COMPARATIVE ANALYSIS OF THE RELATIONSHIP BETWEEN BANK SIZE AND PROFITABILITY: ISLAMIC VERSUS CONVENTIONAL BANKS

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Abstract

This paper examines the relationship between bank size and profitability in both Islamic and conventional banking sectors. Using a dataset of 180 conventional banks and 59 Islamic banks across ten countries, this study employs t-tests and regression analysis to explore how bank size influences profitability, focusing on metrics such as Return on Assets (ROA) and Return on Equity (ROE). The findings reveal that while larger banks tend to be more profitable in both sectors, Islamic banks display more stable profitability. This research highlights the nuances of bank size's impact on profitability, suggesting that Islamic and conventional banks exhibit different dynamics.

Keywords

Bank size, profitability, Islamic banks, conventional banks, ROA, ROE.

1. INTRODUCTION

The global banking industry plays a crucial role in economic development by channeling funds from savers to borrowers and facilitating trade. Over the years, two main types of banking systems have evolved: conventional and Islamic banking. Conventional banks operate under interest-based mechanisms, while Islamic banks follow Shariah-compliant principles, prohibiting interest (riba) and focusing on profit-sharing arrangements.

The emergence of Islamic banking has attracted significant attention due to its unique business model, which aligns financial activities with religious and ethical standards. As Islamic banking grows in popularity, a key question arises: how do Islamic banks compare with conventional banks in terms of profitability, and how does bank size influence this relationship? Larger banks typically benefit from economies of scale, which can enhance profitability. However, in the case of Islamic banks, different principles and structures may alter this dynamic.

This study aims to investigate the relationship between bank size and profitability, specifically comparing Islamic and conventional banks across ten

countries, including those in the Middle East and Asia. This cross-country analysis adds a broader dimension to understanding the distinct drivers of profitability in Islamic versus conventional banking.

2. Literature Review

Bank size is thought to be a key factor affecting the bank profitability. This literature review will look at various studies on this topic to understand better whether larger banks are indeed more profitable and how this relationship plays out in both Islamic and conventional banks.

Several studies have explored the impact of bank size on profitability, with mixed findings. For example, Harbi (2019) reports that GDP per capita, market capitalization and bank size have no impact on profitability (p.5). According to his analysis that investigated the profit margins of 686 traditional banks in 52 developing nations between 1989 and 2008, the size of banks does not have a significant effect on profitability.

Nurhafiza and Azizan (2020) in their work "The Determinants of Islamic and Conventional Banking Profitability in Asian Countries", indicate that the impact of bank size on profitability varies between Islamic and conventional banks in the dual banking system. For Islamic banks, larger size is associated with higher profitability. These findings emphasize the distinctive effects of bank size on the profitability of these two banking types.

Ali Jaara et al. (2021) examined the profitability levels of Islamic and conventional banks and identified significant differences in their determinants of profitability. Conventional banks were found to be more profitable than Islamic banks. For Islamic banks, larger bank size was positively correlated with profitability. In contrast, for conventional banks, a significant negative effect of bank size on profitability was observed.

Majeed and Zainab (2021) found that in Pakistan, IBs face challenges with lower profitability than CBs due to non-performing loans, lower asset quality and small asset size. Despite these challenges, there is potential for IBs to improve their performance and market share in Pakistan's banking sector. In their paper, the authors Sobol, Dopierała and Wysiński (2023) conclude that bank size has a significant positive effect on Islamic banks' profitability, implying that larger Islamic banks tend to be more profitable due to economies of scale and other advantages. Overall, the findings suggest that the impact of bank size on profitability varies between Islamic and conventional banks in the Middle East.

The literature highlights the nuanced link between bank size and profitability, especially in Islamic and conventional banking. Larger Islamic banks often benefit

from economies of scale and diversification, leading to higher profitability. Conversely, the relationship for conventional banks is intricate, with extreme size potentially hindering profitability. The paper aims to contribute to the literature by conducting a thorough analysis of the bank size-profitability relationship using various statistical methods in both Islamic and conventional banking sectors.

