# Determinants of loan loss provisions of commercial banks in Malaysia

**Abstract**

**Purpose** - This paper derives determinants of loan loss provisions of commercial banks in Malaysia.

**Design/methodology/approach** - A single stage panel data analysis multiple regression model that contains a mixture of quantitative and qualitative elements is employed. The loan loss provisions is a dependent variable or regressand; and the independent variables or regressor/explanatory variables are non-performing loan (NPL), interest income, net profit, loans & advances; and the Gross Domestic Product (GDP). The moderating variable is "credit risk management" and the intervening variable is "relevance and faithful representation".

**Findings -** This paper suggests in loan loss provisions; non-performing loans, interest income, loans & advances, net profit, and the Gross Domestic Product, as well as moderating effect of credit risk management and the intervening effect of relevance and faithful representation are determinants of the loan loss provisions. The moderating variable "credit risk management" strengthens the relationship between the independent variables and the dependent variable. The intervening variable "relevance and faithful representation" brings about a more accurate reporting on the levels of the loan loss provisions.

**Research limitations/implications -** The association of the factors is investigated further to detect possible effect of multicollinearity and more research to better understand how banks manage their risk as the current investigation is limited to banks in Malaysia.

**Practical implications -** Loan loss provisioning issues of commercial banks in Malaysia are challenges for both regulators and the banking industry due to the implementation of several new measures, the convergence with internationally accepted accounting standards, differences in loan grading and applications of different loan loss provisioning standards. Because of these challenges, Bank Negara Malaysia, (the Central Bank of Malaysia) has tightened its supervision of commercial banks to ensure that banks are sufficiently and adequately provisioned. The banking sector plays a significant role and it is important that it is resilient in the face of potential sources of systemic risk. And, like in other major Asean economies, the Malaysian's financial system remains largely bank-dominated.

**Originality/value** – This study discovers whether Malaysian banks are sufficiently provisioned for the regional financial integration under the Asean Capital Markets Forum (ACMF) by the end of 2015, where several initiates have been initiated, including the harmonization of standards to encourage greater intra-regional investment flows and transactions, and continued provisions of the much needed funds by the region's private sectors.

**Keywords** Commercial banks, Loan loss provisions, Credit risk management

**Paper type** Research paper



## 1. Introduction

The problem in existing loan loss provisioning practice is because of the incurred loss model. It requires a loss event to occur before a provision can be made, thus it causes a delay in recognizing losses expected to occur. The recent crisis have highlighted that the incurred loss model currently in practice does not accurately reflect credit losses that are expected to occur. This has distorted accurate reporting of financial statements. The collectability of the defaulted loans is not reflected by the reported levels of loan loss provisions. Further, this exacerbates the impact of the economic downturn on bank's income and capital.

When banks do not capture their loss expectations and do not continuously reassess their loss expectations when the conditions affecting their borrowers have changed; henceforth, in their financial reporting, banks do not faithfully present their relevant and true underlying credit risk conditions. When banks do not faithfully present their relevant and true underlying credit risk conditions, investors, creditors, regulators and policy-makers will be unable to accurately assess

the credit risk that the banks are exposing themselves to through lending activities. In other words, they will be unable to assess the reliability of the banks' financial statements.

The assessment is meant to safeguard banks' solvency and general economic stability. When this is the case, it also contradicts the objectives of useful financial reporting as stipulated in the Framework for the Preparation and Presentation of Financial Statements 2010 ("Framework 2010") of the International Financial Reporting Standard (IFRS) and Financial Accounting Standards Board (FASB). The Framework 2010 stipulates the qualitative characteristics of relevance and faithful representation as the useful information in financial reporting. For financial reporting to be useful, "it must be relevant and must faithfully represent what it purports to represent" (Pacter, 2011, p. 5).

The updated objectives of useful financial reporting emerged from the lessons learned from the financial crisis. There is a current need for banks for an early recognition of loan losses to address the financial system pro cyclicality, and continuously reassess their loss expectations over the lifespan of their loans, as well as reassess changes in loss expectations as the conditions affecting their borrowers may change. This paper derives factors determining loan loss provisions of commercial banks in Malaysia, and examines how does credit risk management moderate the relationship between the determinants of loan loss provisions and the loan loss provisions of the banks? The paper investigates also how relevance and faithful representation intervenes loan loss provisions of the banks?

The remainder of the paper is organized as follows. In section 2 reviews previous literature. Section 3 is on methodology and section 4 discusses the results. Section 5 concludes the paper.



## 2. Literature review

From reviewing of literature on loan loss provisions, two classification models were discovered. The two classification models are the basis of themes or schools of thought, and have linkages to research questions of this paper. The two classification models are;

(1) perception is the basis for credit risk assessment; and

(2) when the loan loss provisions is used to achieve certain purposes, such as for earnings smoothing management, for signalling tool; and cycles of time lag between loan losses and credit growth.

From identifying and interpreting the two classification models, it situates this paper in the context of current literature on loan loss provisions. These two classification models have linkages to the research objectives. The first classification model identified above - "perception is the basis for credit risk assessment" - has linkages to the objectives of the study because in loan loss provisioning practices, it premises on an analysis of the perception of credit risk. The analysis of the perception of credit risk is based on the factors determining loan loss provisions. The analysis determines how much of non-performing loans are expected to be recovered, and how much of the non-performing loans are estimated as loan loss provisions. An assessment of the perception of the credit risk determines how much of non-performing loans are expected to be recovered and how much of the non-performing loans are estimated as loan loss provisions. In a recent study on credit risk assessment, Consiglio and Zenios (2015) illustrate scenario analysis as a useful tool for risk-profiling of debt. This study provides significant insights on how unsustainable debt can be identified early enough with high probability. It allows corrective actions to be taken to restore sustainability.

Further, the loan loss provisions are being used for various purposes as a result the collectability of the defaulted loans is not reflected in the loan loss provisions. Thus, banks do not capture their loss expectations and they do not continuously reassess their loss expectations as the conditions affecting their borrowers have changed. In their financial reporting, banks do not

faithfully present their relevant and true underlying credit risk conditions. As a consequence, their financial statements become less reliable.

*2.1 Perception is the basis for credit risk assessment*

Hussain and Al-Ajmi (2012) in their empirical study on risk management practices of conventional and Islamic banks in Bahrain point out that "the most important risk banks face is the credit risk" (p. 230). It is the risk that borrower might fail in its loan obligations in accordance to some agreed terms. The risk that the borrower might fail in its loan obligations are attributed to the core purpose of the banks, that is in the business of lending. In this article, the authors assume that all bank staff is able to identify risks that the banks faced but the methods for measuring it is not clearly explained. Further, the assumption that all bank staff are able to identify the risks that the banks faced, depends on the beliefs of the staff, not necessarily their actions. While the authors recognise the importance of different risks on assets portfolio, they have not clearly elaborated on how this contributed to the results. It poses first research question, "what are the factors determining the loan loss provisions of banks" in the context of their work. Recently, researchers have shown an increased interest in indicators of banking crisis. In a recent study on indicators that can detect crisis signals, Hmili and Bouraoui (2015) categorize them into macroeconomic, external and internal variables. However, one of the limitations in this study with the conclusion inflation has the strongest impact in predicting systemic banking crisis is that it does not explain how global financial imbalances affect an economic environment.

*2.1.1 Credit risk analysis in Loan loss provisioning practices*

In loan loss provisioning practices, as in credit risk assessment, subjective judgment plays an important role in assessing how much of the defaulted loans are expected to be recovered. Moreover, according to Jin, Yu and Mi (2012), banks' subjective expert judgment is also used in circumstances in the absence of data, such as, the data on "credit rating" (p. 386). In a rare study on whether credit ratings of banks are related to their location, van Loon and Haan (2015) imply - controlling for systemic relevance and other bank-specific factors, as well as characteristics of the home country - banks in the Euro-area receives a higher credit rating. Returning to the study by Jin, Yu and Mi, the authors advise that "this method (use of subjective expert judgment) is mostly focused on credit risk assessment from a qualitative angle" (p. 386). Because of this, the authors choose to use grey incidence method instead of regression analysis method as the former assumes bad loan of an industry is a behavioral consequence of that industry. The authors' findings reveal that different industries may have different effects on the credit risk of commercial banks may be more valid if more industries are analysed than the five being selected, and the basis for selection be clearly justified. In their note on the ratings of international banks from 90 countries, Matousek and Stewart (2009) assessed the ratings of international banks. The authors admitted that the banks used their expert information in addition to financial ratios in assigning final ratings. It is the case when the bank's financial position suddenly deteriorates following a sudden surge in non-performing loans.

