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Risk Management Behaviour of Selected Commercial Banks in Malaysia

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ABSTRACT

The purpose of this paper is to examine the risk management behaviour of selected commercial banks in Malaysia based on their stock performance in term of Average Daily Return (ADR) and Value at Risk (VaR). VaR is measured using Historical Simulation Model. We present results of ADR and VaR at 99% confidence interval, on one-day horizon from year 2003-2010, for the following stock index of eight commercial banks in Malaysia: RHB; Maybank; CIMB; Affin; Alliance; Ambank; Hong Leong and Public Bank. The ADR and VaR of each commercial bank in Malaysia are measured and compared to identify their risk behaviours. The risk management behaviour of commercial banks in Malaysia can be categorised into three categories: conservative; moderate; and aggressive. Our results show that the risk management behaviour of one bank is considered conservative, three banks are considered moderate and four banks are considered aggressive. This may give suggestions to the investors which bank/banks to invest in.

Introduction

The financial crisis occurs when the value of asset of financial institutions drops rapidly. It is much related with the investor behaviour. The panic situations led the investors to sell off their assets and withdraw their money from their bank accounts. This is due to the assumptions that the value of those assets will continuously drop if they remain at the financial institution. If the phenomenon happens continuously, then it will cause the economy to go into a recession or depression. However, the panic situation is normally due to certain core issues that potentially affect the economy such as what happened during the financial crisis of 1998. It started when the announcement of the Thai Baht which would be allowed to float, effectively devaluing the Baht by 20% (Bhagwan Chowdhry, 2000). Another crisis is the global financial crisis in 2007-2008 with the debt issues of subprime mortgage crisis in the United States where it was later spread to the rest of the world including East Asia like Malaysia. The subprime crisis in the US began to unfold in the summer of 2007, and soon transferring into a global financial crisis (Reinhart & Rogoff, 2009).

As a financial institution, banks are authorized and regulated by the state or federal government. They accept deposits from customers and transfer into lending activities, either directly or through the capital market. All banks are subject to minimum capital requirements set by international standard capital standard of Basel Accords. Basically, banks can be categorized into four types of banks: commercial banking which deal with individuals and small businesses; business banking which deal with mid-market businesses; private banking which provide services of wealth management to high net worth individuals and families; and investment banking which deal with financial markets activities.

In terms of risks, generally, banks are exposed to various types of risks. Risks can be broadly categorised into business and financial risks. Business risks are risk associated with the underlying operations of a business or the probability that a company incurred lower anticipated profit from the expected, and experienced greater loss than profit. Financial risk is the uncertainty of losses due to the financial market activities. Financial risk can be divided into market risk, liquidity risk, credit and operational risk. Santomero (1996) added counterparty risk, and legal risk for the banking sector as a whole.

In terms of the performance of banks, one way is by looking at the risk and return of their stocks. This study is primarily concerned with the risk measurement and variability of stocks return using one of the risk management models to examine the risk behaviour of commercial banks in Malaysia. Measuring the stock return may give us the picture of economic efficiency of the investment. The model employed in this study is Value-at-Risk (VaR) because this model is widely used due to the requirement under Basel II Accord that require banks and any financial institutions to communicate their daily market risk to the relevant national monetary authority (Steelyana, 2000). Basel II Accord consists of three main pillars: minimum capital requirement; supervisory review; and market discipline. We focus on the first pillar (minimum capital requirement) which deals with maintenance of regulatory capital calculated for three major components of risks that a bank faces: credit risk; operational risk; and market risk. From these three risks, VaR model is the preferred approach to measure the market risk. In addition, by making use of VaR tool, institution can decide how to assign economic capital and how to assess trade-off between risk and return.

