional test, this paper utilizes independent sample T-test to examine the null hypothesis of no significant differences in banks' age, size, ROE, and equity/assets ratios of these two groups of banks. Table 2 shows the results of the *t*-test for differences in above mentioned factors and ratios between CBID and IB. Findings offer evidence of an insignificant difference between two sets of banks as the p-value associated with the null ($H_0: \mu_1 - \mu_2 = 0$) is higher than 0.05.

⁶ Equity to asset ratio is a measure of a business's solvency and is derived dividing its net worth by total assets.

Table 2: Analysis of Banks Capital Adequacy Ratios

Bank Name	Av. ROE	Av. Equity/Asset*	Size PKR mln	Age**	GDP %	Type***
AlBaraka Bank (Pakistan)	-3%	9%	861,445	7	4%	IB
Allied Bank Limited	17%	9%	595,505	12	4%	IB
BankIslami Pakistan Limited	4%	7%	103,146	13	4%	IB
Bank Al Habib Limited	26%	5%	435,717	26	4%	CBID
Bank Alfalah Limited	16%	5%	655,718	25	4%	CBID
Faysal Bank Limited	11%	6%	355,851	23	4%	CBID
JS Bank Limited	6%	9%	135,362	11	4%	CBID
MCB Bank Limited	24%	12%	829,492	26	4%	CBID
The Bank of Punjab	6%	8%	187,377	14	4%	CBID
Soneri Bank Limited	-6%	8%	203,432	13	4%	CBID
Standard Chartered Bank	16%	13%	399,555	12	4%	CBID
The Bank of Khyber	10%	15%	113,890	26	4%	CBID
t-statistics	2.5 (P-value=.542)	2.44 (P-value=.522)	2.36 (P-value=.443)	2.12 (P-value=.532)		

* Capital adequacy ratio, **from 2010 -2019, *** IS = Islamic, CBID=Conventional Bank with Islamic Division

4.2 Regression Analysis

The results of regression analysis are summarized in Table 3. Findings indicate the presence of positive and significant correlation between banks return on equity (ROE) and the long- and short-term credit ratings (Demirovic & Thomas, 2007) with values of 0.3909 and 2.74968, respectively. The values for type of banks (0.19231), age of bank (0.32134) and GDP growth rate (0.14365) are also positive. Hence indicating that variables with higher scores tend to have a higher impact on return on equity/ performance. ROE is negatively correlated with Equity to assets ratio (-.40266) and log of total assets (-0.46688), indicating that higher financial leverage and larger banks size have a lower return on equity, demonstrating consistency with the findings of Akinlo and Asaolu,(2012); Alkhatib (2012); Kartikasari and Merianti (2016); and Shah and Ilyas (2014).

The p-values of six out of seven variables namely, long-term rating (0.0223), short-term rating (0.0152), equity to total asset (0.0499), log (0.01739), GDP growth rate (0.0426) and banks age (0.0216) are lower than that of the alpha (0.05). Therefore, we accept the alternative hypothesis of H_1 concluding these variables have a significant effect on banks'

volatility performance. However, the p-value for banks type (0.6231) is higher than that of alpha (0.05) indicating that banks type has no significant effect on banks' performance. The R² is 0.7749 indicating that about 77% of the variability in banks' performance is explained by the regression equation. Results support findings of Ceylan and Ceylan (2020).

Table 3. Regression Analysis of Dependent and Independent Variables

Dependent Variable		ROE		
Variable	Parameter	Standard Error	t-Value	Pr> t
Long-Term ratings	0.3909	0.31798	1.23	0.0223
Short Term ratings	2.74968	1.90276	1.45	0.0152
Equity/ Assets	-0.40266	0.59245	-0.68	0.0499
Log (Total Assets)	-0.46688	0.33983	-1.37	0.01739
GDP Growth Rate	0.14365	0.17939	0.8	0.0426
Age	0.32134	0.2134	0.21	0.0216
Type	0.19231	.11326	0.532	0.6231
Adjusted R Square	0.7749			

4.3 Unit Root Test Analysis

Table 04 shows ADF results. T-statistics for the θ are (two variables) less than the critical values at the 1%, 5% and 10% significance level (*P-value* is 0) indicating that the null hypothesis is strongly rejected. Therefore, the variables ROE-short and -long term rating are stationary, and each variable time series has no unit root, or $I(0)$.

Table 4. t-statistics

t-Test	t-Statistic	p-Value	1% Level	5% Level	10% Level	Lag Length
ROE-Short Term Rating	-5,12	0,00	-2,87	-1,95	-1,22	1
ROE-long Term Rating	-4,02	0,00	-2,11	-1,95	-1,03	2

Having established the co-integration among the two sets of variables, this paper employs a panel Granger causality test, using VECM vector error-correction model, to determine the direction of causality among the two variables (Jayakumar, et al., 2018).

4.4 Granger Causality Test Results

The causality test results are susceptible to the length of lags, and an appropriate lag can be determined by using the Akaike Information Criterion (AIC). This paper utilizes the AIC statistic and reveals lag 4 between pairs to be optimal. The Granger causality test results are summarised in Table 5 where seven out of eight hypotheses testing the presence of causality among pairs have been rejected.

The null hypothesis H_2 stating that banks short-term credit ratings do not Granger cause banks volatility performance (ROE) is rejected with a probability of 0.00. Hence, indicating the presence of relationship between short-term credit rating and ROE. Similarly, the null of H_3 which states that banks volatility performance (ROE) does not Granger cause banks short-term credit ratings is also rejected with a probability of 0.00 indicating the presence of a bidirectional causal relationship between banks volatility performance and credit ratings.