*2.1.2 Recoveries as a measurement on adequacy and reasonability of Loan loss provisions*

Besides an adequate and reasonable level of loan loss provisions, Dermine and Carvalho (2006) explain that "any empirical study of credit risk and loan loss provisioning practices raises two measurement issues; the criteria to define the time of default event; and the method to measure recovery" (p. 10). The authors content that "measurement of recovery on defaulted loans (is a method to determine whether the levels of loan loss provisions are adequate and reasonable), as provisions will be the amount that will not be recovered" (p. 10). In other words, in loan loss provisioning practices, the measurement of the bad debts recoveries is a method to determine

whether an amount set aside for the loan loss provisions is adequate and reasonable. For example, a measurement of the recoveries of 80% - that is 3 months to 6 months after the days in arrears - requires the loan loss provisions to be set at 20%. The 20% is the loan loss provisions, i.e. the amount estimated not to be recovered or irrecoverable. In other words, this is the estimated amount to be provided as the loan loss, or the "loan loss provisions". In a recent examination of Vietnamese banks lending behaviour, Sarath and Pham (2015) find the banks' non-performing loans do not significantly affect loan supply. However, this study fails to account the distinctive nature of the Vietnamese banking industry. It consists of only two main groups, state-owned and private commercial banks.

In his research that examines business cycle and bank assets, Currie (2004) describes the business cycle influence on contraction or expansion of bank loans. The author postulates that an upswing in the business cycle, "is almost invariably preceded and accompanied by an expansion of credit, and the down turn is preceded by either a prior cessation of the expansion or by an actual contraction of credit" (p. 247). As such, for this paper, the Gross Domestic Product (GDP) is included as one of independent variable by adapting the procedure of Beck, Jakubik and Piloiu (2013). However, Mullineux (2002) in his conceptual study on the implications of bank regulations and monetary policy of business cycle subscribed to the belief of considerable drawbacks of rigorous loan loss provisioning practices. Such explanations tend to overlook the fact that loan loss provisions may also be used to achieve certain purposes. Following the global economic crisis, Alao and Raimi (2011) report the exercise by the Central Bank of Nigeria to determine financial strengths of 24 banks in the country using performance measurements. In this exercise, the banks used many criteria to measure their financial strengths, including the "percentage of non-performing loans to total loans portfolio" (p. 208). However, a major source of uncertainty is in the method used to measure the effect of non-performing loans on economic crisis. In a similar vein, a study on banks in Ghana, Osei-Assibey and Asenso (2015) reveals credit growth associated with high regulatory capital has brought about high non-performing loans among the banks in the country. With respect to the relationship between regulations and behaviours of banks in assuming risk, Ofoeda, Abor and Adjasi (2012) reveal that the results are inconclusive. According to the authors, it is because most studies were completed utilizing data on banks in advanced countries. From a recent study on banks in Germany, Ireland and the UK, Forbes, Donohoe and Prokop (2015) illustrate that time pressure, complexity, and opacity of underlying cause-effect relationships are the root causes of bank failures. This is so because investors, regulators and politicians have fall victim to cognitive biases, and this effects their decisions. Ofoeda, Abor and Adjasi (2012) go on to refer to Gorton and Rosen (1995) who concluded that "in an unhealthy banking industry, entrenched managers will tend to take on more rather than less risk" (p. 436). This study fails to consider the differing measurements and definitions of financial institutions' risk. From this study, because banks tend to assume more risk in an unregulated banking industry, Zainal and Kassim (2012) emphasize that a prudent risk management practice is crucial to ensure the banks' profitability and stability. The findings might have been far more useful if the authors had suggested the methods to measure risk in the banking industry.

*2.2 The Loan loss provisions to achieve certain purpose*

In their study on loan loss provisions among Australian banks, Anandarajan et al. (2005) categorize the uses on loan loss provisions into three groups. The authors list the three uses of loan loss provisions as: "earnings management, capital management; and signalling tool" (Anandarajan et al., p. 7).

*2.2.1 Earnings smoothing management*

A series of banking literature analyse the scope in pro-cyclical loan loss provisioning practices, which exhibits trends of low levels of loan loss provisions ahead of a banking crisis. Ismail et al. (2005) in their studies on whether banks in Malaysia manage earnings, describe earnings smoothing behaviour as a behaviour that exhibits earnings which did not dip and rise according to actual performance. As a result, banks' earnings show little fluctuation from one year to another. As it is becoming increasingly difficult to ignore for other industries, Wasiuzzaman, Sahafzadeh and Nejad (2015) detect the presence of specific industry variables or characteristics in explaining earnings smoothing behaviour. In the banking industry, although several authors had found positive associations of loan loss provisions and earnings management, Anandarajan et al. (2005) refer to an earlier study of Bhat (1996). Bhat suggest that "the banks that engaged in aggressive income smoothing were in poorer financial health relative to others" (p. 7). More recently, literature has emerged that extend the study on earnings smoothing management from the motivation for smoothing earnings to study differences in earnings management as banks move toward principle-based standards. One of such a study is by Liu, Yuen, Yao and Chan (2014) on the earnings management with data from Germany between users of the US GAAP and the IFRS. The study reveals the principles-based standards with imprecise rules like the IFRS compared to the rules-based GAAP may encourage higher degree of earnings management due to compliance uncertainty.

Interestingly, using Bangladesh as a case, Muttakin, Khan and Azim (2015) writes about earnings management behaviour in providing more CSR disclosures. The study uses data on 135 non-financial companies listed on the Dhaka Stock Exchange (DES) in the country. In an increasingly important area of dividends decisions among non-financial firms, Kighir, Omar and Mohamad (2015) concludes that current earnings are more important smoothing agents than current cash flow in the dividends payout decisions. This novel finding contributes to investors and the government in making informed decisions on dividends policy in the country.

*2.2.2 Signalling tool*

Dermine and Carvalho (2006) describe a second category of literature on loan loss provisions derived from studies of Musumeci and Sinkey (1990), and Elliott et al. (1991) on the announcement of unexpected loan loss provisions. In their paper, Musumeci and Sinkey account for all supporting evidence to imply that manager's choice to report huge increases in loan loss provisions may be used by outsiders as a signal that the bank is strong enough to absorb future potential losses. As a result, the market reacts positively to the announcement that the data reflects. It has been suggested by Maffei, Aria, Fiondella, Spano and Zagaria (2014) based on reporting practices of 66 Italian banks that they tend to provide denser information in the notes to the Financial Statements following the adoption of IFRS. However the differences in reporting of risk categories decreases as the level of risk increases, the authors conclude. Wahlen (1994), revealed the announcement of unexpected loan loss provisions "at first counter-intuitive". However, the announcement "is interpreted as a signal that future earnings will be good allowing the build-up of provisions by bank managers" (p. 5). Further, Liu, Ryan and Wahlen (1997) go on to say that this practice has resulted in positive impacts on bank stock returns especially for those banks with "relatively low regulatory capital" (p. 5). Because the role of capital in bank efficiency is unclear in the banking literature reflecting differences in choice of variables, sample size, analysis periods, and estimation methods, Nguyen and Nghiem (2015) studied a sample of Indian banks. From the study they conclude that bank's capital ratio an efficient tool that provides a signal of efficiency and default risk. One of the most important elements in this study is that it accounts for the impact of ownership structure. In their study on income smoothing behaviour of

21 Malaysian banks from 1996 to 2002, Ismail, Shaharudin and Samudhram (2005) believe that the stability of the banking sector is more perception based than anything else. Further, the authors state that the problems of the sector are either "real or assumed" (p. 42). This reinforces the above notion that perception is the basis for credit risk assessment, the first theme unearthed from reviewing current literature on loan loss provisions.