3. Methodology

The paper investigated the impact of bank size on profitability by analyzing a dataset comprising 180 conventional banks and 59 Islamic banks across ten different countries. The methodology involves the calculation of summary statistics using Excel's descriptive statistics functions. Hypothesis testing, specifically t-test was employed to compare two independent variables, Islamic and conventional banks, to determine if one is more profitable than the other. Additionally, regression analysis was conducted in Excel to explore the relationship between bank size and profitability.

4. Findings and Discussions

First of all, the data was organized in descriptive statistics in Microsoft Excel.

1.   Descriptive analysis (summary statistics table)

Country	Assets (in million USD)							ROE (%)					
Column1	Count	Mean	Median	STD	Range	Min	Max	Mean	Median	STD	Range	Min	Max
Bahrain	4	12 906.8	8 297.1	14 076.9	31 856.6	1 588.3	33 444.9	14.38	14.34	0.23	0.51	14.17	14.68
Bangladesh	25	2 170.7	2 105.8	731.3	3 024.5	352.4	3 376.8	12.62	13.89	7.18	38.71	-11.55	27.16
Indonesia	53	7 246.5	2 389.6	13 383.0	62 390.5	151.1	62 541.6	11.68	9.71	6.77	27.90	1.65	29.55
Kuwait	5	29 083.5	18 206.6	25 923.7	62 449.1	11 950.1	74 399.2	8.65	8.69	1.63	3.66	6.91	10.57
Malaysia	23	21 718.5	11 819.7	35 648.1	175 121.7	-45 634.0	129 487.7	9.88	11.35	5.66	20.71	-1.08	19.63
Pakistan	17	5 822.5	4 077.0	5 105.8	17 424.1	187.0	17 611.1	11.89	16.39	12.16	48.62	-25.83	22.79
Qatar	6	36 219.4	17 412.0	48 510.1	125 130.4	8 484.1	133 614.5	14.25	13.93	3.14	9.28	9.99	19.27
Saudi	8	53 272.2	50 184.8	28 367.4	91 000.5	24 967.0	115 967.5	15.37	14.22	2.66	6.79	12.66	19.45
Turkey	24	32 245.7	11 850.2	34 224.4	106 065.5	612.8	106 678.3	9.75	12.66	6.37	23.95	-6.51	17.44
UAE	15	28 550.6	9 484.1	34 224.4	98 807.9	3 601.6	102 409.4	15.17	15.73	5.36	16.76	5.81	22.57
Average	18	22 923.6	13 582.7	24 019.5	77 327.1	626.0	77 953.1	12.36	13.09	5.12	19.69	0.62	20.31

Tabl*e 1. Summary statistics for Conventional banks (CBs)*

Country	Assets (in million USD)							ROE (%)					
Column1	Count	Mean	Median	STD	Range	Min	Max	Mean	Median	STD	Range	Min	Max
Bahrain	5	2 976.7	2 327.7	1 545.6	3 626.0	1 574.3	5 200.3	4.53	3.00	4.38	10.61	1.22	11.83
Bangladesh	7	2 832.7	2 588.5	2 540.4	8 138.7	13.3	8 152.0	11.62	11.62	3.91	9.56	6.83	16.39
Indonesia	5	2 803.1	1 635.3	2 244.1	4 966.3	414.9	5 381.2	3.17	1.43	4.08	9.98	0.39	10.37
Kuwait	4	21 421.9	10 663.9	24 985.7	53 003.1	5 678.3	58 681.4	9.53	9.02	3.51	8.24	5.92	14.16
Malaysia	16	9 804.0	5 738.4	10 669.4	41 068.2	818.6	41 886.8	10.15	10.26	5.14	16.01	0.67	16.68
Pakistan	4	1 829.8	22 003.9	1 683.2	3 414.9	939.2	4 354.1	9.27	6.45	8.64	19.29	2.45	21.74
Qatar	3	19 651.9	22 003.9	8 184.6	15 854.1	10 548.8	26 402.9	15.63	15.91	3.18	6.35	12.31	18.66
Saudi	4	33 357.2	19 655.4	32 700.1	69 995.1	12 061.3	82 056.4	12.39	12.68	4.69	9.70	7.25	16.95
Turkey	4	11 209.9	12 180.4	4 197.1	8 825.8	5 826.5	14 652.4	0.87	12.89	25.92	53.60	-37.96	15.64
UAE	7	15 029.4	11 275.1	12 047.5	30 675.6	3 058.2	33 733.8	13.43	8.38	9.01	21.46	2.26	23.72
Average	5.9	12 091.7	11 007.3	10 079.8	23 956.8	4 093.3	28 050.1	9.06	9.16	7.25	16.48	0.13	16.61

