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EQUITY-BASED FINANCING AND LIQUIDITY RISK: INSIGHTS FROM MALAYSIA AND INDONESIA

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ABSTRACT

This study examines the effect of equity-based financing (EBF) on Islamic bank liquidity risk (LR) in Malaysia and Indonesia. The EBF-LR relationship is compared using the traditional and BASEL III liquidity measures. The results provide little evidence that EBF increases banks' LR using the Net Stable Funding Ratio (NSFR). The higher the EBF, the higher the required stable funding; hence, lower NSFR sequentially raise the LR, supporting the maturity transformation hypothesis. EBF may increase exposure to LR if Islamic banks often use short-term deposits to fund long-term financing. However, EBF does not have a significant influence on the traditional LR measure, suggesting the pass-through mechanism exists, implying that investment account holders absorb the losses in cases of default. This study offers empirical evidence of the pass-through mechanism of profit loss-sharing in Islamic banks using the traditional measure besides supporting the maturity transformation hypothesis using the BASEL III liquidity risk measure.

JEL Classification: C13, G20, G30

Key words: Liquidity risk, Equity-based financing, Islamic banks, Profit-loss sharing, Pass-through mechanism

1. INTRODUCTION

The financial crisis of 2007 shocked the world in general, and the banking industry in particular. The crisis affected both conventional banks and Islamic banks. However, the Islamic banks' performance was much more stable compared to their conventional counterparts during the global crisis (Mahmood, Gan and Nguyen, 2018). Most banks were forced out of business and some were compelled to merge with other banks to maintain adequate liquidity. Islamic banks faced a big challenge in managing liquidity due to religious limits besides adhering to the nature of the product. They needed to retain a high liquidity level because they lacked *shariah*-compliant instruments for managing liquidity risk (LR) (Hassan, Khan and Paltrinieri, 2019). Retaining high liquidity, however, has adverse effects on bank profitability. Some empirical studies on Islamic banking have suggested debt-based financing (DBF) via commodity *Murābaḥah* for liquidity management (Ismal, 2010; Ramzan and Zafar, 2014;). On the other hand, another group of studies (Chapra, 2002 and 2007; Siddiqui, 2008) theoretically claim that equity-based financing (EBF) is the most suitable banking product offering justice for both banks and customers due to its profit loss sharing (PLS) pass-through mechanism[1] between asset and liability. Since empirical evidence to support this theory is still limited, this research is aimed at offering empirical verification by examining the impact of EBF on LR.

Theoretically, Islamic banks are less exposed to instability than conventional banks (Ariffin, 2012) due to their profit loss sharing (PLS) pass-through mechanism between asset and liability. Chapra (2002) highlighted that an ideal Islamic banking framework is mirrored by its balance sheet structure since both assets and liabilities are dominated by PLS. He hypothesized that investors (i.e., *muḍārabah* investment account holders and shareholders) who are willing to share the liability risk with the bank are expected to absorb any undesirable consequences on the asset side (i.e., *muḍārabah* and *mushārakah* financing) of the balance sheet. When EBF incurs losses, the bank will receive a lower return; hence, the general investment *muḍārabah* account holders will also receive lower returns. This implies that both shareholders and investments account holders will absorb negative shocks in Islamic banks' asset return (Dusuki, 2005), assuming that losses or lower EBF returns do not jeopardize the Islamic banks if the pass-through mechanism holds.

Interestingly in practice, Islamic banks tend to shy away from EBF due to the belief that EBF is risky and the pass-through

mechanism is too good to be true. Therefore, they engage more in DBF as they believe it to be less risky. DBFs such as *Murābaḥah* on the asset side have been widely practiced and dominate the financing portfolio more than the average of 57 percent (Samad et al., 2004; Ismal, 2010). In managing liquidity risk, banks employ commodity *Murābaḥah* on the liability side, which is debt-based as well.

Supposedly, higher EBF levels do not require an increase in the required stable funding (RSF) due to its pass-through mechanism between asset and liability; hence, there is no effect on the net stable funding ratio (NSFR) and liquidity risk. The pass-through mechanism is supported by empirical evidence in a study by Jedidia and Hamza (2014b) on MENA countries. The authors had found that asset investment in PLS reduces liquidity risk. Nevertheless, Jedidia and Hamza (2014b) differs from the current study in at least two ways. First, they had used the traditional measures of liquidity risk, namely the ratios of loan to asset ratio and cash to total assets. Those traditional liquidity measures are subject to criticism; hence BASEL III has introduced the latest measure of liquidity risk, namely the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR)[2] in 2010, which are expected to be fully implemented by 2019. Against this background, it is crucial and timely to empirically investigate the impact of EBF on liquidity risk using the BASEL III measure. Second, while they had examined the pass-through mechanism via the impact of PLS investment on liquidity risk, this study has the same intention, but focuses on financing composition instead of other asset allocations. Unlike Jedidia and Hamzah (2014b) who had explored the investments portfolio in subsidiary and associated companies using PLS contract, we concentrate on the equity-based financing portfolio. This measure is more reflective as most Islamic banks in Malaysia and Indonesia play an intermediating role between the bank (financier) and customers (who are in need of financing); while for MENA countries, the Islamic banks tend to play an entrepreneurial role between the depositors/shareholders and the businesses.

The goal of this study is to investigate the impact of EBF on liquidity risk using both traditional and BASEL III measures. We use Malaysian and Indonesian banks as samples due to the large number of banks employing EBF. Using the panel regression method, the study found different results of the EBF-LR relationship using the traditional and BASEL III liquidity risk measures. While we found little evidence that EBF increases liquidity risk using NSFR, EBF was proven to not significantly influence LR using the traditional measure.

The latter supports the PLS pass-through mechanism between asset and liability, while the former supports the maturity transformation hypothesis.