In a study in 2012 among commercial banks within the European Union during a ten-year periods between 1999 and 2008, Leventis, Dimitropouls and Anandarajaran (2012) reveal that banks which are in financial difficulties engaged more aggressively relative to the healthy banks in using loan loss provisions to signal prospects about their future profits. Also, according to the findings, the propensity to engage in this behaviour is more pronounced after the implementation of International Financial Reporting Standards (IFRS) due to its lax enforcement. For this reason, in this paper the intervening term is assigned a value 0 for reporting years before 2010, and 1 for reporting years 2010 and after, because, in Malaysia, effective from 2010, loan are reported based on FRS 139.

*2.2.3 Time lag between loan losses and credit growth*

Jimenez and Saurina (2005) of the Bank of Spain show strong empirical support of a positive, although quite lagged, association between loan losses and credit growth. The authors reported stacking of provisions in times of economic growth. In a relevant study, Leathers, Raines and Richardson-Bono (2015) provide convincing evidence the contributing role of debt in times of economic growth that fuel financial instability and the subsequent bank failures. From this study from a societal economic perspective, it points to the importance of finding ways to meet societal needs (such as greater opportunities for home ownership) under realistic lending standards within a stable financial system.

From the earlier study by Jimenez and Saurina (2005), they hold the view that the behavior of staking of provisions in times of economic growth may be due to bank managers' disaster myopia, herd behavior, agency problems and institutional memory hypothesis. The authors suggest transforming counter cyclical provisions into a capital requirement in order to cope with the former problem. However because accounting frameworks usually do not allow for counter cyclical provisioning, it might be helpful to provide more details on how this could possibly be implemented. In a timely examination by Ghosh (2015) on the impact of macro-prudential policies on bank lending behaviour and the consequent build-up of loan default risks, he finds support for the policies at curbing credit growth. Further, when factored in ownership structure, it appears to exhibit much more force in moderating the severity of the credit growth. The findings might have been far more convincing if the author had included more relevant variables.

## 3. Methodology

*3.1 Regression equation*

A single stage panel data multiple regression equation to ascertain the determinants of loan loss provisions of commercial banks in Malaysia is as follows:

$$LLP_{it} = B_8 RF_{it} (B_0 + B_1 NPL_{it} + B_2 II_{it} + B_3 NP_{it} + B_4 LA_{it} + B_5 GDP_{it} + B_6 CRM_{it} + B_7 CRM_{it} (NPL_{it} + II_{it} + NP_{it} + LA_{it} + GDP_{it}) + \varepsilon_{it})$$

LLP = loan loss provisions, a dependent variable
i = 1,2,3,....12 (i.e. "i"= identity for 12 banks)
t = 1,2,3,.....17 (i.e. "t"= time for 17 years i.e. from 1997 to 2014)

$B_0$ = intercept that is mean or average value of Y (i.e. loan loss provisions) when NPL, interest income, net profit, loans & advances, and the GDP, are equal to zero

$B_1$ = partial regression coefficient that measures the mean value of LLP per unit change in NPL holding the values of interest income, net profit, loans & advances and the GDP constant

*NPL* = Non Performing Loan (NPL). It is a previous term that is used and reported in financial reports of banks. It is now reported as "Impaired Loans, Advances and Financing"

$B_2$ = partial regression coefficient that measures the mean value of LLP per unit change in interest income holding the values of NPL, net profit, loans & advances, and the GDP constant

*II* = Interest Income

$B_3$ = partial regression coefficient that measures the mean value of LLP per unit change in net profit holding the values of NPL, interest income, loans & advances and the GDP constant

*NP* = Net Profit

$B_4$ = partial regression coefficient that measures the mean value of LLP per unit change in loans & advances holding the values of NPL, interest income, net profit and the GDP constant

*LA* = Loans & Advances

$B_5$ = partial regression coefficient that measures the mean value of LLP per unit change in the GDP holding the values of NPL, interest income, net profit and loans & advances constant

*GDP* = the Gross Domestic Product (GDP) where the GDP = 1 if the GDP for the current year is higher than that in the previous year; the GDP = 0, otherwise

$B_6$ = parameter estimate for moderating term

*CRM* = the moderating variable, which is assigned a value of 1 for banks with full-frequency of board credit risk management committee meetings; and a less than 1 for banks with lesser meetings frequency

$B_7$ = parameter estimate for interaction term between the moderating variable (i.e., "Credit Risk Management") and the independent variables.

$CRM_{it}$ $(NPL_{it} + II_{it} + NP_{it} + LA_{it} + GDP_{it})$ = interaction term between the moderating variable (i.e., "Credit Risk Management") and the independent variables.

$B_8$ = parameter estimate for intervening term

$RF_{it}$ $(B_0 + B_1NPL_{it} + B_2II_{it} + B_3NP_{it} + B_4LA_{it} + B_5GDP_{it} + B_6\, CRM_{it} + B_7\, CRM_{it}\, (NPL_{it} + II_{it} + NP_{it} + LA_{it} + GDP_{it}) + \varepsilon_{it})$ = intervening term that is assigned a value 0 for reporting years before 2010; 1 for reporting years 2010 and after.

$\varepsilon_{it}$ = stochastic or random error term

*3.1.1 The independent variables*

NPL is a measure of Non-performing loans. Rottke and Gentgen (2008) document high levels of non-performing loans in balance sheets of banks during a banking crisis when an economy experienced distressed debt cycles. Lin and Mei (2006) attribute the main cause of a bank failure to a large number of non-performing loans. In their analysis in several countries, Boudriga, Taktak and Jelloudi (2009) attribute bank failures mainly to high levels of non-performing loans. The authors refer to previous work of Hasan and Wall (2004) who observed that "higher levels of NPLs are associated with high rates of provisioning" (p. 289). A recent study on trends in non-performing loans across 75 countries during the last decade completed by the European Central Bank illustrates that an increase in lending interest rates tends to cause an increase in non-performing loans (Beck, Jakubik and Pilou, 2013).

II measures the levels of Interest income. Taktak et al. (2010) in their study on Islamic banks' use of loan loss provisions to smooth their results include interest income as one of the explanatory variables. According to the authors "the variable is usually used in prior literature as a

proxy for earnings management practices" (p. 119). The authors refer to suggestions by Moyer (1990), Betty et al. (1995), Collins et al. (1995) and Ahmed et al. (1999), whereby a positive relation is expected between interest income and loan loss provisions in studies on earnings smoothing. Balla and McKenna (2009) explain that cyclicality in loan loss provisioning practices where "during periods of economic expansion, provisions fall (as a percentage of loans and advances), and conversely, they rise during (economic) downturns" (p. 393).

NP measures banks' profitability where "banks with high profitability are less pressured to revenue creation and less constrained to engage in risky credit offerings: (Boudriga et a., 2009, p. 289. In such a case, the banks' profitability as measured by the net profit is negatively associated with non-performing loans.

LA and GDP are indicators of Loans & advances, and the Gross Domestic Product, respectively. Balla and McKenna (2009) explain that cyclicality in loan loss provisioning practices where "during periods of economic expansion, provisions fall, and conversely, they rise during downturns" (p.393).

CRM is a moderating variable that has a contingent effect on the independent variable-dependent variable relationship is credit risk management pertaining to non-performing loans, interest income, net profit, loans & advances, and the Gross Domestic Product. Because the largest and most obvious source of risk for most banks is credit risk (Cole, 2000), the credit risk management has become so significant over the years. Ojo, 2010 in his study on increasing importance of credit risk in financial regulation also refers to earlier work by Rendon (2008). The latter highlights the Basle Committee's core principles (Basel Committee on Banking Supervision, 2006) that "banks are (to) adequately measure and manage them (the credit risk)" (p. 253). Moreover, in his study on the origins of bank crisis and on suggestions for future research, Jean-Pierre (2011) writes that "banks are not all the same, and have subtle differences of risk attitude, aversion, and tolerance, which depend on their internal culture, their history, the background of their managers, and so on" (p. 16). The moderating variable moderates either the form and/or strength of the relationship (Sharma et al., 1981). In this paper, the credit risk management moderates the independent variables in their loan loss provisioning practices. The moderating variable (credit risk management) interacts with the independent variables to influence their form and/or strength of the relationship with the dependent variable (loan loss provisions). In the existing provisioning schedule, the regulators stipulate that a loan would be classified as impaired when the principal or interest/profit or both is past due for more than 90 days or 3 months. However, some banks could adopt a more efficient credit risk management so that they could effort to classify a loan as impaired when the principal or interest/profit or both is past due after 30 days or one month (much sooner than the stipulated 3 months or 90 days).The argument that individual bank's credit risk management could moderate the relationship between the independent variables in its loan loss provisioning practices is supported by Packer and Zhu (2012) in their study on loan loss provisioning practices among Asian banks. The authors discover that the explanatory variables have substantial differences across different banks, typically apart from the requirements imposed by supervisor/regulators, it may also be linked to different bank-specific performance cycles, which is typically driven by "individual banks' incentives" (p. 7) (see Appendix A1 on list of roles and responsibilities of the Risk Management Committee of a sample bank). In order to capture an interaction of the moderating variable (credit risk management), the frequency of board credit risk management meetings during the time the directors held office is used. The attendance of the board credit risk management committee members is divided by the number of board credit risk management committee meetings held in a year to obtain a scale that ranges from 0 to 1. A score of 1 for a bank indicates that all the

