DETERMINANTS OF LIQUIDITY RISK IN DUAL AND FULLY ISLAMIC BANKING SYSTEMS: EVIDENCE FROM MALAYSIA AND SUDAN

AbdulFattah AbdulGaniyy*, Zairy Zainol and Nor Hayati Ahmad
Islamic Business School,
Universiti Utara Malaysia, Malaysia.

Abstract: The objective of this study is to compare the determinants of liquidity risk of Islamic banks in the two environments of full Islamic banking scheme and dual banking system. The researchers used samples of Islamic banks in Sudan and Malaysia to represent the two banking environment. Data sourced from Islamic Banks Information System (IBIS) provided by Islamic Research and Training Institute(IRTI) for three banks in each of the countries from 2004 and 2015 was used for the study. Using Ordinary Least Regression Analysis (OLS) and panel data analysis techniques, the authors conclude that the different environment the Islamic banks operate determines the significance of liquidity risk determinants. There are conflicting effects of bank's specific(micro) factors including bank's size, capital adequacy ratio as well as macroeconomic variables like GDP and Money Supply on liquidity of Islamic banks. However, the study concludes that management efficiency proxied by deployment ratio is a common factor in the two settings. The authors recommend future study on comparison of liquidity risk management policies and structures of Islamic banks in the two environments.

Key Words: Liquidity, liquidity Risk, Full-fledged Islamic Banking Schem Banking System, Deployment Ratio, Money Supply

JEL Classification: G01, G21, G24, G28, G32

1 Introduction

The stability of Islamic banks today could be hampered if the liquidity issues are not addressed. In practice, some Islamic banks have shown signs of financial distress and few have been forced to close their operations. The banking and financial crisis of 2000- 2001 in Turkey provides evidence of liquidity problems which affected the stability of Islamic banks in that country (Ali, 2007). Likewise, the collapse of Islamic bank Limited of South Africa was attributed to impairment of loans and receivables which seriously affected the liquidity of the bank as well (Nathie, 2015).

It is no longer news that Islamic banking system has witnessed a tremendous growth in the last two decades (Kabir and Worthington, 2014). Yes, the growth is real, but whether the growth will be sustained is the issue at stake. Liquidity remains a major factor in the sustenance of the rapid growth of Islamic banks.

Figure 1.4 illustrates the global growth trend in deposits, financing and assets of Islamic banks in the world over the 2009 and 2013 period. While deposits, financing and assets of the Islamic banks started rising from 2009, it reached the peak in 2010 at an estimated 25 percent growth rate. However, the growth in these three categories slowed down to less than 15 percent by 2013 in tandem with the slowdown in the global economy.
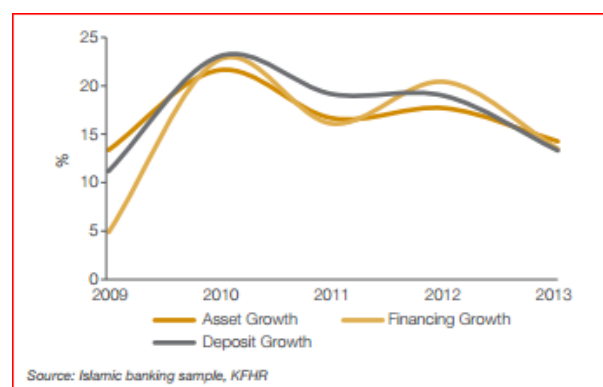

Figure 1: Islamic Banking Global Average Annual Growth Trends

The growth of the Islamic banking has created two systems in most of the countries where it operates. These are dual banking system where Islamic banks operate side by side with conventional interest based banks. The other is full Islamic banking system where the entire financial system is based on Shariah. Only Sudan and Iran are currently operating full Islamic banking system. All other countries are operating dual banking system.

Islamic banks functioning in dual banking system are faced with various challenges. They operate in uncharted water as there were little or no precedence or experience to tap from (Kasim, Abd.Majid and Yusof, 2009). Islamic banks were more or less a replication of conventional banking system that is being 'islamised'. Thus many risks

even including interest rate risk which is prohibited by Shariah is linked to Islamic banks in the calculation of profit rate.

