

## **Are Bank Profits Determined by Bank-Specific Factors or Bank External Factors? Evidence from Malaysian Banks**

**Abdus Samad<sup>1</sup>, Ph.D.**

### **Abstract**

This paper first obtained the bank technical efficiency applying the stochastic frontier function and then applied the heteroscedasticity corrected Ordinary Least Square for determining the significant determinants of the commercial bank profitability of Malaysia during 2008-2011. The paper found that bank risk averse factor, bank efficiency, bank employee incentive factor, and bank diversification ability were positively related to bank profits and were significant factors for the profitability of the commercial banks of Malaysia whereas the bank nonperformance loan and the loan loss provisions were significantly negative factors for the determinant of bank profitability. Bank external factors such as market structure measured by HHI index, concentration ratio, and the macroeconomic variable were not significant determinants for the profitability of the commercial banks of Malaysia. The paper provides policy prescriptions for bank managements.

**Keywords:** Bank, profitability, liquidity and credit risk, Malaysia

**JEL Classification:** F21, G20, G21

### **Introduction**

Malaysian economy witnesses dual commercial banks. Interest free Islamic banks and the interest based conventional banks. Interest free Islamic banks operate side by side with interest based conventional banks. Malaysia was the first country in the South-East Asia that established a Shariah based Islamic banking. Bank Islam Malaysia Berhad was established in 1983. Malaysian commercial banking including Islamic constitutes is a dominant institution in the financial sector of Malaysia. The Banking institutions constitute about 50% of Malaysia's financial sectors. The growth of Islamic banking in Malaysia is phenomenal. According to Zawya (2016), the banking is expected to grow at an average of 18 percent and in the next five years the Islamic banking sector will be more than double to \$296.29 billion in 2019 compared to \$141.77 in 2013. The growth of interest based conventional banking is also large. There are about twenty seven banks including foreign banks serving the needs of the growing economy of Malaysia. Under the implementation of Malaysian Financial Sector Master Plan 2001-2010, there are significant changes in the Malaysian banking sectors. The financial sector of Malaysia is well diversified. Capital market and money market are complement to each other. The development of capital market complemented the growth of credit intermediation of commercial banks by channeling pension funds, mutual funds and insurance savings. Over the last decade (2000-2010), Malaysia witnessed a rapid growth of banking sector under the strong regulatory oversight of the government and with favorable economic conditions. Malaysian banking deposits and assets grew at an annual rate 12 percent with real GDP growth rate 5.4 percent. Banking lending to household sector increased significantly. Lending to the household sector (personal and credit card lending) accounts almost 55 percent of total bank lending. Before the Asian financial crisis, the banking sector was dominated by the presence of conventional banks. Only one Islamic bank—Bank Islam Malaysia Bhd—was operating. Malaysian has, now, become an international Islamic financial hub. There is not only a significant development of Islamic banking, there are also significant developments in Islamic fund management, takaful, Islamic equity and sukuk market.

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<sup>1</sup> Professor of Economics, Department of Finance and Economics, Utah Valley University, 800 W University PKY Orem, UT 84058, USA

After the Asian financial crisis in 1997-1999, Malaysian banking has undergone consolidation. Due to consolidation, the number of commercial banks was reduced. However, the consolidation of banking did not deter competition. According World Bank report (April 2014), the overall competition in the banking sector has increased. Unemployment rate remained 3.5 percent. This structural change—consolidation of banking institution—has impact on institutions' profitability. Under the strong regulatory requirement, the capital asset ratio of Malaysian banks has increased and is comparable with Basel III capital requirements as far as tier 1 capital ratio. The increase of tier 1 capital has significant impact of bank profitability. In view of Malaysian government regulations such as (i) increased lending (personal and credit card loans) to household sectors, (ii) strong regulatory increased capital requirements, and (iii) improved liquidity, identification of the significant factors, among bank internal and bank external, affecting the bank profitability of Malaysia deserves empirical examination for policy prescriptions as well as efficient bank management. The exploration of significant determinants of bank profitability is an important contribution of the banking literature of the commercial bank of Malaysia. Secondly, the paper provides policy prescriptions to bank management and regulators.

