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Equity Financing and Performance of Islamic Commercial Banks in Kuala Lumpur, Malaysia

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Abstract

Equity financing plays a crucial role in the performance of banks by providing a stable and reliable source of capital. With equity financing, banks can strengthen their balance sheets, improve their capital adequacy ratios, and enhance their ability to absorb financial shocks. By issuing new shares or raising equity capital from investors, banks can expand their lending activities, invest in technology and infrastructure, and pursue growth opportunities. Moreover, a higher equity base can increase investor confidence and improve credit ratings, enabling banks to access funding at lower costs. A well-capitalized bank through equity financing is better positioned to navigate economic downturns, mitigate risks, and sustain long-term performance. The study used the descriptive research design. The target population was 20 branches of Islamic commercial banks in Kuala Lumpur, Malaysia. The study did sampling of 15 participants that were chosen from the target population of 20 branches of Islamic commercial banks in Kuala Lumpur, Malaysia. Questionnaires were used to collect the data. It was concluded that equity financing enables investors and the bank to share risks and rewards, and understanding how this affects the risk profile, stability, and profitability of Islamic banks is essential. Identifying areas for improvement and growth in the Islamic banking sector will require ongoing evaluation of the impact of equity financing on various performance indicators, including profitability, risk management, and asset quality. The study recommended that Islamic commercial banks in Kuala Lumpur should focus on strengthening their risk management frameworks to effectively manage the risks associated with equity financing. There should be implementation of robust risk assessment and monitoring systems, conducting thorough due diligence on potential shareholders, and diversifying their equity base to minimize concentration risk. Regulatory frameworks should address issues such as corporate governance, disclosure requirements, and risk management standards to promote transparency, investor confidence, and the overall performance of Islamic commercial banks in Kuala Lumpur.

Keywords: *Equity financing, performance, Islamic commercial banks, Malaysia*

1.0 Background of the Study

Islamic commercial banks in Kuala Lumpur, Malaysia, have established themselves as key players in the country's financial sector (Shabbir, 2022). These banks operate in accordance with the principles of Islamic finance, which prohibit interest-based transactions and promote ethical financial practices. Kuala Lumpur, being a prominent global hub for Islamic banking and finance, houses several leading Islamic commercial banks that offer a wide range of Shariah-compliant products and services. These include Islamic savings and current accounts, home and business financing, trade finance, investment solutions, and wealth management services. The presence of Islamic commercial banks in Kuala Lumpur contributes significantly to the development and growth of Malaysia's economy. These banks provide financing options to individuals and businesses while ensuring compliance with Shariah principles. Their profit-sharing and risk-sharing models foster a sense of fairness and ethical conduct in financial transactions, attracting customers who seek banking services that align with their religious beliefs (Oladapo, Hamoudah, Alam, Olaopa & Muda, 2022). Moreover, these banks actively participate in supporting the country's infrastructure projects, corporate ventures, and trade activities, contributing to economic stability and sustainable growth. With their expertise in Islamic finance and Kuala Lumpur's status as a thriving financial center, Islamic commercial banks play a crucial role in positioning Malaysia as a global leader in Islamic banking and finance.

Equity financing serves as an important source of capital for Islamic commercial banks in Kuala Lumpur (Alamoudi & Othman, 2021). It allows banks to raise funds by selling ownership stakes to investors, who become shareholders in the bank. These shareholders share the risks and rewards of the bank's operations and play a significant role in shaping its performance. The performance of Islamic commercial banks in Kuala Lumpur is influenced by several factors related to equity financing (Setiawan, 2021). One such factor is the composition of the equity base. Banks with a well-diversified equity base are better positioned to manage risks and absorb losses. Therefore, it is essential for banks to attract a diverse group of shareholders to enhance their resilience and stability. The quality of shareholders is another important aspect to consider. Shareholders who bring expertise, experience, and strategic value to the bank can contribute positively to its performance (Vitolla, Raimo, Rubino & Garzoni, 2019). Banks should prioritize attracting shareholders who align with the bank's vision and can provide valuable insights and guidance.

