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Factors affecting the profitability of Malaysian commercial banks

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This study intends to investigate the impact of bank-specific characteristics and macroeconomic conditions on Malaysian commercial banks financial performance, during the period of 2003 to 2009. This study employs regression models that relate bank profitability ratios to various explanatory variables. There are three ratios which represent profitability measures are return on assets (ROA), return on equity (ROE) and net non-interest margin (NIM). Seven variables are drawn from the conventional banking literature as proxies for bank-specific and macroeconomic factors. Results of this study indicated that ROA is the best profitability measures. All bank-specific determinants affect bank profitability significantly in the anticipated way. However, no evidence is found in support of the macroeconomic variables have an impact on profitability.

Key words: Bank-specific characteristics, macroeconomic, bank performance.

INTRODUCTION

The banking system is the most important segment of a country financial system. It plays a very important role in providing the capital, whereby the financial intermediaries (that is, banks) channel of funds from economic units that have saved surplus of funds to those that have shortage of funds. The health of the nation's economy is closely related to the soundness of its banking system. A large body of academic research across many countries has demonstrated that a highly developed banking sector plays important role in facilitating economic growth. A bank as a matter of fact is just like a heart in the economic structure and the capital provided by it is like blood in it. As long as blood is in circulation the organs will remain sound and healthy. If the blood is not supplied to any organ then that part would become useless. So if there is no financing provided to the various sector in the economy, the economy will not grow and expand.

A weak banking system could lead to major disaster for any financial system. This has become much more apparent during the financial crisis. In 1997 financial crisis, Asian countries such as Thailand and Indonesia, not only their banking system was collapsing but the country's financial system was also being pressured. They had restructured their financial system and received financial aid from International Monetary Funds (IMF) and to restore confidence and to bring stability in the banking. Recently, the US subprime mortgage crisis also reminded us the vital role of a sound and efficient banking system.

History of Malaysian banking system

In early 1900s, economic in the country was rapidly developed. The rubber plantations and tin industry were grown rapidly. This created the need of banks and led to establishment of banking system. The banking system was underdeveloped and dominated by foreign banks. The first local bank, Kwong Yik (Selangor) Banking Corporation was first set up in 1913. Kwong Yik (Selangor) Banking Corporation is survived until today, which is called Malayan Banking Berhad in 2011.

Since then, the banking sector has continuously growth and steady expansion until eventually there was a need

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Table 1. List of Malaysian Commercial Banks.

S/N	Local Commercial Bank	S/N	Foreign Commercial Bank
1	Affin Bank Malaysia Bhd	1	Bangkok Bank Bhd
2	Alliance Bank Malaysia Bhd	2	Bank of America (M) Bhd
3	AmBank (M) Bhd	3	Bank of China (M) Bhd
4	CIMB Bank Bhd	4	Bank of Nova Scotia Bhd
5	EON Bank Bhd	5	Bank of Tokyo-Mitsubishi UFJ (M) Bhd
6	Hong Leong Bank Bhd	6	Citibank Bhd
7	Malayan Banking Bhd	7	Deutsche Bank (Malaysia) Bhd
8	Public Bank Bhd	8	HSBC Bank Malaysia Bhd
9	RHB Bank Bhd	9	Industrial & Commercial Bank of China (M) Bhd
		10	J.P. Morgan Chase Bank Bhd
		11	OCBC Bank (M) Bhd
		12	Standard Chartered Bank Malaysia Bhd
		13	The Royal Bank of Scotland Bhd
		14	United Overseas Bank (M) Bhd.

Source: Bank Negara Malaysia (Central Bank of Malaysia) (2010).

for a governing body to supervise the activities and operations of the numerous banks in the country. This led to the establishment of Bank Negara Malaysia (BNM) or Central Bank of Malaysia, a statutory body which is wholly-owned by the Federal Government. Its first priority upon its establishment in 1959 was to create basic infrastructure for the financial system and a truly Malaysian-oriented banking system is developed.

In the late 1970s, BNM's efforts were focused on introducing other financial institution such as merchant banks and investment banks. The enactment of the Banking Act 1973 is to strengthen the regulation and supervision of banking institution.

In the 1980's, BNM introduced the used Automated Teller Machines (ATM's). This can be considered as the first and most visible piece or evidence of the emerging electronic banking in Malaysia. This was then followed by the introduction of Tele-banking and later on the PC-banking in the 1990's. The economic recession in 1985 had significantly affected the health of the banking sectors. The 1997 financial crisis has resulted in deterioration in capitalization and asset quality of the banking sector.