Furthermore, VaR method is a well-known tool of risk evaluation, widely used in the banking sector as their risk management procedures (Aniūnas et al., 2009). It has become important tool and many studies had used this model (McAleer, et al., 2009). As stated by Jorion (2001, page 22) "VaR

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measures the worst expected loss over a given horizon under normal market conditions at a given level of confidence". The purpose of VaR model is to answer the question "what is the most I can lose from my investment?" VaR can be explained as the highest possible losses of an investment in one asset or a portfolio of asset in certain holding period and with a certain acceptable confidence level.

Therefore, we examine the risk management behaviours of commercial banks in a certain period by identifying the VaR of each stock for every year. In this paper, we chose the period from 2003-2010 and categorized under three: before the financial crisis (2003-2006); during the financial crisis (2006-2008); and after the financial crisis (2008-2010). We relatively compare the annual VaR and ADR of each bank. Then, we categorize their risk behaviours into three: aggressive (when a particular stock repeatedly denoted high value of VaR); moderate (when the particular stock repeatedly denoted moderate value of VaR); and conservative (when the particular stock always denoted low value of VaR). In addition, this study investigates the relationship between the risk behaviour and average daily return of commercial banks' stocks before, during and after the subprime mortgage crisis. Finally, the results may give information on the risk management behaviours among commercial banks in Malaysia and give suggestion to the investors which stocks are better to invest in.

Literature Review

There are numerous studies that focussed on banks' risks and the impact not only on their performance but to the economic and financial markets as a whole. Shirai (2009), for example, argues that the subprime mortgage crisis mainly in the United State is far more complicated compared to the previous of crisis (e.g., the Great Depression of 1929-1930s, the Saving and Loan crisis in the 1980s-90s, and the bursting of the IT bubble of 2000-01). The crisis has brought a huge impact on the economic and financial markets. Majority of the financial institutions and banks have faced large losses because of the declining in transactions in the interbank markets and plunge in their stock price (Shirai, 2009). The risks associated with investment increased during the crisis. The financial crisis has affected many investors that they will never forget. The reasons, impact and solutions to the crisis become an important research in the academic. Some were questioning about the regulations especially in the United States whether appropriate monitoring and encouragement of (possibly excessive) risk taking are in place (McAleer et al., 2009). In term of commercial banks in Malaysia, the losses can be clearly seen in the downtrend of their stock prices.

Different authors have defined risk in various perspectives. Steelyana (2001) defined risk as the volatility of unexpected outcome, which can represent the value of assets, equity, or earnings. Redhead (2008) posited that the experts and individual investors have different perceptions towards investment risks. Experts like fund managers and financial advisers, look at risk with a narrow definition, objective and measureable. The perceptions of risk for individual investors are more likely to be a subjective, multi-dimensional view of risk and strongly influenced by social interaction. A survey conducted by Investment Company Institute in year 1996 reported that 85% of mutual fund investors are concentrated on downside risk and some investors and academics defined risk as its standard deviation (Fortuna, 2000). Even Markowitz & Harry (1959) recognized that a semi variance me asure of asset risk that focused only on the risks below certain target return would be more intuitively appealing measure and the standard deviations are chosen for technical reasons.

Bank as an important player in providing services to the customers are also taking part to gain profit as much as possible from their activities such as investment fund and loans. However, the risks are always related with the profit. Therefore, the most important bank's managerial tasks are measuring risk and response with appropriate risk management tool. Kazlauskiene & Christauskas (2007) posited that risk management is defined as priority issues of management in the global context. Risk management becomes an important task to ensure that risk can be avoided, transferred, or reduced. Santomero (1996) argued that banks need not absorb all risks since they can efficiently transfer the risks to other participants. The risks are the main factor that affect the value of banks in the market and much related with the confidence of investors to the banks image (Strumickas & Valanciene, 2006).

