UPM-SAGE Publications Young Writer's Award 2015 Papers

http://www.epsas.upm.edu.my/upmsage

MARKOWITZ PORTFOLIO THEORY AND CAPITAL ASSET PRICING MODEL FOR KUALA LUMPUR STOCK EXCHANGE

Lee Hui Shan

Department of Economics, Faculty of Economics and Management, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. E-mail: huishan.leehuishan@gmail.com

ABSTRACT

Capital Asset Pricing Model is widely used by investors to estimate the return or the moving behavior of the stock and Markowitz Model is employed to achieve portfolio diversification. This study examines whether CAPM is valid to forecast the behaviour of the each individual stock and its return as well as its validity in the portfolio with stocks listed in Malaysia. Second, it evaluates the suitability of Markowitz Model to evaluate the performance of the Malaysia investment portfolio. It is concluded that CAPM is reasonable to be the indicator of stock prices in Malaysia as well as in portfolio basket. It proves that there is linearity in CAPM but unique risk and systematic do not need to be captured. Managers can use CAPM as a proxy to estimate their stock return and diversify the portfolio to reduce the unsystematic risk to enable them to execute the right policy in their management in order to maximise profit at the same time increase shareholder wealth maximisation. Furthermore, it is suggested to apply Markowitz portfolio diversification to reduce the unsystematic risk. Overall, portfolio diversification could build up the investors' confidence towards the investment decision and to develop a sound investment financial market in assisting Malaysia to achieve its mission to be a developed country in 2020.

Keywords: Capital asset pricing model, Risk and return, Markowitz Portfolio Diversification

INTRODUCTION

In this new century, stock investment is not only heavily traded by local institutions and foreign institutions, it has become very common for household investors to involve in stock market as well. This is due to the transparency of the reporting requirement by the public listed companies and the new advanced technology and software. Malaysia is not an exception, stock market Malaysia which is Kuala Lumpur Security Exchange (KLSE) has expanded significantly with market capitalisation increasing from RM444 billion in 2000 to RM1.2 trillion in 2010 (BNM 2012). This is because investors notice that by investing in stock market, it will offer them higher return. It is also believed that stock market is one of the major contributions for Malaysia's economic development. (Zeti, 2009)

Capital Asset Pricing Model is widely used by investors to estimate the return or the moving behavior of the stock whereas Markowitz Model is employed to achieve portfolio diversification. The study by (Rahman, 2010) investigated the factors of the capital asset pricing model (CAPM) risk exposures by using Malaysia commercial banks. (Lean & Parsva, 2012) examined the performance of Islamic indices in Malaysia with CAPM. Their studies are focusing on CAPM with performance of Islamic indices or commercial banks in Malaysia, but not the stocks come from variety of industries which could be more representative of the performance of the stocks in Malaysia. Moreover, the study on portfolio diversification by Markowitz Model is used by researchers to study on the sample in Malaysia in the area of oil by Mansourfar et al. (2010) and Islamic Unit trust by Kassim & Kamil, (2012) are narrower in a specific industry. In addition, the study by Goh et al. (2014) only investigated 25 companies' stocks in the portfolio to examine the portfolio diversification might be less convincing due to lesser sample data selection.

This paper attempts to study an empirical assessment of the benefits of portfolio diversification in the Malaysia's stock market and more particularly it involves four vital objectives. First, it examines whether CAPM is valid to forecast the behaviour of each individual stock and its return. Secondly, it tests the validity of CAPM in the portfolio with the stocks listed in Malaysia. Thirdly, it evaluates the suitability of

Markowitz Model to study the performance of the Malaysia investment portfolio and whether portfolio investment is preferable to single company's stock investment. Lastly, it studies the effectiveness of portfolio diversification in reducing risk.

This paper will elaborate the relevant literature review, details the methodology, present the data and interpretation of the results in the next section. Finally, the last part will summarise the main finding and present some concluding remarks.