After the Asian financial crisis in 1997-1999, Malaysian banking has undergone consolidation. During 2008-2011 there was global financial crisis which had devastating impact on the financial institutions of the industrialized nations. The U.S. economy witnessed a large bank failure during the 2008-2010 recession. One hundred forty banks went bust in 2009 and 157 banks were wiped out in 2010 (Time, January 2012). So, the period (2008-2011) is important for the exploration of the determinant of profitability of Malaysian banking sector which witnessed the rapid economic growth and expanding government regulation in the commercial banking sector of Malaysia. The paper is organized as: Section 1 provided the introduction of paper. Section 2 provides the survey of literature. Model descriptions, methodology, and data are discussed in Section 3. Empirical results are discussed in Section 4. Conclusion and policy prescriptions are provided in Section 5

### Survey of Literature

The literature of bank profitability studies for the less developed countries is limited compared to that of the industrialized nations. The important studies for the industrialized nations were Williams (2003), Burke (1989), Hoggstad (1977), Koehn and Santomero. (1980), Short (1979), Smirlock, M. (1985), Molyneux and Thornton (1992), and Williams, Molyneux and Thornton (1994). Among them, Short (1979) and Burke (1989) were pioneers who examined first the determinants of bank profitability. Burke (1989) examines the internal and external determination of profitability for the banks of Australia, California, Massachusetts, New York, Canada, Ireland, England and Wales, Belgium, Holland, Denmark, Norway, and Spain. His results did not confirm Short's (1979) findings except in the most general sense. The results of his study are in agreement with concentration and bank profitability studies for the domestic US market, and provide support for the Edwards-Heggstad-Mingo hypothesis.

Smirlock (1985) examined the determinants of bank profitability and found that it was the bank efficiency factor, not the concentration factor, explained bank profitability. "there is no relationship between concentration and profitability, but rather market share and bank profitability" (Smirlock, 1985, p. 69). Williams, Molyneux, & Thornton, (1994) examined the profitability of Spanish banking market using structure conduct hypothesis (SCH). According to the SCP hypothesis, there is a positive correlation between market concentration and the firm's profits. Due to collusive or monopolistic reasons, "firms in a concentrated market will earn higher profits than firms operating in a less concentrated one, irrespective of efficiency" (Williams, Molyneux, & Thornton, 1994, p. 437).

They found evidences that market structure was a significant factor for banks' increased profitability. Molyneux and Thornton (1992) examined the European banking profitability. They found economic growth as "primary" indicator of bank profitability, along with interest rates and inflation. Economic growth increases bank profits through enhancing demand for household and business loans. Williams (2003) studied the profitability of Australian banking markets and found that profits were "a negative function of competitor market share and bank license status, and a positive function of Australian size and home GDP growth". There are studies of bank profitability determinants for the less developed countries. Abdulla and Idrees (2013) examined the determinant of bank profitability. Their study was confined only to the profitability determinants of Malaysian ten Islamic banks. However, they found that bank size, market concentration, and macro variable were significant factors. Muda, Shaharuddin and Embaya (2013) examined the bank profitability determinants. Their study was confined only to Malaysian Islamic banks not all banks including conventional banks.

The empirical results of their study found that overhead expenses ratio, loans ratio, deposits ratio, technical efficiency and bank size were a positive significant factor in determining banks' profitability. Wasiuzzaman and Tarmizi (2010) examined the impact of bank specific characteristics as well as macroeconomic determinants of profitability. Their study was limited to the study of Malaysian Islamic banks only. They found that bank liquidity was a significant positive factor for banks' profitability. Srairi (2009) explored the impact of bank characteristics, macroeconomic indicators and financial structure on the profitability of Islamic and conventional banks of the Gulf Cooperation Council (GCC) countries. His study found that money supply growth had a significant positive factor for the profitability of Islamic bank as well as conventional commercial banks.

Haron (2004) study found a positive but insignificant relationship between the growth of money supply and profitability of Islamic banks. Khrawish, Walid, and Ali. (2011) studied the determinants of bank profitability of Jordanian banks. However, their study focused only to the study of Islamic banks. They found that a significant negative relationship between banks' profitability and the bank size, total liabilities, GDP growth rate and Inflation rate. Smaoui and Salah (2011) data examined the determinants of bank profitability of 44 banks Islamic banks of the Gulf Cooperation Council (GCC) countries during the period of 1995-2009 found that capital was positively related to the profitability of Islamic Banks, but the impact of liquidity on bank profitability were insignificant factors. Their results also found that "overhead and efficiency are negatively and significantly related to profitability, whereas the results of GDP growth, inflation and size are found positively and significantly related to bank profitability" (p.122).

Sufiyan and Habibullah (2009) examined the determinants of the profitability of the Chinese banking sector during the post-reform period of 2000–2005 and found that liquidity, credit risk, and capitalization had positive impacts on the state owned commercial banks' (SOCBs) profitability, while the impact of cost was negative on profitability. Vejzagic and Zarafat (2014) examined the determinants of commercial banks' profitability of Malaysia. The results of their study found that real GDP were significant and had positive relationship with banks' profitability. Samad (2008) examined two competing hypothesis—structure-conduct-performance (SCP) and efficiency hypothesis (EH)—in Bangladesh banking market and found validity for EH for bank profitability.

