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Basel III New Liquidity Framework and Malaysian Commercial Banks Profitability

(Kerangka Kecairan Baru Basel III dan Keuntungan Bank Perdagangan di Malaysia)

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ABSTRACT

In the light of the 2007-2008 global financial crisis, Basel Committee on Banking Supervision proposed the Net Stable Funding Ratio (NSFR), a new liquidity framework under Basel III. Its aim is to promote sustainable funding structures of the financial institutions. This current paper attempts to analyse NSFR impact on Malaysian commercial banks profitability. Using panel data of eight domestic Malaysian commercial banks for the period 2005-2011, the results suggest there is a convincing evidence that this new liquidity ratio is an important factor in affecting the sample banks' profitability. The ability of banks in managing the stability of their funding sources as well as liquidity of its asset is an advantage to them and is translated into higher profitability. In addition, this study also confirms finding of previous studies that relates bank-specific determinants and profitability.

Keywords: Basel III; liquidity framework; net stable funding ratios; liquidity coverage ratio; profitability

ABSTRAK

Lanjutan daripada krisis kewangan global yang bermula pada tahun 2007-2008, Jawatankuasa Basel berkenaan Penyeliaan Bank telah mencadangkan sebuah kerangka kecairan di bawah Basel III yang dikenali sebagai Net Stable Funding Ratio (NSFR). Tujuannya ialah untuk memperkenalkan sebuah struktur pendanaan yang teguh kepada institusi kewangan. Kajian ini bertujuan menganalisis kesan NSFR ke atas keuntungan bank-bank perdagangan di Malaysia. Dengan menggunakan data panel dari lapan bank perdagangan tempatan di Malaysia untuk tempoh 2005-2011, keputusan analisa membuktikan bahawa nisbah kecairan baru ini merupakan faktor penting yang boleh mempengaruhi keuntungan bank-bank yang dikaji. Keupayaan bank-bank dalam menguruskan kestabilan sumber dana dan kecairan aset mereka memberikan kelebihan kepada bank untuk meningkatkan keuntungan bank. Selain itu, kajian ini juga menyokong keputusan kajian-kajian lepas yang menunjukkan hubungan antara faktor penentu bank dengan keuntungan bank.

Kata kunci: Basel III; kerangka kecairan; nisbah dana kestabilan bersih; nisbah perlindungan kecairan; keuntungan

INTRODUCTION

The collapse of US subprime mortgage market in 2007 has not only affected the country but also the global financial system. The episode of major banks failure following this event has depicted the importance of liquidity of the world banking institutions. As a result banking regulation was overhauled, resulted in the introduction of Basel III, which will over time replace Basel II. The new reform Basel III aims to improve the banking sector's ability to absorb shocks arising from financial or economic crisis. In addition to changes in capital requirements, Basel III also contains two entirely new minimum standards for funding liquidity: the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). Briefly, the LCR impose tighter controls on short-term liquidity flows, while the NSFR aims at reducing the maturity mismatch between assets and liabilities of the banks. These ratios are the landmark requirement of the new Basel III and apply to all banks if they are engaged in international banking activities. Banks have until 2015 to meet the LCR standard and until 2018 to meet the NSFR standard. These new measures were introduced in the Basel III accord to avoid a repeat of the liquidity crisis of financial sectors in the future (Pakravan 2014).

The liquidity coverage ratio (LCR) is the ratio of liquid assets to estimated cash outflow under stress conditions. The standard requires that the value of this ratio be never below than 100 percent and that banks are expected to meet this requirement continuously. The aim is to ensure the resilience of banks to adverse shocks. It therefore, stresses that banks hold sufficient high quality liquid assets to meet short-term liquidity needs for at least 30 days.

The requirements of the Net Stable Funding Ratio (NSFR) were introduced whereby banks are required to maintain sufficient liquid funds. Net stable funding ratio (NSFR) is defined as the ratio of banks' available stable funding (ASF) to the banks' required stable funding (RSF). Stable funding is defined as those types and amounts of EQUITY and liability financing expected to be reliable sources of funds over a period of one year under conditions of extended stress. To determine the value of ASF, a factor

ranging from 0 to 100 percent is assigned to each particular type of EQUITY and liability, which are then multiplied by the available amount in each category and the value of ASF is the sum of the weighted amounts. The same principle goes for the RSF where the amount of each type of assets held and funded by the institution is multiplied by an assigned factor for each category and the value of RSF is the sum of the weighted amounts(refer to Appendix 1 for a complete list of factors for each category). Like LCR standard, this standard also requires that the value of the ratio ASF over RSF to be greater than 100 percent to ensure that banks hold sufficient stable funding to match their medium and long-term lending over the evaluated period.