This study sheds light on an important debate in Islamic banking literature especially with respect to the PLS pass-through mechanism hypothesis. First, as some research has conceptually proposed DBF to be a tool for liquidity management, EBF that is claimed to be prone to market risk may have potential in managing the liquidity risk of Islamic banks via its PLS pass-through mechanism. Nevertheless, some caveats should be noted as the maturity transformation hypothesis may at the same time co-exist. Past studies had made no attempt to ascertain which claim is most apparent in reality based on empirical findings. This research closes the literature gap on the issue of liquidity risk by considering the effect of EBF from two angles; the PLS pass-through mechanism as well as the maturity transformation hypothesis. This study also compares the traditional and BASEL III liquidity risk measures to offer an unbiased analysis. Finally, this research benefits the Islamic banking industry of Southeast Asia as limited research has been carried out for this region.

This paper is organized as follows: in the second section, we carry out a review of related literature, and in the third section we specify the models and identify the variables. The empirical results are presented in section four. Finally, we conclude in section five.

2. LITERATURE REVIEW

In examining the EBF-LR relationship, we structured the literature review into two sections that describe the determinants of liquidity risk besides giving background information on equity-based financing.

2.1 LIQUIDITY RISK DETERMINANTS

Before dwelling on liquidity risk determinants, we first need to understand liquidity risk in general. It is the potential loss arising from banks' incapability either to meets liabilities or to finance growth in asset values (Wójcik-Mazur and Szajt, 2015; Ruozi and Ferrari, 2013). Liquidity risk occurs whenever there is non-payment of the principal at the end of a contract or the non-payment or late of profit payment during an equity financing contract (Jedidia and Hamza, 2014a). For bank sustainability, it is important to control liquidity efficiently because difficulties in obtaining cash by the banks to fulfil their commitment may cause insolvency

Various measures of liquidity risk have been employed, namely cash to total assets (Ramzan and Zafar, 2014; Sayedul Anam et al., 2012), loan to deposit (Lee et al., 2013), liquid assets to total assets (Riahi, 2019), ratio of total loans to total deposits (Moussa, 2015), loan to total assets, cash to deposits (Jedidia and Hamza, 2014b), loan to total asset, liquid asset to total deposit, short-term funding (Wójcik-Mazur and Szajt, 2015), debt assets to total assets (Ahmed, Ahmed, and Naqvi, 2011), current asset to current liabilities (De Waal et al, 2013) liquidity transformation gap, which is the ratio of current liability minus current asset to total asset (Otero González et al., 2017) as well as NSFR (De Waal et al, 2013; Cucinelli, 2013; Hassan et al, 2019; Riahi, 2019). As there is still a limited number of research which have tested the NSFR, the current study compares both the NSFR and the traditional measure (current asset to current liability) of liquidity risk.

We compare both liquidity risk measures based on studies focusing on firstly conventional and Islamic banks, followed by studies on Islamic banks and research on conventional banks. For studies on conventional and Islamic banks, the research employs measures such as cash to total assets (Sayedul Anam et al., 2012), loan to deposits (Lee et al., 2013), liquid assets to total assets, total loans to total deposits (Moussa, 2015), liquid asset to total asset, and NSFR (Riahi, 2019). For Islamic banks, the liquidity risk measures employed are loan to total assets, cash to deposits (Jedidia and Hamza, 2014b), NSFR, and ratio of financing gap[2] to total asset (Haroon et al., 2018). Finally, for conventional banks, liquidity risk is measured by loan to total assets, liquid assets to total deposits, short-term funding (Wójcik-Mazur and Szajt, 2015), LCR, NSFR (Cucinelli, 2013), liquid assets to total assets, liquid assets to total customer deposits plus short-term funding (Mehmed, 2014), cash to total assets (Ramzan and Zafar, 2014), liquidity transformation gap (Otero González et al. 2017), debt assets to total assets, and current assets to total liabilities (Ahmed et al., 2011). We observed that there is no fixed pattern of liquidity risk measures attributed to the bank types. In addition, we observed that limited studies have been done on the liquidity measures of Islamic banks. Our study therefore focuses on the liquidity measures of Islamic banks.

Focusing on the determinants of liquidity risk, in studies on conventional and Islamic banks, bank specific variables such as capital adequacy ratio (CAR), net working capital (Sayedul Anam et al., 2012), profitability (Lee et al., 2013), return on assets (ROA) (Riahi, 2019), capital, loans to total assets ratio (Otero González et al. 2017;

Riahi, 2019), operating expenses to total assets, return on equity (ROE), total loans to total assets, net interest margin (NIM) (Moussa, 2015), size and credit risk (Otero González et al., 2017) have been studied. The studies further examined country-specific factors such as gross domestic product (GDP) (Lee et al., 2013), GDP growth rate (Riahi, 2019), and inflation rate (Moussa, 2015; Riahi, 2019). As for determinants of liquidity risk in Islamic banks, bank specific variables that have been tested are size, ROA, CAR (Haroon et al., 2018), PLS investment to total assets as a representation of EBF (Jedidia and Hamza, 2014b), and credit risk (Hassan et al. 2019). Country specific variables are GDP and INF (Haroon et al, 2018). Finally, in studies on determinants of liquidity risk in conventional banks, some bank specific variables that have been tested are size (Ramzan and Zafar, 2014; Cucinelli, 2013), capital (Cucinelli, 2013), asset quality (Cucinelli, 2013; Mehmed, 2014), equity to total assets, NIM, ROA, interbank ratio, loan loss reserve to gross loan (Wójcik-Mazur and Szajt, 2015), reserve ratio (RR), loan to deposit ratio (LTD), ROE, and loan loss reserve (LLR) (Mehmed, 2014), and net loan charge off to total loan (Hassan et al. 2019). Country-specific variables tested in past research are GDP growth, domestic credit, GDP, inflation (Mazur and Szajt, 2015), debt assets to total assets, fixed assets to total assets, and years of establishment (Ahmed et al., 2011). Besides EBF, our study further controls for some of these factors.

