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Empirical Analysis of Liquidity Risk and Operational Risk in Islamic Banks: Case of Pakistan

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Abstract

This paper aims to identify the impact of firm specific factors on liquidity risk and operational risk management for Islamic banks. The performance of Islamic financial institutions has been explored at length in regards to their operational differences, product offering and customer patronage. However, firm specific factors related to risk management have not been explored in Pakistan. This paper intends to fill that gap using empirical analysis. This study utilizes full-fledged Islamic banks operating in Pakistan during the period of 2006-2014. The ratio of capital to total assets us used as a proxy for liquidity risk and the ratio of return on assets is used as a proxy for operational risk. Size, NPL ratio, capital adequacy ratio, leverage and asset management have been used as independent variables. Results show that CAR, NPL ratio, leverage and asset management have a significant impact on liquidity risk. Size, car, and asset management have a significant impact on operational risk. The findings of this study can be utilized to create policies for enhanced risk management for Islamic financial institutions.

Keywords: Liquidity Risk, Operational Risk, Islamic Banks, Pakistan

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1. Introduction

Islamic finance is developing at a remarkable pace. Since its inception three decades ago, the number of Islamic financial institutions worldwide has risen from one in 1975 to over 300 today in more than 75 countries. The Islamic finance industry crossed the $2 trillion mark in 2014, attributed to increasing popularity in traditional markets of Malaysia and Middle East and new market movements into non-Muslim majority markets such as Europe, Australia and China. There are more than 1500 organizations in more than 90 countries in the area of Islamic banking, finance, takaful, sukuk, Islamic funds and microfinance. 40% are in non-Muslim nations. The global takaful portion marks new entrants such as Tanzania, Namibia, Morocco and India.

This incredible growth in Islamic finance can be credited to the increasing demand of immigrant and non-immigrant Muslims for financial products and services that are Sharia-compliant. Secondly, the increasing oil-wealth and necessity for investment avenues in the Gulf has increased demand for these products in the region. Also, a third is the competitive nature of Islamic financial systems coexisting with conventional systems and offering of parallel products to attract customers. Yet regardless of this rapid growth, Islamic banking remains a very small part of the worldwide financial system. For it to take off and assume a greater part policymakers must address the most tremendous obstacle regarding regulations. Islamic banking has so far been saved from severe financial crises. All things considered, establishing trust in the industry is essential for the advancement of Islamic finance.

Keeping as a top priority the final objective to assess the Islamic financial institutions, the determining the role of fluctuations in firm specific factors and the risk exposure of this sector of the economy is essential (Helmy, 2012). Deplorable financial conditions can bring about a decrease in the estimation of the bank's portfolio, causing liquidity and operational risk exposures, which in the end cause losses for the banks (Metwally, 1997). In this way, a sound and dependable banking system is a need for accomplishing financial advancement totally through the assembly and utilization of assets. In the setting of an internationally integrated system, developing a suitable risk management system for Islamic banks is a challenging task (Abedifar, Molyneux, & Tarazi, 2013). The purpose of this

study is to determine the impact of size, capital adequacy, non-performing loans, leverage and asset management on liquidity risk and operational risk. Capital to total assets is used as a proxy for liquidity risk, while return on total assets is used as a proxy for operational risk.

The significance of studying the impact of various factors on risks of Islamic banks is essential due to its growing market share in a dominantly conventional financial system (Akhtar & Sadaqat, 2011; Illias, 2012). According to the State Bank of Pakistan's Islamic Banking Bulletin (2014), the total assets have reflected a year on year growth of 24.2%, while deposits and net financing and investment have increased by 23.3% and 7.9%, respectively. In terms of financing mix, December 2014 shows a year on year increase in musharaka (including running musharaka), salam and istisna financing while a decrease has been reported in murabaha and mudaraba financing[1]. Each product indicates exposure to different risks. With appropriate identification of determinants of liquidity and operational risks, it will be considerably easier to benchmark risk exposure of Islamic financial institutions against conventional financial institutions.

2. Literature Review and Theoretical Framework

The Islamic finance system found that Islamic banks as a system depend on the principal idea of an interest free and profit and loss sharing products (Al-Jarhi & Iqbal, 2001). In examining the practices of this sector, Hull (2002) found that this sector has used aggressive practices to stay competitive with conventional banks and to reach potential customers. Previous research shows that Shariah based banking and finance is essential for academic and practical purposes because it serves as a growing system worldwide. In addition, patronage of commercial and corporate customers in this system is dependent upon customer satisfaction and service quality, where universally Islamic banking has maintained superior performance than its conventional counterpart (Mounira, 2008; Ahmad, Rehman & Saif, 2010). It is essential to note that this superior performance is attributed to relative exclusivity with clients, recognition of deposit characteristics, investment patterns and adequate risk management (Ismal, 2010). The key capacity of an Islamic

[1] Islamic Banking Bulletin, State Bank of Pakistan. October-December 2014.

banking system is like a trading house which supports exchange and enterprise to induce economic activity and generate profit. Moving past the general financial loan capacity of conventional financial institutions, the Islamic bank is reliably steadier than conventional banking system because of the aforementioned qualities.