In 2003, there is a major restructuring and consolidation in the banking sector. Fifty-four (54) banking institutions has being consolidated and reduced to ten (10) local anchor banking groups namely Affin Bank, Alliance Bank, AmBank, Bumiputra-Commerce Bank, EON Bank, Hong Leong Bank, Malayan Banking, Public Bank, RHB Bank, Southern Bank. In 2010, there are fourteen (14) foreign and nine (9) local anchor banking groups: Affin Bank, Alliance Bank, AmBank, CIMB Bank, EON Bank, Hong Leong Bank, Malayan Banking, Public Bank, RHB Bank. Table 1 shows the list of Malaysian commercial banks.

Malaysian commercial banks

Basically, financial system in Malaysia is divided into banking system and non-banking system. Malaysian banking system consists of commercial banks, Islamic banks, and investment banks. The main role of banking system is to mobilize the funds and act as the main source of financing which supports economic activities in Malaysia. The banking system is supervised by BNM which is a statutory body wholly owned by our Malaysia Government. It was established on 26 January 1959 under the Central Bank of Malaysia Act 1958. On 25 November 2009, the Central Bank of Malaysia Act 1958 has been revoke by the Central Bank of Malaysia Act 2009.

Commercial Banks are the main players in Malaysian banking system. Commercial Banks are the largest and most significant providers of funds in the banking system. Commercial Banks were supervised by BNM under Banking Act 1973, but this was subsequently repealed by the BAFIA in 1989.

Under BAFIA 1989, the commercial banks business is defined as the business of:

1. Receive deposits on savings accounts, current accounts, or other similar accounts.
2. Collect or pay cheques drawn.
3. Provision of finance which is defined as lending of money, leasing business, factoring business, purchase of bills of exchange, promissory notes, certificates of deposits, debentures or other negotiable instruments, and acceptance or guarantee of any liability, obligation or duty of any person.
4. Such other business that BNM and Minister of Finance may prescribe.

To obtain a sound and healthy banking system in the country is relatively critical. Thus, there is abundance of literatures on performance studies of banking system's performance and most of these studies are confined to commercial banks especially in Western countries. The literatures indicated that internal and external variables contribute significantly towards a bank's profitability. However, empirical studies on banking performance in ASEAN are relatively sparse. Up to this date, there are only a few literatures on performance studies on Malaysian commercial banks. Therefore, this paper is conducted to fill the gap and provide some evidence on the determinants of Malaysian commercial banks profitability. We believed that banks that operate in different environment influenced by different determinants. Therefore, we re-examined the variables that suggested by previous studies.

Objectives of the Study

1. To identify the determinants of bank-specific characteristics and macroeconomic variables of Malaysian commercial banks.
2. To investigate the effect of commercial banks bank-specific determinants on profitability performance of Malaysian.
3. To investigate the effect of macroeconomic variables on profitability performance of Malaysian commercial bank.

LITERATURE REVIEW

Bank profitability

Bank profitability is defined by Rose (2002) as the net after-tax income or net earnings of a bank (usually divided by a measure of bank size). There are various ways to measure the bank profitability. Financial ratios are found to be the most generally used methods. This is supported by Mamatzakis and Remoundos (2003). This study examined the determinants of the Greek commercial banks performance and discovered that financial ratios are excellent in explaining the bank profitability.

Financial ratios allow us to analyze and interpret the banks financial data and accounting information which provide us a deeper understanding on a bank financial situation and help us to evaluate the bank performance. Furthermore, financial ratios allow us to make comparison among different sized banks, and serve as an industry's benchmark where we can compare the individual bank's ratio with the industry average (Vasiliou and Frangouli, 2000; Guru, et al., 2002).

There are many financial ratios that can be used to assess bank profitability performance. The previous studies suggested financial ratios such as Returns on

Assets (ROA), Returns on Equity (ROE), and Net Interest Margins (NIM) are the common used indicators. Studies such as Naceur (2003), Peters et al. (2004), Mamatzakis and Remoundos (2003), Staikouras and Wood (2003), Kosmidou et al. (2008), Pasiouras and Kosmidou (2007), Athanasoglou et al. (2008), Heffernan and Fu (2008) employed ROA and ROE to measure for bank profitability,

Bank profitability measures

Return on asset (ROA)

$$ROA = \frac{Net\ Income}{Average\ Total\ Assets}$$

ROA is a comprehensive financial ratio to measure the profitability performance of banks. It measures the overall performance of the banks. According to Rose (2002), ROA is defined as net income divided by total assets. ROA tells us how many incomes that the management is able generated from the assets. Hence, ROA can be used to indicate the efficiency of bank management in converting asset into revenue (Goddard et al., 2004). We prefer higher ROA because this means that the management is efficient in making profits by utilizing the assets and performance of the bank is good.