Table 2. Summary statistics for Islamic banks (IBs)

Total Assets for Conventional Banks vs Islamic banks:

<u>Size:</u> The results suggest that the average total assets for conventional banks are notably higher compared to Islamic banks, indicating that conventional banks tend to be larger in terms of total assets. On average, CBs have larger assets compared to IBs. The average assets of CBs are approximately $22,923.6 million,

while the average assets of IBs are significantly lower at around $12,091.7 million, indicating that they are generally smaller in size.

Variability in Size: CBs tend to have higher variability in their asset sizes as indicated by their higher standard deviation. This means that CBs' assets vary more widely from the mean compared to IBs. For CBs, Malaysia has the highest standard deviation, indicating significant variation in asset sizes among Malaysian CBs. In contrast, for IBs, Kuwait has the highest standard deviation. The standard deviation for total assets is lower among Islamic banks, indicating that their sizes tend to be more consistent within this category.

ROE for Conventional Banks vs Islamic Banks:

Profitability: The mean ROE for conventional banks is approximately 12%, indicating that, on average, they achieve a moderate return on equity. Islamic banks have a lower mean ROE, averaging around 9%, indicating a somewhat lower average profitability compared to conventional banks. Qatar has the highest average ROE among CBs, while Saudi Arabia has the highest average ROE among IBs.

Variability in profitability: According to the Table 1, CBs exhibit a higher standard deviation of ROE, suggesting greater variability in their profitability. This means that the profitability of CBs can vary significantly from one bank to another within the same country. For ROE, the range for CBs is also wider, indicating that there is more variability in profitability among conventional banks. This variability includes some CBs experiencing losses (negative ROE) and others being highly profitable. IBs, on the other hand, display a lower standard deviation of ROE, indicating relatively less variation in profitability among IBs in the same country.

In summary, conventional banks tend to have larger average assets and slightly higher average ROE compared to Islamic banks. However, conventional banks also exhibit higher variability in both asset size and ROE. Islamic banks, on the other hand, have lower average assets and lower average ROE but demonstrate more stable and less variable financial performance. The lower variability in profitability among Islamic banks may suggest a certain level of stability and consistency in their financial performance compared to conventional banks, which exhibit greater variability. However, it's essential to note that the profitability of both CBs and IBs can still be influenced by a wide range of other factors.

2. Hypothesis testing for profitability

Next, to examine whether Islamic banks are more profitable than conventional banks, a one-tailed t-test was conducted. Below are the steps taken:

1. Formulate hypothesis: *H_o: $\mu1 \leq \mu2$; H_1: $\mu1 > \mu2$*

2.   Significance level: α = 0.05.

3.   Test type: One-tailed (right) t-test, because:

- Comparison of two independent samples: Islamic banks and Conventional banks;

- Small sample size in the number of banks in each category;

- Unknown population standard deviations.

4.   Decision rule: compare the calculated p-value P(T <= t) to the critical t-value to make decision.

- If the calculated p-value is greater than the critical t-value, reject the Ho.

- If the calculated p-value is less than the critical t-value, fail to reject the Ho.

5.   Test the hypothesis:

5.1.   The mean ROE values for both IBs and CBs in various countries were calculated, as well as the standard deviations and variances for these data points. Table 3 is built for running t-test.