The acceptable risks or the degree of risk aversion are different between investors. Some of them are aggressive, moderate and conservative risk takers. Liu & Wang (2010) investigated the nature of investment styles and issues in asset allocation decisions and found that risk-averse have significant relationship with capital value in the investment. The study concluded that in the shorter investment horizon, large-cap growth style is better for more risk-averse investors, while small-cap value style is better for longer investment style. However, the small-cap value style is always the safest style for more aggressive investor regardless of the investment horizons. These investment styles are important to help investors making decisions in their investment strategy.

Therefore, to evaluate acceptable risk level can be achieved using investment models. However, different model may give different answers. That is why some models become more popular because the ability to evaluate risk with the volatility of market movement. For example, VaR approach introduced by Jorion (2000) becomes an important method in the investment strategies to evaluate and analyze the risk of portfolios. Before that, traditional standard deviation and volatility technique are widely used to evaluate risk. Gupta and Liang (2005) on their study to compare traditional standard deviation and VaR, found that VaR is better measurement because of its ability to capture the risk characteristic especially in term of skewness, and kurtosis.

Jing & Zhao(2010) studied the correlations between the VaR and hedge return for the period, pre-Financial-Crisis and during Financial Crisis using cross-sectional regression. They found that there is significant positive correlation between VaR and hedge return. However, the correlation weakened during the financial crisis. This result is very useful to the investment strategies. The findings are parallel with the study conducted by (Bali et al., 2007) who argued that VaR of hedge funds has strong correlation with hedge fund return. They developed an investment strategy from the findings that proposed the strategy to sell low and buy high VaR portfolio and sell high change and buy low change of VaR (ΔVaR).

Methodology

Data: The data used in calculating the Value at Risk (VaR) of eight commercial banks in Malaysia (RHB, Maybank, CIMB, Affin, Alliance, Ambank, Hong Leong and Public Bank), were from 1st January 2003 to 31st December 2010 provided by the website *Yahoo Finance*. The variables required

are the date and the adjusted close price for those particular assets. Adjusted close price is the stock's close price that has been amended to include any distributions and corporate actions that occurred at any time prior to the next day's open. The data is on the daily basis index which is the close price for the particular assets. It consists of two thousand and fifty (2050) observations from 2003 to 2010. The historical data are used to measure the performance of banks using the average daily return as an indicator. The average daily return for each bank will be calculated annually and for the whole period. The average daily return will be compared between the Kuala Lumpur Composite Index (KLCI) daily return with the banks' daily return. Then, the daily return can rank the performance among these banks based on their daily return. Average daily return is a useful tool for investors to decide where to invest in.

The historical data will also be used to forecast annual VaR for each bank using Historical Simulation Model. This method is employed because historical simulation can cope with the options in a portfolio. This model can cope with all vanilla exchange traded and over-the-counter (OTC) options (Best, 1998). The most important advantage of this model is that it reflects the actual market behaviour without assuming that the price changes are normally distributed.

Return as the key performance indicator: Return is the numerical measure of investment performance. The returns are normally measured in percentage. It consists of the income and the capital gains relative to investment. Percentage return measures investment performance per Ringgit Malaysia invested. It represents the percentage increase in the investor's wealth that results from making the investment. There are two types of return measurement which are daily return and average daily return.

Daily Return: All the bank stocks in this study are computed on a daily basis. We take the price at time *t-1* and *t* as a guide to calculate the return in order to get the daily returns on each bank. In the calculation, we need to take the log of both price (*t-1 and t*) and find the differences. Since the daily returns are holding period returns, we convert the daily return to log-returns.

In a formula form, it is as follows:

$$R_t = \ln(CP)_t - \ln(CP)_{t-1} \quad (1)$$

R_t = daily return at time *t*

$(CP)_t$ = closing price at time *t*

$(CP)_{t-1}$ = closing price at time *t-1*

t = period

Average Daily Return ($\overline{R}_t$): The average daily return indicates the performance of the sector in a given period of time. In a similar investment, we have to evaluate the performance of each portion such as stocks. The formula of the average return is as follows:

$$\overline{R}_t = \frac{1}{N}\sum_{t=1}^{N} R_t \quad (2)$$

$\overline{R}_t$ = average daily return at time *t*

N = number of daily returns

R_t = daily return at time *t*

Value-at-Risk: Historical Simulation uses the historical price of assets in the portfolio to measure the VaR for the current portfolio of assets at any particular in time. The distribution of profit and loss of the current or the selected portfolio will be produced and the VaR can be determined according to a chosen confidence level. It is very computationally intensive if the portfolio has long length of historical price or large number of assets.