members of the committee of the bank attended all meetings during the time they held office (calculated in Appendix A1). Cholopichien (2008) in her dissertation on the relationship on quality of directors to the level of voluntary disclosure among the public listed companies in Thailand uses the attendance of directors at their meetings as a moderating variable that interact to influence the form and strength of the relationship between the independent and dependent variables. In her dissertation she too refers to a previous study by Vafeas (1999) who used frequency of board meetings as a moderating variable that examined qualities of directors. In a later study, Yunos (2011) refers to Raghunandan and Rama (2007). The latter concluded that frequent meetings are reflective of active committee members. In a more recent study, Tong et al. (2013) in their examination on the Chinese state-owned firm's boards, discover that frequency of meetings is positively related to performance of the firms.

RF is the intervening variable that surfaces at the time the independent variables start operating to influence the dependent variable and surfaces as a function of the independent variables is "relevance and faithful representation". The variable has a temporal quality or time dimension. It is relevance and faithful representation that will intervene between the independent variables and dependent variable, and bring about improvements in financial reporting. In King (2013) of the Bank of England Financial Stability Report, June 2013, issue 33; the author lists an introduction of a more forward-looking model for impairment recognition that is intended to achieve "faithful representation of the underlying economic risk and rewards of lending" (p. 58).

In loan loss provisioning practices, the present requirements are for the loan loss provisions to be relevant and faithfully represented. In a study by M. Humayun and Fawzi (2011), the authors investigate relevance in disclosure of income among New Zealand listed companies, because users of the financial reports use them as the basis to measure performance. In an earlier work, Anne, Hemant and Helen (2008) stress the importance of faithful representation after they discovered that four of Australian banks had failed to accurately disclose credit risk in currency trading. The effect of relevance and faithful representation is inferred from the improved disclosure in the financial reports of banks from beginning of the financial year 2010. This is because from the beginning of the year 2010 banks reported their loans based on FRS 139. From the beginning of the year 2010, classification of impaired loans and provisioning of impaired loans are in line with FRS 139. In this study, to measure the relevance and faithful representation, for reporting years 2010 and thereafter the relevance and faithful representation for the banks is assigned a value of 1; whilst for reporting years before 2010, the relevance and faithful representation for banks is assigned a value of 0 (listed in Appendix A1).

*3.2 Hypotheses development*

The hypotheses and relationships for the research questions are set out below.

Hypothesis 1

$H_O$: There is no relationship between non-performing loans and loan loss provisions.

$H_A$: There is a relationship between non-performing loans and loan loss provisions.

If there is no relationship between non-performing loans and loan loss provisions, a negative relationship between non-performing loans (one of the independent variables) and loan loss provisions (the dependent variable) is expected. However, in this paper, a positive relationship is predicted. It is predicted that non-performing loans does reflect loan loss provisions.

Hypothesis 2

$H_O$: There is no relationship between interest income and loan loss provisions.

$H_A$: There is a relationship between interest income and loan loss provisions.

If there is no relationship between interest income and loan loss provisions, a negative relationship between interest income (one of the independent variables) and loan loss provisions

(the dependent variable) is expected. However, in this paper, a positive relationship is predicted. It is predicted that interest income does reflect loan loss provisions. In a study by Ho and Zhu (2004), the authors consider the interest income as an output variable, but how is interest income affecting the performance of the banks? Does it have a positive or negative relationship with loan loss provisions in affecting the performance of the banks? Hence, for this paper the interest income was synthesized to explore the relationship with loan loss provisions.

Hypothesis 3

$H_O$: There is no relationship between loans and advances, and loan loss provisions.

$H_A$: There is a relationship between loans and advances, and loan loss provisions

If there is no relationship between loans and advances, and loan loss provisions, a negative relationship between loans and advances (one of the independent variables) and loan loss provisions (the dependent variable) is expected. However, in this paper, a positive relationship is predicted. It is predicted that loans and advances do reflect loan loss provisions. Dietz et al., (2008) believe that a more systematic approach is needed to examine how forces such as business cycles, economic cyclical and social patterns can have impacts on the banking industry. This hypothesis aims at determining whether there is a relationship between loans and advances and loan loss provisions. Currie (2004) has measured the effect an expansion of credit on bank assets in several ways.

Hypothesis 4

$H_O$: There is no relationship between net profit, and loan loss provisions.

$H_A$: There is a relationship between net profit, and loan loss provisions

If there is no relationship between net profit, and loan loss provisions, a negative relationship between net profit (one of the independent variables) and loan loss provisions (the dependent variable) is expected. However, in this paper, a positive relationship is predicted. It is predicted that net profit does reflect loan loss provisions. Musumeci and Sinkey (1990) provide supporting evidence to imply that bank manager's choice to report huge increases in loan loss provisions might be used by outsiders as a signal that the bank is strong enough to absorb future potential losses. But what is the relationship between net profit and loan loss provisions? Since Leventis, Dimitropouls and Anandarajaran (2012) reveal that banks which are in financial difficulties engaged aggressively in using loan loss provisions to signal the prospects about their future profits, it was decided to measure the relationship between net profit and loan loss provisions.

Hypothesis 5

$H_O$: There is no relationship between the Gross Domestic Product, and loan loss provisions.

$H_A$: There is a relationship between the Gross Domestic Product, and loan loss provisions

In their study, Jimenez and Saurina (2005) reported strong empirical support of a positive association between loan losses and credit growth. The authors reported high figures of provisions in times of economic growth that lends the development of the hypothesis to determine the relationship between the Gross Domestic Product (GDP) and loan loss provisions. If there is no relationship between the Gross Domestic Product and loan loss provisions, a negative relationship between the Gross Domestic Product (one of the independent variables) and loan loss provisions (the dependent variable) is expected. However, in this paper, a positive relationship is predicted. It is predicted that the Gross Domestic Product does reflect loan loss provisions. In a study on bank failures but in matured economies, Westernhagen (2004) discovers that a widespread banking crises involving credit risk are "remarkably similar in characteristics" (p. 66) in that they started with a period of financial deregulations and followed by a surge in lending activities. The author concludes that "generally, even where asset impairment had been properly measured, such quantitative measures might not capture qualitative problems, such as poor management" (p. 1).

His conclusions lend supports for further study to assess how credit risk management moderate the relationship between the determinants of loan loss provisions and the loan loss provisions, and how relevance and faithful representation intervenes loan loss provisions of the banks, the two research questions this paper investigates; and they lead to the development hypothesis 6 and hypothesis 7.

Hypothesis 6

$H_O$: There is a significant negative moderating effect of credit risk management on loan loss provisions

$H_A$: There is no significant negative moderating effect of credit risk management on loan loss provisions

If there is a significant negative moderating effect of credit risk management on loan loss provisions, a negative relationship is expected for the credit risk management and loan loss provisions. However, in this paper, a positive moderating effect is predicted

Hypothesis 7

$H_O$: There is a significant negative intervening effect of relevance and faithful representation on loan loss provisions

$H_A$: There is no significant negative intervening effect of relevance and faithful representation on loan loss provisions

If there is a significant negative intervening effect of relevance and faithful representation on loan loss provisions, a negative relationship is expected for the relevance and faithful representation and loan loss provisions. However, in this paper, a positive intervening effect is predicted.

