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Original Article

Measures of Displaced Commercial Risk on financial stability in Islamic banking institutions

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ABSTRACT

Islamic banks are exposed to a unique risk such as Displaced Commercial Risk (DCR). DCR arises from the assets managed on behalf of the investment account holders which may be borne by the Islamic bank's own capital, when the Islamic banks forgo part or all of its share of profits on the investment account holders funds, in order to increase the return to the investment account holders. In a dual banking system, DCR could be a threat to the Islamic banks given the competition of fixed and higher return from the conventional banks. However, DCR would not be a threat to Islamic banks if their account holders choose Islamic banks due to religious obligatory factor. This paper aims to examine whether DCR is a threat to Islamic banks' stability. For that purpose, a model is set up to estimate bank stability. The model includes other bank specific characteristics and macroeconomic variables as control variables to avoid omitted variables bias. We find that DCR is one of the factor that affects bank profitability, at least in the case of Malaysian Islamic banks. This empirical evidence implies that Islamic banks operating in a dual banking system are affected by displaced commercial risk. Hence, it should be one of the banks' risk management concern

JEL classification: C23; E30; G21.

Keywords: *Islamic banks; Z-score; Displaced Commercial Risk; bank stability; investment account holders; profit sharing investment account*

Introduction

The ideas of risk existence in the Al Quran surah Al Baqarah verse 155 and Ali Imran verse 142. Allah says that: *…And We will surely test you with something of fear and hunger and a loss of wealth and lives and fruits, but give good tidings to the patient… (Al-Baqarah: 155)* and *…Or do you think that you will enter Paradise while Allah has not yet made evident those of you who fight in His cause and made evident those who are steadfast?...(Ali Imran: 142)*.

These verses explains that discussion how we can achieve the ideal having in mind the uncertainty and risks involved in everyday life. The uncertainties leading to loss is called risk based on the situation that involves the probability of deviation from the path that leads to the expected or usual result. The present verses also bid the protection of human life and property and forbid any uncalled for intrusion into that area whether those human beings are men or women, related or unrelated, Muslim or non-Muslim with whom there is a no-war pact in force. (Tafsir al-Mazhari)

The issue goes to the heart of Islamic banking and finance. Two basic principles of the Islamic bank are the avoidance of interest, for fear it may lead to the sin of usury; and avoidance of risk, which could be interpreted as gambling, which is also forbidden. So Islamic financial instruments have to be constructed on the foundations of real physical assets, in which the participants are profit-sharing partners. There is nothing wrong in Islam with profit, but it must be profit from the income from tangible assets.

Almost all financial institutions in Malaysia have fully adopted Islamic banking which is the provision and the use of financial services and products offered that conform to Islamic principles (outlined in the Quran and Islamic law). Banks remain the core of the financial services industry since they account for the bulk of financial transactions and their soundness is of key concern for stability. In Islamic banking, the contract-based regulatory framework will also contribute towards advancing the goals of financial stability which seek to preserve a financial system that works effectively and efficiently to serve real economic activity.

Like the conventional financial institutions, the operations of Islamic banks also face some financial risk problem. In the Malaysian environment, potential risks to financial stability will mainly be from a general weakness in the external economic conditions. The Malaysian financial sector is well placed to cope with external developments by ensuring the healthy economy and sustainable growth. The existence of unique risks in Islamic banks arise both from the contractual design of instruments based on shariah principles and the overall financial infrastructure. One of the risk that is unique to Islamic banking, that is the interest of this paper is Displaced Commercial Risk, (DCR).

Displaced commercial risk illustrates the situation where equity-holders have to transfer (or sacrifice) a part of their profit or incur a portion of depositors' loss to avoid deposit withdrawal (Abedifar P. et al., 2013). DCR is also the risk of transfers from shareholders' funds for the purpose of the smoothing of investors' returns[1] (Andrew, 2004). It means that DCR is relates to the fact that Islamic banks may find themselves under pressure to smooth the rate of return of the Profit Sharing Investments Accounts (PSIA) in order to remain competitive and not lose customers. In addition, the actual return of PSIA would be subsidized by shareholders' profits (Christos & Alexandros, 2009). According to How et. al (2005), DCR should be a concern to the Islamic banks, particularly in a dual banking context such as in Malaysia.

[1] Smoothing Mechanisms are (For further details, refer to IFSB, 2010): a) Usage of prudential reserves; b) Adjusting the mudarib share; and c) Transfers from shareholders' funds.

For instance, usually this risk (DCR) is a result of rate of return risk. This occurs when Islamic banks invest funds in Murabahah or Ijarah assets which yield lower rate of return compared to the current expectations of Investment Account Holders. Although in theory IIFS are not obligated to carry out such income smoothing, they may find that due to supervisory authority or commercial pressure, they are virtually forced to do so (Haron & Hin Hock, 2007).

Consequently, under commercial pressure, the majority of Islamic banks to smooth the rate of return attributed to their Investment Account Holders at the expense of profits normally attributed to shareholders, in order to offer them a competitive remuneration and persuade them to keep their funds in the bank (Khan & Ahmed, 2001; Archer and Karim, 2006).

In Islamic banks, a study conducted by Khan and Ahmed (2001) finds that the DCR is the most critical risk faced by the Islamic banks compared to other risks such as the operational risk and liquidity risk. The reasons for considering DCR as the most important may be because the risk of facing a lower rate of return on assets than currently expected by investment account holders. Therefore, increasing the share of profit sharing investment account (PSIA) that could arise in period of economic recession and loss of competitiveness. DCR also is harder to manage since it too depends on other banks' decision.

Towards achieving this, this paper seeks to answer the questions of whether DCR presents a threat to the stability of Islamic financial institutions. In other to answer that research question; First, DCR date series is calculated using Value at Risk (VaR) method. Second, using standard panel data estimation, the impact of DCR on stability is estimated.