Countries	Mean - ROE Islamic banks	Conventional banks
Bahrain	4.526	14.38
Bangladesh	11.624	12.62
Indonesia	3.168	11.68
Kuwait	9.528	8.65
Malaysia	10.152	9.88
Pakistan	9.270	11.89
Qatar	15.627	14.25
Saudi	12.390	15.37
Turkey	0.865	9.75
UAE	13.429	15.17

Table 3. The difference of ROE for each country's IBs and CBs.

5.2.   To determine whether we should assume equal or unequal variances, F-test for variances was conducted. For null hypothesis, variances are equal; for alternate hypothesis, variances are not equal.

5.3.   The t-test was applied assuming unequal variances and compared the results to our critical t-value. P-value < 0.05 (0.0273), indicating unequal variances.

5.4.   Run the t-test assuming unequal variance. P (T<=t) 0.035 is less than critical value 1.77, so fail to reject Ho.

Decision: Accept the null hypothesis (H0); at the 0.05 significance level, there is not enough statistical evidence to conclude that Islamic banks are more profitable than conventional banks.

3.　　Impact of bank size on profitability.

a.　　Scatter plots were generated to visualize the relationships between the Total assets (size) and ROE (profitability) for both types of banks.
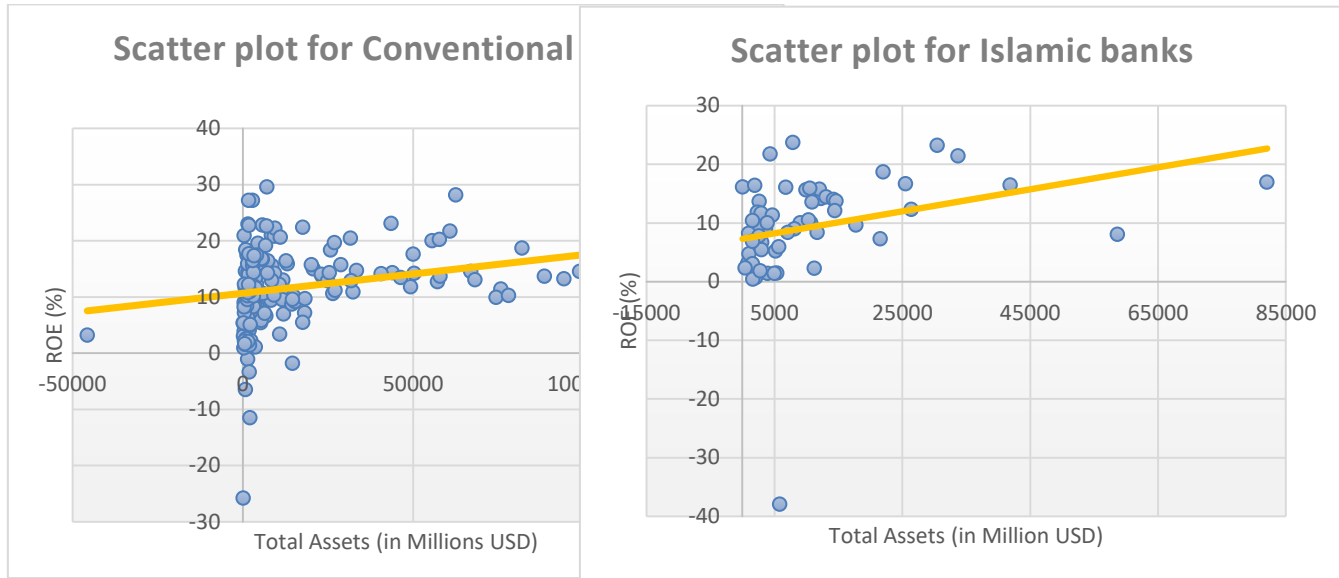
Figures 1-2. Scatter diagrams showing the correlation between Total assets and ROE.