2.2 EQUITY-BASED FINANCING: A BACKGROUND

Unlike conventional banks, Islamic banks use the PLS mechanism in investment (Ismail and Tohirin, 2008). PLS has been created for Islamic financing to avoid *riba'* or interest that is prohibited in Islamic business transactions. There are two main contracts; namely, profit-and-loss-sharing (PLS) and sale-based products using contract of exchange. The PLS mechanism is reflected as EBF (*muḍārabah* and *mushārakah*), while the sale-based product is reflected as debt-based financing products (i.e. *Bai Bithamal Ajil, Murābaḥah, Inah, Tawarruq,* and *Ijarah*).

Getting financing is one of the main strategies in gaining more capital to grow or start-up a business. EBF is one of the products offered by commercial banks aside from debt-based financing. EBF is almost similar to raising capital in terms of its mechanism of selling companies' stocks to investors. As a compensation for investment, shareholders obtain ownership interest in the firm. *Muḍārabah* (trust financing) and *mushārakah* (joint venture project finance) are

partnership financing (PLS) methods unique to Islamic finance. In the current banking asset structure, *muḍārabah* and *mushārakah* which are longer term investments constitute a small percentage of total financing (Abdus Samad, 2005).

Under a *muḍārabah* contract, two parties are involved. The first one is the entrepreneur (*muḍārib*) who seeks finance for project initiation. The second one is the *rabb-ul-māl* who is the capital provider. Both human financial capital and entrepreneurial effort are combined to build up a potentially fruitful investment. The entrepreneur and capital provider share the project operational risk aimed at getting *ḥalāl* income. While the former may bear the risk of losing his effort, the latter bears the risk of losing his capital. The profit sharing ratio is mutually agreed between the two parties and can be set at, for example, 70:30 or 80:20 (Abdus Samad, 2005).

A *mushārakah* is a joint venture partnership in which two (or more) partners contribute capital and partake in administering a hypothetically positive project aimed at generating *ḥalāl* revenue. The profit will be distributed among the parties involved. The parties might or might not have equivalent portions of capital. Differences in shares are permitted depending on mutual agreement. However, the monitoring cost of *mushārakah* is very high for banks (Samad and Hassan, 1999).

From the bank view, *muḍārabah* and *mushārakah* are unpopular because alternative modes of financing such as DBF are more profitable and less risky (Abdul-Rahman et al., 2014, Anwar et al., 2010). From the customer perspective, some of them infer that the idea of sharing joint management and monitoring between banks and clients somehow negatively influences their satisfaction (Khattak and Rehman, 2010). These challenges have curtailed rapid growth of EBF demand and supply.

3. DATA AND METHODOLOGY

This study adopts variables calculated from the income statement and balance sheet of a sample of banks from two countries, Malaysia and Indonesia, because they are among the top countries offering EBF in Southeast Asia. Othman (2018) shows that banks offering equity-based financing for Malaysia and Indonesia are 41% and 98% out of the total Islamic banks, respectively. This study adopts static unbalanced panel data regressions that permit the researchers to cater for unobservable and observable bank level and country level

heterogeneity. In addition, this study analyzes both the traditional and BASEL III liquidity measures to gauge the EBF-LR relationship.

Data on a sample of 17 Islamic banks from Malaysia and 10 Islamic banks from Indonesia for a period between 1995 and 2015 were collected. Data on bank-specific variables were manually collected from the annual reports of the Islamic banks, while macroeconomic variables were gathered from Datastream. Due to a limited number of sample banks, the static panel regression estimations, which include a long time series (21 years) and small cross-sectional measurements is most appropriate for this study. This estimation utilizes repeated information on individual entities. The data contain measurements for individual observations over a period of time. The specification of the model is as follows:

$$LQ_{it} = \beta_0 + \beta_* EBF_{i,t} + \beta_1 ROA_{i,t} + \beta_2 ROE_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 CAR_{i,t} + \beta_5 NPF_{i,t} + \beta_6 GDP_t + \beta_7 INF_t + \alpha_i + \mu_{it}$$

where LQ refers to the alternate traditional (ratio of current asset to current liability) and BASEL III liquidity measures (NSFR - ratio of available amount of stable funding to required amount of funding). Thus, the higher the LQ, the lower the liquidity risk exposure. While CR measures the short-term liquidity within a year period, the NSFR quantifies the long-term liquidity risk. The calculation for NSFR involves giving larger weightage to long-term stable funding (such as regulatory capital and stable deposit), while zero weight is given to the short term liquid asset (such as cash, marketable securities, reserves in central banks, and repo) (Gobat, Yanese and Maloney, 2014). It implies that NSFR focuses more on long term rather than short term liquidity. Our focal variable is equity-based financing (EBF) followed by other control variables such as profitability (ROE, ROA), bank size ($SIZE$), capital buffer (CAR), non-performing financing (NPF), gross domestic product (GDP), and inflation (INF). The specifications for the variables are summarized in Table 1.

Focusing on the relationship between EBF and liquidity risk, there are two theoretical arguments. From the opinion of maturity transformation, EBF can lead to higher liquidity risk exposure if Islamic banks frequently use interim deposits to finance long-term financing of *muḍārabah and mushārakah* (Febianto, 2012). On the other hand, if investors (i.e. *muḍārabah* investment account holders) and shareholders can naturally absorb any adverse outcome from the

EBF, the higher return from EBF can increase or maintain the liquidity position, hence indirectly lowering or maintaining a bank's liquidity risk exposure (Dusuki, 2005). An empirical study by Jedidia and Hamza (2014b) found that banks' investment in subsidiary and associated companies using PLS contract reduces Islamic banks' liquidity risk (using traditional liquidity measures) in MENA countries. However, as Jedidia and Hamza (2014b) focused on the asset portfolio instead of financing portfolio allocation, the empirical finding for the EBF-LR relationship is still uncertain. Thus, we have no prior expectation on the sign of the EBF coefficient due to the mixed theoretical arguments as well as the lack of past empirical evidence.