The remainder of the paper is structured as follows. Section 2 presents some of discussion the DCR. Section 3 present data and methodology. We present empirical results in section 4. Section 5 concludes.

Displaced Commercial Risk (DCR)

Displaced commercial risk is an unexpected losses that the bank is able to absorb to ensure that Investment Account Holders (IAH) are remunerated at a competitive rate (Toumi, 2010). Inspired by Rosly and Zaini (2008), Sundararajan (2008) and How et. al (2005), in competitive pressures on bank to attract and retain investors (fund providers), Islamic banks as mudarib may forgo up their rights to part or their entire mudarib share in profits in favor of Investment Account Holders (fund provider) is a commercial decision.

Displaced commercial risk indicates that the bank may operate in full compliance with the shariah requirements reflected bank may not be able to pay competitive rates of returns as compared to other competitors. This risk arises when an Islamic bank is underperform during a period and is unable to generate adequate profits to pay its investors depositors a rate of return higher than what should be payable under the actual terms of the investment contract (AAOIFI, 1999; Khan and Ahmed, 2001; Van Hennie and Iqbal, 2008). The reasons for this are quite clear in the Islamic bank environment. If bank

do not provide rates similar to deposits, then investment account holders will move their funds to a bank (Islamic or otherwise) that does define displaced commercial risk. This is a legitimate concern and it relates to the mentality of investment account holders who may desire a stable low-risk return.

Therefore, in reality, most of Islamic banks decide to waive their profit portion to pay the investment account holders (IAHs) in order to prevent the withdrawal of the IAHs. An Islamic bank is strongly exposed to massive withdrawal risk due to lower rate of return on investments deposits, which explains the logic of increasing the profits distributed to IAHs (Khan and Ahmed, 2001; Ahmed, 2003; IFSB, 2005; El-Hawary et al., 2007). Once it occurs and cannot be handled properly, Islamic banks may go bankrupt or at least be taken over by government (banking authority). To prevent withdrawal from their depositors, the owners of the bank will need to apportion part of their own share in profits to the investment depositors. As a result, some Islamic banks give minimum guaranteed returns to depositors, although it is prohibited by the shariah principles (AAOIFI, 1999; Warde, 2000).

Thus, Archer and Karim (2006) argue that DCR is potentially an efficient and value creating means of sharing risks between two classes of investor with different risk diversification capabilities and preferences. Therefore, Islamic banks set up two standards of practices reserves with the intention of minimizing any need to forgo management fees. According to Greuning and Iqbal (2007), Islamic banks introducing Profit Equalization Reserve (PER) and Investment Risk Reserve (IRR) is to compete with conventional banking industry, it is a shield used by Islamic banks to protect DCR. Besides that, Central bank of Malaysia (BNM, 2004) issued Framework of Rate of Return to aid Islamic banking sector to mitigate risk of income destruction by sustains comparable rates of return for fund depositors.

It means that DCR is related to the fact that Islamic banks may find themselves under pressure to smooth the rate of return of the Profit Sharing Investments Accounts (PSIA) in order to remain competitive and not lose customers. In addition, the actual return of PSIA would be subsidized by shareholders' profits (Christos & Alexandros, 2009).

Further, the issues of DCR which arise as a result of the risk characteristics of profit-sharing investment accounts (PSIA), the main source of funding of Islamic banks in most jurisdictions. The characteristics of PSIA in Islamic banks could vary among banks and jurisdictions, from being deposit-like products (fixed return, capital certain, all risks borne by shareholders) in some, to being investment-like products (variable return, bearing the risk of losses in underlying investments) in others. Depending upon the extent to which the balance sheet risks get shifted from investment account holders to shareholders through various techniques available to Islamic banks' management. Such as, in Islamic banks, the tenor of unrestricted PSIA may be shorter than that of Islamic financing assets. When market rates of return rise, unrestricted IAH expect their returns to keep compete, while in the absence of repricing, the assets of bank are effectively occur. These market pressures have the effect of displacing onto shareholders' investment risks on IAH funds which, from

a purely shariah point of view, would be borne entirely by the IAH. In other words, these pressures give rise to DCR.

In summary, we can see: First, how various authors define DCR. Second, how Islamic banks work to make the decision in order to prevent the withdrawal of the IAHs. Third, how the market operation are related to DCR. In Islamic banks, the target market is likely to be sensitive to market based price measures, particularly if these banks operate in competitive contractual environments with other Islamic and conventional banks and deposit taking institutions. As a result, Islamic banks may be pressured in varying degrees to provide distributions similar to other institutions or risk losing their depositor base. This risk has been termed displaced commercial risk. It essentially refers to the risk that investors will withdraw their funds in droves, thereby subjecting the bank to failure, if the returns paid demonstrate a trend contrary to the investors' expectations of deposits of a similar nature. Next section provides a step practical procedure for the estimation of DCR.

Under a dual banking system, the stability of interest rates and the financial system is of great importance for the policy maker in developing the Islamic banking industry. Islamic banks are not remote from the interest rate volatility. It is the displaced commercial risk that threatens Islamic banking stability in a changing market interest rate situation (Hutapea and Kasri, 2010). This mainly arises from the risk faced by Islamic banks in the liabilities side, as a result of the mobilization of deposits which are on Mudharabah basis. IFSB (2005) define the displaced commercial risk as: "… *the risk arising from assets managed on behalf of Investment Account Holders which is effectively transferred to the Islamic Financial Institutions own capital because the Institution forgoes part or all of its mudharib's share (profit) of on such fund, when it considers this necessary as a result of commercial pressure in order to increase the return that would otherwise be payable to Investment Account Holder's*" (IFSB, 2005).

Inspired by Rosly and Zaini (2008), he derives DCR from competitive pressures on bank to attract and retain investors (fund providers). The decision of bank to give up their rights to part or their entire mudarib share in profits in favor of Investment Account Holders (fund provider) is a commercial decision. Furthermore, Sundararajan (2008) point out that exposing Islamic bank to displaced commercial risk, where Islamic bank as mudarib forgoes part or all of its share of profits and passes these to the customer, commonly to match the investment yields offered by competitors in the market. Some comparisons may also be made with interest rate levels offered by conventional banks.