Similarly, under dual banking system, the liquidity operations of banking systems are interlinked. In most cases, the central banks which regulate both banks apply the same rules and guidelines in their regulation (Al-Ali & Naysary, 2014). In this circumstance, the management of liquidity and liquidity risk in Islamic banks under dual banking system is affected by the conventional practices. Due to its nature, Islamic bank liquidity risk management cannot be treated successfully in the same way as conventional banks.

The aim of this paper is to compare the determinants of liquidity risk including macro-variables like Gross Domestic Products (GDP), Money Supply (MS) in Islamic banks operating under dual banking system and full Islamic banking system. This will provide empirical evidence of the challenges of risk and returns faced by Islamic banks in these two banking environments. It will also assist the operators and regulators of Islamic banks by highlighting the benefit of getting disentangled completely from the dangers of interest based transactions. The study will use Islamic banks in Malaysia as operating under dual banking system while those in Sudan are under full-fledged Islamic banking.

The remaining part of this study will be structured as follows. The next section reviews literature on the development of Islamic banks in both dual and full Islamic banking system. It will also highlight key determinants of liquidity risk in Islamic banks. Section three discusses the data and methodology used for this study, while section four presents the result. Section five will conclude and make recommendation in line with the findings of the study.

2 Literature Review

2.1 *Development of Islamic Bank in Malaysia.*

The history of Islamic banking in Malaysia can be traced to the introduction of Pilgrims Fund Corporation (Tabung Haji) in 1963. The objective of the corporation was to allow Muslim pilgrims to have gradual savings towards Hajj expenses. The successful operation of this corporation led to the establishment of the first Islamic Bank in Malaysia-Bank Islam Malaysia Berhad (BIMB). Malaysia is among the pioneer of modern Islamic banking and is still a frontrunner in the global Islamic banking (Arif, 2014).

Like most countries operating dual banking system, there are three categories of banking in Malaysia: conventional banking, full-fledged Islamic banks and conventional banks operating Islamic banks windows under Islamic Banks Scheme (IBS). Incidentally, the latter controls nearly 80% of the assets of Islamic banking industry (Arif,2014).

This is one of the challenges faced by Islamic banks in dual banking system in which the conventional banks dominate and dictate the pace of development in the industry. Islamic banks in this setting are more of Shariah-compliant rather than Shariah- based. This is due to fact that they work in line with conventional banks arrangement rather than innovating new arrangement based on Shariah.

Islamic banks in Malaysia enjoy tremendous support of the government through the central bank – Bank Negara Malaysia (BNM). For instance, in terms of liquidity management, the establishment of International Islamic Liquidity Management Corporation (IILM), headquartered in Malaysia was a milestone. The objective of IILM is to facilitate cross-border liquidity management among institutions that offer Islamic financial services. It is to make available a number of different Sharia'h –compliant instruments on commercial transactions that satisfies the liquidity needs of member organizations (Waemustafa, 2014).

In spite of the chequered development of Islamic banking in Malaysia coupled with government support, the banks still face a number of challenges including co-mingling of funds from both conventional and Islamic banks. Even though Islamic banks have gained market share of the banking industry, most of these gains are from Islamic windows or subsidiaries of conventional banks. Thus, the liquidity management of these banks are affected by conventional banks' practices and procedures.

2.2 *Development of Islamic Banks in Sudan.*

Sudan was also among the pioneer of modern Islamic banking. The banking system was introduced in 1977 with the establishment of Faisal Islamic Bank of Sudan (FISB) through the FISB Act (Hamdi, 1998, p.115). The FISB was established with an initial capital of six million Sudanese pounds. The success of FISB led to the establishment of more Islamic banks between 1980 and 1983. This also encouraged the government to Islamize the entire financial system (Magda, 2005).

In 1991, the Bank of Sudan issued Banking Business (Organization) Act which stipulated that all banking financial transactions must be based on Shariah (Babiker et al, 2011). Following the conversion, more Islamic banks and branches were opened across all regions. Thus, Islamic banks increased from 6 to 29 between 1980 and 1997 (Magda, 2005).

In year 2000, Central Bank of Sudan decreased the use of *Murabahah* to 30%. This caused increase in share of other modes of Islamic finance particularly *Musharakah* and *Mudarabah* (Magda, 2005). Thus, the objective of Islamic banks in Sudan to invest funds trusted to them through Profit and Loss Sharing (PLS) and to avoid riba was strengthened.