TABLE 1
Variables Explanation

Variable	Notation	Measurement
Traditional liquidity measure	Current Ratio (CR)	Liquid Asset / Deposit plus Short term funding
BASEL III liquidity measure	Net Stable Funding Ratio (NSFR)	Available amount of Stable funding (ASF) / Required amount of stable funding (RSF)
Equity-based financing	EBF	total equity-based financing / total debt-based financing *Mushārakah*[4] + *Muḍārabah* financing / Total Financing – equity-based financing
Return on Assets	ROA	Net income / Total assets
Return on Equity	ROE	Net income / Total equity
Size	$SIZE$	Logarithm of total assets
Capital adequacy ratio	CAR	Total capital / Total assets
Non performing financing	NPF	Non-performing financing / Total Financing
Gross domestic product	GDP	The growth rate of gross domestic product
Inflation	INF	Inflation rate

With regard to Return on Assets (ROA), Sayedul Anam et al. (2012) and Berger and Bouwman (2017) suggested that the ROA does not affect liquidity risk as proxies by the ratio of cash to total assets. Several studies found that ROA is positively related to the liquidity position measured by the ratio of liquid assets to total assets, ratio of total loans to total deposits (Moussa, 2015) as well as the liquidity risk measure of loan to total assets and ratio of cash to deposits (Jedidia and Hamza, 2014b). On the other hand, Bonfim and Kim (2014) and Ghemini and Omri (2015) and Mohd Amin et al. (2017) found that ROA is negatively related to liquidity position. We thus expect that ROA can either increase or decrease liquidity position, which finally reduces or increases liquidity risk exposure.

We found mixed evidence on the relationship between Return on Equity (ROE) and liquidity risk. Moussa (2015) suggested that ROE reduces liquidity risk as measured by the total loans to total deposits of Tunisian banks. However, Sayedul Anam et al. (2012) found that ROE does not affect liquidity risk of both Islamic and conventional Bangladeshi banks. Using the same liquidity risk measure of liquid assets to total assets, Mehmed (2014) and Moussa (2015) found contrasting results for Bosnia Herzegovina and Tunisia, respectively. Thus, similar to ROA, not any *priori* assumption is developed on the sign of *ROE*.

Bank *SIZE* is anticipated to have either a positive or negative sign, inferring lower or higher liquidity risk. While *SIZE* has a positive and significant relationship with liquidity position as measured by cash to total assets (Ramzan and Zafar, 2014) as well as liquid assets to total assets (Mehmed, 2014); it has an inverse relationship with liquidity position in Bonfim and Kim (2014), Chen et al. (2015), and Berger et al. (2016).

For the capitalization (CAR) and liquidity risk relationship, two contracting findings on the relationship exist. In the first, capital buffer increases liquidity risk for both Islamic and conventional banks (Moussa, 2015; Sayedul Anam et al., 2012). In contrast, other studies suggest that higher capital buffer reduces liquidity risk using traditional measures (Jedidia and Hamza, 2014b; Mehmed, 2015; Moussa, 2015) as well as BASEL III measures (Cucinelli, 2013). We thus have no prior expectations on the sign of the coefficient. The ambiguity with regard to the capitalization and liquidity risk relationship infers that we cannot *a priori* envisage the direction of the coefficient for the CAR variable.

Non-performing financing (NPF) was found to reduce liquidity risk as measured by the ratio of loans to deposits (Lee et al., 2013) of both conventional and Islamic Malaysian banks for the period2003 to 2012. In contrast, Wójcik-Mazur and Szajt (2015) suggested that NPF increases liquidity risk. We thus have no prior expectations on the sign of the coefficient for NPF.

4. FINDINGS AND DISCUSSION

Descriptive analysis was implemented to review the data characteristic statistics used in every variable that formed the model. Tables 2(a)-(c) show a summary of descriptive analysis for the case of Malaysia, Indonesia, and overall, respectively. The mean of EBF for Malaysia, Indonesia, and overall sample are 18.946, 34.133, and 45.547, respectively. It shows that the ratio for equity-based financing to debt-based financing of overall sample is being dominated by Indonesia. At the same time, it is worth noting that the equity-based financing in Malaysia is attributed to Diminishing Profit Loss Sharing (*mushārakah mutanāqiṣah*) home financing while the equity-based financing in Indonesia is attributed to *mushārakah* financing for businesses (annual reports, 1995-2015).

Furthermore, Table 2 highlights that the skewness≠ 0 and Kurtosis ≠ 3, implying that all variables were not normally distributed; that could be attributed to the small sample size. Thus, the generalized least square (GLS) estimation was deemed more suitable. The GLS model is a generalization of Ordinary Least Square (OLS) regression. It handles non normality of data distribution by relaxing the rigid OLS assumption. GLS assumes that the errors are homoskedastic and uncorrelated. By improving these assumptions, GLS rather than OLS is the unbiased estimator of β with the minimum sampling variance among the class of linear unbiased estimators (Kumbhakar and Parmeter 2019).

Tables 3 to Table 5 present the correlation matrix of focal, bank-specific and macroeconomic variables for Malaysia, Indonesia and all Islamic banks, respectively. The correlation matrix is tested to investigate the dependence among independent variables. Based on Gujarati's rule of thumb of 0.80 (Gujarati, 2003), our results show that all independent variables do not have any severe multicollinearity problem except for ROE and ROA for the case of Indonesia (Table 4). Hence, the ROE and ROA for the case of Indonesia were regressed alternately[5].