Reform initiatives taken after the onset of the 1997 Asian financial crisis have improved the strength of banking institutions in the region. Liquidity ratio, cash flows, liquid assets and reserve holdings became commonly available instruments for liquidity management for banking institutions in Malaysia. As a result, these banking institutions were in much better liquidity position during the 2007/2008 global financial crisis. The region has witnessed an abundant of funding liquidity where deposits continued to grow during the crisis. For instance, Indonesia, Thailand, Malaysia and Singapore experienced deposit growth of 18.5 percent, 7.8 percent, 9.5 percent and 10.90 percent per annum, respectively for the period 2007-2011[1]. In Malaysia, the new Central Bank of Malaysia Act 2009 provides a greater supervisory mandate for the country's central bank, Bank Negara Malaysia (BNM). The quality and the degree of enforcement of these regulations has resulted the banking institutions in the country to be able to provide deposit growth of 17.7 percent from the year the new Act came into force in 2009 to 2011.[2]

Although the country's banking system was not badly affected by the recent global crisis, the central bank of Malaysia, Bank Negara Malaysia (BNM) supports the implementation of LCR and NSFR. The BNM targets to implement them gradually beginning in 2013 until 2019 as agreed globally and in accordance with the time line set under Basel III. The BNM will implement these proposed standards through enhancements of the existing liquidity framework[3]. Prior to the formal implementation of the new standards by banks in the country, BNM conducted an observation period to assess the impact of the new standards and assisted bank institutions with the appropriate transition arrangements where necessary. Banks were therefore required to calculate and report both the Liquidity Coverage Ratio and the Net Stable Funding Ratio to the central bank with effect from June 2012. During this observation period, the central bank expects that banking institutions in this country would be able to determine and adopt strategies that could positively impact their capital and liquidity levels so as to maintain their capital and liquidity targets as required by the new standards.

As pointed out earlier, the purpose of the new standards proposed in Basel III is to increase banks' self-insurance against liquidity crises and hence preventing the pressure of solvency problems which promote systemic stability. However, there has been concern that the standards are likely to pose even bigger challenges to banks. Banks will have to face higher costs in order to meet these requirements and the costs can come in two forms. First, cost of adjustments the banks' balance sheet. Banks which have been relying heavily on short-term funding or not holding sufficient high quality liquid assets as required by the new standards will have to face high costs of adjustments to meet the minimum of these ratios. To ensure compliance, all banks within the market will act and make similar adjustments at the same time and this causes the market to move against them. Second, the costs of gathering necessary data, reporting the ratios, monitoring and assessing maturity mismatches and many more are another type of costs that banks will have to incur. These costs, combined with other regulatory requirement set forth by the local authority is said to be able to reduce banks' profitability. In what way, these new reforms influence performance of the banking institutions is another concern that needs to be addressed. This paper therefore, attempts to evaluate the two new proposed liquidity standards and assesses whether they help alleviate the profitability of Malaysian banking institutions. However, since the calculation of the value of LCR requires information that is not publicly available, only NSFR will be considered in this paper. The paper proceeds as follows. Section II reviews the issue of liquidity and discusses the existing empirical evidence. Section III offers an overview of liquidity of commercial banks in Malaysia. Section IV outlines the methodology to test the hypothesis related to liquidity and profitability of banks. Section V presents the empirical results and finally Section VI concludes.

LITERATURE REVIEW

Studies dealing with bank profitability have found several variables such as SIZE, expenses and risk as some of the important determinants. SIZE is introduced to reflect the economies or diseconomies of scale of the banking institutions in the market (e.g. Smirlock 1985; Demirguc-Kunt & Huizinga 2000; Short 1979; Bikker & Hu 2002; Goddard, Molyneux & Wilson 2004; Berger, Hanweck & Humphrey 1987), while bank expenses reflect the efficiency or inefficiency of the management of the banks (Bourke 1989; Molyneux & Thornton 1992). Risk can be divided into several dimensions: credit risk, market risk and liquidity risk. According to the definition of the Basel Committee on Banking Supervision (1997), liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. When a bank has inadequate liquidity, it cannot obtain sufficient funds, either by increasing liabilities or by converting assets promptly, at a reasonable cost, thereby affecting profitability. For example, Molyneux and Thornton (1992) in their study across 18 European banks during

1986 to 1989 found that there is a negative and significant relationship between the level of liquidity and profitability. Study by Pasiouras and Kosmidou (2007) is consistent with that of Molyneux and Thornton (1992) where they found that the ratio net loans to customer and short term funding is statistically significant and positively related to the profitability of their sample banks, indicating a negative relationship between bank profitability and the level of liquid assets held by the banks. In contrast, Bourke (1989) concluded that liquidity ratios were positively associated with profitability when employing international data for 1972 to 1981.

Generally, banks lacking stable and cheap funds will have to use liquid assets or more external funding to meet the demand of fund, and thus increases its cost of funding. As it may appear, the relationship between cost and profit is straightforward implying that the higher the cost banks have to incur in obtaining funds, the lower will be their profits. This is confirmed by Pasiouras and Kosmidou (2007) who argue that banks with lower needs of external funding face lower costs resulting in higher profitability. This argument is consistent with previous studies by Berger (1995), Demirguc-Kunt and Huizinga (1999), Staikouras and Wood (2004), Goddard et. al. (2004), Kosmidou, Tanna and Pasiouras (2005) and Kosmidou (2008).