Samad (2015) studied the determinants of Bangladesh bank profitability. Results indicated that bank specific and internal factors such as loan-deposit ratio, loan-loss provision to total assets, equity capital to total assets, and operating expenses to total assets were significant factors. Bank sizes and macroeconomic variable showed no impact on profits. The short survey of bank determinant literature reveals three most important features. First, almost all Malaysian banking studies focused on Islamic banks, excepting Vejzagic and Zarafat (2014). However, their study concentrated only on six commercial banks and they used only macroeconomic variables. They did not use bank specific factors. Second, the studies of the determinants of bank profitability other countries such as GCC and Jordan also focused on the determinants of Islamic banks. This paper is different from other studies mentioned in the literature. First, the study focuses on the profitability determinants of twenty four commercial banks, both conventional and Islamic, over 2009-2011. While the previous studies such as Abdulla and Idrees (2013), and Muda, Shaharuddin and Embaya (2013) focused only the Islamic banks of Malaysia, Wasiuzzaman and Tarmizi (2010) concentrated only on the macroeconomic variables, this study combines both Islamic banks and conventional banks. Second, this study focuses on the bank specific factors as well as bank external factors.

### Data and Methodology

Data of the twenty four banks were obtained from the annual report of each bank's Website during 2008-2011. Data for bank profits, cash, equity capital, total assets, nonperformance loan, loan loss provisions, and employee salaries were annual. Data for the GDP of Malaysia is obtained from the International Financial Statistics, International Monetary Fund. Ratios representing bank internal factors and bank market structure i.e. Herfindahl-Hirschman index were calculated by the author. This paper employs the time varying decay model of stochastic frontier production function for the measuring technical efficiencies (TE) of banks. The frontier production function  $F(X)$  is defined as the maximum feasible output that can be produced by a banking firm with a given level of technology and input. The actual production function of a bank can be written as:

$$Q_{it} = f(X_{it}, \beta) \exp(-\alpha_{it}); \quad 0 \leq \alpha_{it} \leq \infty; \\ i = 1, 2, \dots, n, \quad t = 1, 2, \dots, T \quad (1)$$

Where  $Q_{it}$  = actual output of sample bank  $i$  in period  $t$ ;  $X_{it}$  is a vector of inputs used by bank, and  $\beta$  is a vector of parameters,  $U_{it}$  is one sided (non-negative) residual. If the performance of a bank is inefficient, its actual output is less than its potential output. (In other words, if a bank is efficient, its output is equal to its potential output). Therefore, TE is the ratio of the actual output  $Q_{it}$  to potential output of a bank in period  $t$  as:

$$TE_{it} = \frac{Q_{it}}{\exp(x_{it}B)} = \frac{\exp(x_{it}B - u_{it})}{\exp(x_{it}B)} = \exp(-u_{it}). \quad (2)$$

When the residual term ( $u_{it}$ ) is zero, the bank produces the potential output and the bank is fully TE. When ( $u_{it}$ )  $>0$ , the bank produces less than its potential output. If the bank is less than full TE, it operates below the production frontier. Thus,  $u_{it}$  is a bank's TE and it is inversely (negatively) related. TEFF is the distribution of bank technical efficiencies presented in Table1 with mean efficiency 52 percent ranging between 2 percent and 99 percent. After obtaining the bank technical efficiency (TEFF), the paper then applied the Ordinary least square (OLS) method for estimating the impact of bank-specific characteristics and macroeconomic variables on bank profitability. The paper estimates the following linear OLS model in the form:

$$\pi_{it} = \beta_0 + \beta_j X_{jt} + \epsilon_{jt} \quad (3)$$

Where  $\pi$  = profit (ROA),  $j$  refers to individual bank,  $t$  refers to year,  $X_j$  = set of independent bank-specific and bank external macroeconomic variables, and  $\beta_j$  = set of unknown parameters to be estimated.  $\epsilon_{jt}$  is the random error term and is assumed to be normally distributed i.e. it is assumed that  $\epsilon \sim \text{iid as } N(0, \sigma^2)$ .