TABLE 2
Descriptive Statistics for Malaysia, Indonesia and Overall Sample

	(a) Malaysia				(b) Indonesia				(c) Overall			
	Mean	SD	Skewness	Kurtosis	Mean	SD	Skewness	Kurtosis	Mean	SD	Skewness	Kurtosis
CR	0.884	1.490	0.000	0.000	1.901	2.011	0.000	0.0005	1.085	1.653	0.000	0.000
NSFR	1.039	1.277	0.000	0.000	0.812	2.283	0.000	0.000	0.985	1.576	0.000	0.000
EBF	18.95	23.88	0.000	0.476	34.13	21.58	0.909	0.000	45.55	48.36	0.000	0.000
ROA	0.007	0.043	0.001	0.000	0.007	0.038	0.000	0.000	0.007	0.041	0.001	0.000
ROE	0.103	0.638	0.000	0.000	0.058	0.196	0.000	0.000	0.090	0.547	0.000	0.000
SIZE	6.192	1.011	0.454	0.000	1.106	0.022	0.325	0.055	5.149	2.246	0.000	0.042
CAR	0.136	0.242	0.000	0.000	1.297	0.323	0.0011	0.195	0.389	0.547	0.000	0.000
NPF	0.034	0.082	0.000	0.000	0.574	0.557	0.936	0.251	0.156	0.353	0.000	0.000
GDP	5.081	3.797	0.000	0.000	4.518	4.219	0.000	0.000	4.873	3.964	0.000	0.000
INF	2.562	1.232	0.000	0.503	13.39	14.65	0.000	0.000	6.574	10.37	0.000	0.000

TABLE 3
Results of correlation matrix for Malaysia

	CR	*NSFR*	*EBF*	*ROA*	*ROE*	*SIZE*	*CAR*	*NPF*	*GDP*	*INF*
CR	1									
NSFR	0.300	1								
EBF	-0.051	-0.311	1							
ROA	-0.087	-0.049	0.047	1						
ROE	0.008	-0.006	0.048	0.467	1					
SIZE	0.074	0.175	-0.065	0.093	0.054	1				
CAR	-0.072	-0.031	-0.229	0.153	-0.048	0.049	1			
NPF	0.056	0.027	-0.034	-0.161	0.225	0.006	0.113	1		
GDP	-0.004	-0.023	0.052	0.044	0.093	0.025	0.030	0.060	1	
INF	0.046	-0.022	-0.058	-0.024	0.075	-0.11	0.108	-0.021	-0.151	1

TABLE 4
Results of correlation matrix for Indonesia

	CR	*NSFR*	*EBF*	*ROA*	*ROE*	*SIZE*	*CAR*	*NPF*	*GDP*	*INF*
CR	1									
NSFR	0.165	1								
EBF	0.134	-0.263	1							
ROA	-0.027	-0.077	0.089	1						
ROE	0.005	-0.007	0.021	0.481	1					
SIZE	-0.141	0.350	-0.455	0.021	0.047	1				
CAR	0.160	-0.485	0.331	0.045	-0.103	-0.803	1			
NPF	0.054	-0.231	0.117	-0.198	-0.125	-0.634	0.493	1		
GDP	0.025	-0.013	0.133	0.038	0.085	-0.097	0.132	0.112	1	
INF	0.170	0.023	0.380	0.051	0.010	-0.640	0.640	0.476	-0.550	1

TABLE 5
Results of correlation matrix for Malaysia and Indonesia

	CR	*NSFR*	*EBF*	*ROA*	*ROE*	*SIZE*	*CAR*	*NPF*	*GDP*	*INF*
CR	1									
NSFR	0.165	1								
EBF	0.134	-0.263	1							
ROA	-0.027	-0.077	0.089	1						
ROE	0.005	-0.007	0.021	0.481	1					
SIZE	-0.141	0.350	-0.455	0.021	0.047	1				
CAR	0.160	-0.485	0.331	0.045	-0.103	-0.803	1			
NPF	0.054	-0.231	0.117	-0.198	-0.125	-0.634	0.493	1		
GDP	0.025	-0.013	0.133	0.038	0.085	-0.097	0.132	0.112	1	
INF	0.170	0.023	0.380	0.051	0.010	-0.640	0.640	0.476	-0.550	1

In estimating the regression, the pooled effect model, fixed effect model and random effect model were tested. Tables 6 and 7 show the regression estimations for Current Ratio (CR) and Net Stable Funding Ratio (NSFR) that were used to test the traditional and BASEL III liquidity measures respectively[6]. As CR and NSFR are indicators for liquidity position, the inference toward liquidity risk exposure is opposite with the coefficient signs for CR and NSFR.

TABLE 6
Regression Results for Malaysia, Indonesia and All Sample
(dependent variable is CR)

Variable	Panel A: Malaysia	Panel B: Indonesia	Panel C: All sample
C	2.747	-15.880	1.176
	(2.445)	(27.700)	(2.306)
EBF	0.001	0.002	0.003
	(0.005)	(0.016)	(0.003)
ROA	-8.592**		-8.831**
	(3.889)		(3.989)
ROE	-0.044	5.820	0.142
	(0.226)	(12.740)	(0.214)
SIZE	-0.457	5.668	-0.521
	(0.359)	(24.430)	(0.364)
CAR	9.316***	-1.153	11.140***
	(2.196)	(1.207)	(1.633)
NPF	9.738**	2.766*	2.109
	(3.966)	(1.540)	(1.306)
GDP	-0.015	0.731	-0.020
	(0.030)	(0.966)	(0.031)
INF	0.033	1.015***	0.051
	(0.063)	(0.291)	(0.063)
R-squared	0.327	0.7418	0.370
F-statistics	6.730	27.060	8.950
Prob-*F*	0.000	0.001	0.000

Notes:
1. Standard errors are in parentheses
2. ***, **, *denotes $p < 0.01$, $p < 0.05$, $p < 0.1$, respectively.
3. The best models for Malaysia, Indonesia and overall are Fixed Effect, Random Effect and Fixed Effect, respectively.
4. As CR is a measure of liquidity position; thus, the interpretation towards liquidity risk is the opposite from the expected sign of coefficient in this table.