Most previous literature discuss the liquidity-profit relationship in the realm of capital. Berger (1995), for example, through the concept of "expected bankcruptcy cost hypothesis" suggest that banks with high levels of capitals experience decrease in fundings costs to the extent that it is more than enough to offset the direct decline in the expected profitability. Drawing together two concepts introduced by Morris and Shin (2009), 'insolvency risk' and 'illiquidity risk', Bordeleau and Graham (2010) asserts that if the 'expected bankcruptcy cost hypothesis' is indeed true, then holding more liquid assets will likely improve banks' profitability through the decrease in their probability of default. Applying this hypothesis on 55 US bank holding companies and 10 Canadian banks for the period 1977 to 2009, Bordeleau and Graham (2010) found that their hypothesis is supported. Earlier, Kosmidou et. al (2005) found that the higher the capital strength of banks, the lower the need for external fundings, and therefore the higher the profitability of the banks. The increase in this profitability is also attributable to the lower cost of bankcruptcy which reduces banks' cost of funding.

From the above discussion, although literature surrounding the analysis of liquidity on banks' profitability are aplenty, empirical work that include liquidity as an explanatory variable that directly affect banks' profitability is limited. Thus, this paper deals with this issue within the framework of new liquidity standards as proposed by Basel III.

DATA AND EMPIRICAL ESTIMATION

This study is based on a balanced panel dataset of eight Malaysia commercial banks over the period 2005-2011 consisting 56 observations. Annual bank data and macroeconomic data were obtained from the Bankscope database and the EIU database, respectively.

Three commonly used measures of profit performance are employed in this study. The first is the return on assets (ROA) which is calculated as the net income divided by total assets. The second measure is the ratio of profits to EQUITY, i.e. the return on EQUITY (ROE), The third measure is the net interest margin (NIM), which is the ratio of net interest income to earning assets. This third measure is included to reflect the profitability of banks based on their main activity which is interest-based. Two groups of determinants are employed. The group of bank-specific determinants of profitability involves liquidity, operating efficiency, capital strength, asset quality and SIZE. These are the ratio of liquid assets to customer and short-term funding, the cost to income ratio, the ratio of loan loss reserve to gross loans, the ratio of EQUITY to total assets, and finally, bank total assets. The second group of determinants are used to examine the impact of environment on these banks profitability. They include the real gross domestic product (RGDP) growth and the annual inflation rate (INF).

In line with the objective of this study, net stable funding ratio (NSFR) is used to represent liquidity of banks. Factors included in the calculation of NSFR are based on IMF Global Financial Stability Report 2011. With the introduction of NSFR, banks are expected to withdraw, although not entirely, from investing in low- to medium-quality assets that offer high return and invest in high-quality assets that offer lower return, hence reducing their profitability. The higher the NSFR of a bank, the more low- to medium-quality assets the bank holds. As a result, the lower would be its profit. Therefore, a negative relationship is expected between this variable and profitability. Although all banks are expected to meet the 100 percent threshold, there are times when this requirement was not met. Without this required liquidity, a bank may become insolvent or fail. Therefore, the lower the value of NSFR, the more illiquid the bank is. Since illiquidity is associated with downside performance of the bank, a positive relationship is therefore expected between this variable and profitability.

As mentioned previously, four other measures of bank-specific determinants are also included in the estimation. To measure the impact of operational efficiency on banks profitability, the cost of income ratio (COST) is used. Since this ratio measures how costs are changing compared to income, a high ratio reflects that costs are rising at a higher rate compared to income. This therefore will produce a lower profitability. Hence, an inverse relationship between the cost to income ratio and profitability is expected.

Holding a sufficient amount of capital provides protection against unexpected losses to banks. Theoretically, a well-capitalised bank is perceived to be of lower risk to become insolvent. It also faces lower expected costs of distressed which further can be translated into higher profitability. To measure capital strength of banks, the ratio of EQUITY to assets (EQUITY) is used, and this ratio is expected to have a positive relationship with banks' profitability.

Asset quality is another factor that is of paramount importance in affecting banks' profitability. It will not only affect the financial performance of the bank itself, but also the soundness of the country's financial system where the banks operate as evidenced during the 1997 Asian financial crisis. The higher the quality of assets, the higher would be the profitability of banks. In this paper, this quality is reflected by the ratio of loan loss reserves to gross loans (LOSSRATIO). If banks operate in more risky environment, it will probably result in higher ratios. Since allocating money to loan loss reserves cuts directly into banks' profits, this ratio is expected to have an inverse relationship with banks' profitability.

Bank's SIZE is the final bank-specific determinant of its performance which is measured by its total assets (SIZE). SIZE matters as it reflects economies of scale and scope of banks although results obtained by studies for the relationship between SIZE and banks' profits are inconclusive (refer to European Commission 1997; Berger & Humphrey 1997; Altunbas et al. 2001, Vander Vennet 1998; and Pallage 1991).

Apart from bank-related factors, bank profitability is also expected to be sensitive to macroeconomic variables. The state of economic cycle has an influence on bank profitability and this is reflected by the real gross domestic product (RGDP). As RGDP slows down, the demand for loans goes down, credit quality deteriorates and thus reducing banks profit. Inflation, which is measured by CPI growth rate, is another macroeconomic variable accounted for in this study. Prices affect cost but the extent to which it affects profitability depends on whether future movement in inflation is anticipated or unanticipated (Perry 1992). As pointed out by Athanasoglou, Brissimis and Delis (2008), the relationship between SIZE and profitability is expected to be non-linear. Hence, to capture this possible non-linear relationship, the factor SIZE is, therefore, in natural logarithm.