Sudan, with a fully Shariah- based banking and financial system is regarded as one of the most resource-rich nations in North Africa. The banking assets reached US$15.6 billion with a compound growth of 16.64% between 2009 and 2014 (IRTI, 2016).

In spite of this achievement, Sudan still remains mainly under-banked because most of the financial institutions are located around the capital city-Khartoum. Whereas, Sudan which depends mostly on agriculture requires widely spread financial institutions across the country especially in the rural areas.

Furthermore, Ali (2013) submitted that liquidity ratio in Sudan was consistently low between 2004 and 2009. Thus, there is need to identify the factors responsible for high liquidity risk in the Islamic banks and how to efficiently manage the risk.

2.3 Liquidity and Liquidity Risk Management

While non –financial organizations are concerned with cash flow in managing their working capital, financial institutions are concerned with maintaining a balanced liquidity profile for their operation. The liquidity of a company is denoted by the current ratio linked to the working capital, cash flow based ratios and the cash conversion cycle (Bolek, 2013). The concept of liquidity lies at the heart of commercial banks and the management of its funds. It represents one of the crucial risk in banking industry (Muharam and Kurnia, 2013). Liquidity to a bank is like blood in a human body (Talekar, 2005).

Liquidity is the ability of a bank to fund increases in current liabilities and meet obligations as they come due, without incurring unacceptable losses. (Basel Committee, 2008). A bank is said to be illiquid if it cannot settle obligation on time (Nikolaou & Drehmann, 2009).

Liquidity Management is a long –standing concern in the global Islamic Finance because there is a general lack of tradeable Sharia'h – compliant instruments that can serve as high quality short-term liquid assets (IFSB, 2015). The report by IFSB also estimates that the Islamic Finance industry currently requires at least US$400 billion of short-term credible, liquid securities for capital management purposes. It further states that most Islamic banks at the moment are involved in bilateral investment based (*Mudarabah*) deposit placements with each other to resolve liquidity surplus and deficit conditions.

Other risks like credit, market and operational risks directly or indirectly have impact on liquidity risk. Thus, the significance of liquidity risk cannot be over emphasized. While the collapse of big banks like Citibank Group, Barclays and Chase Manhattan Bank have been attributed to credit risk (Waemustafa, 2014), the immediate signal of bank customers' default is the inability of the banks to provide adequate liquidity to meet instant obligation as a result of non-payment by the customers.

2.4 *Determinants of Liquidity Risk.*

Various factors have been identified as determining the liquidity risk in banks. These factors have been categorized into bank specific (micro) and macroeconomic variables.

For instance, under micro variables, deployment ratio (DR) is used to measure the proportion of resources deployed in liquid assets. Deployment ratio makes the balance sheet of a bank more noteworthy (Shodhganga, 2016). DR is used as a systematic tool by Islamic banks to represent ratio of total financing and investment to total deposit. The ratio ranges from 0 and 100 (Khan, 2004).

Another widely used determinant of liquidity risk is capital adequacy ratio (CAR). It is the ratio of a bank's capital to its risk. It is used to measure a bank's readiness to absorb a reasonable amount of loss and fulfills statutory capital requirements. The ratio is used to shield depositors and encourage stability and efficiency of financial systems around the world. CAR is calculated thus:

$$\text{CAR} = \frac{\text{Tier1} + \text{Tier2}}{\text{Risk Weighted Assets}}$$

Where Tier1 capital which absorb losses without a bank ceasing business represents (Paid capital + statutory reserves + disclosed reserves) – (equity investment in subsidiary + intangible assets + current and b/f losses).

Tier2 capital which *can* absorb losses in the event of a liquidation. Hence, it shields the depositors to a lesser degree. It includes: Undisclosed Reserves + General Loss Reserves + Hybrid debt capital investments and subordinated debts.

The denominator in the equation above can either be the risk weighted assets or the respective national regulator's minimum total capital requirement (Harzi, 2011).

Muharam & Kurna (2013) investigate the influence of capital adequacy ratio (CAR) and other variables on liquidity risk in conventional and Islamic banks. The authors point out that there is a negative and significant influence of CAR on conventional banks while it has a negative and insignificant in Islamic banks.