Governance structure also plays a significant role in the performance of Islamic commercial banks. Effective corporate governance practices ensure transparency, accountability, and sound decision-making. Abdul Rahim, Shaharuddin and Mohd Suki (2023) mentioned that banks need to establish strong governance frameworks that align with Shariah principles and international best practices to optimize their performance. Regulatory frameworks governing equity financing in Islamic commercial banks should be robust and supportive. The regulatory environment should promote investor confidence, protect shareholder rights, and ensure compliance with Shariah principles (Bello, 2023). Regulations related to disclosure requirements, capital adequacy, and risk management need to be well-defined and effectively enforced to maintain the stability and integrity of the banking system. The profitability of Islamic commercial banks is an important measure of their performance. Equity financing can contribute to profitability by providing a long-term and stable source of capital (Syafrizal & Ilham, 2023). It allows banks to fund their operations and investments without relying solely on debt financing. However, banks need to carefully manage their profitability, ensuring that the return on equity is in line with market expectations while fulfilling their obligations to shareholders.

Asset quality is another key performance indicator affected by equity financing. Sound equity financing practices can help banks maintain a healthy asset quality by reducing leverage and promoting responsible lending (Aslam, Ur-Rehman & Iqbal, 2021). Banks should adopt prudent risk management strategies and conduct rigorous due diligence when selecting equity investors to mitigate the risk of non-performing assets. Capital adequacy is crucial for Islamic commercial banks to meet regulatory requirements and absorb potential losses (Asad, Iftikhar & Jafary, 2019). Equity financing contributes to the capital adequacy of banks by increasing their Tier 1 capital. By maintaining adequate capital buffers, banks can withstand economic downturns and unforeseen challenges, ensuring the stability and resilience of the banking system. Islamic commercial banks in Kuala Lumpur should prioritize investor education and awareness programs to foster a greater understanding of equity financing (Islam & Ahmad, 2020). Educating potential investors about the principles and benefits of Islamic finance and equity participation can help attract a wider pool of investors and strengthen the equity base of banks. Investor education should focus on promoting a long-term investment perspective and the shared responsibility for risks and rewards in equity financing.

1.1 Statement of the Problem

The performance of Islamic commercial banks in Kuala Lumpur, Malaysia, in relation to equity financing has become a significant area of concern. Islamic commercial banks operate based on Shariah principles, which prohibit the payment or receipt of interest and emphasize risk-sharing and asset-backed transactions. Equity financing plays a crucial role in Islamic banking as it allows investors to participate in the profits and losses of the bank. However, there is a need to assess the impact of equity financing on the performance of Islamic commercial banks in Kuala Lumpur to understand whether it contributes to their overall financial health and sustainability. One of the key challenges in examining the relationship between equity financing and the performance of Islamic commercial banks in Kuala Lumpur is the need to evaluate the effectiveness of their risk-sharing mechanisms. Equity financing aligns with the principles of risk-sharing in Islamic finance, where investors and the bank share the risks and rewards of the investment. Therefore, understanding how equity financing affects the risk profile, stability, and profitability of Islamic banks is crucial for assessing their performance. Factors such as the composition of the equity base, the quality of shareholders, and the governance structure need to be examined to determine the extent to which equity financing contributes to the performance of Islamic commercial banks in Kuala Lumpur.

Another important aspect to consider when examining the relationship between equity financing and the performance of Islamic commercial banks in Kuala Lumpur is the impact of regulatory frameworks and market conditions. The regulatory environment in Malaysia, particularly with regard to Islamic finance, influences the practices and operations of Islamic commercial banks. Additionally, market conditions, including the economic climate and competition, can affect the ability of Islamic banks to attract equity financing and their overall performance. Therefore, analyzing the interplay between equity financing, regulatory frameworks, and market dynamics is essential for gaining a comprehensive understanding of the performance of Islamic commercial banks in Kuala Lumpur and identifying areas for improvement and growth in the Islamic banking sector.