*3.3 Data*

The data set used in this paper is comprised of all nine (9) locally-owned commercial banks and three (3) largest foreign-owned locally-incorporated commercial banks in Malaysia. In total there are twelve (12) banks. The secondary data is extracted from published annual reports of the banks from 1997 to 2014 which contain the balance sheets and income statements. All reported figures are in thousands of Ringgit Malaysia (RM'000). Matemilola, Bany-Ariffin and McGowan (2013) reveal that some previous researchers had used balance sheets and income statements to conduct their studies on capital structure. The macroeconomic factor is the Gross Domestic Product (GDP), and it is extracted from the website of the Malaysian Institute of Economic Research (MIER).

3.4 *Panel Data analysis*

In this paper, the panel data or longitudinal data modelling is used i.e. data containing time series observations from 1997 to 2014 of the twelve banks. Panel data analysis has now become widely used to estimate dynamics econometrics models as it has several advantages over cross-sectional or time-series data. The panel data analysis allows for more accurate inference of model parameters, control for individual unobserved heterogeneity effects, and gives greater capacity for capturing the complexity of the relationships than a single cross-section or time-series data. Also, panel data analysis allows investigating the dynamics of the relationships in the data that cannot be estimated from observations at a single point in time, or it is rare for single cross-section survey (in this instance, a survey of a particular bank) to provide sufficient information about earlier time periods for dynamic relationships to be studied.

## 4. Empirical results

*4.1 Results of regression equation*

The output of the regression equation is in Appendix A2. In the ~~above~~ regression output, the predicted equation is LLP=-0.755787(NPL) + 0.835475(INTINCOME)-1.319072(NETPROFIT)+1.455105(LOANADV)-1.718658 (GDP)+32.54039, indicating that the loan loss provisions is predicted to decrease by RM0.755787 when the non-performing loans variable goes up by RM1,000, increase by RM0.8354753 when the interest income goes up by RM1,000, decrease by RM1.319072 when net profit goes up by RM1,000, increase by RM1.455105 when loans and advances goes up by RM1,000. The loan loss provisions is predicted to be RM32.54039 when non-performing loans, interest income, net profit, loans & advances, and the Gross Domestic Product (GDP) are zero. Also, in the results above, the Non-performing loans (NPL) is negatively related to the Loan loss provisions (LLP); it is statistically significant with (Prob. = 0.0143). For the variable, the interpretation is for every RM1,000 increase in the Non-performing loans (NPL), a decrease of about RM0.755787 in the Loan loss provisions (LLP) is estimated. Both variables the Interest income, and Loans & advances have positive relationship with the Loan loss provisions (LLP). For the Interest income, the interpretation is, for every RM1,000 increase in the Interest income, the estimated increase in Loan loss provision (LLP) is about RM0.835475. For the Loans & advances, the interpretation is, for every RM1,000 increase in the variable there is an estimated increase of RM1.455105 in the Loan loss provisions (LLP). On the other hand, the Net profit has a negative relationship with the Loan loss provisions (LLP); for every RM1,000 increase in the Net profit, a decrease of about RM1.319072 in the Loan loss provisions (LLP) is estimated. Moreover, the Loan loss provisions (LLP) has a negative relationship with the Gross Domestic Product (GDP). The regression coefficients of $R^2$ value is 0.526343. It showed a fit of the regression model indicating that 52.6343% of the variance of the Loan loss provisions is explained by the Non-performing loan, Interest income, Net profit, Loans & advances and the GDP.

On the value of the standard error, this value should be small. It measures the statistical reliability of the coefficient estimates. If the errors are normally distributed, there are about 2 chances in 3 that the true regression coefficient is covered by an interval constructed by taking the reported coefficient, plus and minus one standard error. There are about 95 chances out of 100 that it is covered by an interval constructed by taking the reported coefficient, plus and minus two standard errors. The t-statistic is the reported t-value and it is used to test whether the coefficient is equal to zero. Typically, a t-statistic above 2 or below - 2 is considered significant at the 95% confidence level to reject the null hypothesis with 95% confidence, and that the independent variable has a statistically significant effect on the dependent variable. Further, the higher the t-value, the higher the relevance of the variable. As such, the Net Profit (t-statistic = -4.220540), Loans & Advances (t-statistic = 3.279402), and the Gross Domestic Product (GDP) t-statistic = -4.745883 are statistically significant at 95% confidence level. Thus, the variables have a statistical effect on the Loan Loss Provisions (LLP).

The results indicate that the moderating variable (i.e. “Credit Risk Management”) positively moderates the relationship between the independent variables and the Loan loss provisions. When the interaction term between the moderating variable and the independent variables is not entered into the regression equation, there is a significant decrease in the model fit $R^2$ from 0.526343 to 0.522205. The decrease provides evidence that the moderating variable strengthens the relationship between the independent variables and dependent variable; and the relationship is stronger with higher frequency of credit risk management meetings, and vice versa.

Moreover, the results show that the intervening variable (i.e. “Relevance and Faithful Representation”) negatively intervene the relationship between the independent variables and the Loan loss provisions; and the relationship is weaker with stronger relevance and faithful

representation. In other words, the higher the levels of relevance and faithful representation of the Non-performing loans, Interest income, Net profit, Loans & advances, and the GDP; the lower the levels of the Loan loss provisions, and vice versa.

*4.2 To pool or not to pool. The Breusch-Pagan test*

The Breusch-Pagan test is the *poolability* test. It is used to determine whether the variances across the banks are zero, i.e. there are no significant differences (i.e. no panel effect) across the banks. The null hypothesis in the test is that variance across the banks is zero. The results of the test is in Appendix A2

In the results, since the overall significance F test for the regression as a whole is Prob > F = 0.0000, each individual independent variable has some correlation with the dependent variable (Loan Loss Provisions). However, when the regression as a whole is significant, the coefficients on individual independent variables are insignificant (typically, a t-statistic above 2 or below -2 is considered significant at the 95% confidence level to reject the null hypothesis with 95% confidence, and the independent variable has a statistically significant effect on the dependent variable. Further, the higher the t-value, the higher is the relevance of the variable. The coefficients on individual independent variables are insignificant because the independent variables may be correlated, a condition of multicollinearity (also called intercorrelation). This is because highly correlated independent variables are explaining the same part of the variation in the dependent variable (Loan Loss Provisions), so their explanatory power and the significance of their coefficients is "divided up" between them. The adverse effect of multicollinearity is that the estimated regression coefficients of the independent variables that are correlated tend to have large sampling errors. Based on the confidence interval which is equal to the coefficient +/- about 2 standard deviations, it is 95% confident that the true value of the coefficient in the regression model falls within this value.

How much of the Loan Loss Provisions (LLP) would decrease by if Non-Performing Loans (NPL) increases by one of its standard deviations? In other words, if Non-Performing Loans (NPL) increases by 7.817241, how much is the effect on Loan Loss Provisions (LLP)? The predicted effect is a decrease by 7.817241(0.755787) = 0.5908169 in Loan Loss Provisions (LLP). Is the decrease of 0.5908169 in Loan Loss Provisions large enough? The standard deviation of Loan Loss Provisions (LLP) is 5.403852. Therefore, an increase of one standard deviation in Non-Performing Loans (NPL) causes a decrease of 0.5908169/5.403852 = 0.1093 of a standard deviation in Loan Loss Provisions (LLP). How much of the Loan Loss Provisions (LLP) would increase by if Interest income (INTINCOME) increases by one of its standard deviations? In other words, if Interest income (INTINCOME) increases by 0.7947932, how much is the effect on Loan Loss Provisions (LLP)? The predicted effect is an increase by 0.7947932(0.8354753) = 0.66403 in Loan Loss Provisions (LLP). Is an increase of 0.66403 in Loan Loss Provisions (LLP) large enough? The standard deviation of Loan Loss Provisions (LLP) is 5.403852. Therefore, an increase of one standard deviation in Interest Income (INTINCOME) causes an increase of 0.66403/5.403852 = 0.1228 of a standard deviation in Loan Loss Provisions (LLP). How much of the Loan Loss Provisions (LLP) would increase by if the moderating effect increases by one of its standard deviations? In other words, if the moderating effect increases by 13.24279, how much is the effect on Loan Loss Provisions (LLP)? The predicted effect is an increase of 13.24279(1.054251) = 13.961 in Loan Loss Provisions (LLP). Is an increase of 13.961 in Loan Loss Provisions (LLP) large enough? The standard deviation of Loan Loss Provisions (LLP) is 5.403852, therefore an increase of one standard deviation in the moderating effect causes an increase of 13.961/5.403852 = 2.584 of standard deviation in Loan Loss Provisions (LLP). How much of the Loan Loss Provisions (LLP) would decrease by if the intervening effect

increases by one of its standard deviations? If the intervening effect increases by 74.588, how much is the effect on Loan Loss Provisions (LLP)? The predicted effect is a decrease of 74.588(0.0028636) = 0.2136 in Loan Loss Provisions (LLP). Is the decrease of 0.2136 in Loan Loss Provisions (LLP) large enough? Because the standard deviation of Loan Loss Provisions (LLP) is 5.403852, an increase of one standard deviation in intervening effect causes a decrease of 0.2136/5.403852 = 0.0395 of standard deviation in Loan Loss Provisions (LLP). The Breusch and Pagan Lagrangian multiplier test for random effects is in Appendix 2