LITERATURE REVIEW

Investors apply many techniques to minimise risk at the same time to optimise return. Among the methods are Markowitz Model developed by Harry Markowitz in 1952 and followed by its development which is Capital Asset Pricing Model (CAPM) by Jack Treynor (1962), William (1964), John Lintner (1965) and Jan Mossin (1966) independently. CAPM takes into the account of asset's sensitivity to non-diversifiable risk (systematic risk) and is symbolised by the beta (ß) in the industry, as well as the expected return of the market and the expected return of a theoretical risk-free asset. CAPM provides precise expectation of the relationship that should be monitored between the expected return of an asset and its risk (Treynor, 1962).

Markowitz Model tries to maximize portfolio expected return for a given amount of portfolio risk, or homogeneously minimize risk for a given level of expected return, with the correct proportions of various securities. This model presumes that investors are rational and markets are efficient, tends to illustrate an asset's return as a normally distributed random variable, identifies risk as the standard deviation of return and demonstrates a portfolio. By combining different assets whose returns are not perfectly positively correlated, modern portfolio theory seeks to reduce the total variance of the portfolio return. This model looks for reduction of the total variance of the portfolio return by combining different assets whose returns are not perfectly positively. (Markowitz 1952).

Hasan et al. (2011) employed the framework in Dhaka Stock Exchange (DSE) by using monthly stock returns from 80 non-financial companies from 2005 to 2009 to study risk-return relationship with CAPM. The result showed that the intercept term was significantly non-zero and there was positive relationship between beta and return of stocks. The results opposed the CAPM hypothesis and suggested unique risk and the interaction were insignificant in DSE but recommended existence of linearity in the securities market line. This study include the financial crisis period 2008 to 2009 in the data however did not explain the impact of its influence. Besides, it only employed 8 stocks in a portfolio where the sample size was quite small as the rule of thumb for the sample size is at least 30 stocks (Voorhis, 2007). Thus, this provides an insight to this research to use the sample period without financial crisis and use the sample size more than 30 stocks in portfolio.

Tsai et al. (2015) recommended that the optimal level of diversification for the maximization of bank value is asymmetrical and depends on the business cycle by using empirical evidence in Taiwan. Systematic risks were low during expansion thus the influence of lifting systematic risks from portfolio diversification was minor. Subsequently, the benefit of reducing individual risks dictated any loss from raising systematic risks, resulting to a higher value for a bank by holding a diversified portfolio of assets. Systematic risks were high during recession. It was more likely that the loss from raising systematic risks surpasses the benefit of reducing individual risks from portfolio diversification. Consequently, more diversification leads to lower bank values. Instead of using bank industry as the sample as done by Tsai et al. (2015), further research could use the companies in other industries and study the result of the diversification of investment benefits to investors. CAPM's testability issue was discussed by Guermat (2014), it employed a simple combination of the coefficients of determination from Ordinary Least Squares to test whether the index used in the empirical test is efficient. The second step tests the efficient index hypothesis by market portfolio. This has highlighted that to test the CAPM not only testing on the individual assets, it could also test on the portfolio investment.

Elton et al. (2014) illustrated the percentage of risk can be removed by holding a widely diversified portfolio in each of several countries in western region. It showed that the contribution to the portfolio variance by each of the single stock approached to zero as number of stocks in a portfolio getting larger. Furthermore, the contribution of the covariance terms (systematic risk) move towards the average covariance as number of stocks increase. This suggested that the individual risk of the stocks can be diversified away but the contribution to the total risk caused by the systematic risk cannot be diversified away. Hence, the test could be examined by employing the stocks market in non-western region to confirm the validity of this theory.

In addition, the study by Alekneviciene (2012) examined the diversification consequence in Lithuanian Stock Exchange Market by using daily stock market price from 2009 to 2010. It investigated the study with the order of criterions (1) negative correlation coefficient with the highest number (2) negative correlations with the other stocks based on quantitative characteristics (3) stocks based on different industry. The result indicated that the portfolio with naive selections shown a better diversification results compared to the selection criterion portfolios. Thus, it provides another way of methodology tend to work, instead of selection of portfolios based on criterions and with daily stocks return, randomly selection of stocks in the portfolio with weekly returns is suggestible as most of the researchers employed either weekly, monthly or yearly return data as the volatility of daily stock return is very high which might defeat the purpose of portfolio diversification in reducing risk (Hiraki et al., 2015; Marshall et al., 2015; Dutt, 2013).