COMMERCIAL BANKS LIQUIDITY

This section evaluates the net stable funding ratio, one of the liquidity standards proposed for banks by Basel Committee on Banking Supervision (BCBS) under Basel III. The other standard proposed, namely the Liquidity Coverage Ratio (LCR) could not be evaluated because it requires information on credit quality, ratings and liquidity characteristics that are not publicly available.

Figure 1 below shows the ratio of liquid assets to total assets held by commercial banks in Malaysia. As depicted by the figure, those banks had been holding a declining share of their balance sheets in liquid assets during the 1997/1998 Asian financial crisis. With capital regulations initiatives introduced by BNM during the crisis, the share of liquid assets increased but never reached to the pre-crisis level. This ratio stabilised and began to reach the pre-crisis level in 2004/2005. It continued to increase and finally was at its peak in 2008 but began to experience a declining pattern again as a result of the global financial crisis in 2008. No credit crunch took place during the recent crisis, and even though the level of liquidity had dropped dramatically from 2008, it has never reached the level that has seriously affected banks like they experienced during the 1997/1998 financial crisis. Experience and lessons learnt from that crisis has made the central bank to continuously review its supervisory and surveillance system to ensure that commercial banks in the country remain resilience to any adverse shocks.

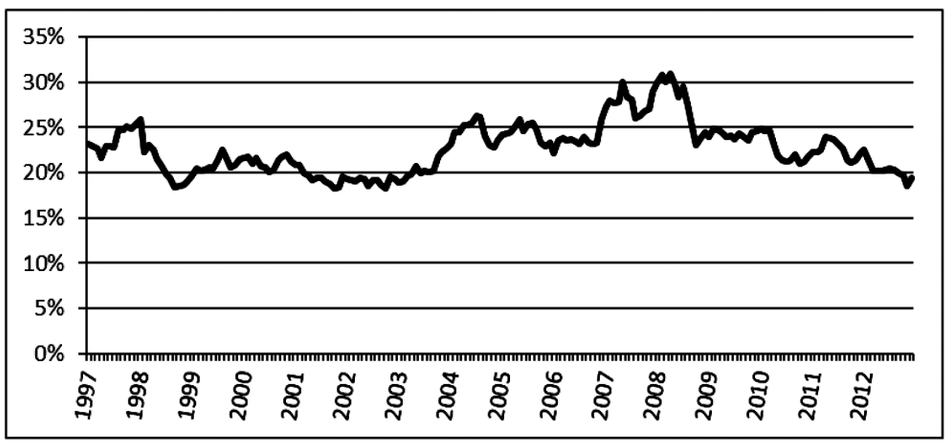
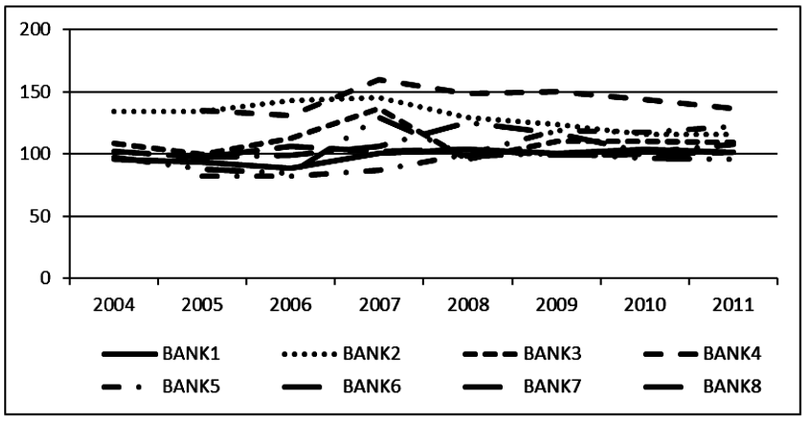


FIGURE 1. Liquid assets* as a percentage of total assets

Source: Monthly Statistical Bulletin, Bank Negara Malaysia
**includes cash, interbank deposits and government securities held by commercial banks*



Source: Author's Calculation based on Bankscope Database
Note: Banks name are not disclosed and they are only identified by numbers assigned to them with no particular order in terms of SIZE or performance.

FIGURE 2. Net stable funding ratio of commercial banks

Although the principles of liquidity risk management have existed long before the introduction of the new liquidity standards under Basel III framework, BNM is committed to ensure that banks in the country will comply with these new standards. Figure 2 below presents the NSFR for commercial banks from 2004 to 2011[4]. As depicted by Figure 2, although the NSFR deteriorated for all banks in 2004 to 2006, most banks managed to stay above the 100 percent threshold and continue to improve until 2007. The NSFR of these banks began to decline again in 2008 but still staying above 100 percent. This ratio improved slightly for most banks sometime in 2010. As pointed out by BCBS 2010, NSFR introduced in the new regulatory standard is to ensure that banks will be able to withstand any liquidity shocks. Banks are also expected to hold enough liquid assets to cover their net cash-flow for a period of 30 days. However, a well-calibrated NSFR can contribute to the stability and profitability of banks and the financial system as a whole. It is, therefore, crucial to understand the impact that a change in bank's liquid asset holdings has on its profitability.