The consequence of such smoothing is that a prudential regulatory framework for a product that is not treated consistently or according to theory across the industry. In an attempt to provide a degree of regulatory certainty, the guidelines issued by the Accounting and Auditing Organization for Islamic Financial Institution (AAOIFI) with the implementation of a displaced commercial risk charge provide an attempt to cushion this risk. A more sophisticated approach to dealing with displaced commercial risk from a capital adequacy standpoint was developed by the IFSB in its standard on capital adequacy (IFSB, 2006).

Whereas, according to Van Hennie and Iqbal (2008), the AAOIFI has identified the displaced commercial risk as the risk when an Islamic bank is underperform during a period and is unable to generate adequate profits to pay its investors depositors a rate of return higher than what should be payable under the actual terms of the investment contract (AAOIFI, 1999). Archer and Karim (2006) argue that displaced commercial risk is potentially an efficient and value creating means of sharing risks between two classes of investor with different risk diversification capabilities and preferences.

Therefore, an Islamic bank is strongly exposed to massive withdrawal risk due to lower rate of return on Investments Deposits, which explains the logic of increasing the profits distributed to Investment Account Holders (Khan and Ahmed, 2001).

In other words, DCR is the transfer of the risk associated with deposits to equity holders (Ahmed, 2003 and IFSB, 2005) or the risk of divergence between asset performance and the expectation for return on liabilities[2]. This risk is one of the triggering factors of withdrawal risk where the bank is exposed to the risk of deposit withdrawals from their depositors (El-Hawary et al., 2007).

Once it occurs and cannot be handled properly, Islamic banks may go bankrupt or at least be taken over by government (banking authority). To prevent withdrawal, the owners of the bank will need to apportion part of their own share in profits to the investment depositors. As a result, some Islamic banks give minimum guaranteed returns to depositors, although it is prohibited by the shariah principles (AAOIFI, 1999).

As such, the Islamic banks may decide to waive their rights to part or their entire mudarib share of profits in order to satisfy and retain their fund providers and dissuade them from withdrawing their funds. Hence, confirms the previous finding of Mangkuto (2004). Taken together, these results suggest that the Islamic banks are exposed to various banking risks which will inevitably affect the bank margin.

An Islamic bank engages in such self-imposed practice to induce its investment account holders not to withdraw their funds in the bank to invest them elsewhere. Hence, during bad times the bank may forgo part or all of its shareholders' profits, and this may adversely affect its own capital. An example is the International Islamic Bank for Investment & Development in Egypt, which distributed all of its profits to investment account holders while the shareholders received nothing from the mid to late 1980s[3] (Warde, 2000).

Further, as the level of Islamic deposit decreased when interest rate increased, the banks are also exposed to displaced commercial risk. In Islamic banking literature, the displaced commercial risk occurs due to market pressure that Islamic bank pays a return that exceeds the rate that has been earned on assets financed by investment account

[2] In bank institutions, can split into two parts: bank and shareholders. Firstly, in bank institutions: Displaced commercial risk may adversely affect the value of the bank's capital. Return on equity goes down. Secondly, shareholders are exposed to the risk of not receiving their share of the bank's profit.

[3] In 1988, the bank distributed to its depositors an amount exceeding its profits, and the difference appeared in the bank's accounts as "loss carried forward". It is also reported that this bank was subject to temporary takeover by the Central Bank of Egypt.

holders when the return on assets is under-performing as compared with competitors' rates.

Thus, in order to assess the DCR, the idea of DCR have been analyzed empirically in Archer et.al (2010) and Toumi et.al (2011) measured by a Value at Risk methodology. The evidence reveals a significant amount of return smoothing, and a significant absorption of risks by bank capital. This finding raises a broader issue of how best to measure empirically the extent of risk sharing between unrestricted investment accounts and bank capital.

Summarizing, DCR exposure in Islamic banks which requires allocating adequate capital. Under commercial pressure or regulatory pressure, the majority of Islamic banks absorb a proportion of losses normally borne by Investment Account Holders in order to mitigate potential massive withdrawal of funds. Note that if the banks are forced to give part of their profit share to fulfill the consumers' expectation and stay competitive in the market, this could suggest a poor risk management practices which increase their operational expenses and reduces their profit margin. Based on the empirical evidence, a methodology for estimating DCR can be measured by value at risk (VaR). Next section provides a step practical procedure for the estimation of DCR_{VaR} and the impact of DCR on Islamic bank stability.

Data and Methodology

Data Inputs

This research will use a sample of 17 full-fledged Islamic banks in Malaysia. The study periods span from 1994 to 2012, using a balanced panel data of 323 observations. Our calculations are based on individual bank data drawn from the available annual report database.

DCR Model

DCR occurs when recognized the rate of return was lower than expected rate of return. It is meant as a potential loss when the shareholder funds used to smooth rate of return on Islamic deposits. With this, there is a potentiality that customer might switch from Islamic deposits to conventional deposits especially in dual banking system.

Some of the Islamic banking depositors position the banks indifferently from the conventional ones, namely rational depositors. For example, when Islamic banks offer deposit products to depositors, the revenue sharing rate of Mudarabah deposit contract should be attractive enough. It is because there is a level of tolerance among depositors to value the return of Islamic deposits which is defined as the difference between the depositors expected rate of return of depositing money in conventional deposits and the Islamic deposit return from Islamic financing. Normally, depositors expect to earn a higher return from Islamic deposits than from conventional ones.