2.0 Literature Review

Lu, Wu, Li and Nguyen (2022) conducted research to analyze how different types of financing affect the bottom lines of China's SMEs. In the cities where the survey was conducted, the sample size was calculated to be 291,449 licensed SMEs in the wholesale and retail sectors. The research sample was selected using a random selection process. The sample size was 384, with participants drawn from the six predetermined locations. Quantitative and qualitative information were gleaned from both secondary and primary sources for this investigation. Data was gathered via the use of a structured questionnaire, with the questionnaires being set aside and then retrieved, so that respondents may deliberate over their answers in peace. Cronbach's alpha was used to calculate the questionnaire's reliability. Quantitative data were coded, entered, and analyzed with the use of SPSS ver 22. The relationship between the independent and dependent variables was examined via the use of regression and correlation analysis. Descriptive and inferential statistics were used to examine the data, and the results were shown graphically and numerically to highlight any discrepancies in frequency distributions. Loans, Trade credit, Equity Financing, and Informal Financing were all shown to have a statistically significant connection with the dependent variable Total Financing. Profitability of China's small and medium-sized enterprises. According to the results, the largest correlation was found between trade credit and the financial performance of China's SMEs, followed by equity financing, loans, and lastly informal financing. The research found that the financial success of China's SMEs is not due to any one factor alone. This research suggests that Chinese SMEs use all four types of financing, but place special emphasis on trade credit.

Afrifa, Gyapong and Zalata (2019) conducted study to analyze the effects of equity capital financing on the corporate financial performance of deposit money banks in Paraguay over a 10-year period (2009-2019) Four banks trading on the Paraguay Stock Exchange (Bolsa de Valores & Productos de Asunción S.A.) were used. Information was extracted from the individual banks' annual reports and accounts, the secondary data utilized in this investigation was analyzed using an ex-post facto research approach and the Pooled Ordinary Least Square Method. Panel data analysis was performed using E-View (version 13) software. Both the strength and direction of the association between the explanatory and response variables might be analyzed with the use of the P and T values. Financial performance of Deposit Money Banks in Paraguay was shown to be positively impacted by both ROE and EVA. According to the results of this study, it can be deduced that an increase in the proportion of equity financing used by Deposit Money Banks in Paraguay would have a beneficial impact on the financial performance of these institutions. In order to avoid a loss of value for the company's financial backers, the report suggests that shareholders and bondholders keep close tabs on how managers allocate their company's capital among equity financing, short-term debt, and long-term debt.

Pham (2020) conducted study on the impact capital structures on performance on Greece's publicly traded commercial banks. Research on the effect of capital structure on the financial performance of enterprises has shown mixed results, with most research having been done in Europe, the Middle

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East, and the United States. Secondary data was used extensively throughout the research process. SPSS version 21 was used to produce inferential statistics using multiple regression analysis to summarize the data from the financial and income statements panel covering the five-year period from 2009 to 2013, calculate ratios, and analyze the results for relationships between dependent and independent variables. Performance, as defined by Return on Assets (ROA) and Return on Equity (ROE), was employed as the dependent variable in the multiple regression models. According to the regression study, there was a negative and significant relationship between deposits, debt, and equity and the return on assets of publicly traded Greek commercial banks. According to the regression study findings, the Retained Earnings ratio had a positive, albeit statistically insignificant, link with financial success as assessed by return on assets. Therefore, it was determined that the capital structure of listed Greek commercial banks has a considerable impact on the financial performance of these institutions. To better understand the elements that influence their industry's success, the many players in this sector should conduct studies outside of their own.