Previous research on the tendency of market consolidation found that liquidity management is a recurrent issue and risk transfer methods require significant development (Clementi, 2001). In another study analyzing the performance of Islamic banks, the role of liquidity was studied. Findings suggest that in developing economies the inherent characteristic of profit and loss sharing is considered an attractive choice for banks (Ghannadian and Goswami, 2004). Scale and scope of financial activities play a significant role in exposure of a financial institution to liquidity risk (Gabbi, 2004). This indicates that an organization's risk exposure is largely dependent upon market conditions. In relation to size, this is important because it specifies that large banks gain additional market information and influence changes in monetary policy, whereas small banks are at a clear disadvantage in these two regards.

In addition, securities market plays a crucial role in mitigating liquidity risk for financial institutions (Franck & Krausz, 2007) and short term returns for institutions are dependent on exposure to liquidity risk (Zheng, 2006). Research suggests that flexibility and regulation are key characteristics in determining exposure to liquidity risk in specific geographical markets, indicating that more liquid markets are superior to less liquid markets (Mianelli, 2008; Sawada, 2010).

Emerging economies present relatively lower aggregate liquidity shortage due to presence of international institutions which offset lower liquidity holdings during normal economic times with higher liquidity holdings during crises (Dinger, 2009). Furthermore, Islamic banks are better at managing long term risk. However, short term liquidity risk management of conventional banks was better (Siddiqui, 2008; Akhtar, et. al, 2011). This indicates higher exposure of Islamic financial institutions in the short run, but greater stability than conventional banks in the long term (Abu Hussain & Al-Ajmi, 2012).

In measuring exposure to risk, methods such as liquidity adjusted conditional value at risk and Monte Carlo simulations yield accurate estimations (Zheng & Shen, 2008). Islamic financial institutions can utilize risk hedging techniques, such as trading in Islamic bonds (known as Sukuks) or insurance (Takaful). This allows enhanced investment opportunities to help strengthen risk management practices (Anas & Mounira, 2008).

Exposure to operational risks influences decision making in different ways in financial institutions. Therefore, appropriate management and mitigation is essential (Ray & Cashman, 1999). Findings based on regional studies show that Islamic financial institution of United Arab Emirates and Brunei Darussalam face greater exposure of credit risk and operational risk. This is due to geographic exposure and country factors (Al-Tamimi & Al-Mazrooei, 2007; Hassan, 2009). In the United Kingdom, financial institutions are exposed to higher levels of operational risks when dealing with strategic business units (Blacker, 2000). In determining the impact of operational risk on productivity of banks, Allen and Bali (2007) used risk adjusted return on capital (RAROC). They found that exposure to operational risk plays a significant role in client selection for financial institutions.

Previous research shows that in order to mitigate operational risk, financial institutions need to introduce innovative products which diminish this risk. This indicates that institutional policies regarding asset side and liability side operations require streamlining to improve risk management (Philippas & Siriopoulos, 2009; Ismal, 2010). Research indicates that analysis of operational risk is essential due to the profit and loss sharing structure of Islamic financial institutions. This structure divides certain risks between institution and depositors. However, it also renders the institution liable for risks normally tolerated by equity investors. This heightened exposure necessitates further empirical analysis (Ojo, 2010; El Qorchi, 2005).

3. Research Methodology

The literature review has provided some basis in determining the significant dependent and independent variables. The ratio of total debt to total assets is used as a proxy for credit risk, while the ratios of capital to total assets, and return on assets are used as proxies for liquidity and operational risk, respectively. The determinants will be the same for both types of risks: bank size, NPL ratio, capital adequacy, leverage and asset management.

Bank size indicates risk and is used for its indication of risk exposure and profitability. The existing literature indicates that the larger the bank, the lower the interest rate. The exception to this rule is where large banks have a significant portion of the total market which could skew the competition in the market and allow abnormally high lending rates for larger banks (Flamini, et. al, 2009). Under conditions of normal market competitiveness, it is possible for smaller banks to earn higher revenues as well. Therefore, it is clear that size impact on risk is a function of competitiveness and market power (Heffernan & Fu, 2008). The ratio of bank size is the natural logarithm of total assets. Previous literature finds mixed results on the direction of impact of size on risk.