Therefore, if

$$\left|r_e D_c - r_e D_i\right| \geq \varphi_n$$

When the $r_e D_c$ is less than $r_e D_i$, a DCR might not occur or φ_n^+

Where;

$r_e D_c$ The Conventional Deposit Return

$r_e D_i$ The Islamic Deposit Return

φ_n A level of tolerance among depositors to value

In the case of

$$\left|r_e D_c - r_e D_i\right| < \varphi_n$$

When the $r_e D_c$ is higher then $r_e D_i$, a DCR might occur or φ_n^-

In order to determine the DCR, assuming a normal probability distribution, and using the standard deviations of rate of return on equity (ROE), the equations can be shown through estimation model proposed by IFSB (2011) as follows:

$$DCR = UL_1 - UL_0 \qquad (1)$$

Where; UL_0 is a multiple of the standard deviation of ROE_0 (Unexpected loss to shareholders when PSIA are treated as pure investment products) and UL_1 is a multiple of the standard deviation of ROE_1 (Unexpected loss to shareholders when PSIA are treated as being in between pure investment and deposit like products). The corresponding unexpected loss to shareholders under the two scenarios of PSIA can be calculated as the rate of return to equity is expressed as follows:

$$ROE_0 = RA - PA \qquad (2)$$

$$ROE_1 = \frac{\left(RA - PA\right) + DI}{K.w.\left(RA - PA - R_m\right)} \qquad (3)$$

Where; *RA* is the gross rate of return on assets; *PA* is the provision as a percentage of assets; *DI* is PSIA funds; *K* is shareholders' funds; R_m is mudarabah income; and *w* is the weight attached market benchmarks in the decision on payouts to IAH.

DCR Value at Risk (VaR) Method

Value at Risk (*VaR*) is one of the risk management tools. The *VaR* indicates how much a bank can lose or make with a certain probability in a given time horizon. *VaR* summarizes

financial risk inherent in portfolios into a simple number. Though *VaR* is used to assess the DCR is an appropriate method to measure effectively the capital charge for this risk. We outline the underlying concept of DCR_{VaR} method of estimating it. *VaR* is well-known in financial mathematics and has become a standard risk measure for financial risk management due to its conceptual simplicity and ease of computation. Nevertheless, *VaR* has been charged as having several conceptual problems (Jorion, 2007, Yamai and Yoshiba, 2005, Artzner et al., 1999).

To assess the DCR based on Value at Risk (VaR), we want to know the bank equity amount necessary to absorb the displaced commercial risk. In spite of the existing reserve level, the return on investment can fall below the benchmark level. The equity level uncovered by the reserve amount will be obtained by the *VaR* for a given probability level α. The estimation *DCR* equation from equation (1) will become (4) after implementing *VaR* method. If the investment and benchmark profit follow the standard normal law and isolating the *VaR* it comes:

$$DCR_{VaR\alpha} = Z_{\alpha}\sigma\left(\overline{r_i} - \overline{r_b}\right) + E + \left(E(\overline{r_i}) - E(\overline{r_b})\right) \qquad (4)$$

This model adapted from Toumi et.al (2011), where; Z_{α} is a quantile of the standard normal law for the level of probability α . $\overline{r_i}$ is the return on the investment account. *E* is the part of accumulated amount of reserve attributed to Investment Account Holders and $\overline{r_b}$ is a return on benchmark.

Now, this study do it value of *VaR* in the percentage amount in *DI*. It is making easier to interpret *VaR* value. By developing the standard deviation (volatility) of the difference between the investment and benchmark profit, the *VaR* is using by the capital asset pricing model (CAPM) model. In the simplest case were the benchmark portfolio is the risk free asset and the invested portfolio is equal to the market portfolio, the *VaR* becomes:

$$\frac{DCR_{VaR\alpha}}{DI} = f\left[Z_{\alpha}\sigma\left(R_m\right) + \left(E(R_m) - R_f\right)\right] + E + \left(f - 1\right)R_f \qquad (5)$$

The Impact of DCR on Bank Stability

In this section, we describe the methodology that is used to estimate the impact of DCR on bank stability. We consider the z-score as a measure stability of Islamic banks because it combines banks' capital and profits with the risk they face in a way that is grounded in theory.

Using standard panel data estimation, the impact of DCR on bank stability is estimated. To ensure robust result, other factors that could possibly influence bank stability such as bank specific characteristics and macroeconomic factors are also included as control variables.

The general estimation model can be specified as follow:

$$BS_{i,t} = \alpha + \beta bc_{i,t} + \omega m_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where the dependent variable is the $BS_{i,t}$ is bank stability for bank *i* at time *t*, *bc* is a vector of bank characteristic variables, *m* is macroeconomic variables, and $\varepsilon_{i,t}$ is the residual.

Bank stability is measured using z-score. It is calculated as:

$$BS = \frac{K + \mu}{\sigma}$$

Where, *K* is equity capital as a percentage of assets, μ is average return as percentage of assets, and σ is standard deviation of return on assets as a proxy for return volatility. Precisely, *BS* indicates the number of standard deviations that a bank's return on assets has to drop below its expected value before equity is depleted and the bank is insolvent (Mercieca, Schaeck, and Wolfe (2007); Cihak and Hesse (2010)). Thus, a higher z-score indicates that the bank is more stable.