To have a clearer picture of the NSFR for each individual banks, those values are presented in Table 1 below:

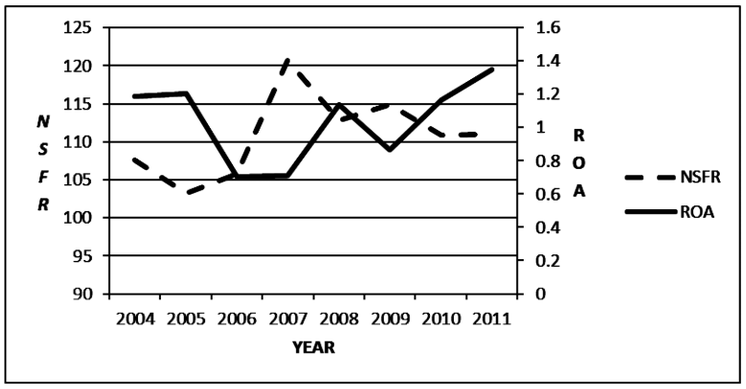
TABLE 1. Estimates of the Net Stable Funding Ratio for the eight sample banks (2005-2014)

	Year							
	2004	2005	2006	2007	2008	2009	2010	2011
BANK1	95.77	93.44	88.53	100.11	103.56	100.39	103.34	101.19
BANK2	133.83	134.05	142.88	145.12	129.23	123.86	115.29	115.60
BANK3	108.20	99.58	112.36	136.16	95.56	110.25	109.83	109.22
BANK4	NA	135.17	130.49	160.07	148.17	150.21	143.91	136.12
BANK5	NA	81.75	82.01	86.64	99.29	118.69	117.31	121.93
BANK6	102.36	96.86	106.39	102.44	103.75	99.12	99.54	101.19
BANK7	NA	97.28	99.01	106.09	124.94	116.30	101.39	107.81
BANK8	97.59	87.58	84.16	129.24	97.707	100.06	96.61	95.33

Source: Author's Calculation based on Bankscope Database

The table shows that two banks, BANK2 and BANK4, have been consistently maintain their NSFR above the threshold level of 100 percent throughout period after 2005. BANK5 and BANK8 appear to have values below than 90 percent for at least two consecutive years. For BANK5, the NSFR increased each year since 2005 which finally crossed the 100 percent level in 2009 to 2011. For BANK8, although its NSFR reached above the 100 percent level in 2007, it dwindled down to below 100 percent the following year. Although the NSFR for BANK8, went back up again in 2009, it appears to be facing difficulty in maintain its NSFR above the threshold level for the last two years of the sample period.

Figure 3 presents the graphical relationship between NSFR and commercial banks profitability, ROA since 2004. In general, this relationship can be divided into three sub-periods: 2004-2006, 2006-2008, and 2008-2011. For sub-period 2004-2006, the relationship appears to be



Source: NSFR is based on author's calculation using data from Bankscope Database ROA is from Bankscope Database

FIGURE 3. NSFR vs ROA of commercial banks

negative, where an increase in NSFR results in a decrease of ROA. This relationship seems to be consistent with the third sub-period, 2008-2011. For sub-period 2006-2008, however, there seems to be a positive relationship between these two variables.

RESULTS AND DISCUSSIONS

The estimation approach applied here is the Least Square with bank dummy variables (LSDV). The dummies were included to allow for heterogeneity across the sample banks. To test for this heterogeneity, the Wald test is performed on the data. *F-statistics* of 6.09 and 3.62 for the two measures of performance, NIM and ROA, respectively, are significant at 1% level of significance. For ROE, *F-statistics* of 2.43 is significant at 5% level of significance. This indicates that these sample banks indeed have different intercepts, or simply there exists a fixed effect across the sample banks.

Table 2 presents the regression results of the Fixed Effect estimations.

TABLE 2. Fixed effect estimations

Variable	A. Dependent : NIM		B. Dependent : ROA		C. Dependent : ROE	
	Coeff.	T-stat	Coeff.	T-stat	Coeff.	T-stat
Constant	7.091	2.34**	-7.851	-2.17**	-121.55	-2.51**
NSFR	0.008	1.92**	0.011	2.29**	0.179	2.75***
COST	-0.052	-4.96***	-0.059	-4.73***	0.789	-4.69***
EQUITY	0.022	0.70	0.079	2.08**	1.179	2.31**
LOSSRATIO	0.069	2.74***	-0.032	-1.07	-0.141	-0.35
SIZE	-0.242	-0.94	0.773	2.52**	11.065	2.70**
RGDP	-0.050	-1.81*	-0.055	-1.68*	-0.869	-1.96*
INF	0.016	1.04	0.045	2.43**	0.638	2.56**
DB_2	-1.039	-3.93***	-0.761	-2.41**	-4.513	-1.07
DB_3	0.174	0.71	0.508	1.75*	7.056	1.81*
DB_4	-1.544	-3.80***	0.214	0.44	2.767	0.43
DB_5	-0.363	-0.94	0.513	1.11	11.308	1.83*
DB_6	-0.322	-0.57	1.629	2.42**	23.152	2.57**
DB_7	-0.614	-1.00	1.482	2.01*	20.981	2.13**
DB_8	-0.314	-1.09	0.533	1.55	9.965	2.17**
R-squared	0.596		0.697		0.733	
F-value	4.32***		6.740***		8.040***	
Observations	56		56		56	