Many regulators believe ROA is the best indicator for profitability. Rivard and Thomas (1997) reported that ROA is the best measure for bank profitability. This is because ROA is not distorted by high equity multipliers. ROA is also a proxy measure used to determine the ability of the company to produce income from the assets. Moreover, it is proven by Golin (2001) that ROA is the most important measure for bank profitability.

Return on equity (ROE)

$$ROE = \frac{Net\ Income}{Average\ Total\ Equity}$$

ROE is defined as net income over by average total equity. It measures bank accounting profits per dollar of book equity capital (Rose, 2002). It shows the effective-ness of bank management in handling the shareholders funds to generate profits. We prefer high ROE as it implied that the management is efficient in managing the shareholders fund and generate to revenues to shareholders. Shareholders are benefits from its capital investment made to the bank.

Furthermore, ROE can be decomposed into a leverage factor (equity multiplier) and ROA. Equity multiplier refers as assets divided by equity, which is the reciprocal of the capital-to-asset ratio. It measures the leverage aspect of bank. In short, ROA measures profitability from the perspective of the overall efficiency of how a bank utilizes its total assets, whereas ROE captures profitability from the shareholders' perspective.

Net interest margin (NIM)

$$NIM = \frac{Net\ Interest\ Income\ - Net\ Interest\ Expenses}{Average\ Total\ Asset}$$

The Net Interest Margin (NIM) is defined as the net interest income minus net interest expenses over the total assets. The interest income is referring to the income that bank collects from asset such as interest charged on loans, overdrafts and trade finance. The interest expense is the amount of interest payment that bank pay for its liabilities (savings accounts and other accounts). Bank involves in collecting deposits and lending. It pays the depositors at a lower interest rate, and uses that money to lend to borrowers at a higher interest rate. We have to minus the net interest expense from the net interest income to determine the NIM.

NIM was employed as performances measurement in Goldberg and Rai (1996), Hassan and Bashir (2003), Naceur (2003), Kosmidou et al. (2006), Heffernan and Fu (2008) studies. The high NIM indicates that the higher bank profitability performance provided the asset quality is maintained sound.

Bank-specific determinants

Capital: Equity to asset ratio (EA)

Capital adequacy of a bank is measured by Equity to Asset ratio (EA). Capital adequacy refers to the sufficiency amount of banks equity to absorb any shocks that the bank may experience. EA reflects the ability of the bank to withstand losses or financial risk.

A bank with a high EA has a strong ability to withstand the financial risk, lower the need to external funding, and subsequently result in higher profit. Besides, well-capitalized bank is able to gable more business opportunities. It is able and flexible in handling the risk and lowers the risk of going insolvent which will reduce the need of borrowing and subsequently increased bank profitability.

Demirguc-Kunt and Huizingha (1999) discovered that well-capitalized banks have a greater NIM and resulted in high profit. Berger (1995b), Mamatzakis and Remoundos (2003), Staikouras and Wood (2003) and Athanasoglou et al. (2008) found that the EA has a positive relationship with profitability. This indicates that the argument of well capitalized banks achieve in higher profitability is supported. Therefore, we expect that the relationship between EA and profitability is positive.

Asset quality: Loan loss reserves to gross loans (LLR)

Asset quality indicates the level of credit risk that a bank face as loan quality has historically been the area of vulnerability for many financial institutions and the biggest cause of bank failures. Bank asset quality is measured by Loan Loss Reserves to Gross Loans ratios (LLR).

LLR is the percentage of the total loan portfolio that has been set aside for bad loans. The higher LLR implied that the bank face a higher risk on its assets. If the asset quality is bad, it means the bank face higher default risk, the interest income will reduces while the provisions costs increase, subsequently lower the bank profitability.

However, as per the risk-return hypothesis, a high LLR indicated that risk has a positive correlated to profits given if the asset quality is good. This argument supported by Heffernan and Fu (2008) reported that LLR improve the bank profit as they discovered that LLR obtain a positive relationship with ROA and NIM, except for ROE.

Efficiency: Cost to income ratio (COSR)

Efficiency in the expenses management is measured by Cost to income ratio (COSR). COSR measures the operating costs banks (the expenses incurred in operating the banks).

Generally, the profits and expenses are negatively related as the higher expenses implied that lower profits, and vice versa. Efficient bank can operate in the lower COSR and achieve higher profit. However, this may not always be the case. Sometime the higher amounts of expenditures may be associated with higher volume of banking activities, which will lead to higher revenues.