Determination of Model

Bank stability estimation model is used to capture the relations between bank stability, DCR, bank characteristic and macroeconomic variables. Equation (7) will be estimated and examines the impact of DCR on bank stability with bank specific characteristics as the control variables includes macroeconomic variables in addition to bank specific characteristics.

$$BS_{i,t} = \gamma_{0i} + \gamma_1 ROA_{i,t} + \gamma_2 AST_{i,t} + \gamma_3 OWN_{i,t} + \gamma_4 LOAST_{i,t} + \gamma_5 LPLO_{i,t} + \gamma_6 DIV_{i,t} + \gamma_7 COST_{i,t}$$

$$+\gamma_8 DCR_{i,t} + \gamma_9 EXCH_{i,t} + \gamma_{10} INFL_{i,t} + \gamma_{11} GDP_{i,t} + \gamma_{12} INT_{i,t} + \gamma_{13} HERFIN_{i,t} + \mu_{i,t} \quad (7)$$

Where BS is used as a proxy measure of the banking stability; ROA is return on asset as a proxy of profitability; AST is total assets of a bank as a proxy of size; OWN is the ownership as a proxy of dummy variable. Assume the value of (1) if the bank is a local Islamic bank and (0) is a foreign Islamic bank in Malaysia. The dummy variable (OWN) is comprised to detect whether there are efficiency differences between local Islamic bank and a foreign Islamic bank banks operating in Malaysia; LOAST is ratio of loans to total assets; LPLO is the ratio of loan loss provisions to total loans is incorporated as an independent variable in the regression analysis as a proxy of credit risk; DIV is the Income Diversity proxies by a measure of diversification across different sources of income; COST is cost to income ratios as a proxy of cost efficiency; and DCR is displaced commercial risk as a proxy of risk factor; *EXCH* is the exchange rates; *INFL* is the inflation rate; *GDP* Gross domestic product; *INT* is the interest rate ratios; *HERFIN* is the Herfindahl index, defined as the sum of squared market shares (in

terms of total assets) of all Islamic banks in the Malaysia; and μ is an error term for bank stability equation.

Empirical Results

DCR outcomes

Based on the sample above, we present empirical results of DCR model between 1994 to 2012. Figure 1 (In Appendix) detail the trend of capital required by Islamic Banks in Malaysia to cover the displaced commercial risk ratio at 99% confidence level.

The figure expresses DCR performance between 1994 to 2012. In overall, since 1994 to 2008, there is a sharp increase DCR for each Islamic bank. This situation occurs on bank since pressures from regulators on each Islamic bank to pay market related returns and avoid any loss of principal, in order to prevent possible risks that might arise from customer withdrawals from banks that offer below market returns. The crisis also revealed a structural weakness in Islamic banking operations particularly under a volatile economic environment. In Malaysia, 90% of Islamic financing are negotiated on fixed-rate terms. Comparatively, the return from financing under Islamic banking would decline under this environment and contribute to lower deposit rates to depositors. In essence, Islamic banking could not react swiftly under the current interest rate environment due to the absence of a floating rate option.

Generally, starting in 1999, all banks need the huge capital to cover the displaced commercial, which is the average capital required by this year to cover the displaced commercial risk (DCRVaR) is 0.13 of the total of investment account. It happened since the impact of interest rate changes on Islamic bank performance in the dual system. The Islamic banks are exposed to interest rate risks and the cause of this phenomenon is the overdependence of Islamic banks on Islamic financing where the profit rate (financing rate) is fixed. When interest rates are rising, the base lending rate (BLR) and rates of return on deposits of the conventional bank would change accordingly to changes in the market interest rate. As a result, the profit margin of the conventional bank will not be affected. However, the Islamic bank cannot increase the rate of returns on its deposits because the profit margin is fixed. As a consequence, Islamic deposits give lower returns. The substitution effect comes into play where depositors prefer the conventional banks. In 2002, the average amount of DCRVaR climbed gradually to just over 0.50. This risk amount has fluctuated between 2002 to 2008, before ending at a peak of average 7.64 in 2008. Such a phenomenon of economic recession and loss of competitiveness is one of the reasons why the banks expose higher DCR.

There was a steep fall in capital to cover the DCR by the end of the year 2009. The result shown that the performance of the Islamic banking in Malaysia had improved during the period. With Malaysia's goal of becoming the most significant Islamic finance hub in the world, it is therefore very important to Islamic banks improve the asset quality and maintain the proportion IAH in reserve within the IAH equity, with the purpose of smoothing returns

to IAH. Therefore, at the end 2012, the average amount of the capital required by each Malaysian Islamic banks to cover the DCR is 4.26 of the total of investment accounts with 99% confidence. We find that, where based on the data used in this regression, an additional year of DCR, insofar as the effect of DCR is still in small amount. However, the equity of Islamic banks is still needed to protect DCR.

Bank Stability results

Descriptive analysis was conducted to observe the statistical properties of the data used as variables, such as the mean, median, standard deviation and normality of the data. Table 1 illustrates the summary of basic descriptive statistics of the variables involved in the model developed, based on two main indicators, namely the indication of bank specification and macroeconomic factors.

According to Table 1, we can see that the variables such herfindahl index, displaced commercial risk, interest rate ratios and inflation rate are recorded the highest average value in the data distribution with mean values are 7.52, 2.41, 4.08 and 2.73 respectively. Meanwhile, return on asset and the ratio of loan loss provisions to total loans variables show the lowest average value of 0.0149 and 0.0240. Throughout this study, Malaysian Islamic banking proves their market power strength. This is shown by the higher average herfindahl index (HERFIN) value. Islamic banks also trying to further strengthen risk management. This was reflected by the finding on higher DCR average value. In terms of macroeconomics, growth of the Gross Domestic Product (GDP) averaged 9.34 and the exchange rates (EXCH) during 1994 to 2011 at 6.61. The level of average Z-score remained stable at 0.67. While total assets of a bank (AST), ratio of loans to total assets (LOAST) and cost to income ratios (COST) have a strong average explained some bank characteristic factors.

Next, standard deviation is used in determining the variation of the data. COST variables have the highest standard deviation value of 3.91. This shows that the Islamic banking involved in the research do not consistently store cost to income ratios. Small data dispersion exists for the gain (ROA) variable. For the macroeconomic variables, the highest data dispersion is the interest rate ratios (INT) variable with a value of 1.81, while the lowest dispersion value is growth of Gross Domestic Product (GDP) with a standard deviation of 0.07.