On the other hand, Vodova (2013) in his study on Hungary banks submits that capital adequacy ratio and profitability are positively related to liquidity while size of the bank and monetary policy on interest are negatively related. He says that the relationship between gross domestic products (GDP) and liquidity is ambiguous. According to him, bank liquidity decreases with the size of bank. This means that big banks rely on the interbank market or on the liquidity assistance of the Lender

of Last Resort while small and medium sized banks hold buffer of liquid assets. This supports the hypothesis of ''too big to fail'' (Kaufman, 2013).

Using GDP, Capital Adequacy and Return on Equity (ROE) as independent variables, Mehmed (2014) concludes that most of the determinants have influence on liquidity risk of commercial banks in Bosnia and Herzegovina.

While Siaw, (2013); Anam et al. (2012), Sabri (2014); Ramzan& Zafar (2014) report positive relationship between bank size and liquidity, Sulaiman et al (2013), Vovada (2013) and Bonfirm & Kim (2012) conclude that the relationship is negative. Yet, Ahmed et al. (2011) reports an insignificant relationship.

Another important macroeconomic variable that has effect on liquidity of banks is money supply (MS). This is regarded as the amount of money in the economy. It has been used as a proxy for macroeconomic variable (Srairi, 2009, Chowdhury, 2015). It is defined to include the stock of money with the public, coins, currency and time deposits with commercial banks, thrift institutions and government deposits with banks and the central bank (Shostak, 2000). This means that money supply has direct impact on the liquidity position of banks.

3 Data and Methodology.

3.1 Data Collection

This is an empirical study that used data from Islamic Banks Information System(IBIS) data base of Islamic Research and Training Institute (IRTI). Three Islamic banks each were selected from Sudan and Malaysia representing full-fledged Islamic banking and dual banking systems respectively. Sudan has a total of sixteen Islamic banks while Malaysia has eighteen (IBIS). Only five of the Islamic banks in Malaysia are full-fledged Islamic banks, the others are subsidiaries of conventional banks (Arif, 2014). The selected sample was based on availability of up to date data from the data base. Banks specific (micro) variables in the form of financial ratios were extracted from the annual financial statement of the individual banks between 2004 and 2015. Macroeconomic variables, GDP and Money Supply (MS) were extracted from World Bank data base.

3.2 Methodology.

The study employed panel data techniques to analyze the determinants of liquidity risk among the selected Islamic banks. This was also used to compare the effects of these determinants between the two banking systems.

In order to establish the relationship between the dependent variable, liquidity risk (LQ) and independent variables, the following econometric model was developed:

$$LQ_{it} = \beta_0 - \beta_1 DR_{it} - \beta_2 CAR_{it} + \beta_3 SIZE_{it} + \beta_4 MS_{it} + \beta_5 GDP_{it} + \varepsilon \ldots \ldots \ldots \ldots \ldots$$

Where

LQ_{it} represents the liquidity risk of Islamic banks in country i and time t

β_0 constant

DR_{it} is the Deployment Ratio

CAR_{it} is Capital Adequacy Ratio

SIZE is the log of Total Customers' Funds

MS is Money Supply.

GDP is the Gross Domestic Product percentage growth

ε is the error term.

$B_{1-}\beta_5$ represent the coefficient of the respective variables

Variable Measurement

Table 1 below shows the measurement of the variables for the study.

Table 1: Variable Measurement.

Variable	Measurement	Positive	Negative	Insignificant	Hypothesized
Bank specific(micro)					
Deployment Ratio	Total Investment/ Total Customers' Funds				**Positive**
Capital Adequacy Ratio	Total shareholders' Equity/ Total Investment	Vodova, (2013)	Jedidia & Hamzah (2015); Muharam & Kurna (2013)		Negative
Size	Log of Total Customers' fund	Siaw,2013; Anam et al. (2012), Sabri (2014); Ramzan& Zafar (2014)	Sulaiman et al (2013), Vovada,2013; Bonfirm & Kim (2012)	Ahmed et al. (2011) Moussa (2015)	Positive
Macroeconomic Variables					
GDP percentage growth	World bank fig.	Mehmet, 2014		Sabri, 2014;	Negative
Money Supply	World bank fig.				Negative

It should be noted that deployment ratio has been used previously as efficiency measurement (Shodhganga, 2016 and Khan, 2004) and not as a determinant of liquidity risk. This study attempt to test the effect of management efficiency using the deployment ratio as a proxy. Similarly, money supply is also being used for the first time to the best of knowledge of the researchers as a macroeconomic variable affecting liquidity risk of Islamic banks. This is due to the direct link money supply has with the liquidity profile of banks.