The scatter plot for Islamic banks (Fig. 1-2) shows a more consistent positive relationship between total assets and ROE, suggesting that as Islamic banks grow in size (total assets), their profitability (ROE) tends to improve. The conventional bank dataset showed a more scattered pattern. This could indicate more diverse factors influencing the profitability of conventional banks. Both diagrams contain outliers, but the outliers in the Islamic bank dataset seem to be less extreme in terms of low ROE values. Further statistical analysis would be required to quantify these trends which will be discussed below.

b.　　**Regression variables and their interpretations for Conventional Banks:**

SUMMARY OUTPUT

Regression Statistics					
Multiple R	0.277254198				
R Square	0.07686989				
Adjusted R Square	0.071683766	α= .05			
Standard Error	6.725847639	Descision rule: if P value is less than .05, correlation is statistically significant			
Observations	180	Result: Statistically Signficant			

ANOVA

	df	SS	MS	F	Significance F
Regression	1	670.5132982	670.513	14.8222	0.00016457
Residual	178	8052.190709	45.237		
Total	179	8722.704008			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	10.68349456	0.586947472	18.2018	1.72E-42	9.52522364	11.8417655	9.52522364	11.8417655
Total Assets in Million	6.86958E-05	1.78432E-05	3.84996	0.00016	3.3484E-05	0.00010391	3.3484E-05	0.00010391

Regression equatio $Y = \alpha + \beta (X)$

$Y = 10.683494 + 0.000069(X)$

Regression Equation: $Y = 10.6835 + 0.000069(X)$.

Here, Y represents the return on equity (ROE), and X represents the total assets in millions.

Correlation Coefficient (Multiple R): approximately 0.2773. This suggests a weak positive linear relationship between size and profitability for CBs.

Coefficient of Determination (R Square): approximately 0.0769. This means that 7.69% of the variability in ROE can be explained by the variability in size of the bank for CBs.

Significance F: 0.000164574. It indicates the overall regression model is statistically significant.

P-Value for each variable: P-value for the variable Total Assets (X) for CBs is approximately 0.000164574 which is less than 0.05, indicating that the relationship between bank size and profitability is statistically significant.

Regression variables and their interpretations for Islamic Banks:

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.311924861							
R Square	0.097297119							
Adjusted R Square	0.081460226		α= .05					
Standard Error	8.343326409		Descision rule: if P value is less than .05, correlation is statistically significant					
Observations	59		**Result: Statistically Signficant**					
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	427.6696945	427.67	6.1437	0.01617173			
Residual	57	3967.832447	69.6111					
Total	58	4395.502142						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	7.309190911	1.361842164	5.36714	1.52E-06	4.58214902	10.0362328	4.58214902	10.0362328
Total_asset_in_millior	0.000187399	7.56051E-05	2.47865	0.01617	3.6002E-05	0.0003388	3.6002E-05	0.0003388

Regression equatio $Y = \alpha + \beta (X)$

$Y = 7.30919 + 0.000187(X)$

Regression Equation: $Y = 7.3092 + 0.000187(X)$.

Here, Y represents the return on equity (ROE), and X represents the total assets in millions.

Correlation Coefficient (Multiple R): approximately 0.3119. This suggests a weak positive linear relationship between size and profitability for IBs.

Coefficient of Determination (R Square): approximately 0.0973. This implies that 9.73% of the variability in ROE can be explained by changes in size of the bank for IBs.

Significance F: 0.016171726. It indicates the overall regression model is statistically significant.

P-Value for each variable: P-value for the variable Total Assets (X) for IBs is approximately 0.016171726 which is less than 0.05, indicating that the relationship between bank size and profitability is statistically significant.

General interpretation:

- for both conventional banks and Islamic banks, the regression models are statistically significant, indicating that the relationship between bank size and profitability is significant.

- However, the impact of asset size on ROE is very small for both types of banks, with IBs having a slightly larger impact compared to CBs.

- The impact of asset size on ROE is still small but slightly larger than for CBs, with a coefficient of 0.000187;

- Lower values for R square suggest that other factors also play higher role in explaining the variability in bank size and profitability.