Non performing loans ratio indicates the likelihood of default on a particular debt. It is measured as the ratio of non-performing loans to total assets and indicates the overall exposure of the institution (Bouwman & Malmendier, 2015).

Capital adequacy is a measure of the bank's capital used to determine the protection of depositors and promote the stability and effectiveness of financial systems around the globe. This standard equity evaluation allows an impartial assessment of the financial health of the institution. This measure represents a proxy for risk and regulatory cost (Flamini et al., 2009) and indicates how well a bank is capitalized.

Leverage is essential because it indicates the source of funding for an institution. Highly leveraged firms face greater risks while firms with low leverage may be forced to forego investment opportunities. The tradeoff and its direct association with risk management make this a critical variable to be studied (Athanasoglou et al., 2005). It is measured as the ratio of debt to equity.

Asset management is essential in this study. It is the ratio of total operating income to total assets. It indicates the operational efficiency of the firms because it gauges the ability to generate revenues from assets. It logically follows that a firm with higher level of efficiency should have lower exposure to risk (Berger, 1995).

3.1 Research Model

$$LR_{it} = \beta_o + \beta_1(SIZE) + \beta_2(NPLRATIO) + \beta_3(CAR) + \beta_4(DE) + \beta_5(AM) + \varepsilon$$

$$OR_{it} = \beta_o + \beta_1(SIZE) + \beta_2(NPLRATIO) + \beta_3(CAR) + \beta_4(DE) + \beta_5(AM) + \varepsilon$$

The models to be applied for this study take into consideration each of the constructs discussed previously. According to the theoretical foundations of previous literature discussed above, the following hypotheses have been formulated for this study:

H1: There is a significant impact of selected determinants on liquidity risk.
H2: There is a significant impact of selected determinants on operational risk.

4. Findings and Analysis

Complete results of empirical tests in Appendix show that both models utilize 40 observations per variable, in 5 independent and 2 dependent variables for 5 full-fledged Islamic banks across 9 years. Due to some missing observations, the total sample contains 600 observations in the panel for dependent and independent variables. Model A (Liquidity Risk) has utilized an OLS regression while Model B (Operational Risk) has a fixed effect specification with regards to both cross section and time.

The Adjuster R square is one of the extremely important indicators of regression analysis. It shows that the type of the data we have used is of nature that 97.73% variation in liquidity risk is explained by the four variables capital adequacy ratio, NPL ratio, leverage and asset management. Similarly, 82.22% of the variation in operational risk is explained by the three variables size, capital adequacy ratio and asset management. The remaining analysis of the results discusses the significance of these variables and their impact on both types of risk.

The results of the Durbin Watson stat show almost no autocorrelation among variables in the liquidity risk model. However, there is a slight presence of positive autocorrelation in the operational risk model. High F statistic for both models indicate acceptance of H_1 and H_2.

An analysis of the model results in Table 1 indicates that size has a negative correlation with liquidity risk, however it is insignificant. It is also negatively correlated with operational risk and found to be significant at approximately 95% confidence level. These findings are in accordance with previous research (Ishaq & Bokpin, 2009; Sawada, 2010). Capital adequacy ratio is significant and positively related to both liquidity risk and operational risk. It is significant at 99% confidence with liquidity risk and 95% confidence level with operational risk. These findings are in accordance with previous research, such as Ojo (2010) and Sensarma and Jayadev (2009) which concluded positive and significant impact of capital adequacy on liquidity and operational risk. NPL Ratio is found to be significant at 95% confidence level for Liquidity risk. However, it is insignificant for operational risk. These findings are in line with the work of Tarawneh (2006). Leverage was also found to be significant at 95% confidence level for liquidity risk; however, it was insignificant for operational risk. These findings are concurrent with Rosly and Zaini (2008). Asset management was found to be significant in both liquidity risk and operational risk at 99% confidence level. This strongly indicates operational efficiency as an essential element of risk management for Islamic financial institutions, as confirmed by previous research (Siddiqui, 2008). The resulting models from this study are:

$$LR_{it} = 0.056 + 0.195(NPLRATIO) + 0.009(CAR) - 0.019(DE) - 0.862(AM)$$

$$OR_{it} = 15.655 - 0.982(SIZE) + 0.036(CAR) + 49.113(AM)$$

Table 01: Regression Results

	Model A (Liquidity Risk)		Model B (Operational Risk)	
Variable	**Coefficients**	**T-statistic**	**Coefficients**	**T-statistic**
SIZE	-0.002045	-0.288847	-0.982167**	-2.118268
CAR	0.009329***	22.88568	0.036172**	2.136315
NPLRATIO	0.195792**	2.379013	-2.690771	-0.517586
DE	-0.019381**	-2.202270	0.740356	1.504285
AM	-0.862457***	-4.192461	49.11310***	5.564507
C	0.056051	0.440779	15.65651*	1.964104
Adjusted R^2	0.977283		0.822022	
Durbin Watson	1.789147		1.316157	
F-statistic	336.5543		11.59581	
Prob(F-stat)	0.000000		0.000000	