Pooled Ordinary Least Square (OLS), Random Effect (RE) and Fixed Effect(FE) were used to compare the determinants of liquidity risk in the two countries. The study employed *STATA14* to conduct the above techniques. Tests were conducted to ascertain the suitability of each of the techniques (OLS, RE and FE).

Breusch and Pagan Lagrangian multiplier test for random effects was carried out to test whether OLS or RE was suitable. The result showed a Prob > chibar2 =   1.0000 for each of the two countries. Thus, OLS was preferred over RE for the study.

3.3 *Diagnostic Tests*

The first diagnostic test conducted was Variance Inflation Factor (VIF). Stine (1995) says vif is a measure of how much multicollinearity has increased the variance of slope of the estimate. O'Brien (2007) argues against rule of thumb for vif but agrees that 10 is the most commonly used rule of thumb. The test shows that Sudan has a higher average vif of 3.07 as against 1.81 for Malaysia. These are below the common threshold of 10 noted by O'Brien (2007).

Modified Wald test for group wise heteroscedasticity in fixed effect regression model was also conducted for the two countries. The result shows that at 5%, there is presence of heteroscedasticity in Sudan while it is not in Malaysia.

Wooldridge test for autocorrelation in panel data was also applied. The result indicates presence of autocorrelation in the data for the two countries. In order to correct autocorrelation and heteroscedasticity, *xtreg* command with *cluster ()* option in Stata was conducted for the variables. The result of this test is contained in the appendix.

4 Result and Discussion.

4.1 *Descriptive Statistics.*

Table 4.1 and Figure 4.1 below demonstrate the growth rates of key financial indicators in both Malaysia and Sudan. Malaysia recorded decreasing growth rates in these indicators between 2005 and 2015. It also documented a fairly stable growth between 2013 and 2015. Sudan, on the other hand started with a negative growth in 2005. It recorded a sharp growth rate between 2006 and 2007. Subsequently it shows an oscillating growth pattern between 2007 and 2013 before recording a fairly stable growth between 2013 and 2015. The growth pattern of Islamic bank assets in Sudan has also been documented by IRTI (2016).

Table 4.1: Key Financial Indicators (%)

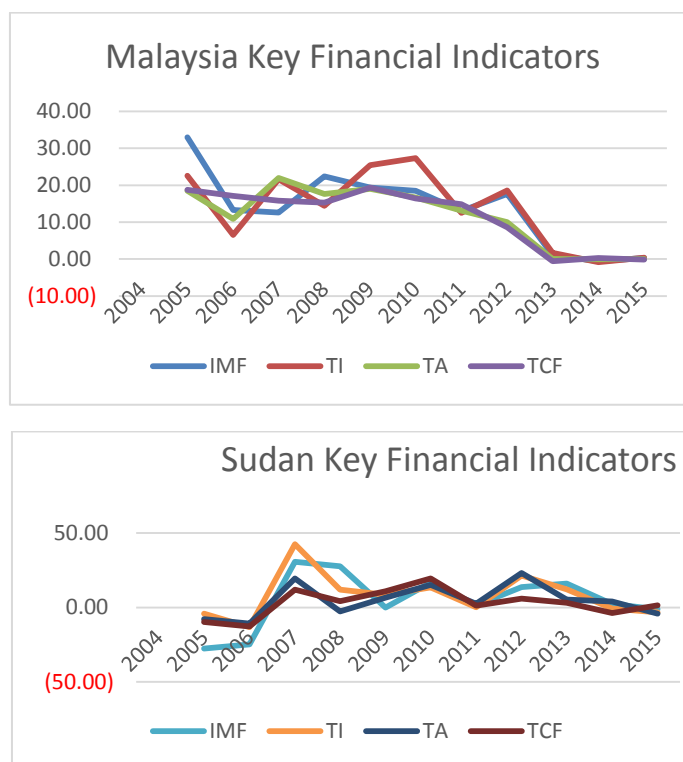| Year	Malaysia				Sudan			
	IMF	TI	TA	TCF	IMF	TI	TA	TCF
2005	32.95	22.57	18.54	18.73	-27.65	-4.11	-7.75	-9.70
2010	18.54	27.32	16.72	16.43	16.72	13.45	15.33	19.52
2015	0.27	0.41	0.01	-0.14	-1.19	-3.20	-4.21	1.42