In summary, this study extends the literature in four aspects. First, to include the companies listed in Malaysia main market and test the suitability to fill the gap in literature where the previous researchers only focus on banking related or Islamic related stocks in Malaysia. Secondly, whether CAPM is suitable to be used in a portfolio to capture the risk and return analysis. Thus, there will be two phases of test (time series and cross sectional series) to test whether individual stocks could be estimated by CAPM and followed by portfolio construction to be tested by CAPM.

Thirdly, it tends to provide an insight whether investors could achieve positive diversification value in Malaysia stock market. Lastly, it also aims to study the usefulness of diversification in reducing the risk on a portfolio in Malaysia's stock market.

DATA AND METHODOLOGY

Data

The data will randomly select 60 stocks listed in Malaysia main market from the period of 1st January 2010 to 31st December 2014 and employ weekly data for all the variables. These recent 5 years were chosen to evade any structural break such as significant economy crisis. The companies from financial industries are being excluded due to the reporting system of financial companies is different from non-financial companies (Aletkin, 2014). Daily data is avoided because according to (Basu et al., 2010) the risk and return relationship too volatile. The company stock prices and market price is estimated by the proxy of FBM KLCI are both extracted from Yahoo Finance and risk free interest rate is obtained from Bank Negara Malaysia website. Computation result will be done by Microsoft Excel and E-view.

Test individual stock by CAPM

The theoretical CAPM (Treynor 1962) formula is:

$R_{it} = R_{ft} + \beta_i(R_{mt} - R_{ft})$ ----- Eq1

First phase of regression

To estimate the above equation by ordinary least square is:

$R_{it} - R_{ft} = \alpha_i + \beta_i[R_{mt} - R_{ft}] + \varepsilon_i$ ----- Eq2

Where

R_{it} =company's rate of return = $\frac{\text{current price} - \text{previous price}}{\text{previous price}}$

R_{ft} = risk free interest rate

R_{m} = market return

ε_i = random disturbance term

The above time series data is then regressed then to obtain β_i and β_i and substitute To

$UR_i = \sigma_i^2 - \beta_i^2\sigma_m^2$ ----- Eq3

Where

UR_i = unique risk

Second phase of regression

The cross sectional regression formula is:

$\bar{r}_i = \gamma_0 + \gamma_1\beta_i + \gamma_2\beta_i^2 + \gamma_3 UR_i + \gamma_4 IT_i + \varepsilon_i$ ---- Eq4

Where

$\bar{r}_i$ = $R_{it} - R_{ft}$

β_i = estimate systematic risk in company i, from Eq2

β_i^2 = square of β_i, from Eq2

UR_i = unique risk, from Eq3

IT_i = interaction of systematic risk and unique risk = $\beta_i \times UR_i$

ε_i = random disturbance term

Test Markowitz Model by CAPM

Thirty stocks will be combined together to form a portfolio, so there will be 2 portfolios in total. Thirty stocks in a portfolio is reasonable as it satisfy rule of the statistics computation as well as to diversify unsystematic risk require minimum 25 stocks (Gupta et al., 2001). Hassan (2011) suggested that in order to accomplish diversification and hence minimise any errors that might happen because of the existence of unique risk, thus the beta need to be organised according to ascending and combine in a portfolio. The thirty stocks are chosen based on the Beta arranged

from highest to lowest. The highest thirty stocks' betas will be grouped into 1 portfolio, another lowest thirty stocks' betas will be grouped into 1 portfolio.
Average portfolio excess returns of companies formula is (Hasan 2011).