Note: The model is estimated using the following equation:

$$\pi_{it} = \alpha_i + \beta_1 NSFR_{it} + \beta_2 COST_{it} + \beta_3 EQUITY_{it} + \beta_4 LOSSRATIO_{it} + \beta_5 SIZE_{it} + \beta_6 RGDP_t + \beta_7 INF_t + \sum_{j=1}^{7} \gamma_j DB_j + \varepsilon_{it}$$

where *i* refers to an individual bank, *t* refers to year, π_{it} the dependent variables that refers to ROA, ROE and NIM; α_i is the intercept of bank *i*; $NSFR_{it}$, $COST_{it}$, $EQUITY_{it}$, $LOSSRATIO_{it}$ and $SIZE_{it}$ are the bank-specific factors for bank i on year t; $RGDP_t$ and INF_t are the environment factors on year t, DB_j is a bank dummy variable which is equal to 1 if the bank is Bank 2 and 0 otherwise, 1 if the bank is Bank 3 and 0 otherwise, and so forth. Bank 1 is taken as the reference bank which is selected based on its high total asset during the whole period of study and ε_{it} is an error term.

***, **, * are significant at 1, 5, and 10 percent significance levels, respectively.

Based on the results presented in Table 2, the explanatory power of the fixed effects model is high (R^2 equals to 0.596 for NIM, 0.697 for ROA and 0.701 for ROE, which highlights the significant contribution of the banks fixed effects. *F*-statistics are also significant at the 1% level for all three dependent variables.

From the fixed effect estimation results in Table 2, COST appears to be highly negative significant for all measures of profitability. Thus, this confirms the operational efficiency of banks in managing their cost which in turn produces higher profits. The coefficient of EQUITY is positive and significant for ROA and ROE, implying that well-capitalized banks experience higher profits. As with the effect of loan loss provision, the significant coefficient of LOSSRATIO is only true when NIM is the proxy for profitability measure. The positive coefficient on LOSSRATIO for NIM suggests that loan loss provisioning improves profits of banks. One explanation could be that banks realized that they may be exposed to high risk loans or were operating in a risky environment, and in order for them to maintain their required profit ratio level, the loan loss provision has to be increased. This supports the conditional wisdom that suggests that higher loan loss provisioning lower return to the banks. This is also true for SIZE, where the positive and significant coefficient of this variable at 5 percent with ROA and ROE imply the support of the economies of scale hypothesis.

Turning to the structural liquidity which is central to this study, the coefficients of NSFR is positive and significant for all measures of profitability. This positive effect is consistent with studies by Molyneux and Thornton (1992) and Barth et al. (2003). These results indicate that bank's liquidity conditions do have an impact on profitability and the better and higher the liquidity positions of banks, the higher the profitability of these banks. The positive relationship between NSFR and NIM, however, contradicts to the result suggested by King (2013). King (2013) argued that holding fewer illiquid assets and more high-quality assets, as encouraged by NSFR, will lower interest income, and eventually causing NIM to decline. This is obviously not true for the sample banks of this current study. The increase in ASF has not increased the interest expense as suggested by King (2013). One likely explanation is that these sample banks may have increased their Tier 1 capital throughout the sample period and reduced the funding from deposits, and by doing so their interest expense were miNIMized which consequently lead to the increase in the NIM.

According to Bank for International Settlements Interim Report 2010, a higher structural liquidity banks have on its balance sheet will produce a negative impact on their performance, hence reduce their profitability and a squeeze on lending margins. Therefore, to prevent profits from falling, banks will have to increase their lending spreads. Study performed by Sun, Kim and Ko (2012) provides support to this theory. Using sample data from sixteen countries, they found that NSFR increases lending spreads by 20.0bp for the commercial banks of these sample countries in order to keep ROE at the pre-regulation level. This finding is consistent with King (2010) where in his calculation, a bank would need to increase its lending spread by 24bp in order to maintain its ROE, provided that its risk-weighted assets (RWAs) also remain unchanged. Following the 1997/1998 Asian financial crisis, there has been a strong supervision of the country's central bank on the commercial banks preventing them from engaging in excessive risk taking behavior. Among the measures taken by the central bank is the introduction of a new liquidity framework. The Liquidity Framework requires banks to assess their short to medium term liquidity periodically. The purpose is to ensure banks will be able to cope with unexpected withdrawals of savings by their clients, which may affect their performance. In addition, although miNIMum deposits rate were prescribed by the central bank, banks were allowed to determine their own lending rates. Therefore, maintaining profitability of banks through lending spreads is not an uncommon scenario since the implementation of new Liquidity Framework in the year 2000. This explains the reason why banks emerged healthier after the crisis, and therefore is reflected in the NSFR-profitability link of this study.

High NSFR implies that either the ASF is high or the RSF is low. This suggests that holding a low amount of liquid assets such as cash and investment in government securities or having high level of capital helps bank to alleviate its profitability. These liquid assets generally have a relatively low return and holding them imposes an opportunity cost on a bank (Bordeleau & Graham 2010). The positive impact of capital on profitability provide support to the argument that well capitalized banks face lower costs of going bankrupt and reduce, thus, their cost of funding or that they have lower needs for external funding resulting in higher profitability (Berger 1995; Demirguc-Kunt & Huizinga 1999; Staikouras & Wood 2004; Goddard et al. 2004; Kosmidou et al. 2005; Kosmidou 2008).