TABLE 7
Regression Results for Malaysia, Indonesia and Overall (dependent variable is NSFR)

Variables	Panel A: Malaysia	Panel B: Indonesia	Panel C: All Sample
C	3.799**	0.099	3.576***
	(1.459)	(0.073)	(-0.684)
EBF	-0.0019	-0.0002***	-0.000
	(0.001)	(0.000)	(0.001)
ROA	2.503**		2.296*
	(0.941)		(1.184)
ROE	-0.013	-0.003	0.052
	(0.029)	(0.033)	(0.063)
SIZE	-0.400*	-0.0689	-0.414***
	(0.227)	(0.064)	(0.108)
CAR	-1.522**	-0.0230***	-0.641
	(0.599)	(0.0034)	(0.485)
NPF	2.430*	0.004	-0.024
	(1.380)	(0.004)	(0.387)
GDP	-0.011	0.005	-0.010
	(0.008)	(0.0023)	(0.009)
INF	0.041	0.000	0.035*
	(0.027)	(0.000)	(0.019)
R-squared	0.215	0.954	0.175
F-statistics	3.800	20.870	3.230
Prob-*F*	0.000	0.000	0.002

Notes:
1. Standard errors are in parentheses
2. ***, **, * denotes $p < 0.01$, $p < 0.05$, $p < 0.1$, respectively.
3. The best models for Malaysia, Indonesia and overall are Fixed Effect, Pooled Effect and Fixed Effect, respectively.
2. As NSFR is a measure of liquidity position; thus, the interpretation towards liquidity risk exposure is the opposite from the expected sign of coefficient in this table.

Comparing the traditional and BASEL III liquidity measures in Tables 6 and 7, it was found that the liquidity risk determinants differ. This implies that empirical evidence using basic traditional liquidity

measures such as current ratio, cash to total asset ratio, total deposits to total asset ratio, and capital to total asset ratio in previous studies might be divergent if the BASEL III measure were adopted. The focal variable EBF is measured by *EBF*. Panel C of Table 6 and 7 shows no effect on EBF and LR for all samples. This study then conducted an individual country analysis to investigate the reasoning behind it.

Interestingly, Panel B of Table 7 reveals that *EBF* is significantly inversely related to liquidity position (NSFR) for the case of Indonesia, implying that *EBF* increases liquidity risk. This result implies that the maturity transformation hypothesis holds for the case of Indonesia, but not for the overall sample as well as for Malaysia. EBF may increase liquidity risk exposure if Islamic banks often use short-term deposits to fund long-term financing. In contrast, when using the traditional measure as shown in Table 6, EBF is proven to not have any significant impact on the liquidity risk for all models in panels A, B and C. This suggests that the pass-through mechanism exists using the traditional liquidity risk measure (CR) as the findings suggest that EBF does not increase liquidity risk. This implies that in the case of an EBF default, investment account holders may have absorbed all losses.

The calculation of NSFR is considered more accurate than the traditional measure according to recent studies in the field. This study focuses on Table 7 for the discussion on the other determinants. An overall sample in Panel C suggests that *ROA, SIZE*, and *INF* are significant factors affecting liquidity risk. ROA is positively related to NSFR, implying that increases in profitability tend to reduce the liquidity risk exposure. Also, we found that Malaysia has consistent results with the overall sample. High bank profitability encourages corporate depositors, which in turn increases the asset stable funding; hence increasing the NSFR followed by reductions in liquidity risk. Our findings are consistent with the findings in Moussa (2015) and Jedidia and Hamza (2014b).

With regard to size, our findings for the overall sample as well as Malaysia show that *SIZE* has a significant inverse relationship with NSFR, implying a positive relationship with liquidity risk. This shows that large-sized banks tend to have higher liquidity risk exposure. This result is in line with Cucinelli (2013). This may be due to the "too big too fail" hypothesis. Normally, bigger banks feel that if they do not have sufficient liquidity in cases of emergency, they will be saved by

lenders as a last resort. As a result, bigger banks tend to get involved in riskier activities, causing their liquidity risk to increase.

Surprisingly, we found that *CAR* is not significant in the overall sample. However, using separate samples for Malaysia and Indonesia, *CAR* is shown to have a significant and negative influence on *NSFR*, hence a positive relationship with liquidity risk. Banks with higher capital seem to have high exposure to liquidity risk which may be due to the high risk taking behavior attributed to the huge capital buffer. This finding is consistent with Mat Yaakub et al. (2017) who inferred that the increasing capital buffer motivates banks to engage in riskier activities and finally increase their liquidity risk exposure.

Focusing on *NPF*, it was found to be not significant for the overall sample. Using a separate sample for Malaysia, *NPF* is significantly and positively related to *NSFR*, suggesting an inverse relation with liquidity risk. Finally, inflation is significantly positively related with *NSFR*, suggesting a negative relationship with liquidity risk. This finding supports the finding by Moussa (2015) who measured liquidity risk using the ratio of total loans to total deposits.

5. CONCLUSION

The objective of this study is to examine the effect of EBF on liquidity risk for banks in the Southeast Asian region. Our results provide little evidence that EBF increases bank liquidity risk using the BASEL III measure for the case of Indonesia. Nevertheless, when using the traditional liquidity measure, the results show that EBF does not have a significant impact on liquidity risk. Hence, our findings offer some policy implications. Firstly, although EBF is highly promoted by Islamic scholars, it should be closely monitored by Islamic banks because without proper controlling mechanisms, it can jeopardize bank liquidity. Even though the impact of the current situation is small for individual countries, prudent banking strategies should be adopted to protect banks from liquidity risk. Second, the monitoring cost of EBF should be taken into consideration in calculating the predetermined profit-sharing ratio between banks and customers as there will be a trade-off between return and liquidity risk. Proper EBF monitoring may increase financing quality, which may reduce liquidity risk. Finally, regulatory bodies may come out with a new controlling mechanism for capital requirements as our findings also show that increases in capital buffer would increase liquidity risk.

Notwithstanding our contribution to the literature on the relationship between EBF and liquidity risk, this study has a limitation in terms of data availability. Data were manually collected from annual reports through the banks' balance sheet. We were unable to get data for EBF from databases such as Bankscope, Osiris or Datastream as they do not provide detailed information on the composition of financing as in the annual reports. It would enrich the literature gap if data on Middle Eastern countries where EBF is heavily offered can be analyzed in terms of liquidity risk using the BASEL III liquidity risk measure.