Alabdullah (2018) conducted study to determine the extent to which capital structure affects financial results in five different commercial banks in Singapore. Capital structure was characterized by the debt to equity ratio and the debt to asset ratio, and financial performance was evaluated in terms of return on equity, return on assets, and net interest margin. The research used yearly time series data from 2009-2019 from five of Singapore's most prominent commercial banks. Five large commercial banks were chosen and their capital structures and financial performances were analyzed using R, a statistical computer programme. Furthermore, Ordinary Least Square linear regression analysis and correlation analysis were carried out to investigate the connection between capital structure and financial performance. Results demonstrated a positive and statistically significant linear link between ROE and D/E at OCBC Bank and DBS Bank Ltd but a negative relationship at United Overseas Bank. Contrary to what the static trade-off theory of capital structure would suggest, the data indicated an unstable up-and-down (fluctuation) movement in capital structure, showing that no banks tried to obtain an optimal debt to equity ratio (leverage ratio). All five banks' financial performance was characterized by erratic swings, pointing to a potentially volatile market. It seems from the data that there is no universally accepted explanation for the hypothesis that capital structure influences financial performance. To put it another way, not all banks have the same link between capital structure and financial performance. This study's results demonstrate that one cannot generalize about the link between capital structure and financial performance in the banking sector. Therefore, financial institutions need to assess how their capital structure affects their bottom line and make adjustments as necessary.

Dao (2020) performed research to explore the effect of capital sufficiency on the profitability of deposit money banks, a case study of five different banks in Venezuela was used. Empirical research was conducted from 1990 to 2010. Secondary sources, such as the annual reports and financial statements of the chosen banks and the Central Bank of Venezuela statistics bulletin, provided the information used in the research. The research followed the two-step co-integration approach developed by Engle and Granger. Returns on Assets (ROA), a common metric for assessing a bank's profitability, were shown to be significantly explained by capital adequacy. There is a positive and statistically substantial correlation between a bank's level of capital adequacy and its profitability, suggesting that customers will see banks with a greater level of equity capital as being safer. A greater capital ratio is associated with increased profitability for banks. Conclusions included a call for the minimum capital requirement of deposit money institutions in Venezuela to be reviewed on a regular basis until it was set at the optimum level. For the sake of public trust and the satisfaction of clients' credit demands, banks in Venezuela should be adequately capitalized so that they may take use of cheaper sources of funding and see increased profits.

3.0 Research Methodology

The study used the descriptive research design. The target population was 20 branches of Islamic commercial banks in Kuala Lumpur, Malaysia. The study did sampling of 15 participants that were chosen from the target population of 20 branches of Islamic commercial banks in Kuala Lumpur, Malaysia. Questionnaires were used to gather the data.

4.0 Research Findings and Discussion

4.1 Correlation Analysis

Table 1: Correlation Analysis

		Performance	Equity financing
Performance	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Equity financing	Pearson Correlation	. 239 **	
	Sig. (2-tailed)	0.000	0.000

The correlation results from Table 1 show that the equity financing was positively and significantly associated with performance (r=.239, p=.000). This concurs with Afrifa, Gyapong and Zalata (2019) who argued that an increase in the proportion of equity financing used by Deposit Money Banks would have a beneficial impact on the financial performance of these institutions.

4.2 Regression Analysis

The section includes model fitness, analysis of variance and regression of coefficient. The results on Table 2 show the model fitness

Table 2: Model Fitness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.239a	0.299	0.224	0.0125765

The results from Table 2 indicate that equity financing was discovered to be satisfactory in explaining the performance among the Islamic commercial banks in Kuala Lumpur, Malaysia. It was supported by the coefficient of determination, R^2 of 0.299. It shows that equity financing

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explain 29.9% of the variations in the performance of the Islamic commercial banks in Kuala Lumpur, Malaysia.

Table 3: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.17	1	4.17	13.30	.000b
	Residual	6.27	20	0.314		
	Total	10.44	19			

The result in Table 3 shows that the overall model was statistically significant. The results show that performance is a good predictor in explaining the equity financing among the Islamic commercial banks in Kuala Lumpur, Malaysia. This was supported by an F statistic of 13.30 and the reported p-value of 0.000 which was less than the conventional probability significance level of 0.05.