Since the Breusch and Pagan Lagrangian multiplier calculated value exceeds the tabulated chi-squared. Therefore, to conclude the Random Effects model is more appropriate than the Pooled OLS. In other words, there are bank-specifics effects ($u_i$) in the data. The Pooled OLS may result in heterogeneity bias because there are often reasons why the intercept or the slope coefficients (the effects of the explanatory variables on the dependent variable) may be different across the 12 banks and over the observed periods (17 years of observation from 1997 to 2013). In other words, the unobservable factors or heterogeneity effects (i.e. uniqueness or individuality difference between one bank from another in a fundamental unmeasured ways) may exist among the banks. These unobservable factors or heterogeneity effects that may exist among the banks would probably remain constant over time (i.e. time invariant) for a given bank, but they may have effects on the loan loss provisions (the dependent variable). For example, the banks which are more willing to assume risk in lending activities may report higher loan loss provisions. Besides, the "more willingness to assume risk in lending activities" may have effect on, or may be correlated with, the Interest income (one of the explanatory variables). As a result, the estimated coefficients probably would be higher than they would otherwise have been (i.e. "biased upward"). This is because the Pooled OLS would mistakenly attribute that the variation in "the loan loss provisions" is caused by "more willingness to assume risk in lending activities", instead of "Interest income". Then, the next question is how to treat the bank-specific effects?

*4.3 The Hausman specification test*

The Hausman specification test is used to choose a more appropriate model between the Random Effect and the Fixed Effect model, where the null hypothesis is that the preferred model is the Random Effects versus the alternative the Fixed Effect. The test investigates whether the unique errors ($\mu i$) are correlated with the regressor. The null hypothesis is that they are not. The Hausman specification test results are in Appendix A2

Since the Hausman specification test results calculated Pro>chi2=0.2952 (which is > than 0.05, it is insignificant); thus it shows that the results have failed to reject the null hypothesis, and concludes that the Random Effects model is more appropriate. Therefore, the Random Effects model is more preferable as it is more efficient and consistent.

On the other hand, the Fixed Effects model is not preferred as it is less efficient but consistent. Also, the Prob>chi2 = 0.2952 indicates evidence that there are unique errors ($u_i$) that are correlated with the regressors (Greene, 2008), and therefore there is a reason to believe that differences across the 12 banks have some influence on the independent variables.

*4.4 Hypotheses testing. Overall results*

Hypothesis 1

A negative relationship between Non-performing loan and Loan loss provisions indicates prudent provisioning policies, according to Boudriga et al. (2009) who analysed the role of supervisory framework and the determinants of Non-performing loans across 59 countries over the period of 2002-2006. The authors posit the view that a relationship between Non-performing loans and loan loss provisions may reflect the general attitude towards risk in the banking industry of each

country. The regression results show that Non-Performing Loans (NPL) is increased by 7.817241, the predicted effect is a decrease by 7.817241(0.755787) = 0.5908169 in Loan Loss Provisions (LLP). Further, an increase of one standard deviation in Non-Performing Loans (NPL) causes a decrease of 0.5908169/5.403852 = 0.1093 of a standard deviation in Loan Loss Provisions (LLP).

Hypothesis 2

There is a positive relationship between Interest income and Loan loss provisions. How much of the Loan Loss Provisions (LLP) would increase by, if Interest income (INTINCOME) is increased by one of its standard deviations? Or, if Interest income (INTINCOME) is increased by 0.7947932, how much is the effect on Loan Loss Provisions (LLP)? Based on the calculation, an increase of one standard deviation in Interest Income (INTINCOME) causes an increase of 0.66403/5.403852 = 0.1228 of a standard deviation in Loan Loss Provisions (LLP). Because of the positive relationship between Interest income and Loan loss provisions, the null hypothesis that there is no relationship between Interest income and Loan loss provisions is rejected. The Interest income does reflect the Loan loss provisions.

Hypothesis 3

The null hypothesis that there is no relationship between Loans and advances, and Loan loss provisions is rejected. This finding further asserts previous findings in a study by Taktak, Zouari and Boudriga (2010) on loan loss provisioning practices of 66 Islamic banks operating in 19 countries over the period of 2001-2006. The authors observed that the total loans positively explain the loan loss provisions of the banks. Further, based on the calculation, an increase of one standard deviation in Loans & Advances (LOANADV) causes an increase of 0.2424 of a standard deviation in Loan Loss Provisions (LLP).

Hypothesis 4

There is a negative relationship between Net profit and Loan loss provisions; and the null hypothesis of no relationship is rejected. Again, how much of the Loan Loss Provisions (LLP) would decrease by, if Net Profit (NETPROFIT) is increased by one of its standard deviations? If Net Profit (NETPROFIT) is increased by 7.071207, the predicted effect on Loan Loss Provisions (LLP) is a decrease by 7.071207(1.319072) = 9.327. And, is the decrease of 9.327 in Loan Loss Provisions (LLP) large enough? An increase of one standard deviation in Net Profit (NETPROFIT) causes a decrease of 9.327/5.403852 = 1.726 of a standard deviation in Loan Loss Provisions (LLP). There is a negative relationship between Net profit and Loan loss provisions because Loan loss provisions is reported as an expense item on banks' income statement and therefore, it reduces the Net profit (Zoubi and Al-Khazali, 2007).

Hypothesis 5

A negative relationship between the Gross Domestic Product and Loan loss provisions indicates the anti-business cyclical behavior of the banks' loan loss provisions. This is in the same vein with Taktak, Zouari and Boudriga (2010) with reference to a previous study by Perez, Salas and Saurina (2008). Taktak et al. remark that "the correlation between LLPs and GDP growth is negative, suggesting an anti-business cyclical behavior of banks' LLP" (p. 121). Based on the regression results above, an increase of one standard deviation in the Gross Domestic Product (GDP) causes a decrease of 0.85745/5.403852 = 0.1586 of a standard deviation in Loan Loss Provisions (LLP).

Hypothesis 6

The results provide evidence for the rejection of the null hypothesis of a significant negative moderating effect of credit risk management on loan loss provisions. Instead, there is a positive moderating effect of credit risk management on loan loss provisions. How much of the Loan Loss Provisions (LLP) would increase by, if the moderating effect is increased by one of its standard

deviations? Or, if the moderating effect is increased by 13.24279, how much is the effect on Loan Loss Provisions (LLP)? The predicted effect is an increase of 13.24279(1.054251) = 13.961 in Loan Loss Provisions (LLP). Further, an increase of one standard deviation in the moderating effect causes an increase of 13.961/5.403852 = 2.584 of a standard deviation in Loan Loss Provisions (LLP).

Hypothesis 7

The results provide evidence for the rejection of the null hypothesis of a significant negative intervening effect of relevance and faithful representation on loan loss provisions. Instead, there is a positive intervening effect of relevance and faithful representation on loan loss provisions. Again, how much of the Loan Loss Provisions (LLP) would decrease by, if the intervening effect is increased by one of its standard deviations? That is, if the intervening effect is increased by 74.588, how much is the effect on Loan Loss Provisions (LLP)? The predicted effect is a decrease 74.588(0.0028636) = 0.2136 in Loan Loss Provisions (LLP). And, an increase of one standard deviation in intervening effect causes a decrease of 0.2136/5.403852 = 0.0395 of a standard deviation in Loan Loss Provisions (LLP).