The problem of **heteroscedasticity** is more common with the cross-sectional data than with the time series data. In a cross-sectional data the member of a population at a given point of time, such as the number of firms, consumers, and their sizes are not the same. In this study, the bank sizes are different. Some banks are small, some banks are medium, and some banks are large. Hence, heteroscedasticity is likely to be common. This study utilizes White's heteroscedasticity corrected regression method to overcome the problem of heteroscedasticity. The reported results of regression are heteroscedasticity corrected. **Multicollinearity** among the independent variables is another problem. As the result of correlation between nonperformance loan to total assets (NPLTA) and loan loss provision to total asset (LLPTA) are 0.92 and significant, they are not used in the same estimating equation for avoiding multicollinearity. The paper estimated three basic models: (I) Bank specific profit determinant models (II) Bank external factor profit determinant model, and (III) combination of bank specific and bank external factor determinant model.

#### (I) Bank Specific Profit Determinant Model:

Model 1:  $\pi_{it} = \alpha_0 + \alpha_1 EQTA_{it} + \alpha_2 NPLTA_{it} + \alpha_3 CASTA_{it} + \alpha_4 BKSIZ_{it} + \alpha_5 WAGTA_{it} + \alpha_6 TEFF_{it} + \epsilon_{it}$

Model 2:  $\pi_{it} = \alpha_0 + \alpha_1 EQTA_{it} + \alpha_2 LLPTA_{it} + \alpha_3 CASTA_{it} + \alpha_4 BKSIZ_{it} + \alpha_5 WAGTA_{it} + \alpha_6 TEFF_{it} + \epsilon_{it}$

#### (II). Bank External Factor Profit Determinant Model:

Model 3:  $\pi_{it} = \gamma_0 + \gamma_1 HHI_{it} + \gamma_2 CR_{it} + \gamma_3 GDP_{it} + \epsilon_{it}$

Model 4:  $\pi_{it} = \gamma_0 + \gamma_1 HHI_{it} + \gamma_3 GDP_{it} + \epsilon_{it}$

Model 5:  $\pi_{it} = \gamma_0 + \gamma_2 CR_{it} + \gamma_3 GDP_{it} + \epsilon_{it}$

#### (III). Combination of Bank Internal and Bank External Factor Profit Determinant Model:

Model 6:  $\pi_{it} = \beta_0 + \beta_1 EQTA_{it} + \beta_2 NPLTA_{it} + \beta_3 CASTA_{it} + \beta_4 BKSIZ_{it} + \beta_5 TEFF_{it} + \beta_6 HHI_{it} + \beta_7 GDP_{it} + \epsilon_{it}$

Model 7:  $\pi_{it} = \beta_0 + \beta_1 EQTA_{it} + \beta_2 LLPTA_{it} + \beta_3 CASTA_{it} + \beta_4 BKSIZ_{it} + \beta_5 TEFF_{it} + \beta_6 HHI_{it} + \beta_7 GDP_{it} + \epsilon_{it}$

All models are estimated using the pooled data of twenty four banks for the year 2008-2011.

#### Variables of the Models are:

$\pi_{it}$  = Represents each bank's profitability index at time  $t$ . It is measured by net profits as the percentage of total assets (ROA). The ROA is a dependent variable as the profits of banks are assumed to be impacted by bank internal factors and bank external factors. Bank internal factors are within the control of bank management. They are also called bank specific factors. They are classified into: (i) Bank risk aversion factor (ii) Bank credit risk factor (iii) Bank liquidity factor, (iv) bank' economies of scale. Bank external factors are factors which are beyond the control of bank management. They are (i) economic condition of the economy (ii) Bank market structures.

**Risk Aversion:** EQTA = bank equity capital as a percentage of total assets. It represents bank' risk aversion. The conventional risk-return hypothesis suggests negative relation between bank capital and bank profits. That is, the higher the amount of equity capital to total assets, the higher the risk aversion of a bank. The higher risk aversion implies low leverage and thus, low profits. Koehn and Santomero (1980) argued that the regulatory requirement of high capital-asset ratio, reducing bank's power of shock absorption, may provide incentive to invest in high profitable and risky financing and, thus, increase bank's profitability. It is, thus, expected that,  $\frac{\partial \pi}{\partial EQTA} > 0$

**Credit Risk are measured** by Nonperformance loan (NPLTA) and Loan loss provisions (LLP).

NPL is estimated by the amount of bank's nonperformance loan as the percentage of total assets. It is expected that the higher the amount of bank's nonperformance loans to total assets, the higher the income losses and the lower the profits. Thus,  $\frac{\partial \pi}{\partial NPLTA} < 0$

Another measure of credit risk is the loan loss provision (LLPTA). LLPTA is measured by loan loss provision as the percentage of total assets. It is expected that the higher the amount of bank's loan loss provision to total assets, the lower the profits of bank. Thus,  $\frac{\partial \pi}{\partial LLPTA} < 0$