Kosmidou et al. (2006) and Pasiouras and Kosmidou (2007) found that the COSR is significant negatively related to banks profitability. This is because the more expenses incurred will lower the bank profits. We prefer lower COSR as improve the bank profitability. Kosmidou et al. (2005) reported that expense management plays important roles in improving the bank profitability. The bank with poor expenses management will lower its profitability performance. So, COSR is expected to have an inverse relationship with profitability.

Liquidity: Liquid assets/deposit and short-term funding (LIQ)

The nature of the bank business is to turn the short-term deposits into long-term lending. So bank would be constantly face maturity mismatch problem. Therefore, bank is required to hold sufficient liquid assets that can be easily convert into cash to avoid insolvency problems.

Bank liquidity is represented by Liquid Assets to Deposit and Short-Term Funding ratio (LIQ). LIQ indicates the ability of bank to meet its current obligations. However, liquid assets are usually associated with lower rate of return. The higher LIQ indicates that the banks are more liquid; bank may lose profitable investment activities and may result in lower profitability. Therefore, we expect

that LIQ has an inverse impact on profitability.

The results from empirical studies are mixed. Heffernan and Fu (2008) found that that LIQ has a positive impact ROA and ROE, but it has inverse relationship with NIM.

Size

The size of banks (size) is one of important factor that influence profitability. Generally bank will large firm size is able to take greater loan and accessibility to markets which may not be available for smaller banks. The results from previous studies are mixed. European Commission (1997), Berger and Humphrey (1997) discovered that big bank achieve economies of scale. Spathis et al. (2002) studied on performance of small and large Greek banks over the period 1990-1999 and found large banks to be more efficient. Mamatzakis and Remoundos (2003) found that economies of scales significantly influence profitability.

On the other hand, Vander (1998) found evidence of economies of scale for small banks or diseconomies for larger banks. Kosmidou et al. (2006) found that bank size is negatively related to bank profits in the research of investigating the impact of bank-specific characteristics, macroeconomic conditions and financial market structure on UK owned commercial banks' profits.

As per the well-documented literature, we use banks' total assets as a proxy for its size to account for size-related economies or diseconomies of scale.

Macroeconomic variables

GDP growth

Gross domestic product (GDP) is the most commonly used macroeconomic indicators. It refers as the income generated by output and production on a country's economy during a period of time. To measure the macroeconomic condition, GDP growth is used as proxy measure for GDP.

The GDP growth is it defined as the annual change of the GDP. It reflects the state of the economic cycle. GDP growth is expected to have effect the supply and demand for loans and deposits. When economic booms, demand for credit or loan increased as well as the quality of asset. Bank can generate higher profit. As economic slows down, the GDP growth is slows down too. The lending tends to decrease. In addition, banks are associated with higher default risk and provisions cost tends to higher, hence reduce bank profitability. In short, GDP growth can be served as an indicator of the demand for banking services.

GDP growth is included as a variable that influence bank profitability (Kosmidou et al. 2006; Pasiouras and Kosmidou, 2007; Heffernan and Fu, 2008). Kosmidou (2006), Hassan and Bashir (2003) found that GDP growth has a positive impact on bank profitability. Thus, the GDP

growth is expected.

Inflation

Inflation is the rate at which the general level of prices for goods and services is rising in economy overtime. Inflation erodes the purchasing power of consumer because we buy fewer good and services with each unit of currency.

The relationship between bank profitability and inflation was introduced by Revell (1980). The effect of inflation on bank profitability depends on whether operation cost increase at a faster rate than inflation or vice versa. In the vein, Pasiouras and Kosmidou (2007) stated that inflation may have a positive or negative impact on banks profitability. The relationship is depending on whether the inflation rate is anticipated or unanticipated. If the inflation rate is anticipated, banks can adjust interest rates timely. As a result, the revenues increase faster than costs and consequently record a positive impact on profitability. On other hand, if inflation rate is unanticipated, banks cannot adjust the interest rates immediately and the cost will be higher than revenue. This will have a negative impact on profitability.

Generally, inflation is measured by calculating the inflation rate of a price index, consumer price index (CPI). CPI is calculated base on rate of change in prices of a fixed basket of goods and services that represent the expenditure pattern of all households in Malaysia. Department of Statistics Malaysia will published the inflation rate that is measured by CPI. Hence, the inflation rate is the percentage rate of change of a CPI over time.

CPI is an indicator for inflation. Mamatzakis and Remoundos (2003), Haron and Wan (2004), Kosmidou et al. (2006), and Athanasoglou et al. (2008) found that inflation has a positive impact on profitability.

Based on the literature review searched, the theoretical framework (Figure 1) hypotheses and regression model are thus developed.