In measuring skewness, it is found that the bank characteristic variables, which consist of cost to income ratios (COST) and the Herfindahl index (HERFIN), have a negative scattering data. In contrast, the ratio of loan loss provisions to total loans (LPLO), total assets of a bank (AST) and displaced commercial risk (DCR) were positively scattered. Next, macroeconomic variable such as growth of Gross Domestic Product (GDP) recorded negative scattering data, while the data on the exchange rates (EXCH), inflation rate (INFL) and the interest rate ratios (INT) variables are positively scattered.

Next, kurtosis tests were carried out to observe the normality of the data distribution. The inflation rate (INFL), Income Diversity (DIV) and the Herfindahl index (HERFIN) kurtosis' values are approaching two, meeting the criteria for a normally distributed data.

Jarque-Bera test is then used to confirm the extent of the data normality distribution. From this test, results in Table 1 demonstrate that all variables are significant. This shows that all data are not normally distributed. Therefore, ordinary least square (OLS) estimation is not compatible with the research data. Hence, the Generalized Least Square (GLS) method is more appropriate and expected to yield a much better result.

The method to test the existence of multicollinearity is by checking the Pearson correlation between the independent variables, which can lead to biased results. Correlation analysis is a simple method to detect the existence of collinearity in a multi-variable data based on the variables' correlation matrix. It can test and measure the degree of strength (absolute value) of the relationship between dependent and independent. Correlation analysis can also be used to determine the type of relationship or the direction of the figure, whether it is moving from left to right or vice versa. Thus, a relatively high correlation value between the two independent variables indicates the possibility of a multicollinearity happening.

Table 2 shows the correlation matrix for the independent variables. Based on the correlation table, it seems that all independent variables have significant correlation with stability variables except the (GDP), (OWN), and (COST) variables. Variable (INFL) and (INT) have significantly strong negative values with stability indicating that the greater amount of the inflation and interest rate the economic have, the lesser their amount of stability.

Most of the variables are correlated but not beyond the critical threshold of multicollinearity. All correlation results are below 0.6 for each pair of variables, which indicates that multicollinearity is not a potential problem.

The connections DCR and bank stability also presented. Applying statistical model, we obtain the result of bank stability and the amount of capital charge required to cover the DCR. A positive relationship exists between DCR and bank stability.

DCR is incorporated as an independent variable in the regression analysis as a proxy of bank risk. the positive sign means if the lower (higher) amount of capital charge required to cover the DCR, the lower (higher) bank stabilise their capital. In this vein, Cihak and Hesse (2010) and Toumi et.al (2011) point out that the greater the exposure of bank to high risk, bank stability would be lower. When the Islamic banks more absorb a proportion of losses normally borne by investment account holders under commercial pressure, the Islamic banks became less stabilize.

The best model selection

In this section, we use the three models: None effects, Fixed effects, and Random effects (See Table 3). A fixed effect model asks how heterogeneity from group and/or time affects

individual intercepts, while a random effect model hypothesizes error variance structures affected by group and/or time.

Specifically, the F-test compares a fixed effect model and (pooled) OLS conduct a Chow test and then, the Hausman specification test compares fixed and random effect models. Whereas the Breusch Pagan LM test to detect the heteroskedasticity problem.

Firstly, Chow test was conducted to choose between non effects or fixed effects model. The model in effect uses an F-test where the H_0: None effects, versus H_1: Fixed effects model. The result is that there is no structural break and reject the null hypothesis.

To observe the importance of bank size on stability in Islamic banks, this paper present subdivide banks into all, large and small Islamic banks. It is most important because banks can improve their performance by expanding their resources within their existing business lines where they possess distinctive comparative advantages. The results separately for sub-samples of large Islamic banks (assets over RM 3,500,000 million) and small Islamic banks (all others). The same method has been used in previous research by Mercieca, Schaeck, and Wolfe (2007). In Malaysia, about 30 percent of the Islamic banks fall into the small bank category and about 70 percent of the Islamic banks fall into the large bank category.

By inspecting the output (See Table 3), it can be seen that for 3 group categories (all, large and small Islamic banks) the p-value reported for the Chow test statistic is less than 0.0001. A low p-value suggest that we are able to reject the null hypothesis. Therefore, we choose the fixed effect model.

Secondly, the best model is selected based on the Hausman test. The test to choose between fixed effects or random effects model. Hausman test statistic is used to test the null hypothesis that the random effect model is correct. Given a model and data in Table 3 which fixed effects estimation would be appropriate. In a fixed effects kind of case, the Hausman test is a test of H_0: That random effect would be consistent and efficient, versus H_1: That random effect would be inconsistent.

Note that the test statistic model is reported to be chi-square with 2 degrees of freedom, and a p-value of 0.0001. Based on these results we would to reject the null hypothesis. We conclude that a fixed effect approach will be preferred.

In Table 3 also shows the result heteroskedasticity problem. When we use the Breusch-Pagan test that the null hypothesis is a constant variance. The output shown the p-value is 0.3584, then we failed to reject the null and there is no problem of heteroskedasticity.

Based on the output, our results show that fixed effect model is better than none effect and random effect model. In addition, we adopt the approach by Baltagi (1995) who suggest that a random effects model is not appropriate if the sample is not randomly taken from a large population.

Conclusion

We can conclude that, basically the Displaced Commercial Risk problem should not occur in the Islamic banking system if their account holders choose Islamic banks due to religious obligatory factor. However, the empirical data proven the existing of DCR in Islamic banking system in Malaysia because of a customer that behaves profit motivated or often referred to as a floating client.

To prevent a migration of the deposits, Islamic bank will pay the deficit using its own fund. This will decline total earning of the bank. Furthermore, we use displaced commercial risk as an indicator of stability. This paper using Z-score method to assess the stability of Islamic banks across the bank characteristics and macroeconomic variables. We find that, based on the output regression, the effect of *DCR* is still small. However Islamic bank needed to be protected from this unique risk (DCR).

Why this issue is important because this study focus on demonstrating of the *VaR* approach to quantify *DCR* for Islamic banking institutions in Malaysia where have implement the dual banking system. The results also show the variations on *DCR* across the bank's stability between of three size groups Islamic banks (all, large and small categories).