**Liquidity Risk** is measured bank's liquidity index. It is measured by the amount of cash holding as the percentage of total assets (CASTA). Banks hold cash reserve to protect themselves from liquidity shortage. The shortage of liquidity may lead to bank runs and bank insolvency. However, banks' cash holding has opportunity cost. When a bank holds more cash, it minimizes the loan financing opportunity and bank's profitability. Bank's liquidity profitability is a tug of war. It is expected that the higher the amount of cash holding by banks to total assets, the higher the income losses and the lower the profits. Thus,  $\frac{\partial \pi}{\partial CASTA} < 0$

**Economies of Scale/diversification** is measured by bank size (BKSIZ). Total assets represents bank's diversification capability and the ability to economies the scale in loan financing and asset management. Bank assets are measured in natural log. It is expected that the higher the amount of total assets, the higher the capability of a bank for the diversification of its assets/the economies of scale and, thus, the higher the prospect of profitability. Thus,  $\frac{\partial \pi}{\partial BKSIZ} > 0$

**Employee efficiency/Incentive (WAGTA)** is measured by employee compensation as a percentage of total assets. The impact of WAGTA indicator may be interpreted in two ways. It may represent higher incentive to bank employees. The higher employee incentive may lead to the increased production of deposits and assets leading to higher bank profits. In this case, the higher the WAGTA, the higher the productivity and the higher bank profits. It is, thus, expected  $\frac{\partial \pi}{\partial WAGTA} > 0$ . On the other hand, it may represent cost inefficiency. The higher cost per dollar asset may indicate banks' inefficient management of asset portfolios. It is, thus, expected that  $\frac{\partial \pi}{\partial WAGTA} < 0$ .

**Technical Efficiencies/Inefficiencies (TEFF)** is the technical Efficiency of a bank. The TE is obtained applying the stochastic frontier function. The efficiency ranges from zero to one. One means that a bank is 100 percent efficient. The ratio measures how effectively a bank is operating compared to peer bank. The efficiency ratio of one is one of the important factors in explaining differences in profitability across the banks. The technical efficiency of each bank's loan production is estimated by stochastic frontier function. It is used to measure the efficiency of bank. It is denoted by TEFF. It is expected that the higher the technical efficiency, the higher the bank profits.  $\frac{\partial \pi}{\partial TEFF} > 0$ . Bank's profitability is subject to external factors. The economic condition of the country in which banks operate is an important factor for bank profitability. Banks' ability to deposit mobilizations and loan financing depend on the country's economic conditions. Bank's profitability is a procyclical variable. During the down turn of business cycle, banks profitability decline and vice versa. The economic condition is measured by GDP. This paper uses TAGDP as total bank assets as a percentage of the GDP of Malaysia. It represents the external index of bank. As the GDP of an economy grows, it increases the loan financing of banks leading to the increased assets of banks. In this scenario, it is expected that the higher the TAGDP, the higher the profits.

On the other hand, if the increased assets of bank following increased loan financings are diverted to increased cashing holdings out of the fear of depositors' withdrawal of deposits, the relation between asset-GDP (TAGDP) and profits is expected to be negative. Thus,  $\frac{\partial \pi}{\partial TAGDP} > 0$  or  $\frac{\partial \pi}{\partial TAGDP} < 0$ . Market structure is another external factor affecting the profitability of a bank. A bank with a large market share enjoys advantage over other banks which normally affect a bank's profits positively. The market structure, level of competition, is measured by the Herfindahl-Hirschman Index (HHI) or concentration ratio (CR). The low HHI indicates competitive market and a banking firm is expected to earn less profits compared to a monopoly market where the HHI is 10,000. Herfindahl-Hirschman Index in banks' deposit market is considered in this paper. It is expected that a higher market share in the deposit markets may lead to higher the profitability because the higher market share in the deposit helps banks in making more loan financings. Thus,  $\frac{\partial \pi}{\partial HHI} > 0$ . The summary of the descriptive statistics of variables used in the paper is provided in Table 1.