A bidirectional causal relationship has been identified between banks long-term credit ratings and banks volatility performance by testing the hypotheses H_4 and H_5 . H_4 states that banks long-term credit ratings do not Granger cause banks volatility performance (ROE) and is rejected with a probability value of 0.00. H_5 address the causal relationship among ROE and banks long-term credit ratings and is also rejected with a probability of 0.00 indicating that banks volatility performance (ROE) does not Granger cause banks long-term credit ratings. This supports results revealed by Afonso et al. (2012); Alsakka and Gwilym (2012); Dichev and Piotroski (2011); Fatnassi and Hasnaoui (2014); and Ferreira and Gama (2007).

Moving forward, this paper investigates the presence of a causal relationship among banks long-run volatility performance (trend ROE) and short and long-term credit ratings (in the long run). The long-run volatility performance of bank is represented by “trend ROE” and the short- and long-term credit ratings (in the long term) are represented by “trend short-term ratings” and “trend long-term rating” in the table 5, respectively. To achieve the said objective, the researchers repeat the ADF unit root test for trend ROE (banks’ Return on equity from 2010 to 2019) and trend short-term ratings (ratings for sample banks for a period of less than 12 months) and long-term ratings (ratings for sample banks for a period of 12 months and above) to investigate stationarity. The results show that they have no unit roots.

Subsequently, this paper performs the Granger causality test. As shown in Table 5, the hypothesis H_6 which proposes that banks long run performance (trend ROE) does not have a significant positive effect on banks short term credit ratings (in the long run) is rejected with a probability of 0.00. Correspondingly, the hypothesis H_7 testing the reverse

effect of H6 proposing that banks trend short term credit ratings do not have a significant effect on banks long run performance (trend ROE) is also rejected. H₈ states that the bank's long run performance (trend ROE) does not have a significant positive effect on banks' trend long term credit ratings is rejected. And the researchers establish a bidirectional causal relationship between trend ROE and trend long-term ratings.

To establish the causal relationship between trend long-term rating and trend ROE, the paper tests the hypotheses H₉. H₉ proposed that banks long term credit ratings do not have a significant positive effect on banks trend ROE; however, we fail to reject H₉ with a probability of 0.98 indicating the presence of unidirectional causality relationship running from long-term rating to trend ROE.

Table 5: Granger Causality Test Results

Null Hypothesis	Lags	F-Statistic	Probability
H ₂ : Short-Term Rating does not Granger cause ROE	4	12.555	0,00
H ₃ : ROE does not Granger cause Short-Term Rating	4	6.443	0,00
H ₄ : Long-Term Rating does not Granger cause ROE	4	9.111	0,00
H ₅ : ROE does not Granger cause Long-Term Rating	4	3.882	0,00
H ₆ : Trend ROE does not Granger cause trend Short-Term Rating	4	2.937	0,00
H ₇ : Trend Short-Term Rating does not Granger cause trend ROE	4	1.562	0,00
H ₈ : Trend ROE does not Granger cause trend Long-Term Rating	4	10.324	0,00
H ₉ : Trend Long Term Rating does not Granger cause trend ROE	4	0.331	0,98

5 Conclusion

This paper utilizes the ordinary least square regression (OLS) approach to examine the relationship between long- and short-term credit rating on the Islamic banking performance in Pakistan over the sample period from 2010 to 2019. Sample consists of nine conventional banks with Islamic windows and three pure fully-fledged Islamic banks listed on Karachi Stock Exchange with credit ratings assigned by the Pakistan Credit Rating Agency. Bank's performance is proxied by banks' return on equity (ROE) (Caselli, et al., 2016). This paper also utilizes internal and external control factors to measure their effect on the strength and direction of the relationship between credit rating and banks' performance. Among internal factors, the paper utilizes both banks' size and financial leverage, and for external macroeconomic factors it uses the annual percentage growth on countries' GDP.

Moreover, this paper applies Granger causality to examine the cause-and-effect relationship between banks' rating and performance.

The results from the ordinary least square regression model (OLS) indicates that the high-performance banks exhibit positive long and short-term credit ratings, higher GDP growth rates, lower equity to assets ratio despite being smaller in size. Further application of a unit root test indicates an integrated relationship among banks' performance and credit ratings allowing the examination of short and long-run effects of credit ratings on ROE. The Granger causality test further identifies the direction of causality among banks performance and credit ratings. The outcomes designate that there exists a bidirectional Granger causality relationship between short- and long-term ratings and ROE. The analysis of trend ROE and trend short-term rating indicates that a bidirectional causality relationship is running from short-term rating to ROE. However, there is no indication of the relationship between long-term credit ratings and trend ROE. Concluding there exists a long-run unidirectional causality relationship running from (Jiang & Bai, 2017) trend ROE to long-term rating.

6 Limitations and Further Research

One major limitation of this study is that it is limited to the Pakistani banking industry and relies on data derived from PACRA. This may cause a potential subjective bias due to the specific sample and methodology employed. Nevertheless, the research endeavor offers significant and timely contribution to the literature. Findings even being based on a specific emerging market have significant implications for the international market. As such evidence is useful for creditors, investors, managers, and other stake holders to assess the banks' performances, (Islamic or conventional) in the short- and long-term, in relation to the movement of their credit rating and vice versa.

Moreover, the study of Islamic banks' performance is fascinating due to multiple factors, beyond credit ratings assigned by PACRA. The analysis of the following will produce a new stimulating research inquiry/ paper: 1) The role of bank-specific factors on credit risk, 2) In-depth investigation of the process and accuracy of ratings issued by credit ratings agencies in Pakistani financial markets, 3) The review of various existing validation models to check the ability of credit rating systems to forecast banks' future defaults 4) showing extended statistics for the two groups of banks separately as two panels and running a t-test to test whether there is any significant statistical difference between the two types of banks with regards to the basics statistics.

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