4. **The impact of bank size on profitability considering the bank type in the model.**

To study the impact of bank size on profitability, first of all, we assigned dummy variables to represent the categorical variable "Bank Type." Conventional Bank was assigned a value of 1, and Islamic Bank was assigned a value of 0. This allows us to include the type of bank as a predictor in the regression analysis. The significance level chosen is 0.10.

Regression Equation:

Predicted ROE = $\alpha + \beta_1(X) + \beta_2(D)$	
Predicted ROE = 8.497+0.000078(X) + 2.02610(D)	

"Predicted ROE" represents the predicted return on equity (ROE), "X" represents the total assets in millions, and "D" represents the bank type (1 for Conventional Bank and 0 for Islamic Bank).

Interpretation:

The intercept (8.4971) represents the predicted ROE when both the total assets and bank type are zero.

The coefficient for Total assets (0.000078) indicates that for every one-unit increase in total assets in millions, the predicted ROE is expected to increase by approximately 0.000078 units, holding bank type constant.

The coefficient for "Bank Type" (2.0261) represents the difference in the predicted ROE between Conventional Banks (Bank Type = 1) and Islamic Banks (Bank Type = 0).

P-value: the coefficient has a p-value of approximately 0.0628, which is lower than significance level chosen 0.10. At the 0.10 significance level, the type of the bank is statistically significant in predicting profitability.

General interpretation:

- The regression model, which considers both the size of the bank (Total Assets) and the type of the bank (Conventional or Islamic), is statistically significant at the 0.10 significance level.

- The size of the bank has a statistically significant positive effect on the predicted profitability.

- The type of the bank is also statistically significant in predicting ROE at the 0.10 significance level. This suggests that the type of bank, Conventional or Islamic, does have a meaningful impact on profitability at 0.10 significance level.

After conducting the necessary t-tests and regression analysis, the results reveal interesting differences between Islamic and conventional banks, particularly

in how bank size influences profitability. The findings can be summarized as follows:

• Summary statistics concluded that CBs tend to have significantly larger average total assets and higher variability in both assets size and profitability compared to Islamic IBs. However, IBs display more stable and less variable financial performance.

• The hypothesis test results indicated that, at a 0.05 significance level, there is insufficient statistical evidence to conclude that Islamic banks are more profitable than conventional banks. This aligns with the literature, which suggests that the relationship between bank size and profitability is nuanced and varies across different contexts.

• Scatter plots revealed that Islamic banks generally exhibit a more consistent positive relationship between total assets and ROE, indicating that larger Islamic banks tend to be more profitable. In contrast, conventional banks displayed a scattered pattern, suggesting that profitability is influenced by diverse factors, as mentioned in the literature.

• Regression analysis confirmed that bank size has a statistically significant positive effect on profitability for both CBs and IBs, although the impact is relatively small. The relationship is slightly stronger for IBs, supporting the literature's notion that larger Islamic banks can benefit from economies of scale.

• Considering the bank type using dummy variable in the regression model was statistically significant at the 0.10 significance level. This indicates that the type of bank has a meaningful impact on profitability. This finding is consistent with the literature, which emphasizes the distinctive effects of bank size on the profitability of these two banking types.

5. Conclusion

This study provides a comparative analysis of the relationship between bank size and profitability in Islamic and conventional banks. The results indicate that while larger banks in both sectors tend to be more profitable, the relationship is stronger for conventional banks. This suggests that conventional banks benefit more from economies of scale, while Islamic banks face unique challenges that limit their ability to fully capitalize on size-related advantages.

The findings have important implications for both practitioners and policymakers in the banking industry. For Islamic banks, the findings underscore the need to focus on enhancing operational efficiency and developing innovative financial products that align with Shariah principles while promoting profitability. Policymakers should consider regulatory frameworks that support the growth of

Islamic banks and enable them to compete more effectively with their conventional counterparts.

Future research can explore other factors that influence profitability in Islamic banks, such as governance, risk management practices, and the role of technology in improving operational efficiency.

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