Figure 4.1 Key Financial Indicators (%)

Key: IMF= Islamic Modes of Finance; TI = Total Investments; TA= Total Assets; TCF= Total Customers' Fund

Descriptive analyses of the variables were also carried out. Univariate analysis of the variables was used to compare the mean, standard variation, maximum and minimum values of the variable. Bivariate analysis using pairwise correlation to test the correlation of variables was also carried out.

Table 4. 2 below shows that Malaysia recorded higher average on LQ and MS while Sudan had higher mean values in all the other variables. Sudan particularly recorded a higher deployment ratio suggesting a more

efficient utilization of customers' funds. The size of the sampled banks in the two countries also suggested a slightly higher customers' fund was available for Sudanese banks. Higher percentage GDP growth rate in Sudan can also be attributed to growth in Sudanese economy after the separation from Southern Sudan. The growth was at its peak in 2012, a year after the separation. The average GDP growth rate of 3.3 for Malaysia here is close to 3.7 reported by Chowdhury (2015).

Table 4. 2: Descriptive Statistics

	Malaysia				Sudan			
Var.	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
LQ	.770	.117	.54	.94	.671	.140	.31	.88
DR	.910	.181	.61	1.2	1.102	.410	.48	2.2
SIZE	7.318	.232	6.87	7.81	7.529	.741	4.99	8.17
CAR	.112	.039	.02	.21	.283	.150	.06	.64
MS	.523	.032	.481	.589	.217	.025	.174	. 262
GDP	3.264	2.194	-3.2	5.7	4.855	3.318	.4	9.4

Table 4.3 below show the correlation between the variables for the two countries. While the upper diagonal shows the correlation of the variables in Sudan, the lower diagonal shows that of Malaysia. Positive correlation indicates movement of the variables in the same direction, while negative suggest movement in opposite direction. Cohen (1988) suggested the guidelines on interpretation of correlation thus:

       small r = 0.10 to 0.29
       medium r = 0.30 to 0.49
         large r = 0.50 to 1.0

Malaysia recorded the highest positive correlation 0.96 between liquidity and deployment ratio while Sudan recorded the highest correlation of 0.90 between capital adequacy ratio and deployment ratio. The least negative correlation in Malaysia -0.016 was between bank size and money supply. Sudan recorded   -0.068 between deployment ratio and GDP. Major positive and negative correlations are highlighted in the matrix.

Table 4.3: Correlation Matrix

	LQ	DR	SIZE	CAR	MS	GDP	
LQ	1	**0.787**	-0.134	**0.713**	0.227	-0.208	
DR	**0.955**	1	-438	**0.904**	0.011	**-0.068**	
SIZE	**0.702**	**0.752**	1	-0.505	0.115	-0.190	Sudan
CAR	0.337	**0.512**	0.361	1	-0.045	-0.041	
MS	-0.193	-0.178	**-0.016**	-0.234	1	0.210	
GDP	0.121	0.083	-0.059	0.024	0.109	1	

<div align="center">Malaysia</div>

4.2 Regression Analysis

Prior to conducting regression analysis, Breusch and Pagan Lagrangian multiplier test for random effects was carried out to decide which of Ordinary Least Square (OLS) and Random Effect (RE) is appropriate. The result shows Prob > chibar2 = 1.0000 for both countries. This indicates that OLS is preferred over RE.

Based on this, the result of OLS for the two countries is presented below in table 4.4

Table 4.4: Ordinary Least Square(OLS)

VARIABLES	Malaysia	Sudan
DR	0.693***	0.225***
	(0.0482)	(0.0786)
SIZE	-0.0109	0.0396*
	(0.0347)	(0.0222)
CAR1	-0.654***	0.208
	(0.154)	(0.222)
MS	-0.215	1.358**
	(0.169)	(0.579)
GDP	0.00227	-0.00689
	(0.00240)	(0.00438)
Constant	0.398*	-0.196
	(0.226)	(0.210)
Observations	33	33
R-squared	0.949	0.743
Adjusted R^2	0.940	0.695
Prob > X^2	0.000	0.000
Number of Bank	3	3

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The result shows that prob>x^2 = 0.000 for both countries. This shows that model is appropriate. The R^2 of 0.94 (Malaysia) and 0.74 (Sudan) indicate the proportion of variation in dependent variable – liquidity risk that is explained by the independent variables.