The fixed effect estimation also shows that economic growth has positive significant impact on all measures of bank profitability, thus supporting the findings of Bourke (1989), Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1999), Athanasoglou et al. (2008), Albertazzi & Gambacorta (2009); and Dietrich and Wanzenreid (2011). As argued by Dietrich and Wanzenreid (2011), this is due to the increase in demand for lending during cyclical upswings. The results also show that inflation increases bank profitability, as measured by ROA and ROE. As suggested by Perry (1992), if the rate of inflation is anticipated, there will exist a positive effect of inflation on bank profitability. This anticipation gives bank the opportunity to adjust its interest rates accordingly and consequently allowing it to earn higher profit. Demirguc-Kunt and Huizinga (1999) suggest that this positive relationship implies that bank income increases more with inflation than do bank costs.

Finally, with respect to the bank-dummy variables, NIM of two banks is found to be statistically significant

lower than our reference bank at 1 percent level, and these banks are BANK2 and BANK4, the only two banks that have been maintaining their NSFR above 100 percent threshold. This result suggest that these two banks have not done a good job in their asset and liability management such that these banks incur a higher cost on its liabilities and earns lower income on their assets compared to the reference bank. This affect the spread between the interest earned and the interest incurred which subsequently reducing their NIM lower than that of the reference bank. This result support the claim by King (2013) who suggests that as banks seek to meet the NSFR requirement, they may experience decline in their NIM. When ROA is taken as the profitability measure, the number of banks that show significant results increased to four. ROA for three out of these four banks are higher than our reference bank. As for the ROE, five banks are statistically significant different from the reference bank, and all these five banks that produce statistically significant results have higher profitability than our reference bank. Generally, we can conclude that most banks are healthy and are earning well on their non-interest activities and asset management.

CONCLUSION

The 2007/2008 financial market crisis that began in the United States with the collapse of the subprime mortgage market has led to the decline in solvency of the banking system. This has drawn the Basel Committee on Banking Supervision (BCBS) to propose Basel III, which imposed more stringent rules and regulations for banks to address their liquidity positions. With the introduction of the net stable funding ratio (NSFR), banks are expected to have high quality and stable source of funding. This requires bank to retire from investing in low and medium-quality assets and instead focus on high quality assets and at the same time maintaining their profitability. In this paper, whether NSFR is related to various bank performance indicators is analysed. Other explanatory variables that have been introduced in earlier studies were also included in the regressions. The results are in line with earlier studies, where findings in those earlier studies are confirmed. For instance, there exists a positive relationship between EQUITY and profit, and SIZE of banks and profit, and a negative relationship between cost to income ratio and profit. The results also meet the expectation of the NSFR-profit link. There appears to be a positive relationship between NSFR and all three indicators of performance. Although banks switched from low and medium-quality assets to high quality assets which may have reduced their net interest margin, they were still able to maintain their profitability.

Overall, the results provide evidence that regulations set forth by the central bank as a consequence of the 1997/1998 Asian financial do shape the profitability of Malaysian commercial banks. While this study provides some insights of the NSFR, implications of the new liquidity frameworks proposed by BASEL III warrant further research.

ENDNOTES

1 Alvarez et al. (2013)

2 Author's calculation, data source Monthly Statistical Bulletin.

3 The Liquidity Framework was issued in 1998 following the asian financial crisis and first implemented in 2000.

4 The calculation of NSFR is based on factors suggested by International Monetary Fund in Global Financial Stability Report April 2011 as presented in Appendix 1.

REFERENCES

Albertazzi, U. & Gambacorta, L. 2009. Bank profitability and the business cycle. *Journal of Financial Stability* 5(4): 393-409.

Altunbas, Y., Gardener, E.P.M., Molyneux, P. & Moore, B. 2001. Efficiency in European Banking. *European Economic Review* 45(10): 1931-1955.

Alvarez, A., Bhardwaj, N., Guse, F., Kremer, A., Kshirsagar, A., Lüders, E., Stegemann, U. & Tahilyani, N. 2013. Between deluge and drought: Liquidity and funding for Asian banks. *McKinsey Working Papers on Risk* 45. McKinsey&Co.

Athanasoglou, P.P., Brissimis, N.S. & Delis, M.D. 2008. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money* 18(2): 121-136.

Barth, J.R., Nolle, D.E., Phumiwasana, T. & Yago, G. 2003. A cross-country analysis of the bank supervisory framework and bank performance. *Financial Markets, Institutions and Instruments* 12(2): 67-120.

Basel Committee on Banking Supervision (BCBS). 1997. Core principles for effective banking supervision. *Bank for International Settlements (BIS) Publications.* Available at http://www.bis.org/publ/BCBS30a.pdf.

Berger, A.N., Hanweck, G.A. & Humphrey, D.B. 1987. Competitive viability in banking: Scale, scope and product mix economies. *Journal of Monetary Economics* 20(3): 501–520.