*significant at 10% **significant at 5% ***significant at 1%

5. Conclusion

This study attempted to examine the firm specific factors which can have a considerable impact on risk management practices in Islamic banks. For the study full-fledged Islamic banks operating in Pakistan for the period of 2006-2014 were considered. Utilizing liquidity risk and operational risk as dependent variables, the impact of size, capital adequacy ratio, NPL ratio, leverage and asset management were determined. Model results show that size of bank has a significant and negative relationship with operational risk; on the other hand it has a statistically insignificant impact on liquidity risk. The capital adequacy ratio is positive and statistically significant in both models. The NPL ratio is only significant and positive in liquidity risk model. The asset management has revealed a significant impact on both risks; positive impact on operational risk and negative impact on liquidity risk. The leverage ratio was found to be significant in only the liquidity risk, with a negative relationship. The findings of this study have indicated the most significant indicators to the management of liquidity risk and operational risk for Islamic banks in Pakistan. This can contribute to the policies that are utilized by this sector in risk management and mitigation.

References

Abedifar, P., Molyneux, P., & Tarazi, A. (2013). Risk in Islamic banking. *Review of Finance*, rfs041.

Abu Hussain, H., & Al-Ajmi, J. (2012). Risk management practices of conventional and Islamic banks in Bahrain. *The Journal of Risk Finance*, *13*(3), 215-239.

Ahmad, A., Humayoun, A. A., & ul Hassan, U. (2010). An analysis of functions performed by Islamic bank: a case of Pakistan. *European Journal of Social Sciences*, *17*(1), 7-11.

Ahmad, A., Rehman, K., Saif, M. I. &Safwan, M.N.(2010). An Empirical Investigation of Islamic Banking in Pakistan based on Perception of Service Quality, *African Journal of Business Management, 4* (6), 1185-1193.

Akhtar, M. F., Ali, K., &Sadaqat, S. (2011). Liquidity Risk Management: A comparative study between Conventional and Islamic Banks of Pakistan. *Interdisciplinary Journal of Research in Business, 1* (1), 3 5-44.

Al-Jarhi, A.M., &Iqbal, M. (2001). Islamic Banking: Answers to Some Frequently Asked Questions, Occasional paper No. 4, Islamic Development Bank, Islamic Research and Training Institute.

Al-Tamimi, H. A., & Al-Mazrooei, F. M. (2007). Banks' risk management: a comparison study of UAEnational and foreign banks. *The Jo u r n a l of Risk Finance, 8* (4), 394-409.

Allen, L., & Bali, T. G. (2007). Cyclicality in catastrophic and operational risk measurements. *Journal of Banking & Finance, 31,* 1191–1235.

Anas, E., & Mounira, B. A. (2008). Managing Risks and Liquidity in an Interest Free Banking Framework: The Case of the Islamic Banks. *International Journal of Business and Management*, 80-95.

Athanasoglou, P. P., Delis, M. D. and Staikouras, C. (2005). Determinants of Bank Profitability in the South Eastern European Region. *Journal of Financial Decision Making, 2*, 1-17.

Berger, A. N. (1995). The relationship between capital earnings in banking. *Journal of Money, Credit and Banking, 27*, 432-456.

Blacker, K. (2000). Mitigating Operational Risk in British Retail Banks. *Risk Management, 2* (3)*,* 23-33.

Bouwman, C. H., & Malmendier, U. (2015). Does a Bank's History Affect Its Risk-Taking?. *American Economic Review*, *105*(5), 321-25.

Clementi, D. (2001). Financial Markets: Implications for Financial Stability. *Balance Sheet, 9*(3), 7-12.

Flamini, V., McDonald, C. and Schumacher, L. (2009). The Determinants of Commercial Bank Profitability in Sub-Saharan Africa. *IMF Working Papers, No 09/15,* 1-30.

Franck, R., & Krausz, M. (2007). Liquidity risk and bank portfolio allocation. *International Review of Economics and Finance* , 60-77.

Gabbi, G. (2004). Measuring Liquidity Risk in a Banking Management Framework. *Managerial Finance, 30*, 44-58.