The overall results for hypothesis testing are tabulated below.

**Table I.** Overall results for hypothesis testing

| No. | Hypothesis | Results |
|---|---|---|
| 1. | Hypothesis 1 | A *negative* relationship between Non-performing loan and Loan loss provisions |
| 2. | Hypothesis 2 | A *positive* relationship between Interest Income and Loan loss provisions |
| 3. | Hypothesis 3 | A *positive* relationship between Loans & Advances and Loan loss provisions |
| 4. | Hypothesis 4 | A *negative* relationship between Net profit and Loan loss provisions |
| 5. | Hypothesis 5 | A *negative* relationship between the Gross Domestic Product and Loan loss provisions |
| 6. | Hypothesis 6 | A *positive* moderating effect of credit risk management on Loan loss provisions |
| 7. | Hypothesis 7 | A *positive* intervening effect of relevance and faithful representation on Loan loss provisions |



## 5. Conclusions

The paper provides evidence in relation to the loan loss provisioning practices, which are based on variables, such as Non-performing loans, Interest income, Loans & advances, Net profit and the Gross Domestic Product, among others; and moderating effect of credit risk management, as well as intervening effect of relevance and faithful representation. In this way, banks will capture the loss expected to occur, and will continuously reassess changes in the loss expectations as the conditions affecting their borrowers may change. The guiding principles in the loan loss provisioning practices are in tune with the Expected Loss (EL) approach which replaces the Incurred Loss (IL) approach. The change from the Incurred Loss approach to the Expected Loss approach reflects the lessons learned from the Asian Financial crisis in 1997 and the Global Financial crisis in 2008. The crisis highlighted that the Incurred Loss model currently in practice does not accurately reflect credit losses expected to occur. This is because it requires a loss event to occur before a provision can be made. As such, it causes a delay in recognizing of expected losses. This paper sets out to strengthen the reliability of financial statements. In this way, the banks' financial reporting will faithfully represent their relevant and true underlying credit risk conditions. Further, the results of the Hausman specification test Prob>chi2 = 0.2952 failed to

reject the null hypotheses. Thus, to conclude the Random Effects model is more appropriate. It provides evidence that unique errors ($u_i$) are correlated with the regressors. In other words, the Random Effects model is a more preferred model as it produces estimators which are efficient and consistent. The findings that there are unique errors among banks that are correlated with the regressors enhance our understanding of the importance of different risks affecting assets portfolio of banks as Hussain and Al-Ajmi (2012) pointed out. The results of the Random Effects model indicate greater variations between the banks. The variations between the banks are higher at 0.9222; the variations within the banks are lower at 0.2857 as tabulated below in Table II.

**Table II.** Results of variations between the models

| No. | | Pooled Ordinary Least Squares (OLS) | Random Effects | Fixed Effects |
|---|---|---|---|---|
| 1. | R-squared: within | | 0.2857 | 0.2892 |
| 2. | R-squared: between | | 0.9222 | 0.4605 |
| 3. | R-squared: overall | 0.5263 | 0.5262 | 0.3546 |

Further, the results in the Panel Data Analysis show that there are unobserved heterogeneity that are unique in fundamental unmeasured ways among the 12 banks. The Random Effects model allows for the unobserved heterogeneity effects or features among the 12 banks. It suggests that different bank characteristics and in particular the risk profile of their loans is also a reason for their different loss experience. Besides the ability of the Random Effects model to account for the variations between the individual banks, the model also accounts for variations within the individual banks. The results provide suggestive evidence that the moderating variable "Credit Risk Management" positively moderates the relationship between the independent variables and the loan loss provisions. The moderating variable strengthens the relationship between the independent variables and the dependent variable. The relationship is stronger in banks with higher frequency of credit risk management meetings, and vice versa. Further, the results indicate that the intervening variable "Relevance and Faithful Representation" negatively intervene the relationship between the independent variables and the loan loss provisions. The relationship is weaker with stronger relevance and faithful representation. In other words, the higher the levels of relevance and faithful representation of Non-performing loans, Interest income, Net profit, Loans & advances, and the Gross Domestic Product (the independent variables); the lower the levels of loan loss provisions (the dependent variable); and vice versa.

How much of the Loan Loss Provisions (LLP) increase or decrease by, if the independent variables are increased by one of standard deviation? The effect on Loan Loss Provisions (LLP) if the independent variables are increased by one standard deviation is as tabulated below in Table III.

**Table III.** The effect on Loan Loss Provisions (LLP) if the independent variables are increased by one standard deviation

| | Independent variable | Effect on Loan loss provisions |
|---|---|---|
| 1. | Non-Performing Loans (NPL) | Decreased by 0.1093 |
| 2. | Interest Income (II) | Increased by 0.1228 |
| 3. | Loans & Advances (LA) | Increased by 0.2424 |
| 4. | Net Profit (NP) | Decreased by 1.726 |
| 5. | Gross Domestic Product (GDP | Decreased by 0.1586 |
| 6. | Credit Risk Management (CRM) (Moderating Variable) | Increased by 2.584 |
| 7. | Relevance & Faithful Representation (Intervening Variable) | Decreased by 0.0395 |

The results show that if the moderating variable (Credit Risk Management) is increase by one standard deviation, Loan Loss Provisions would increase by 2.584, which is the highest change. This information can be used to develop a more effective credit risk assessment, monitoring, measuring and recovery procedures by banks. Furthermore, it provides a new understanding of how credit risk management moderates the relationship between the determinants of loan loss provisions as Westerhagen (2004) earlier called for a further study to assess how credit risk management moderates the relationship between the determinants of loan loss provisions and the loan loss provisions. The most important practical implication is to assist investors and regulators in making informed decisions regarding loan loss provisioning of banks in Malaysia. An implication of this study is the possibility that longer sample periods from 1997 to date may be more informative. It has gone some way towards enhancing our understanding on the efficiency of commercial banks in Malaysia and loan quality as previously discovered by Ismail, Abd. Majid and Ab Rahim (2013). Further, the present study provides additional evidence with respect to the authors' contention that loan quality as measured by non-performing loan, is negatively associated with efficiency. Taken together, these findings provide additional evidence with respect to measuring the effect of non-performing loans on economic crisis, an exercise undertaken by the Central Bank of Nigeria as reported by Alao and Raimi (2011). The findings suggest future studies on differences between IFRS principles-based standards versus GAAP rules-based standards may enhance our understanding on the efficiency of the banks in the country. It could be an efficient way to reduce insolvency risk and improve banks performance. Also, it would be interesting to enlarge the explanatory variable in future studies to include variables such as financial liberalisation.



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**Appendix 1**

**Table AI.** The roles and responsibilities of the Risk Management Committee of a sample bank are for risk oversight that includes:

| No. | Responsibilities |
|---|---|
| 1. | To review and approve risk management strategies, risk frameworks, risk policies, risk |

| | |
|---|---|
| | tolerance and risk appetite limits |
| 2. | To review and assess adequacy of risk management policies and framework in identifying, measuring, monitoring and controlling risks and the extent to which they operate effectively |
| 3. | To ensure infrastructure, resources and systems are in place for risk management, i.e. ensuring that the staff responsible for implementing risk management systems perform those duties independently of the financial institution's risk taking activities |
| 4. | To review management's periodic reports on risk exposure, risk portfolio composition and risk management activities |

**Source:** Maybank Annual Report 2013, pp. 155

**Table AII.** The measurement of Credit Risk Management (CRM)

| No. | Bank | Credit Risk Management (CRM) |
|---|---|---|
| 1. | Maybank (Malaysia) Berhad | 0.985 |
| 2. | CIMB Bank (Malaysia) Berhad | 0.943 |
| 3. | Public Bank (Malaysia) Berhad | 1.00 |
| 4. | RHB Bank (Malaysia) Berhad | 0.959* |
| 5. | AmBank (Malaysia) Berhad | 0.979 |
| 6. | Hong Leong Bank (Malaysia) Berhad | 1.00 |
| 7. | EON Bank (Malaysia) Berhad | 1.00 |
| 8. | Affin Bank (Malaysia) Berhad | 0.975 |
| 9. | Alliance Bank (Malaysia) Berhad | 1.00 |
| 10. | HSBC Bank (Malaysia) Berhad | 1.00# |
| 11. | Standard Chartered Bank (M) Berhad | 0.964 |
| 12. | Citibank (Malaysia) Berhad | 0.975 |

(Notes: * Annual Report 2013 (pp. 22), Director 1, 24/25 = 0.88, Director 2, 24/25 = 0.96, Director 3, 25/25 = 1, Director 4, 19/25 = 0.76, and Director 5, 24/25 = 0.96; giving an average attendance for the directors = 0.959; # Annual Report 2013 (page 12), a total of 6 meetings were held during the year and all 5 members attended every meeting, giving an average attendance for the directors = 1.00).