Table 4: Regression of Coefficient

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.674	0.145		4.648	0.068
Equity financing	0.741	0.232	0.580	3.194	0.018

Based on the results in Table 4, it was noted that equity financing was positively and significantly related to performance (β=0.741, p=0.018). This was supported by a calculated t-statistic of 3.194 that is larger than the critical t-statistic of 1.96. The results imply that when the rate of equity financing improves by one unit, the performance of Islamic commercial banks in Kuala Lumpur, Malaysia will increase by 0.741 units while other factors that influence the performance remain constant. Dao (2020) mentioned that there is a positive and statistically significant correlation between a bank's level of capital adequacy and its profitability, suggesting that customers will see banks with a greater level of equity capital as being safer. Equity financing aligns with the principles of risk-sharing in Islamic finance, where investors and the bank share the risks and rewards of the investment. Therefore, understanding how equity financing affects the risk profile, stability, and profitability of Islamic banks is crucial for assessing their performance.

5.0 Conclusion

In conclusion, the relationship between equity financing and the performance of Islamic commercial banks in Kuala Lumpur, Malaysia, is a complex and multifaceted issue. Equity financing plays a vital role in Islamic banking, as it aligns with the principles of risk-sharing and asset-backed transactions. However, several factors need to be considered to fully understand its

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impact on the performance of Islamic commercial banks in Kuala Lumpur. Evaluating the effectiveness of risk-sharing mechanisms is crucial. Equity financing enables investors and the bank to share risks and rewards, and understanding how this affects the risk profile, stability, and profitability of Islamic banks is essential. The composition of the equity base, the quality of shareholders, and the governance structure all play a role in determining the extent to which equity financing contributes to the performance of Islamic commercial banks.

The regulatory framework and market conditions in Malaysia significantly influence the practices and operations of Islamic commercial banks. A supportive regulatory environment is important for the growth and development of Islamic finance. Market conditions, such as the economic climate and competition, also impact the ability of Islamic banks to attract equity financing and ultimately affect their overall performance. It is necessary to analyze the interplay between equity financing, regulatory frameworks, and market dynamics to gain a comprehensive understanding of the performance of Islamic commercial banks in Kuala Lumpur. Moving forward, continued research and analysis are crucial to further explore and enhance the relationship between equity financing and the performance of Islamic commercial banks in Kuala Lumpur. Identifying areas for improvement and growth in the Islamic banking sector will require ongoing evaluation of the impact of equity financing on various performance indicators, including profitability, risk management, and asset quality. This knowledge will enable policymakers, regulators, and industry stakeholders to make informed decisions and implement strategies that promote the sustainable development of Islamic commercial banks in Kuala Lumpur.

6.0 Recommendations

Islamic commercial banks in Kuala Lumpur should focus on strengthening their risk management frameworks to effectively manage the risks associated with equity financing. This includes implementing robust risk assessment and monitoring systems, conducting thorough due diligence on potential shareholders, and diversifying their equity base to minimize concentration risk. By enhancing risk management practices, Islamic banks can mitigate potential risks and ensure the stability and sustainability of their operations. To attract a wider pool of investors and promote equity financing, it is crucial to educate and raise awareness among potential investors about the benefits and opportunities offered by Islamic commercial banks. This can be achieved through targeted investor education programs, seminars, and awareness campaigns that highlight the principles and advantages of equity financing in Islamic banking. By improving investor understanding, Islamic banks in Kuala Lumpur can encourage greater participation in equity financing, thereby strengthening their capital base.

Regulators and policymakers in Malaysia should continue to enhance the regulatory frameworks governing Islamic commercial banks and equity financing. This includes ensuring clear and comprehensive regulations that support the principles of Islamic finance, while also providing a conducive environment for equity financing. Regulatory frameworks should address issues such as corporate governance, disclosure requirements, and risk management standards to promote transparency, investor confidence, and the overall performance of Islamic commercial banks in Kuala Lumpur. Research should focus on analyzing the impact of equity financing on key performance indicators, such as profitability, asset quality, and capital adequacy. By promoting research and collaboration, valuable insights can be generated to inform policy decisions, identify best practices, and drive the continuous improvement of equity financing practices in Islamic banking.