Best (1998, page 34) proposes the correct method to calculating VaR using historical simulation. He summarized into 4 steps:

(1) Obtain percentage price change series for every asset or risk factor needed to revalue the portfolio.

(2) Apply price change to portfolio, to generate a 'historical' series of portfolio values changes.

(3) Sort the series of portfolio value changes into percentiles.

(4) The VaR of the portfolio is the value of changes corresponding to the required level of confidence.

In this study, we measure the VaR for the individual asset, before, during and after the subprime mortgage crisis, 2003-2010.

Historical Price Series: In the historical simulation, choosing the length of time series is very crucial part because the time of series will be used to represent the future. It is will give the significant impact on the VaR characteristic due to the chosen of time series. Best (1998) proved that the VaR behaviour will be different when using different observation period. In this paper, we use the time series for eight years beginning from 2003 until 2010. However, for the purpose of looking at the behaviour of each bank before, during and after the crisis, we calculate VaR for each year.

Confidence Interval: The market risk surface can be analyzed by varying the level of confidence. The most common confidence levels are between 95% and 99%, although they can vary between 90% and 99.9% (Hendricks, 1996). The Basel Committee requires the use of 99% confidence level in official reporting, as it must be high enough for capital requirement calculations, but a lower level of confidence (e.g. 95%) can be used for internal reporting. This study used 99% confidence interval with holding period N of one day to find VaR. The VaR 99% of banks for each year will be compared with the average daily return to find the best asset to invest in.

Determine VaR using Historical Simulation: Once a series of asset value changes has been generated, VaR can be determined. The asset value changes will be sorted into percentiles. A percentile contains 1% of the value changes. The asset value changes must first be sorted and then placed into percentiles. The VaR of any confidence interval for the portfolio can be determined. For example VaR at 99% confidence interval can be determined by looking at the value of the sorted portfolio changes at 1% percentile.

Average Daily Return vs Value at Risk: Average Daily Return (ADR) is measured annually for each commercial banks in Malaysia from 2003-2010. In term of investment, we can evaluate the performance of stock using ADR as a simple tool. The daily return and losses will be sum up and divided by the total days of the years as shown in Equation (2). The higher ADR of stock, the better performance of stock because we can say the stocks generate higher return than losses for that particular year. Usually there is a trade-off between risk and return where low-risk securities often produce commensurately low returns. The measurement of the average daily return

includes return and losses which mean the high value of ADR shows the stability of particular stock on generating profit.

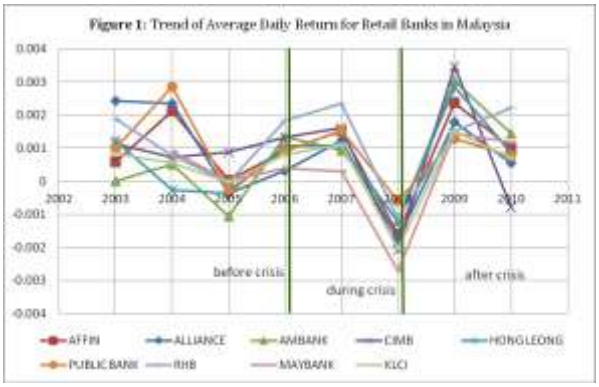
The best investment is if we can generate higher income with low risk. Therefore, measuring risk of each stock is very crucial in the investment decision. The Value at Risk (VaR) is a well-known tool in risk management to measure the worst expected loss over a pre-set time horizon at a given confidence level (Jorion, 2000). If one stock denoted high figure of VaR, it means that the stock is of high risk. Therefore, we may observe the risk behaviour of stock in certain period if we can identify the VaR of each stock for every year. In this paper, we relatively compared the annual VaR of each commercial banks and KLCI. The risk management behaviours are determined in this study to investigate how to risk behaviour of commercial banks before, during and after the financial crisis.