**Table 1: Descriptive Statistics of Bank Specific and Market Structure Variables**

	ROA	CASTA	EQTA	NPLTA	LLPTA	BKSIZ	WAGTA	TEFF	HHI	CR
Mean	0.105	3.22	1.02	0.08	0.21	16.36	0.09	0.52	0.005	0.04
Median	0.007	0.21	0.08	0.008	0.01	16.28	0.006	0.53	0.005	0.02
Maximum	9.00	271.94	83.13	5.99	18.19	18.60	7.56	0.99	0.07	0.26
Minimum	-0.05	0.02	0.02	0.00	0.00	10.58	0.00	0.02	0.00	0.00
S.D.	0.93	28.32	8.65	0.62	1.89	1.24	0.78	0.24	0.01	0.05
Skewness	9.43	9.43	9.43	9.35	9.43	-1.00	9.43	-0.27	3.89	1.78
Curtosis	89.98	89.99	89.97	80.00	89.99	61.09	89.97	2.51	20.34	6.10
Jerque-Bera	30366	30373	30359	29693	30377	61.45	30359	1.96	1371	83
Prob	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00
Obs	92	92	92	92	92	92	92	87	91	89

In Table 1, various statistics of all variables are provided for basic information necessary for readers. The low probability of all variables associated with the statistics of Jerque-Bera suggests that variables are not normally distributed.

### Empirical Results

The empirical result of the bank internal/specific factor model affecting bank profitability is presented in Table 2 and Table 3. Please note that all results of the regression used in this paper are White's heteroscedasticity corrected.

**Table 2: Result of Regression for Model 1 and Model 2**

Model 1									
$\pi_{it}$	$\alpha_0$	EQTA	NPLTA	CASTA	WAGTA	TEFF	BKSIZ	R <sup>2</sup>	F-stat
	-003.89 (-4.1E-8)	0.091 (2.56)*	-1.21 (-8.66)*	-0.001 (0.08)	1.32 (1.93)***	0.03 (3.02)*	0.01 (3.80)*	0.94	29.33 (0.00)
Model 2									
$\pi_{it}$	$\alpha_0$	EQTA	LLPTA	CASTA	WAGTA	TEFF	BKSIZ	R <sup>2</sup>	F-stat
	-006.3	0.27 (3.54)*	-0.84 (-8.44)*	-0.63 (-2.69)**	0.29 (0.47)	.02 (2.62)**	0.007 (3.32)**	0.94	30.88 (0.00)

Table 2 shows the results of bank internal factor determinants for model 1 and model 2. The results of show that the signs of the coefficient of all bank internal factors such as EQTA, LLPTA, NPLTA, CASTA, BKSIZ, WAGTA, and TEFF are consistent as outlined in section 3.4, and they are statistically significant. The coefficient of bank risk aversion indicator (EQTA) is positive and significant at 1 percent level of significance. The higher capital-asset ratio indicates bank's low leverage and hence low risk. The low risk is expected to be associated with low profitability. The statistical significance suggests that it is an important factor for the profitability of Malaysian banking industry. Malaysian banks are risk averse. Bank management is careful and cherry picking investment financings. The coefficient of credit risk, measured by nonperformance loan to total assets (NPLTA), is negative and significant at 1 percent level of significance. As the credit risk of banks increased, the profits of the commercial banks decreased during 2008-2011. The increase of nonperformance loans adversely affected the bank profitability of Malaysia.

The sign of the alternative credit risk indicator measured by the loan loss provision to total assets (LLPTA), in model 2, is also negative and also a significant at 1 percent level of significance. When a bank balance sheet exhibits a large amount of expected loan loss provision, it reduces banks' profitability significantly in Malaysia. The sign of bank technical efficiency (TEFF) is positive and significant in both model 1 and model 2. This is consistent with the expectation that a technically efficient banks significantly reduces misallocation and underutilization of resources which enhanced bank profitability in Malaysia. Model 2 shows that the coefficient of bank liquidity (CASTA) is negative and significant. A higher amount of cash holding i.e. liquidity reduced banks' loan financing which decreased the profitability of Malaysian banks during 2008-2011. The result supports the traditional view of 'tag of war' that exists between profitability and liquidity. The sign of bank size (BKSIZE) is positive and significant all models. As the bank sizes increased, banks were able to make more diversification of asset portfolio which significantly increased the profitability of Malaysian commercial banks. The significance of this variable indicates that large banks can diversify their asset portfolios and hence generate higher profits. This result supports the findings of Hoggstad (1977) and Smirlock (1985). Bank employee incentive denoted by WAGTA is a positive factor in all models under study in Model 1. Banks' cost of production increase with wage increase. When banks' profitability increased with the increase of employee wages, it indicates that bank productivity increased more than the increase in cost and as a result bank profit increased. The higher employee incentive significantly contributed the banks' profitability in Malaysia. The  $R^2 = 0.94$  of model 1 and model 2, in Table 2, suggested that the bank internal factors explained 94 percent of the bank profitability of the Malaysian commercial banks during 2008-2011.