**Table AIII.** Measurement of Relevance and Faithful

| | Bank | Relevance and Faithful | |
|---|---|---|---|
| | | Years 1997-2009 | Years 2010 & after |
| 1. | Maybank (Malaysia) Berhad | 0 | 1 |
| 2. | CIMB Bank (Malaysia) Berhad | 0 | 1 |
| 3. | Public Bank (Malaysia) Berhad | 0 | 1 |
| 4. | RHB Bank (Malaysia) Berhad | 0 | 1 |
| 5. | AmBank (Malaysia) Berhad | 0 | 1 |
| 6. | Hong Leong Bank (Malaysia) Berhad | 0 | 1 |
| 7. | EON Bank (Malaysia) Berhad | 0 | 1 |
| 8. | Affin Bank (Malaysia) Berhad | 0 | 1 |
| 9. | Alliance Bank (Malaysia) Berhad | 0 | 1 |
| 10. | HSBC Bank (Malaysia) Berhad | 0 | 1 |
| 11. | Standard Chartered Bank (M) Berhad | 0 | 1 |
| 12. | Citibank (Malaysia) Berhad | 0 | 1 |

**Appendix 2**

**Table AIV**. Regression output

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| CONSTANT | 32.54049 | 28.41119 | 1.145340 | 0.2522 |
| NPL | -0.755787 | 0.308299 | -2.451478 | 0.0143 |
| INTINCOME | 0.835475 | 0.402590 | 2.075251 | 0.0381 |
| NETPROFIT | -1.319072 | 0.312536 | -4.220540 | 0.0000 |
| LOANADV | 1.455105 | 0.443710 | 3.279402 | 0.0011 |
| GDP | -1.718658 | 0.362137 | -4.745883 | 0.0000 |
| CRM | -84.27543 | 28.46356 | -2.960818 | 0.0031 |
| MODERATING | 1.054251 | 0.317399 | 3.321534 | 0.0009 |
| INTERVENING | -0.002864 | 0.001438 | -1.991246 | 0.0466 |
| R-squared | 0.526343 | | | |
| Adjusted R-squared | 0.524717 | | | |

Notes: LLP = Loan Loss Provisions, an expense account in the income statement. NPL = Non-Performing Loans, an outstanding amount of loans that is classified as non-performing when principal or interest is six months or more in arrears. INTINCOME = Interest Income, an interest earned on loans, advances and financing. NETPROFIT = Net Profit, a net gain arising from loans, advances and financing; and LOANADV = Loans & advances, an outstanding of gross loans, advances and financing. GDP = Gross Domestic Product, the total Ringgit value of all goods and services produced over a specific time period. CRM = Credit Risk Management, a moderating variable that is assigned a variable of 1 for banks with full-frequency of credit risk management committee meeting; and less than 1 for banks with lesser meetings frequency. MODERATING = interaction term between the moderating variable and the independent variables. INTERVENING = intervening term that is assigned a variable 0 for reporting years 2010; 1 for reporting years 2010 and after.

**Table AV.** The *Breusch-Pagan* test results

| Source | SS | df | MS | Number of obs = 195 | | |
|---|---|---|---|---|---|---|
| Model | 2981.79042 | 8 | 372.723803 | F(8,186) = 25.84 | | |
| Residual | 2683.3236 | 186 | 14.426471 | Prob > F = 0.0000 | | |
| Total | 5665.11403 | 194 | 29.2016187 | R-squared = 0.5263 | | |
| | | | | Adj R-squared = 0.5060 | | |
| | | | | Root MSE = 3.7982 | | |
| LLP | Coef. | Std. Err. | t | P> (t) | (95% Conf. Interval) | |
| NPL | -.755787 | 1.091405 | -0.69 | 0.489 | -2.908912 | 1.397338 |
| INTINCOME | .8354753 | 1.425206 | 0.59 | 0.558 | -1.976172 | 3.647123 |
| NETPROFIT | -1.319072 | 1.106408 | -1.19 | 0.235 | -3.501794 | .8636495 |
| LOANADV | 1.455105 | 1.570776 | 0.93 | 0.355 | -1.643723 | 4.553933 |
| GDP | -1.718658 | 1.281997 | -1.34 | 0.182 | -4.247781 | .8104662 |
| CRM | -84.27543 | 100.7637 | -0.84 | 0.404 | -283.062 | 114.5111 |
| MODERATING | 1.054251 | 1.123622 | 0.94 | 0.349 | -1.16243 | 3.270932 |
| INTERVENING | -.0028636 | .0050911 | -0.56 | 0.574 | -.0129073 | .00718 |
| _cons | 32.54039 | 100.5783 | 0.32 | 0.747 | -165.8803 | 230.9613 |

Notes: LLP = Loan Loss Provisions, an expense account in the income statement. NPL = Non-Performing Loans, an outstanding amount of loans that is classified as non-performing when principal or interest is six months or more in arrears. INTINCOME = Interest Income, an interest earned on loans, advances and financing. NETPROFIT = Net Profit, a net gain arising from loans, advances and financing; and LOANADV = Loans & advances, an outstanding of gross loans, advances and financing. GDP = Gross Domestic Product, the total Ringgit value of all goods and services produced over a specific time period. CRM = Credit Risk Management, a moderating variable that is assigned a variable of 1 for banks with full-frequency of credit risk management committee meeting; and less than 1 for banks with lesser meetings frequency. MODERATING = interaction term between the moderating variable and the independent variables. INTERVENING = intervening term that is assigned a variable 0 for reporting years 2010; 1 for reporting years 2010 and after.

**Table AIV.** *Breusch and Pagan Lagrangian* multiplier test for random effects

LLP (Code, t) = Xb + u (Code) + e (Code, t)

Estimated results:

| | Var | sd = sqrt (Var) |
|---|---|---|
| LLP | 29.20162 | 5.403852 |
| e | 13.90175 | 3.728505 |
| u | .2024108 | .4499009 |
| Test: Var (u) = 0 | | |
| chibar2 (01) = 0.16 | | |
| Prob > chibar2 = 0.3431 | | |

**Table AV.** The Hausman specification test results are as tabulated below.

\- Coefficients -

| | (b) Fixed | (B) | (b-B) Difference | sqrt(diag(V_b-V_B)) S.E. |
|---|---|---|---|---|
| NPL | -1.119382 | -.8061892 | -.3131928 | .5861254 |
| INTINCOME | .9186528 | .85772 | .0609328 | .5429834 |
| NETPROFIT | -1.559117 | -1.355273 | -.2038434 | .5689709 |
| LOANADV | .603727 | 1.349586 | -.7458586 | .8561997 |
| GDP | -1.681995 | -1.721458 | .0394633 | .6632287 |
| MODERATING | 1.346659 | 1.095849 | .2508096 | .6089006 |
| INTERVENING | -.0031458 | -.002945 | -.0002007 | .0014922 |

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2 (7) = (b-B) ' [(V_b-V_B) ^ (-1)] (b-B)
= 8.44
Prob>chi2 = 0.2952
(V_b-V_B is not positive definite)

Notes: NPL = Non-Performing Loans, an outstanding amount of loans that is classified as non-performing when principal or interest is six months or more in arrears. INTINCOME = Interest Income, an interest earned on loans, advances and financing. NETPROFIT = Net Profit, a net gain arising from loans, advances and financing; and LOANADV = Loans & advances, an outstanding of gross loans, advances and financing. GDP = Gross Domestic Product, the total Ringgit value of all goods and services produced over a specific time period. MODERATING = interaction term between the moderating variable and the independent variables. INTERVENING = intervening term that is assigned a variable 0 for reporting years 2010; 1 for reporting years 2010 and after.