ENDNOTES

1. Theoretically, the pass-through mechanism suggests that default in equity-based financing should be absorbed by the profit sharing (*muḍārabah*) investment account holders.
2. The short-term liquidity risk by BASEL III, Liquidity Coverage ratio (LCR), has not been examined in this study as the banking data within the 30-day time horizon is not publicly available.
3. Financing gap refers to the difference between banks' financing and customer deposit.
4. *Mushārakah Mutanāqiṣah* home financing is designed to look like equity instruments, but in substance they are not much different from debt-based financing. However, due to the limitation of the reporting style of financing structure by contract that does not separate *mushārakah* and *mushārakah mutanāqiṣah,* the findings of the study should be treated with caution as it may slightly overestimate the EBF measurement in the study. Also, it is worth noting that *mushārakah mutanāqiṣah* was first introduced in 2007 in Malaysia and by end of 2015, *mushārakah mutanāqiṣah* contract accounted for 30% of total home financing and only nine out of 17 Islamic banks in Malaysia offered *mushārakah mutanāqiṣah* (Muhamad Sori et al., 2017).
5. The results of *ROA* for Indonesia are consistent with the findings in Table 6 and 7.
6. According to the likelihood ratio and Hausman test, Fixed effect model is the best model for Malaysia and all sample while Pooled effect model is the best model for Indonesia. Following De Waal et al. (2013), this study considers traditional liquidity measure as the ratio of current assets to current liability. Meanwhile, the calculation of NSFR is based on Gobat et al. (2014). The short-term BASEL III liquidity measure, Liquidity Coverage Ratio (LCR) cannot be analyzed as the data on 30 days activities are not freely available to public (Dietrich 2014).

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REFERENCES

Abdul Ghaffar, A.T. "Theoretical Model of Profit-loss Sharing and Investment." Working Paper in Islamic Economics and Finance, 2008: 1-13.

Abdul-Rahman, A, R. Abdul Latiff, R. Muda, M.A. Abdullah. "Failure and Potential of Profit-Loss Sharing Contracts: A Perspective of New Institutional Economic (NIE) Theory." *Pacific-Basin Finance Journal* 28 (2014): 136-51.

Abdus Samad, M.H. "The Performance of Malaysia Islamic Bank During 1984-1997: An Exploratory Study." *International Journal of Islamic Financial Services* 1, no. 3 (1999): 7-26.

Abdus Samad, N.D. "Islamic Banking and Finance in Theory and Practice: The Experience of Malaysia and Bahrain." *The American Journal of Islamic Social Sciences* 22, no. 2 (2005): 70-86.

Agnieszka Wojcik-Mazur, M.S. "Determinants of Liquidity Risk in Commercial Banks in the European Union." *Argumenta Oeconomica* 2, no. 35 (2015): 25-48.

Ahmed, N., Ahmed, Z., and Naqvi, I. H. "Liquidity Risk and Islamic Banks: Evidence from Pakistan." *Interdisciplinary Journal of Research in Business* 1, no. 9 (2011): 99-102.

Anwar, S., D. Romansyah, S. Pramono, and K. Watanabe. Treating Return of Muḍārabah Time Deposit as Investment Instrument: A Utilization of Artificial Neural Networks (ANNs)." *Humanomics* 26, no. 4 (2010): 296-309.

Ariffin, N. M. "Liquidity Risk Management and Financial Performance in Malaysia: Empirical Evidence from Islamic Banks." *Aceh International Journal of Social Sciences* 1, no. 2 (2012): 77-84.

Berger, A.N. and C.H. Bouwman. "Bank Liquidity Creation, Monetary Policy, and Financial Crises." *Journal of Financial Stability* 30 (2017): 139-55.

_____, C.H. Bouwman, T. Kick, and K. Schaeck. "Bank Liquidity Creation Following Regulatory Interventions and Capital

Support." *Journal of Financial Intermediation* 26 (2016): 115-41.

Bonfim, D., and M. Kim. (2012). Liquidity Risk in Banking: Is There Herding? European Banking Center Discussion Paper 24: 1-31.

Chapra, M.U. "Alternative Visions of International Monetary Reform." In *Islamic Banking and Finance*, edited by Munawar Iqbal and David T. Llewellyn, 219-38. Cheltenham, UK: Edward Elgar, 2002.

_____. "The Case Against Interest: Is It Compelling?" *Thunderbird International Business Revie*w 49, no. 2 (2007): 161-86.

Chen, T.H., H.H. Chou, Y. Chang, and H. Fang. "The Effect of Excess Lending on Bank Liquidity: Evidence from China." *International Review of Economics and Finance* 36 (2015): 54–68.

Cucinelli, D. "The Determinants of Bank Liquidity Risk Within the Context of Euro Area." *Interdisciplinary Journal of Research in Business* 2, no. 10 (2013): 51-64.

De Waal, B., M. A. Petersen, Lungile, L.N. Hlatshwayo and J.M. Mukuddem-Petersen, J. M. "A note on Basel III and Liquidity." *Applied Economics Letters* 20 (2013): 777-80.

Dietrich, A., Hess, K., and Wanzenried, G. "The Good and Bad News about the New Liquidity Rules of Basel III in Western European countries." *Journal of Banking and Finance* 44 (2014): 13-25.

Dusuki, A.W. "Commodity Murābaḥah Programme (CMP): An Innovative Approach to Liquidity Management." *Journal of Islamic Economics, Banking and Finance* 3, no. 1 (2005):1-23.

Febianto, I. "Adapting Risk Management for Profit and Loss Sharing Financing of Islamic Banks." *Modern Economy* 3 (2012): 73-80.

Ghenimi, A., and Omri. M. A. "Liquidity Risk Management: A Comparative Study between Islamic and Conventional Banks." *Journal of Business Management and Economics* 3 no. 6 (2015): 25-30.

Gobat, J., Yanase, M., and Maloney, J. "The Net Stable Funding Ratio: Impact and Issues for Consideration." Working Paper in International Monetary Fund no. 14/106 (2014): 1-43.