**Table 3: Result of Regression for Model 3, Model 4, and Model 5**

Model 3						
$\pi_{it}$	$\alpha_0$	HHI	CR	TAGDP	R <sup>2</sup>	F-stat
	-3.03 (-2.8E-9)	13.16 (0.66)	0.99 (0.49)	0.00 (0.11)	0.10	0.29 (0.000)
Model 4						
$\pi_{it}$	$\alpha_0$	HHI		TAGDP	R <sup>2</sup>	F-stat
	-003.8 (-003.8)	2.53 (0.27)		90.8* (0.00)	0.001	0.04 (0.00)
Model 5						
$\pi_{it}$	$\alpha_0$		CR	TAGDP	R <sup>2</sup>	F-stat
	1.9E-12 (1.8E-8)		1-.37 (0.70)	002.9* (0.03)	0.006	0.25 (0.000)

The results of bank external factor model, presented in model 3, model 4, and model 5, in Table 3, showed that among the bank external variables such as bank's total asset as a percentage of GDP (TAGDP) is significant and it positively affected the profitability of the commercial banks of Malaysia. . On the other hand, market structure measured by HHI and CR were insignificant although the sign of these coefficients was correct and consistent as outlined in the model. The insignificance of the coefficient of these variables suggested that bank market structures were not significant factors for the bank profitability of the Malaysian commercial banks during 2008-2011. The empirical result of the combined model i.e. the bank internal factor and the bank external factor model affecting bank profitability is presented in Table 4.

**Table 4: Regression Result of Model 6, Model 7**

Model 6 Dependent Variable= $\Pi$		Model 6 Dependent Variable= $\Pi$	
Variable	Coefficient	Variable	Coefficient
CASTA	-0.004 (-1.03)	CASTA	0.02 (7.36)*
EQTA	0.08 (3.37)*	EQTA	0.06 (2.87)*
NPLTA	-0.28 (-5.57)*		
LLPTA		LLPTA	-0.39 (-5.11)*



WAGTA	0.73 (2.70)*	WAGTA	0.45 (1.68)***
TEFF	0.003 (0.30)	TEFF	0.007 (1.38)
BKSIZ	0.003 (2.07)**	BKSIZ	0.006 (3.68)*
CR	0.014 (0.64)	CR	-0.02 (-0.81)
HHI	0.16 (0.54)	HHI	-0.22 (-0.66)
TAGDP	0.00* (0.00)	GDP	0.00 (0.00)
R <sup>2</sup>	0.99	R <sup>2</sup>	0.99
F-statistics	102883.3	F-statistics	95077
Prob(F-statistic)	0.00	Prob(F-statistic)	0.00
Durbin-Watson	1.93	Durbin-Watson	1.4

\* = Significant at 1 percent level, \*\* = Significance at 5 percent level, and \*\*\* = Significant at 10 percent level.

The combined results of bank internal and external factor on bank profitability, presented in Table 4, basically confirm the findings of bank internal factor models. The results shows that bank risk aversion (EQTA), bank efficiency (TEFF), bank employee incentive (WAGTA), and bank size were positively related to bank profits. The coefficients of these factors were positive and significant. On the other hand, bank nonperformance loan (NPLTA) and bank loan loss provision (LLPTA) were negatively related to bank profitability. The coefficients of NPLTA and LLPTA were negative and significant. Among the variables of external factor, the macroeconomic variable (GDPTA) is a significant determinant. GDPTA positively affect the bank profitability. Although the signs of the coefficients of bank external factors such as market structure measured by HHI index (HHI) or concentration ratio (CR) were correct but were not significant factors suggesting that the bank market structures were not significant determinants for the profitability of the Malaysian commercial banks during 2008-2011. Results of the models that combined both the bank internal factor determinant and the external factor determinant presented in Table 6 and 7 confirmed the basic results of bank internal factor models (Model 1 and Model 2) with the main difference that the R<sup>2</sup>= 0.99 i.e. the variables of the models explain 99 percent of the profitability of Malaysian commercial banks. The high R<sup>2</sup>= 0.99 of the models may initially be suspected for collinearity but the suspicion is ruled out to be invalid when we looked at the Durbin-Watson statistics. The Durbin-Watson statistics for both models, model 6 and model 7, were 1.93 and 1.4 respectively. As the Durbin-Watson statistics are less than 2.0, it safely rules out the suspicion of multicollinearity among variables.