Ghannadian, F. F., & Goswami, G. (2004). Developing economy banking: the case of Islamic banks. *International Journal of Social Economics* , 740-752.

Hassan, A. (2009). Risk management practices of Islamic banks of Brunei Darussalam. *The Journal of Risk Finance, 10* (1), 23-37.

Heffernan, S. and Fu, M. (2008). The Determinants of Bank Performance in China. *SSRN working paper series.*

Helmy, M. (2012). Risk management in Islamic banks.

Hull, L. (2002). Foreign-Owned Banks: Implications for New Zealand's Financial Stability, *Discussion Paper Series, DP 2002/05*.

Isshaq, Z., & Bokpin, G. A. (2009). Corporate liquidity management of listed firms in Ghana. *1 (12),* 189-198.

Ismal, R. (2010). Assessment of liquidity management in Islamic banking industry. International Journal of Islamic and Middle Eastern Finance and Management, *3* (2), 147-167.

Mainelli, M. (2008). Liquidity and Diversity. *The Journal of Risk Finance*, 211-216.

Metwally, M. (1997). Differences between the financial characteristics of interest-free banks and conventional banks. *European Business Review* , 92–98.

Mounira, B. A. (2008). Managing Risks and Liquidity in an Interest Free Banking Framework: The Case of the Islamic Banks. *International Journal of Business and Management, 3* (9), 80-95.

Ojo, M. (2010). The growing importance of risk in financial regulation. *The Journal of Risk Finance,* 11(3), 249-267.

Philippas, D. T., & Siriopoulos, C. (2009). Influence of financial innovation to the validation of operational risk. *Managerial Finance, 35* (11), 940-947.

Ray, D., & Cashman, E. (1999). Operational risks, bidding strategies and information policies in restructured power markets. *Deci sion Support Systems, 24,* 175–182.

Rosly, S. A., & Zaini, M. A. (2008). Risk-return analysis of Islamic banks' investment deposits and shareholders' fund. *Managerial Finance*, 695-707.

Sawada, M. (2010). Liquidity risk and bank portfolio management in a financial system without deposit insurance: Empirical evidence from prewar Japan. *International Review of Economics and Finance, 19*, 392–406.

Siddiqui, A. (2008). Financial contracts, risk and performance of Islamic banking. *Managerial Finance, 34* (10), 680-694.

Tarawneh, M. (2006). A Comparison of Financial Performance in the Banking Sector: Some Evidence from Omani Commercial Banks. 101-111.

Zheng, H. (2006). Interaction of credit and liquidity risks: Modelling and valuation. *Journal of Banking & Finance*, 391-407.

Zheng, H., & Shen, Y. (2008). Jump liquidity risk and its impact on CVaR. *The Journal of Risk Finance*, 477-491.

Appendix

Complete Results of Empirical Tests

Table 02: Liquidity Risk

Dependent Variable: LR
Method: Panel Least Squares
Sample: 2006 2014
Total panel (unbalanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE	-0.002045	0.007079	-0.288847	0.7745
CAR	0.009329	0.000408	22.88568	0.0000
NPLRATIO	0.195792	0.082300	2.379013	0.0231
DE	-0.019381	0.008800	-2.202270	0.0345
AM	-0.862457	0.205716	-4.192461	0.0002
C	0.056051	0.127164	0.440779	0.6622

R-squared	0.980195	Mean dependent var	0.179509
Adjusted R-squared	0.977283	S.D. dependent var	0.134036
S.E. of regression	0.020202	Akaike info criterion	-4.828573
Sum squared resid	0.013876	Schwarz criterion	-4.575241
Log likelihood	102.5715	F-statistic	336.5543
Durbin-Watson stat	1.789147	Prob(F-statistic)	0.000000

Table 03: Operational Risk

Dependent Variable: OR
Method: Panel Least Squares
Sample: 2006 2014
Total panel (unbalanced) observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SIZE	-0.962167	0.454223	-2.118268	0.0457
CAR	0.036172	0.016932	2.136315	0.0440
NPLRATIO	-2.690771	5.198697	-0.517586	0.6099
DE	0.740356	0.492164	1.504285	0.1467
AM	49.11310	8.826137	5.564507	0.0000
C	15.65651	7.971325	1.964104	0.0623

R-squared	0.899602	Mean dependent var	-0.715348
Adjusted R-squared	0.822022	S.D. dependent var	1.563765
S.E. of regression	0.659711	Akaike info criterion	2.308135
Sum squared resid	9.574824	Schwarz criterion	3.068130
Log likelihood	-28.16269	F-statistic	11.59581
Durbin-Watson stat	1.316157	Prob(F-statistic)	0.000000