After the value of average daily return (ADR) and value at risk (VaR) are measured, we can compare the performance of each stock. The higher average daily return and the lower VaR is the better asset to invest because it is expected to give higher return with lower risk.

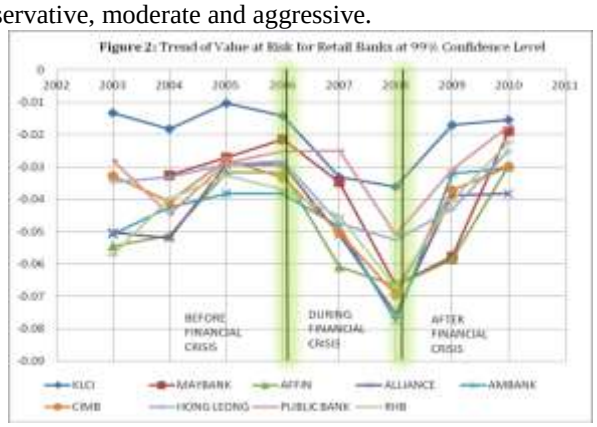
Results and Discussions

Average Daily Return: The average daily returns indicate the performance of each bank in a given period of time. We calculate the annual average daily return for each stock of commercial banks in Malaysia using Equation (2). We summarize the results in Table 1 and Figure 1. From Table 1, we can see the summary of average daily returns each stock of commercial banks in Malaysia and the market return (Kuala Lumpur Composite Index (KLCI)). In 2003, all the banks are performing better than the market except Affin and AmBank. In 2004, Hong Leong and AmBank are performing below the market whereas Maybank, Affin, Alliance, CIMB, Public bank and RHB performed better than the market. In 2005, it appears that KLCI and all banks except Maybank, Affin and CIMB obtained negative average daily return. However, in 2006, the market return is positive and all banks except Maybank and Alliance perform better than the market. Maybank, Ambank and Hong Leong perform below the market in 2007. In 2008, which is the peak of the recession period, all banks obtained negative average daily return and perform better than the market except Maybank and CIMB. In 2009 and 2010, which is the recovery period, majority of the commercials banks perform better than the KLCI. Generally, we can say that the performance of the commercial banks in term of daily return is better than the market return: at least five banks denoted higher average daily return compared with the market return.

Value at Risk: The study used one day holding period and the confidence level 99%. The VaR measured the expected maximum losses of the assets at the given confidence interval. The higher figure of VaR means the higher risk of investment in the particular assets. Therefore, if we can illustrate VaR for every year, we can see the trend of the risk behaviour for the assets. This is shown as in Figure 2.



From Figure 2, all commercial banks in Malaysia incurred higher losses before, during and after the financial crisis compared with the market losses. This can be proved based on the trend of VaR for each commercial bank during the period. Therefore, generally, investments in the commercial banks stocks are higher risk. We broke the timeline into three periods for comparison purpose; before the financial crisis from year 2003 until 2006, during the financial crisis from year 2006 until 2008 and after the financial crisis from year 2008 until 2010. We also categorized the trend of the risk management behaviours of banks into three categories which are conservative, moderate and aggressive.



Before the Financial Crisis (2003-2006): In term of average daily return, commercial banks in Malaysia perform better than market return. Three banks, Alliance, Public Bank and RHB can be categorized as having high average daily return before the financial crisis. In year 2004, Public Bank and Alliance earned the highest average daily return. However, in year 2005, all the average daily return for all banks fell except CIMB. If we look at the trend, CIMB has a stable increase from year 2004 until 2007 although the increase is small. Ambank, Maybank and Hong Leong earned the lowest average daily return before the financial crisis.