Hypotheses

H_1: Bank profitability has a positive relationship with Equity to Asset ratio (EA).
H_2: Bank profitability has a positive relationship with Loan Loss Reserves to Gross Loans ratio (LLR).
H_3: Cost to Income ratio (COSR) has a negative relationship with bank profitability.
H_4: Liquid Assets to Deposit and Short-term Funding ratio (LIQ) has a negative relationship with bank profitability.
H_5: Bank profitability has a positive relationship with Bank Size.
H_6: Bank profitability has a positive relationship with GDP growth.
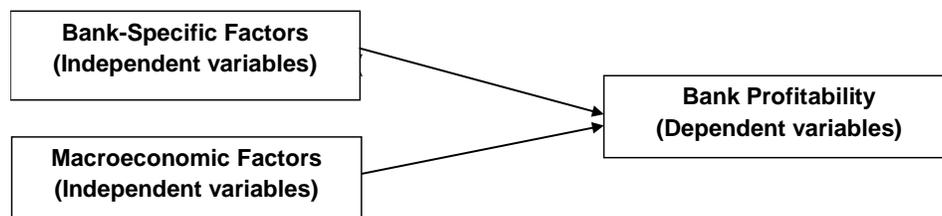H_7: Bank profitability has a positive relationship with inflation.

Figure 1. Theoretical framework.

Table 2. Malaysian Commercial Banks used as a sample.

S/N	Local Commercial Banks	S/N	Foreign Commercial Banks
1	Affin Bank Bhd	1	Bank of America (M) Bhd
2	Alliance Bank Malaysia Bhd	2	Bank of Nova Scotia Bhd
3	AmBank (M) Bhd	3	Bank of Tokyo-Mitsubishi UFJ (M) Bhd
4	CIMB Bank Bhd	4	Citibank Bhd
5	EON Bank Bhd	5	Deutsche Bank (M) Bhd
6	Hong Leong Bank Bhd	6	HSBC Bank Malaysia Bhd
7	Malayan Banking Bhd	7	J.P. Morgan Chase Bank Bhd
8	Public Bank Bhd	8	OCBC Bank (M) Bhd
9	RHB Bank Bhd	9	Standard Chartered Bank Malaysia Bhd
		10	The Royal Bank of Scotland Bhd
		11	United Overseas Bank (M) Bhd

Regression model

$$\text{Profitability} = X_0 + X_1(EA) + X_2(LLR) + X_3(COSR) + X_4(LIQ) + X_5(SIZE) + X_6(GDP) + X_7(CPI)$$

Where,

Dependent variable: Profitability = Return on asset (ROA), Return on equity (ROE) or Net interest margin (NIM)

Independent variables: EA = Total equity to total assets ratio; LLR = Loan loss reserves to gross loan ratio; COSR = Cost to income ratio; LIQ = Liquid assets to deposit and short-term funding ratio; SIZE = Bank's total assets; GDP = GDP growth rate; CPI = Consumer price index

Sample and data

This study employed a pooled time-series and cross-sectional data. Data was collected from the local and foreign commercial banks operating in the Malaysian banking sector for the calendar year 2003 to 2009. The sample was obtained from BANKSCOPE which information is provided and compiled by International Bank Credit Analysis Limited (IBCA). BANKSCOPE is a complete financial analysis tool, which combining information on 29199 banks around the world with a financial analysis software program. Data of seven years was selected because AmBank (M) Bhd was established in year 2002 as a result of merger and acquisition, thus, the data only available in year 2003. Data related to Malaysia variables was collected from the Department of Statistic Malaysia's Official Website and the World Economic Outlook database 2010. The Department of Statistic Malaysia is responsible to collect, interpret and disseminate latest and real time statistics in the monitoring of national economic performance and social development.

There are 23 local and foreign commercial banks that located Malaysia. However, a total of 20 commercial banks (9 local and 11 foreign (Table 2)) were used as a sample in this study. Bangkok Bank Bhd, Industrial and Commercial Bank of China (M) Bhd, and Bank of China (M) Bhd were excluded because the data is missing and not complete. A total of 140 observations were obtained for period 2003 to 2009.

RESULTS AND DISCUSSION

Descriptive statistics

Table 3 shows the descriptive statistics of this study. There are 140 observations collected from period 2003 to 2009.

Bank profitability performance (dependent variable) is measured by Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM). The mean for ROA, ROE and NIM are 1.1243, 13.5530 and 3.3256% respectively. The standard deviations for ROA, ROE and NIM are 0.5395, 8.3772 and 1.7765% correspondingly.

There are seven independent variables used in this paper. The mean and standard deviation of Equity to Total Assets ratio (EA) are 8.3361 and 4.1978%. EA is a

Table 3. Descriptive statistics.