Berger, A.N. & Humphrey, D.B. 1997. Efficiency of financial institutions: International survey and directions for future research. *European Journal of Operational Research* 98(2): 175-212.

Berger, A.N. 1995. The relationship between capital and earnings in banking. *Journal of Money, Credit, and Banking* 27(2): 432-456.

Bikker, J.A. & Hu, H. 2002. Cyclical patterns in profits, provisioning and lending of banks and procyclicality of the new Basel capital requirements. *BNL Quarterly Review* 221(1): 143-175.

Bordeleau, E. & Graham, C. 2010. The impact of liquidity on bank profitability. *Bank of Canada Working Paper*, WP#2010-38.

Bourke, P. 1989. Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance* 13(1): 65-79.

Demirguc-Kunt, A. & Huizinga, H. 2000. Financial structure and bank profitability. *Policy ResearchWorking Paper Series* 2430. The World Bank.

Dietrich, A. & Wanzenried, G. Determinants of bank profitability before and during the crisis: Evidence from Switzerland. 2011. *Journal of International Financial Markets, Institutions and Money* 21(3): 307-327.

Dietrich, A., Hess, K. & Wanzenried, G. 2014. The good and bad news about the new liquidity rules of Basel III in Western European countries. *Journal of Banking & Finance* 44: 13-25.

Goddard, J.A., Molyneux, P. & Wilson, J.O.S. 2004. The profitability of European banks: A cross-sectional and dynamic panel analysis. *The Manchester School* 72(3): 363-381.

International Monetary Fund. 2011. Durable financial stability: Getting there from here. *Global Financial Stability Report*, Washington DC.

King, M.R. 2010. Mapping capital and liquidity requirements to bank lending spreads. *BIS Working Paper* No. 324. Bank for International Settlement.

King, M.R. 2013. The Basel III net stable funding ratio and bank net interest margin. *Journal of Banking and Finance* 37(11): 4144-4156.

Kosmidou, K. 2008. The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance* 34(3): 146-159.

Kosmidou, K., Tanna, S. & Pasiouras, F. 2005. Determinants of profitability of domestic UK commercial banks: Panel evidence from the period 1995-2002. In *Money Macro and Finance (MMF) Research Group Conference* Vol. 45.

Macroeconomic Assessment Group (MAG). 2010. *Assessing the macroeconomic impact on the transition to stronger capital and liquidity requirements*. Interim Report, Bank for International Settlement.

Molyneux, P. & Thornton, J. 1992. Determinants of European bank profitability: A note. *Journal of Banking and Finance* 16(6): 1173-1178.

Morris, S. & Shin, H.S. 2009. *Illiquidity component of credit risk*. Working Paper, Princeton University.

Pakravan, K. 2014. Bank capital: the case against Basel. *Journal of Financial Regulation and Compliance* 22(3): 208-218.

Pallage, S.J. 1991. An econometric study of the Belgian banking sector in terms of scale and scope economies. *Cahiers Economiques de Bruxelles* 130: 126-143.

Pasiouras, F. & Kosmidou, K. 2007. Factors influencing the profitability of domestic and foreign banks in the European Union. *Research in International Business and Finance* 21(2): 222-237.

Perry, P. 1992. Do banks gain or lose from inflation. *Journal of Retail Banking* 14(2): 25-40.

Short, B. 1979. The relation between commercial bank profit rates and banking concentration in Canada, Western Europe and Japan. *Journal of Banking and Finance* 3(3): 209-219.

Smirlock, M. 1985. Evidence on the (non) relationship between concentration and profitability in banking. *Journal of Money, Credit, and Banking* 17(1): 69-83.

Staikouras, C. & Wood. G. 2004. The determinants of European bank profitability. *International Business and Economics Research Journal* 3(6): 57-68.

Sun, E.C., Kim, H. & Ko, W. 2012. The impact of Strengthened Basel III banking regulation on Lending Spreads: Comparisons across Countries and Business Models. Available at www.bis.org/events/bokbisimf2012/session6_lending_spreads.pdf.

Vander Vennet, R. 1998. *Cost and profit dynamics in financial conglomerates and universal banks in Europe*. Presented at the Societe Universitaire Europeenee de Recherchers Financiers/CFS colloquium, 15-17 October, Frankfurt.

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APPENDIX

APPENDIX 1

Available Stable Funding	Factor	Required Stable Funding	Factor
Equity	1.00	Cash	0.00
Tier 2	1.00	Customer loans	0.75
Demand Deposits	0.80	Commercial loans	0.85
Saving and term deposits	0.85	Advances to banks	0.00
Bank Deposits	0.00	Other commercial and retail loans	0.85
Other Deposits and short-term borrowing	0.00	Other loans	1.00
Derivative liabilities	0.00	Derivative assets	0.90
Trading liabilities	0.00	Trading securities	0.15
Senior debt maturing after one year	1.00	Available for sale securities	0.15
Other long-term funding	1.00	Held-to-maturity securities	1.00
Other noninterest-bearing liabilities	0.00	Investments in associates	1.00
Other reserves	1.00	Other earning assets	1.00
		Insurance assets	1.00
		Residual assets	1.00
		Reserves for nonperforming loans	1.00
		Contingent funding	0.05

Source: IMF Global Financial Stability Report April 2011