In term of VaR, Affin, Alliance, Ambank and RHB have large figure of VaR .The risk behaviour of these four banks can be categorized as aggressive. The investors in these four banks have high potential to face huge losses based on VaR. Maybank had the lowest VaR which means the risk behaviour of Maybank is still on the conservative level. The risk management behaviour of CIMB, Hong Leong and Public bank are on the moderate level.

Table 1: Average Daily Return for Commercial Banks in Malaysia

Year	Maybank	Affin	Alliance	AmBank	CIMB	Hong Leong	Public Bank	RHB	KLCI
2003	N/A	0.0006	0.0024	0.0000	0.0011	0.0012	0.0010	0.0019	0.0008
2004	0.0009	0.0021	0.0024	0.0005	0.0007	-0.0003	0.0029	0.0008	0.0005
2005	0.0000	0.0000	-0.0004	-0.0011	0.0009	-0.0004	-0.0003	0.0000	0.0000
2006	0.0004	0.0009	0.0003	0.0013	0.0013	0.0011	0.0009	0.0018	0.0008
2007	0.0003	0.0015	0.0012	0.0009	0.0016	0.0011	0.0015	0.0024	0.0011
2008	-0.0027	-0.0016	-0.0018	-0.0012	-0.0021	-0.0012	-0.0006	-0.0011	-0.0020
2009	0.0014	0.0024	0.0018	0.0030	0.0035	0.0028	0.0013	0.0015	0.0015
2010	0.0012	0.0010	0.0006	0.0014	-0.0008	0.0009	0.0008	0.0022	0.0007
Notes: N/A = Not available, KLCI = Kuala Lumpur Composite Index									

The best investment is when we can earn much profit with the low risk (See Table 2). Therefore, it is good for investor to invest in the stocks of high average daily return on the conservative risk behaviour. Among the stocks of commercial banks in Malaysia, Public bank stock is a better choice because it is able to generate high average daily return on the moderate level of risk behaviour. The second choice is CIMB because it generates moderate average daily return on the moderate level of risk behaviour. The Ambank stock should be the last choice of investment base on VaR.

Table 2: Risk Behaviour and ADR of Commercial Banks before the Financial Crisis

Bank	Risk Behaviour	Average Daily Return
Maybank	Conservative	Low
Affin	Aggressive	Moderate
Alliance	Aggressive	High
Ambank	Aggressive	Low
CIMB	Moderate	Moderate
Hong Leong	Moderate	Low
Public bank	Moderate	High
RHB	Aggressive	High

During the crisis 2006-2008: In year 2006 to 2008, the sub-prime mortgage crisis had caused a great financial crisis worldwide including Malaysia. The chart of average daily return and value at risk clearly shows the downtrend pattern during the crisis. The stock prices of banks drop rapidly and it is hard to make profit during this period. The huge losses can be seen through the value at risk chart (Figure 2), when all banks denoted higher VaR. The commercial banking sector in Malaysia faced greater losses compared to the market loss.

Almost all the eight commercial banks incur losses with negative value of ADR. However, if we take the average of ADR for 2006 and 2008, Public Bank and RHB are still making profit. The largest losses based on VaR incurred by Ambank followed by Alliance and Affin. Although the losses incurred by Affin on the peak of recession in 2008 are not too large compared with Ambank and Alliance but Affin incurred the largest loss in 2007. Therefore, we classified the risk management behaviours of these three banks as aggressive.. The best stock performance during this recession period is Public Bank because of small figure of VaR. We consider the risk management behaviour of Public Bank as conservative.