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Appendix

Figure 1: The Capital Required by Banks to Protect DCR

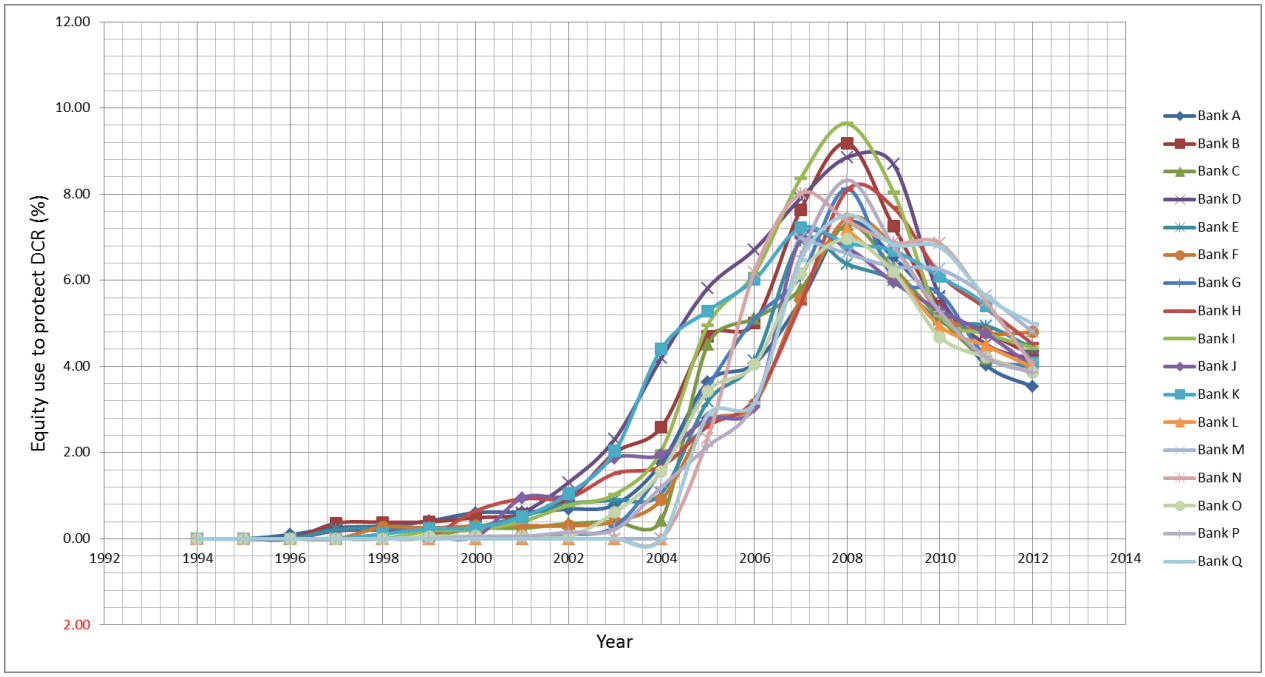

Table 1: Descriptive Statistic variables

Variables	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
Z	0.6664	0.8236	0.4897	-0.2679	1.8508	21.6376*
ROA	0.0149	0.0142	0.0133	0.9050	4.7920	87.3101*
AST	0.3824	0.1046	0.8141	3.4953	16.3708	3063.7550*
OWN	0.6471	1.0000	0.4786	-0.6155	1.3788	55.7643*
LOAST	0.3578	0.3913	0.2847	0.0278	1.6804	23.4783*
LPLO	0.0240	0.0162	0.0274	1.1523	3.3198	72.8515*
DIV	0.3979	0.3319	0.3506	0.3721	2.2487	15.0521*
COST	0.6263	0.0000	3.9118	-0.7313	11.2019	934.1464*
EXCH	0.0661	0.0159	0.1066	2.3222	8.1410	646.0145*
INFL	2.7253	2.7300	1.3055	0.4082	2.4659	12.8094*
GDP	0.0934	0.1106	0.0667	-0.9825	3.1517	52.2744*
INT	4.0847	3.2000	1.8131	1.2713	3.2412	87.7949*
DCR	2.4100	0.6148	2.7979	0.7038	1.9915	40.3536*
HERFIN	7.5224	9.3151	4.8324	-0.6091	2.0863	31.2036*

*Note: * Significant at 1%, ** 5% and*** 10%.*

Table 2: Pearson's Correlations

Correlation	*Z*	*ROA*	*AST*	*OWN*	*LOAST*	*LPLO*	*DIV*	*COST*	*EXCH*	*INFL*	*GDP*	*INT*	*DCR*	*HERFIN*
Z	1.0000													
ROA	0.4560***	1.0000												
AST	0.2857***	0.0064	1.0000											
OWN	0.0287	0.1410***	-0.0068	1.0000										
LOAST	0.6635***	0.5387***	0.0361	0.2590***	1.0000									
LPLO	0.4032***	0.3938***	0.1009**	0.2575***	0.4478***	1.0000								
DIV	0.5106***	0.4265***	0.0739*	0.0550	0.4855***	0.3274***	1.0000							
COST	0.0451	0.0427	0.2273***	0.0035	-0.0232	0.1166***	0.1524***	1.0000						
EXCH	0.1015**	0.1407***	0.1162***	0.0000	0.1320***	-0.0040	0.0585	-0.0045	1.0000					
INFL	-0.1677***	0.0020	-0.0078	0.0000	-0.0471	-0.0921*	-0.0663	0.0226	0.2798***	1.0000				
GDP	0.0292	-0.0028	-0.0359	0.0000	0.0615	0.0161	0.0658	-0.0064	-0.0673	0.1938***	1.0000			
INT	-0.4449***	-0.1837***	-0.0060	0.0000	-0.3294***	-0.2678***	-0.3261***	-0.0686	0.5293***	0.4504***	0.0721*	1.0000		
DCR	0.5417***	0.4186***	0.0080	0.0314	0.5620***	0.2751***	0.5258***	0.1544***	0.0902*	0.0299	0.0526	-0.4666***	1.0000	
HERFIN	0.7332***	0.5483***	0.1859***	0.2245***	0.6671***	0.4266***	0.6435***	0.0695	0.0685	-0.1028**	0.0619	-0.4456***	0.5709***	1.0000