Variable	Description	Observation	Mean	Std. deviation
Dependent				
ROA	Return-on- Asset	140	1.1243	0.5395
ROE	Return-on- Equity	140	13.5530	8.3772
NIM	Net-Interest- Margin	140	3.3256	1.7765
Independent				
EA	Equity/Total Assets	140	8.3361	4.1978
LLR	Loan Loss Reserves/Total Assets	140	4.6396	3.1702
COSR	Cost to income ratio	140	41.6153	10.6349
LIQ	Liquid Assets/Deposits & Short-term Funding	140	43.2714	33.5794
Size	Total Assets of Bank	140	4.3834	0.6177
GDP	GDP Growth Rate	140	4.7471	2.7215
CPI	Consumer Price Index	140	2.4543	1.5627

proxy measure for capital adequacy. In term of asset quality, LLR has a mean of 4.6396% with a standard deviation of 3.1702%. Cost to Income ratio (COSR) indicates the efficiency of expense management, which obtained a mean of 41.6153 and 10.6349% in standard deviation. For liquidity aspect, Liquid Assets to Deposits and Short-term Funding ratio (LIQ) has a mean 43.2714% and a high standard deviation of 33.579%. Total assets of bank is used to represent the size of the bank. Mean of the bank size is 4.3834%, whereas the standard deviation is 0.6177%. For macroeconomic variables, the mean of GDP and CPI are 4.7471 and 2.4543% respectively. The standard deviation of GDP and CPI are 2.7215 and 1.5627%.

Correlation between variables

The correlation between the variables that were used in this paper is shown in Appendix A: Correlation Matrix. ROA has positive significant relationship with ROE, NIM, EA, COSR, and LIQ. ROA, ROE and NIM are used as proxy measures for banks profitability. ROA has the highest strength of correlation with EA, and is supported by Mamatzakis and Remoundos (2003) which suggest that well capitalized banks achieve higher profitability. Besides that, ROA has a negative relationship with COSR. This is similar with the previous finding by Kosmidou et al. (2006) and Pasiouras et al. (2007). They found that the higher expenses incurred will result in lower profits and vice versa. Thus, the relationship between COSR and bank profitability performance is expected to be negative. ROA is positively correlated with LIQ and this suggests that liquid banks may result in higher profitability.

ROE has a negative correlation with EA, LLR, COSR, and LIQ. This suggests that ROE has inverse relationship with EA, LLR, COSR and LIQ. The relationship between

ROE and EA is supported by Mamatzakis and Remoundos (2003). At the same time, ROE is positively correlated with ROA and SIZE. The positive relationship between ROE and SIZE is backed by Berger and Humphrey (1997), who found that larger banks can achieve economies of scales and record higher profitability. Hence, the measure of profitability is determined when NIM is positively significant to ROA, EA, LLR, and LIQ. On the other hand, when NIM has inverse relationship with SIZE. Vander (1998) found evidence of economies of scale for small banks or diseconomies for larger banks. EA is positive correlated with ROA, NIM, LLR, and LIQ. It is negative correlated with ROE and SIZE. All the relationships are statistically significant at 0.01 level, which indicates that the strength of the relationships is very high. In term of LLR, it is positive correlated with NIM, EA, COSR, and LIQ. Meanwhile, it has an inverse relationship with ROE and SIZE. The relationship between LLR and NIM is positively correlated. Heffernan and Fu (2008) stated that loan loss provisioning actually improved performance. LLR is negative correlated with ROE. LLR is the percentage of the total loan portfolio that has been set aside for bad loans. If the quality of loan is poor, it lowers the profitability performance of bank. COSR is negatively correlated with ROA and ROE. The result is consistent with Kosmidou et al. (2006) and Pasiouras et al. (2007) which found that higher COSR will lower bank profitability. There is a positive association between COSR and LLR. This means that LLR tends to move in the same direction with COSR.

Next, LIQ is negatively significant to ROE and SIZE. LIQ has positive relationship to ROA, NIM, EA, and LLR. LIQ is positively correlated to ROA and NIM (profitability measures) as it is to be said LIQ has a positive impact on profitability. Bourke (1989) discovered that liquidity has a positive impact on profitability of bank in Europe, North America and Australia. SIZE is negative significantly

Table 4. ANOVA.

	Model	Sum of squares	Df.	Mean square	F.	Significant
ROA	Regression	14.131	7	2.019	10.124	0.000
	Residual	26.319	132	.199		
	Total	40.449	139			
ROE	Regression	2144.253	7	306.322	5.313	0.000
	Residual	7610.402	132	57.655		
	Total	9754.655	139			
NIM	Regression	139.965	7	19.995	8.836	0.000
	Residual	298.696	132	2.263		
	Total	438.661	139			

Table 5. Regression model summary.