The result also indicates variation in the magnitude and sign of almost all the coefficients of variables for the two countries.

For instance, only DR has the same positive direction with Liquidity Risk (LQ), the dependent variable. The magnitude of the effect of this variable in Malaysia is more than triple that of Sudan. Similarly, SIZE, CAR and MS all have negative sign in Malaysia but indicate positive sign in Sudan. The negative sign of CAR is supported by the report of Jedidia & Hamzah (2015); Muharam & Kurna (2013); while Sulaiman et al (2013), Vovada (2013); Bonfirm & Kim (2012) supported negative sign of bank's SIZE. On the other hand, only Vovada, 2013 agreed with positive sign of CAR. This conflicting impact of the banks' specific variable on liquidity can be attributable to the different environment under which the banks operate.

The result also shows inconsistent impact of the microeconomic variables of GDP and MS.

In terms of significance of the impact of these variables, only DR is significant at 1% for the two countries. In Malaysia, CAR is also significant at 1% while SIZE is significant at 10% in Sudan. MS which is being measured as a determinant of liquidity risk for the first time is significant at 5% in Sudan only.

5 Conclusion.

There has been an increasing emphasis on liquidity risk in banks especially after the last financial crisis of 2008. This study provides an empirical evidence on the nature of liquidity risk faced by Islamic banks under full Islamic banking scheme and dual banking. It shows that the different environment under which Islamic banks operate determines both the internal (micro) and macroeconomic factors that affect liquidity risk. It is important to note that management efficiency proxied by deployment ratio (DR) is a significant determinant in both banking environments.

This study is limited to identification of factors determining liquidity risk as the first stage of liquidity risk management. Further study can extend to comparison of policies and structures in place to manage liquidity risk in the two environments in which Islamic banks operate.

References

Ahmed, N., Ahmed, Z., & Naqvi, I. H. (2011). Liquidity risk and Islamic banks: Evidence from Pakistan. *International Journal in Business., 1*(9), 99-102.

Al-Ali, H., & Naysary, B. (2014). Risk management practices in Islamic banks in Kuwait. *American Research Institute for Policy Development*.

Ali, S. S. (2007). Financial distress and bank failure: Lesson from closure of Ihlas Finance in Turkey. *Islamic Economic Studies*.

Ali, S. S. (2013). State of liquidity management in Islamic finanacial institutions. *Islamic Economic Studies, 21*(1), 63-98.

Anam, S., Hassan, S. B., Huda, H. A., Uddin, A., & Hossain, M. (2012). Liquidity risk management: A comparative study between conventional and Islamic banks of Bangladesh.

Arif, M. (2014). Islamic banking in Malaysia: industry at crossroads. *INCEIF*.

Babiker, F. E., Awad, H., Mohamed, W. E., & Ebrahim, M.-S. (2011). Islamic banking in Sudan. *SSRN Electronic Journal*.

BASEL, C. (2008). *Principles for sound liquidity risk management and supervision.* Basel Committee on Banking Supervision.

Bolek, M. (2013). Profitability as a liquidity and risk function basing on the new connect market in Poland. *European Scientific Journal, 9*(28).

Bonfim, D., & and Kim, M. (2012). Liquidity risk in banking: is there herding?

Chowdhury, A. M. (2015). Which is more important in terms of Profitability of Islamic Banks: Bank Specific factors or Macroeconomic factors? An Empirical Study on Malaysian Islamic Banks. *European Journal of Islamic Finance, 2*.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Hamdi, M. E.-H. (1998). *The making of an Islamic political leader: converstaion with Hasan al-Turabi.* Boulder: Westview Press.

Harzi, A. (2011). The impact of Basel III on Islamic banks: a theoretical study and comparison with conventional banks.

IRTI. (2016). *Launch of Sudan Islamic Finance Country Report 2016: next phase of development.* Jeddah: Islamic Research and Training Institute (IRTI).

Islamic Financial Services Board(IFSB). (2015). *IFSB Report.* IFSB.