Although generally all the stocks in the commercial banking sector in Malaysia during the financial crisis are making losses but Public Bank and RHB may be considered as the best investment choice. Public Bank has the highest average daily return with conservative risk behaviour. RHB also has high average daily return with moderate risk behaviour level. The worst performers during this period are Alliance and CIMB because they have low average daily return and aggressive risk behaviour. Table 3 summarizes the situation during the financial crisis.

After the Financial Crisis (2008-2010): Based on Figure 2, the financial crisis due to the sub-prime mortgage started to recover as early as 2009. All the commercial banks in Malaysia have shown rapid increase in term of average daily return. CIMB generates the highest average daily return in 2009 but suddenly had the lowest in 2010. Generally, the average daily return for all commercial banks drops in 2010 except RHB. Alliance and Public bank have the lowest average daily return after the crisis.

Table 3: Risk Behaviour and ADR of Commercial Banks during the Financial Crisis

Bank	Risk Behaviour	Average Daily Return
Maybank	Moderate	Low
Affin	Aggressive	Moderate
Alliance	Aggressive	Low
Ambank	Aggressive	Moderate
CIMB	Aggressive	Low
Hong Leong	Moderate	Moderate
Public bank	Conservative	High
RHB	Moderate	High

The maximum losses of the commercial banks have also significantly decreased after the financial crisis. However, they are still higher than maximum market losses. We classified the risk behaviour of Public bank as conservative because they had the lowest VaR. Ambank, CIMB, Hong Leong and RHB appear to have moderate risk management behaviour. The other three banks which are Maybank, Alliance and Affin are categorized as aggressive risk behaviour. Based on our findings, we suggest that Ambank, Hong Leong and RHB are good stocks to invest after the financial crisis because they have high average daily return with the moderate level of risk behaviour. The trend of the risk behaviour and average daily return after the financial crisis can be summarized in Table 4.

Table 4: Risk Behaviour and ADR of Commercial Banks after the Financial Crisis

Bank	Risk Behaviour	Average Daily Return
Maybank	Aggressive	Moderate
Affin	Aggressive	Moderate
Alliance	Aggressive	Low
Ambank	Moderate	High
CIMB	Moderate	Moderate
Hong Leong	Moderate	High
Public bank	Conservative	Low
RHB	Moderate	High

Conclusion and Future Research

The sub-prime mortgage crisis of 2003-2010 has created huge losses to the all industries around the world including the banking sector in Malaysia. The stock prices rapidly dropped creating the panic situation and encouraged the investors to sell their stocks to avoid the price to drop further. The objective of this paper is to examine the risk management behaviours of eight commercial banks in Malaysia.

Our results suggest that before the financial crisis, Ambank, Maybank and Hong Leong earned the lowest ADR. In term of VaR, Affin, Alliance, Ambank and RHB had high VaR values. The risk management behaviours of these four banks can be categorized as aggressive. The investors in these four banks have high potential to face huge losses based on VaR. Maybank had the lowest VaR which means the risk behaviour of Maybank is still on the conservative level. The risk management behaviours of CIMB, Hong Leong and Public bank are on the moderate level.

Although generally all the stocks in the commercial banking sector in Malaysia during the financial crisis are making losses but Public Bank and RHB may be considered as the best investment choice. Public Bank had the highest ADR with conservative risk behaviour. Similarly with RHB bank. The worst performers during this period were Alliance and CIMB because they had low ADR with aggressive risk management behaviour.

After the financial crisis, our results suggest that, the risk management behaviour for Public Bank is conservative because they had the lowest VaR. Four banks' stocks (Ambank, CIMB, Hong Leong and RHB) are grouped as moderate risk behaviour.

The other three banks which are Maybank, Alliance and Affin are categorized as aggressive risk behaviour. Based on our findings, we suggest that Ambank, Hong Leong and RHB are the good stocks to invest after the financial crisis because they have high ADR with the moderate level of risk management behaviour.

Future research should use other confidence level for VaR values so that we can make a comparison using different confidence levels.

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