Model	R	R-square	Adjusted R-square	Standard error of the estimate
ROA	0.591	0.349	0.315	0.44652
ROE	0.469	0.220	0.178	7.59306
NIM	0.565	0.319	0.283	1.50428

associated to NIM, EA, LLR, and LIQ. SIZE has a negative relationship with NIM (profitability measure), but, SIZE is positively correlated with another profitability measure, ROE. Hence, our results are same as previous studies whereby the empirical results are reported as mixed. Berger and Humphrey (1997) found that larger bank can achieve economies of scales and record higher profitability, meanwhile, Vander (1998) found evidence of economies of scale for small banks or diseconomies for larger banks.

For macroeconomic variables, GDP and CPI are the most generally used proxy measures. GDP is only statistically significantly to CPI. CPI gives the positive impact to GDP. The relationship between GDP and CPI is very strong. Besides, CPI, a proxy measure of inflation, is positively correlated with GDP, but it has negative effect on LLR as it is negatively correlated with LLR.

Regression results

Three proxy measures, namely return on assets (ROA), return on equity (ROE) and net interest margin (NIM) are used to measure profitability of banks.

Table 4 exhibits ANOVA test for all models. ROA has the highest F-value, 10.124, followed by NIM, 8.836 and ROE, 5.313. All three models have the significant value of F as 0.000 (0.000 is lesser than 0.05) which indicates that all models are good models to measure banks profitability.

Tables 5 and 6 exhibit the model summary for all

models. Among these three models, ROA model generates the highest R square, 0.349, which means that 34.9% of the variance in ROA are explained by seven independent variables considered in this paper and still leaves 65.1% unexplained. In other words, there are other additional variables that are important in explaining ROA that have not been considered in this paper. The R square for ROE and NIM model are 0.220 and 0.319 respectively. For NIM model, the independent variables explain 31.9% of NIM. ROE model generates the lowest R squares, whereby the sample only describes 22% of ROE and the remaining 78% unexplained.

From the analysis, it is concluded that ROA model is the most reliable model among the three profitability measures. ROA model provided the highest R square and it is better explained by bank-specific determinants and macroeconomic determinants that were employed in our analysis. According to Rivard and Thomas (1997), Golin (2001), they found that ROA is the best measurement of bank profitability as compared to ROE and NIM. ROA suggested that there are four variables that have significant relationship with bank profitability, namely EA, LLR, COSR and LIQ.

EA is found to be the most critical determinants in the ROA model. EA has a positive impact on Malaysian commercial bank profitability. Demirguc-Kunt and Huinzingua (1999), Pasiouras and Kosmidou (2007), Athanasoglou et al. (2008) have proven that EA is a critical determinant in bank profitability performance. Well-capitalized banks are able to withstand financial risk, lesser the risk of in-solvency, lesser the cost for external funding, and hence

Table 6. Summary of regression results for bank profitability.

Independent variable	Dependent variable								
	ROA			ROE			NIM		
	Coefficient	t-value	Significant	Coefficient	t-value	Significant	Coefficient	t-value	Significant
EA	0.043	3.983	0.000	-0.141	-0.767	0.444	-0.018	-0.501	0.617
LLR	-0.042	-2.628	0.010	-0.474	-1.731	0.086	0.134	2.474	0.015
COSR	-0.018	-4.462	0.000	-0.117	-1.692	0.093	-0.031	-2.271	0.025
LIQ	0.005	2.622	0.010	0.023	0.790	0.431	0.029	4.943	0.000
SIZE	0.129	1.377	0.171	4.915	3.075	0.003	0.479	1.512	0.133
GDP	0.009	0.553	0.581	0.146	0.555	0.580	0.020	0.376	0.708
CPI	0.003	0.120	0.905	0.295	0.647	0.519	0.078	0.859	0.392

achieve higher profitability performance. This increases the confident of depositors to continuously deposit money to bank. Another determinant of ROA model is LLR. LLR has an inverse relationship with ROA. The higher the LLR means that the bank has to set aside more reserves to cover the bad loans and lower the bank profitability. LLR has a negative impact on bank profitability. The impact of LLR on bank profitability is not clear-cut as NIM model found that LLR is positively correlated to NIM. Heffernan and Fu (2008) prove that loan loss provisioning actually improved performance, if the asset quality is sound.

COSR has a negative and highly significant relationship with ROA model. This suggested that COSR is an essential variable in ROA measure of bank profitability. Besides, COSR is also a determinant in NIM model. Bank with efficiency expense management has a low COSR, and will results in higher profitability. Kosmidou et al. (2006) found that COSR has a negative effect on UK banks. Hence, bank must manage its expenses efficiently.