*Note: *** Correlation is significant at the 0.01 level (2-tailed).*
*** Correlation is significant at the 0.05 level (2-tailed).*
**Correlation is significant at the 0.1 level (2-tailed).*

Table 3: None, Fixed and Random Effects Estimation Result

	GLS WITH NONE EFFECTS			*GLS WITH FIXED EFFECTS*			*GLS WITH RANDOM EFFECTS*		
	ALL	**LARGE**	**SMALL**	**ALL**	**LARGE**	**SMALL**	**ALL**	**LARGE**	**SMALL**
C	0.3969	0.2569	0.8105	0.3439	0.2389	0.7126	0.4113	0.2569	0.8105
	(0.0735)***	(0.0765)***	(0.1724)***	(0.0763)***	(0.0834)***	(0.1722)***	(0.0762)***	(0.0790)***	(0.1724)***
S	0.5481	-5.7568	1.7904	-1.8437	-6.9817	1.1604	-0.2791	-5.7568	1.7904
	(1.5153)	(2.0951)***	(2.4041)	(1.6691)	(2.4401)***	(2.5327)	(1.5568)	(2.1626)***	(2.4041)
AST	0.1160	0.1034	0.0653	0.1016	0.1106	0.0641	0.1106	0.1034	0.0653
	(0.0207)***	(0.0255)***	(0.0336)**	(0.0212)***	(0.0272)***	(0.0341)**	(0.0207)***	(0.0263)***	(0.0336)**
OWN	0.1556	0.0571	0.1836	n.a	n.a	n.a	0.1526	0.0571	0.1836
	(0.0356)***	(0.0455)	(0.0598)***	n.a	n.a	n.a	(0.0446)***	(0.0469)	(0.0598)***
LOAST	-0.5210	-0.6031	-0.4372	-0.5463	-0.7085	-0.5322	-0.5330	-0.6031	-0.4372
	(0.0843)***	(0.0969)***	(0.1721)***	(0.0960)***	(0.1203)***	(0.1845)***	(0.0876)***	(0.1001)***	(0.1721)***
LPLO	-1.0691	-0.5427	-2.4532	-0.5737	-0.0652	-2.9741	-0.8835	-0.5427	-2.4532
	(0.6824)*	(0.7149)	(1.6766)*	(0.7082)	(0.7655)	(1.7474)*	(0.6865)*	(0.7379)	(1.6766)*
DIV	0.0015	0.0470	0.1732	0.0109	0.0643	0.2084	0.0044	0.0470	0.1732
	(0.0615)	(0.0743)	(0.1054)*	(0.0688)	(0.0865)	(0.1191)*	(0.0636)	(0.0767)	(0.1054)*
COST	-0.0054	-0.0033	-0.0004	-0.0045	-0.0036	-0.0002	-0.0051	-0.0033	-0.0004
	(0.0043)	(0.0059)	(0.0058)	(0.0042)	(0.0062)	(0.0058)	(0.0042)	(0.0061)	(0.0058)
DCR	0.5235	0.2012	1.6551	0.6084	0.1830	1.6533	0.5525	0.2012	1.6551
	(0.2087)***	(0.2262)	(0.4091)***	(0.2079)***	(0.2367)	(0.4127)***	(0.2063)***	(0.2335)	(0.4091)***
EXCH	-0.0268	-0.0341	-0.0041	-0.0259	-0.0339	-0.0079	-0.0264	-0.0341	-0.0041
	(0.0143)**	(0.0159)***	(0.0270)	(0.0140)**	(0.0164)**	(0.0272)	(0.0141)**	(0.0164)***	(0.0270)
INFL	0.1707	0.0093	0.4498	0.1711	0.0183	0.4201	0.1700	0.0093	0.4498
	(0.2464)	(0.2686)	(0.4443)	(0.2406)	(0.2765)	(0.4466)	(0.2419)	(0.2773)	(0.4443)
GDP	-0.0441	-0.0281	-0.1090	-0.0492	-0.0305	-0.1013	-0.0459	-0.0281	-0.1090
	(0.0157)***	(0.0168)*	(0.0325)***	(0.0157)***	(0.0175)*	(0.0331)***	(0.0156)***	(0.0174)*	(0.0325)***
INT	-0.0103	-0.0143	-0.0069	-0.0109	-0.0170	-0.0091	-0.0103	-0.0143	-0.0069
	(0.0086)	(0.0091)*	(0.0172)	(0.0086)	(0.0099)*	(0.0177)	(0.0085)	(0.0094)*	(0.0172)
HERFIN	0.0382	0.0468	0.0250	0.0397	0.0423	0.0240	0.0387	0.0468	0.0250
	(0.0057)***	(0.0067)***	(0.0105)***	(0.0060)***	(0.0075)***	(0.0107)***	(0.0057)***	(0.0069)***	(0.0105)***
R2	0.4580	0.6836	0.5311	0.6601	0.7312	0.6319	0.6844	0.7357	0.6760
Hausman	Test Random effect vs Fixed effect			9.97					
Prob				0.0001					
Breusch-P	Test the Heteroskedasticity problem			12.55					
Prob				0.3584					
Chow test	Test None effect vs Fixed effect			7.43					
Prob				0.0000					

Note:
Figures in parentheses denote 'Standard Error' values of the regressions coefficients.
**** Significant at 1 percent level.*
*** Significant at 5 percent level.*
** Significant at 10 percent level.*