Kabir, N., & Worthington, A. (2014). Do Islamic banks have higher credit risk? *Available at SSRN 2479136*.

Kassim, S. H., Abd.Majid, M. S., & Yusof, R. M. (2009). Impact of monetary policy shocks on the conventional and Islamic banks in a dual banking system: evidence from Malaysia. *Journal of Economic Cooperation and Development, 30*(1), 41-58.

Kaufman, G. G. (2013). *Too big to fail : what does it mean?* LSE Financial Market Group Paper Series.

Khan, M. A. (2004). *Islamic economics and finance: a glossary.* Routledge, Business & Economics.

Magda, I. A. (2005). The practice of Islamic banking system in Sudan. *Jnr. of Economic Cooperation, 26*(4), 27-50.

Mehmed, G. (2014). An emperical study on liquidity risk and its determinants in Bosnia and Herzegovina. *Romania Economic Journal*(52).

Muhammad Ramzan and Zafar, M. I. (2014, April). Liquidity risk management in Islamic bank: a study of Islamic banks of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business., 5*(12).

Muharam, H., & Kurnia, H. P. (2013). The influence of fundamental factors to liquidity risk on banking industry: comparative study between Islamic and conventional banks in Indonesia. *Conference in Business Accounting and Management (CBAM) 2012* (pp. 359-368). Unissula Semarang Indonesia.

Mumtaz, H., Asghar, S., & Rima , T. (2015). *An overview of Islamic finance.* IMF.

Nathie, M. (2015). *Islamic bank failure: a case study*. Retrieved January 18, 2016, from www.academia.edu/.

Nikolaou, K., & Drehmann, M. (2009). Funding liquidity risk: definition and measurement. *European Institute of Financial Regulation*.

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity, 41*(5), 673-690.

Reserve Bank Australia. (2014). *Australian major banks' cost-to-income ratios.* Financial Stability Review. Retrieved April 10, 2016, from www.rba.gov.au/publication/fsr/boxes/2014

Shodhganga. (2016). A reservoir of Indian theses. Retrieved April 10, 2016, from http://shodhganga.inflibnet.ac.in/bitstream/10603/37983/5/05_chapter%203.pdf.

Shostak, F. (2000). The mystery of money supply definition. *The quarterly Journal of Australia economics, 3*(4), 69–76.

Siaw, S. (2013). *Liquidity risk and bank profitability.* University of Ghana(Thesis).

Srairi, S. A. (2009). Factors influencing the profitability of conventional and Islamic commercial banks in GCC countries. *Review of Islamic Economics , 13*(1), 5-30.

Stine, R. A. (1995). Graphical interpretation of variance inflation factor (vif). *The American Statistician*.

Sulaiman, A. A., Muhammad, M. T., & Samsudin, M. L. (2013). How Islamic banks of Malaysia managing liquidity? an emphasis on confronting economic cycles. *International Journal of Business and Social Science, 4*(7).

Talekar S.D. (2005). *Management of working capital.* Discovery Publishing House.

Vodova, P. (2013). Determinants of commercial banks liquidity in Hungary.

Waemustafa, W. (2014). *Comparative evaluation of credit risk determinants between Islamic and conventional banking.* UUM, OYA (Thesis).

Appendix

Having corrected the autocorrelation and heteroscedasticity, the result generated is shown in table 6 below.

Table6: Linear regression, correlated for autocorrelation and heteroscedasticity

Variable	Malaysia				Sudan			
	Coeff	Std Error	z-value	P>IzI	Coeff	Std Error	z-value	P>IzI
Constant	.3981	.2263	1.76	0.079	-.1957	.2100	-0.93	0.351
DR	0.6926	.0482	14.36	0.000***	.2252	.0786	2.87	0.004***
SIZE	-.0109	.0347	-0.31	0.754	.0396	.0222	1.78	0.075*
CAR	-.6540	.1543	-4.24	0.000***	.2081	.2220	0.94	0.349
MS	-.2152	.1687	-1.28	0.202	1.3578	.5786	2.35	.019**
GDP	.0023	.0024	0.95	0.344	-.0069	.0044	-1.57	0.116

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

R^2 =   0.9492 R^2 = 0.7425
Prob > χ2   =   0.0000   Prob > χ2   = 0.000

The result is not different from what was obtained from OLS in terms of significance of the variables and their direction.