## Conclusions

This paper examined the profitability determinants of the commercial banks of Malaysia during 2008-2011. Bank profitability determinants were classified into bank internal factors and bank external factors. Bank internal factors are those factors which are within the control of bank management. These factors were risk aversion factor measured by leverage ratio (EQTA), credit risk factors measured by nonperformance loan (NPLTA) and loan loss provision (LLPTA), employee incentive factor (WAGTA), liquidity risk (CASTA), and bank size (BKSIZ). Bank external factors were those factors which were beyond the control of bank management. The factors considered in this paper were the bank market structure. I is measured by the concentration ratio (CR) and the Herfindalh-Hirschman index (HHI). The third external factor is the total assets as percentage of GDP (GDPTA) As heteroscedasticity is common with the cross-sectional data, this paper employed heteroscedasticity corrected Ordinary Least Square method in determining the significant factors affecting the profitability of the commercial bank of Malaysia. The results of the bank internal factor models (Model 1 and Model 2) found that the bank risk averse factor (EQTA), bank efficiency factor (TEFF), bank employee incentive factor (WAGTA), and bank diversification ability factor (BKSIZ) were positively related to bank profitability and were significant factors for the profitability of the commercial banks of Malaysia. The result also found that the bank internal factors such as the nonperformance loan (NPLTA) and the loan loss provisions (LLPTA) were negatively related to bank profits and were significant factors for the profitability of the commercial banks of Malaysia.



The results of bank external model factors revealed that the bank external factors such as concentration ratio (CR) and the Herfindalh-Hirschman index (HHI) were not significant factors for the profitability of the commercial banks of Malaysia during 2008-2011 although the signs of the coefficient were consistent as per the expectation of the model. Among the variables of external factor, the macroeconomic variable (GDPTA) is a significant determinant. GDPTA positively affect the bank profitability. Results of the combined models i.e. combining the bank internal factor determinant and the external factor determinant presented in Table 4 basically confirmed the findings of bank internal factor models i.e. bank risk aversion (EQTA), bank efficiency (TEFF), bank employee incentive (WAGTA), and bank size were positively related to bank profits and were significant. On the other hand, bank nonperformance loan (NPLTA) and bank loan loss provision (LLPTA) were negatively related to bank profitability. The coefficients of NPLTA and LLPTA were negative and significant. Although the signs of the coefficients of bank external factors such as market structure measured by HHI index (HHI) or concentration ratio (CR), and the macroeconomic variable (GDPTA) were correct but were not significant suggesting that the bank external factors were not significant determinants for the profitability of the Malaysian commercial banks during 2008-2011.

### Policy Prescription

As the profitability of the commercial banks of Malaysia were negatively and significantly impacted by the bank credit risk (EQTA), nonperformance loan (NPLTA) and loan loss provision (LLPTA), the paper suggests policy prescription for bank management that the bank management should undertake an extra precaution in loan financing application because of adverse selection and moral hazard, a common problem associated with loan financing. The problem of moral hazard and adverse selection can significantly be minimized if the bank management were taking extra time and cautious in loan financing. The prudent behavior of bank management may significantly avoid and minimize nonperformance loan (NPLTA) and increase bank profitability in Malaysia. The paper has some limitations. First, the paper omitted important external variables such interest rate, inflation rate, and the impact of government regulation in the model. The future study should incorporate these variables for finding a robust conclusions. Second, this paper did not examined other indexes of bank inter factor such as deposit to loan as liquidity risk.

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## Appendix

Table 1

	ROA	CASTA	EQTA	NPLTA	LLPTA	BKSIZ	WAGTA	TEFF	HHI	CR
Mean	0.105	3.22	1.02	0.08	0.21	16.36	0.09	0.52	0.005	0.04
Median	0.007	0.21	0.08	0.008	0.01	16.28	0.006	0.53	0.005	0.02
Maximum	9.00	271.94	83.13	5.99	18.19	18.60	7.56	0.99	0.07	0.26
Minimum	-0.05	0.02	0.02	0.0000	0.0000	10.58	0.000	0.02	0.000	0.000
S.D.	0.93	28.32	8.65	0.62	1.89	1.24	0.78	0.24	0.01	0.05
Skewness	9.43	9.43	9.43	9.35	9.43	-1.00	9.43	-0.27	3.89	1.78
Curtosis	89.98	89.99	89.97	80.00	89.99	61.09	89.97	2.51	20.34	6.10
Jerque-Bera	30366	30373	30359	29693	30377	61.45	30359	1.96	1371	83
Prob	0.000	0.000	0.000	0.000	0.0000	0.000	0.000	0.37	0.000	0.00
Obs	92	92	92	92	92	92	92	87	91	89

BKSIZ is measured by log total assets.