Next, LIQ is the determinants in ROA and NIM profitability measure. This implied that LIQ improve

the profitability performance of banks. Banks with sufficient liquidity assets has lowered the risk to be insolvency as they can withstand with financial risk. They can lower the cost of borrowing from external and results in higher profit. Therefore, we should keep enough liquid assets. Bourke (1989) discovered that liquidity has a positive impact on profitability of bank in Europe, North America and Australia.

From ROE model, we are able to conclude that SIZE is the determinant of bank profitability. It affects the bank profitability positively and implied that big size banks are more profitable than smaller banks. Pasiouras and Kosmidou (2007) big bank can benefits from economies of scales and achieve higher profit.

Finally, macroeconomic variables, such as GDP growth and inflation do not affect the profitability performance. Our findings are different from previous studies who found that GDP growth and inflation do clearly affect the performance of the banking sector. Kosmidou et al. (2006) found that Inflation and GDP growth are profitability determinants for banks in UK. But, for Malaysian commercials banks, GDP growth and inflation are not determinants of profitability in any model

measure by ROA, ROE, and NIM. We believed that banks operating in different macroeconomic environments will be influence by different macroeconomic variables. Naceur (2003) who examined the Tunisian bank profitability performance during 1900 to 2000 had found that GDP growth rates and inflation have no impact on bank profitability performance.

This paper proposed that Malaysian commercial banks profitability is affected by bank-specific determinants while the macroeconomic determinants such as GDP growth and inflation are seem insignificant towards profitability performance.

Conclusion

This paper provides the discussion on the determinants of Malaysian commercial banks' profitability. It should interest many parties, such as the government, regulators, bankers, academician, and stakeholders. They can benefits from this study as it contributes more understanding on the determinants that affect the Malaysian commercial bank profitability performance. Today, banks in Malaysia control most of financial flows and it

holds almost 70% assets in the financial system (Bank Negara Malaysia, 2010). Thus, it is important for regulators to ensure that bank is in sound position and bank is making profit. So, the knowledge on determinants of bank profitability is useful for bank management in the process of making the policy, regulators and government to regulate policymaking and future research.

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APPENDIX

Appendix A. Correlation matrix.

		ROA	ROE	NIM	EA	LLR	COSR	LIQ	SIZE	GDP	CPI
ROA	Pearson Correlation	1									
	Sig. (2-tailed)										
	N	140									
ROE	Pearson Correlation	0.662(**)	1								
	Sig. (2-tailed)	0.000									
	N	140	140								
NIM	Pearson Correlation	0.243(**)	-0.124	1							
	Sig. (2-tailed)	0.004	0.146								
	N	140	140	140							
EA	Pearson Correlation	0.321(**)	-0.240(**)	0.221(**)	1						
	Sig. (2-tailed)	0.000	0.004	0.009							
	N	140	140	140	140						
LLR	Pearson Correlation	-0.155	-0.348(**)	0.320(**)	0.422(**)	1					
	Sig. (2-tailed)	0.068	0.000	0.000	0.000						
	N	140	140	140	140	140					
COSR	Pearson Correlation	-0.464(**)	-0.168(*)	-0.096	-0.110	0.332(**)	1				
	Sig. (2-tailed)	0.000	0.047	0.257	0.195	0.000					
	N	140	140	140	140	140	140				
LIQ	Pearson Correlation	0.206(*)	-0.271(**)	0.510(**)	0.386(**)	0.411(**)	-0.004	1			
	Sig. (2-tailed)	0.015	0.001	0.000	0.000	0.000	0.961				
	N	140	140	140	140	140	140	140			
SIZE	Pearson Correlation	-0.151	0.365(**)	-0.321(**)	-0.392(**)	-0.345(**)	0.119	-0.730(**)	1		
	Sig. (2-tailed)	0.074	0.000	0.000	0.000	0.000	0.161	0.000			
	N	140	140	140	140	140	140	140	140		
GDP	Pearson Correlation	0.004	0.012	0.081	-0.012	0.157	-0.041	-0.004	-0.086	1	
	Sig. (2-tailed)	0.962	0.891	0.344	0.891	0.064	0.628	0.966	0.310		
	N	140	140	140	140	140	140	140	140	140	

Appendix A. Continued.

CPI	Pearson Correlation	0.110	0.153	0.068	-0.067	-0.191(*)	-0.155	-0.010	0.062	0.311(**)	1
	Sig. (2-tailed)	0.197	0.071	0.423	0.434	0.023	0.068	0.905	0.469	0.000	
	N	140	140	140	140	140	140	140	140	140	140

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