Green, D.P., and L. Vavreck. "Analysis of Cluster-randomized Experiments: A Comparison of Alternative Estimation Approaches." *Political Analysis* 16, no. 2 (2008): 138-52.

Gujarati, D.N. *Basic Econometrics*. New York, USA: McGraw-Hill Education, 2003.

Hassan, M. K., Khan, A., and Paltrinieri, "A Liquidity Risk, Credit Risk and Stability in Islamic and Conventional Banks." *Research in International Business and Finance 48* (2019):17-31.

Ismal, R. "Assessment of Liquidity Management in Islamic Banking Industry." *International Journal of Islamic and Middle Eastern Finance and Management* 3, no. 2 (2010): 147-67.

Jedidia, K.B. and H. Hamza. "Profits and Losses Sharing Paradigm in Islamic Banks: Constraints or Solutions for Liquidity Management?" *Journal of Islamic Economies, Banking and Finance* 10, no. 3 (2014a): 2-45.

_____. "Determinants of Liquidity Risk in Islamic Banks: A Panel Study." *European Journal of Business and Management* 2, no. 2 (2014b): 137-46.

Khattak, N.A., and K-Ur. Rehman. "Customer Satisfaction and Awareness of Islamic Banking System in Pakistan." *African Journal of Business Management* 4, no. 5 (2010): 662-71.

Kumbhakar, S.C., and C.F. Parmeter. "Implementing Generalized Panel Data Stochastic Frontier Estimators." In *Panel Data Econometrics*, edited by Mike Tsionas, 225-49. Academic Press, 2019.

Lee, K.C., Lim, Y.H., Lingesh, T.M., Tan, S.Y. and Teoh, Y.S. The Determinants Influencing Liquidity of Malaysia Commercial Banks and Its Implication for Relevant Bodies: Evidence from 15 Malaysia Commercial Banks. Unpublished PhD Thesis, UTAR, 2013.

Maher Mohamad Hassan Sr, J.D. The Effects of the Global Crisis On Islamic and Conventional Banks: A Comparative Study. Working Paper in International Monetary Fund no. 10/201 (2010): 1-47.

Mahmood, H., Gan, C. and Nguyen, C. "Maturity Transformation Risk Factors in Islamic Banking: Implication of Basel III Liquidity Regulations." *Managerial Finance* 44, no. 6 (2018): 787-808.

Majid, A.R. "Development of Liquidity Management Instruments: Challenges and Opportunities." Paper presented at the *International Conference on Islamic Banking: Risk Management, Regulation and Supervision*, Jakarta, Indonesia September 2003.

Mat Yaakob, N., A. Abdul-Rahman. and M.A. Sulaiman. "Financing Structure and Liquidity Risk: Analysis on Domestic and

Foreign Islamic Banks in Malaysia." *Jurnal Ekonomi Malaysia* 51, no. 2 (2017): 133-44.

Mehmed, G., "An Empirical Study on Liquidity Risk and Its Determinants in Bosnia Herzegovina." *The Romanian Economic Journal* 52 (2014): 157-84.

Moussa, M.A. "The Determinants of Bank Liquidity: Case of Tunisia." *International Journal of Economics and Financial Issues* 5, no. 1 (2015): 249-59.

Mohd Amin, I, Mohamad, S, and Shah, M.E. "Do Cost Efficiency Affects Liquidity Risk in Banking? Evidence from Selected OIC Countries." *Jurnal Ekonomi Malaysia* 51, no. 2 (2017): 55-71.

Muhamad Sori, Z, S. Mohamad. and A. Asadov. The Practice of Musharaqah Mutanaqisah at Malaysian Islamic Banks: An Empirical Review, 2017. http://www.inceif.org/archive/wp-content/uploads/2018/04/The-Practice-Of-Mushārakah-Mutanaqisah-At-Malaysian-Islamic-Banks.pdf

Otero González, L., Ashour, S. O., Redondo-López, J. A., and Rodríguez Gil, L. I. "Country Risk, Regulation, and Liquidity Transformation in Palestine and Neighboring Countries." *Emerging Markets Finance and Trade* 54 no. 6 (2018): 1375-90.

Othman, N. The Influence of Partnership Financing on the Efficiency and Stability of Islamic Banks: Evidence from Malaysia and Indonesia. PhD Thesis, Universiti Kebangsaan Malaysia, 2018.

Ramzan, M., and M.I. Zafar. "Liquidity Risk Management in Islamic Banks: A Study of Islamic Banks of Pakistan." *Interdisciplinary Journal of Contemporary Research in Business* 5, no. 12 (2014):199-215.

Riahi, Y. M. "How to Explain the Liquidity Risk by the Dynamics of Discretionary Loan Loss Provisions and Non-Performing Loans? The Impact of the Global Crisis." *Managerial Finance* 45, no. 2 (2019): 244-62.

Ruozi, R., and P. Ferrari. *Liquidity Risk Management in Banks: Economic and Regulatory Issues*. Berlin, Germany: Springer, 2013.

Samad, A. "Performance of Interest-Free Islamic Banks Vis-A-Vis Interest-Based Conventional Banks of Bahrain." *IIUM Journal of Economics and Management* 12, no. 2 (2004): 1-15.

Sayedul Anam, S.H. "Liquidity Risk Management: A Comparative Study Between Conventional and Islamic Banks of

Bangladesh." Re*search Journal of Economics, Business, and ICT* 5 (2012): 1-5.

Siddiqui, A. "Financial Contracts, Risk and Performance of Islamic Banking." *Managerial Finance* 34, 10 (2008): 680-94.

Wójcik-Mazur, Agnieszka, and Marek Szajt. "Determinants of Liquidity Risk in Commercial Banks in the European Union." *Argumenta Oeconomica* 2, no. 35 (2015): 25-47.

Zafar, M.R. "Liquidity Risk Management in Islamic Banks: A Study of Islamic Banks of Pakistan." *Interdisciplinary Journal of Contemporary Research in Business* 5, no. 12 (2014): 199-215.