REFERENCES

Abdul Rahim, M., Shaharuddin, N. A. S., & Mohd Suki, N. (2023). Shariah governance disclosure and its effect on Islamic banks' financial performance: evidence from Malaysia and GCC countries. *Journal of Islamic Accounting and Business Research*. https://doi.org/10.1108/JIABR-08-2021-0235

Afrifa, G. A., Gyapong, E., & Zalata, A. M. (2019). Buffer capital, loan portfolio quality and the performance of microfinance institutions: A global analysis. *Journal of Financial Stability, 44, 100691*. https://doi.org/10.1016/j.jfs.2019.100691

Alabdullah, T. T. Y. (2018). The relationship between ownership structure and firm financial performance: Evidence from Jordan. Benchmarking: *An International Journal*. https://doi.org/10.1108/BIJ-04-2016-0051

Alamoudi, A. A., & Othman, A. H. A. (2021). Available financing resources for Islamic microfinance institutions to alleviate poverty-cash waqf approach. *Journal of Islamic Finance, 10, 076-084.*

Asad, M., Iftikhar, K. I., & Jafary, A. Y. (2019). Relationship between capital structure and financial performance of textile sector companies. Kashmir Economic Review, 28(1).

Aslam, E., Ur-Rehman, A., & Iqbal, A. (2021). Does Corporate Governance Matter For Asset Quality Of Islamic Banks?. Buletin Ekonomi Moneter dan Perbankan, 24(2), 221-236. https://doi.org/10.21098/bemp.v24i2.1344

Bello, S. I. A. A. (2023). 1 A Critical Analysis of Conceptual Background of Shariah Governance Framework for Islamic Banking and Finance. Shariah Governance in Islamic Banking Institutions, 1. https://doi.org/10.4324/9781003324836-1

Dao, B. (2020). Bank capital adequacy ratio and bank performance in Venezuela: A simultaneous equations framework. *Journal of Asian Finance, Economics and Business, 7(6), 039-046.* https://doi.org/10.13106/jafeb.2020.vol7.no6.039

Islam, R., & Ahmad, R. (2020). Applicability of Mudarabah and Musharakah as Islamic micro-equity finance to underprivileged women in Malaysia. *The European Journal of Development Research, 32(1), 176-197.* https://doi.org/10.1057/s41287-019-00225-3

Lu, Z., Wu, J., Li, H., & Nguyen, D. K. (2022). Local bank, digital financial inclusion and SME financing constraints: Empirical evidence from China. Emerging Markets Finance and Trade, 58(6), 1712-1725. https://doi.org/10.1080/1540496X.2021.1923477

Oladapo, I. A., Hamoudah, M. M., Alam, M. M., Olaopa, O. R., & Muda, R. (2022). Customers' perceptions of FinTech adaptability in the Islamic banking sector: comparative study on Malaysia and Saudi Arabia. *Journal of Modelling in Management, 17(4), 1241-1261.*

Pham, C. D. (2020). The effect of capital structure on financial performance of Vietnamese listing pharmaceutical enterprises. *The Journal of Asian Finance, Economics and Business, 7(9), 329-340*. https://doi.org/10.13106/jafeb.2020.vol7.no9.329

Setiawan, I. (2021). The Impact of Financing Risk on Islamic Banking Performance in Indonesia. Share: *Jurnal Ekonomi Dan Keuangan Islam, 10(2), 208-229*. https://doi.org/10.22373/share.v10i2.9400

Shabbir, M. S. (2022). Regulatory and Supervisory Regime of Islamic Banking System in Nigeria: Challenges, Constraints and Way Forward. *Journal of Islamic Banking & Finance, 39(2).*

Syafrizal, A., & Ilham, R. N. (2023). Effect Of Capital Adequacy Ratio, Non Performing Financing, Financing To Deposit Ratio, Operating Expenses And Operational Income On Profitability At Pt. Bank Aceh Syariah. *Journal of Accounting Research, Utility Finance and Digital Assets, 1(4), 312-322*. https://doi.org/10.54443/jaruda.v1i4.51

Vitolla, F., Raimo, N., Rubino, M., & Garzoni, A. (2019). How pressure from stakeholders affects integrated reporting quality. Corporate Social Responsibility and Environmental Management, 26(6), 1591-1606. https://doi.org/10.1002/csr.1850