$r_{pk} = \frac{\sum_{k=1}^{p} r_{pk}}{p}$ ----- Eq5

Where,

r_{pk} = excess return of companies

k = number of stocks in portfolio (k = 30)

p = number of portfolios (p = 2)

To estimate portfolio's beta, the formula:

$\bar{r}_{pk} = \alpha_p + \beta_p r_{m\,m} + \varepsilon_p$ ----- Eq6

Where,

β_p = beta of portfolio

$r_{m\,m}$ = average market risk premium

Hypotheses

For CAPM to hold true in the individual stocks, the following hypotheses should be convinced: 1. $\alpha_p = 0$, should not be different significantly from 0
2. $\beta_p > 0$, stock price should be positively sensitivity to market price in capital market

3. $\beta_p = 0$, security Market line is linear

4. $\alpha_p = 0$, diversifiable unique risk that will not affect return

5. $\alpha_p = 0$, interaction risk that will not affect return

Effect of Number of Stocks in Risk of the Portfolio

The risk of the portfolio with increasing number of stocks is calculated through: (Elton 2014)

$\sigma_p^2 = \frac{1}{p}\bar{\sigma}_i^2 + \frac{p-1}{p}\bar{\sigma}_{ij}$ ----- Eq7

Where,

$\sigma_{\square}$ = standard deviation of the portfolio = risk of the portfolio

N = number of stocks (j=1, k=1, k≠ j to N)

$\bar{\sigma}_{\square} = \frac{\sum \square_{\square}}{\square}$ = average standard deviation of the stock = average risk of the stock

$\bar{\sigma}_{\square\square}$ = $\frac{\sum \square_{\square\square}}{\square(\square\square\square)}$ = covariance term

RESULT AND ANALYSIS

Result for the individual companies

Table 1 illustrates the beta coefficient for individual companies; the range is from 0.227 to 1.577. This shows that the systematic risk of the companies in Malaysia are spread in wider range among the companies due to the nature of the business. Air Asia attains the highest beta at 1.577. This might suggest that aviation business in Malaysia has higher undiversifiable risk compared to other business. Whereas, Denko which is a manufacturing company has the lowest beta at 0.227, however the data shows no significance level. The lowest beta that shows significance at 1 percent is Amway at 0.2956 which engaged in distribution of consumer product. The finding highlights that 57 companies out of 60 companies demonstrate significant beta at 1 percent significance level. One company's beta shows 5 percent of significance level. Only 2 companies such as Harbour and Denko show insignificance level on their beta. The concluding of this result supports the study by Michailidis et al. (2006) but contradicts the research by Hasan (2011). As suggested by Treynor (1962), the higher the beta in CAPM, the higher the return would be. Air Asia has an average excess return of -0.35 percent per week. On the other hand, Amway has an average excess return of -0.49 percent per week. The lowest average excess return is -0.45 percent per week by ACME, however its beta is 0.84. The highest average excess return is 0.64 percent per week by Yinson which is an investment holding with business segment in transportation, trading and operation in addition as an insurance agency, its beta is 1.05. The result does not support with the theory of the higher the

systematic risk, the higher the return. Based on the sample result, it can be concluded that CAPM could be employed to estimate the systematic risk of the company in Malaysia. Nevertheless, there is no evidence to show that the company in Malaysia with higher systematic risk could gain higher return.

As in Table 2, the regression result fitted into Eq 4 become:

$$\bar{r}_{\square} = -0.0021 - 0.0045\beta_{\square} + 0.002\beta_{\square}^{\square} - 0.3803UR_{\square} + 0.5915IT_{\square}$$

The intercept, $\gamma_{\square}$do not reject hypotheses 1, therefore CAPM could be used to estimate Security Market Line (SML) for Malaysia stocks. It is observed that the CAPM slope is - 0.0045, shows that it does not support the theory of there should he non-negative price of risk in the capital markets. This result is the same as the finding by Omran (2007). Moreover, this study accepts hypotheses 3, 4 and 5 by do not rejecting null hypothesis of $\gamma_{\square}, \gamma_{\square}$ and $\gamma_{\square}$ =0. It demonstrated that SML of Malaysia stocks is linear relationship. In addition, unique risk and interaction risk do not influence the creating return process by company in Malaysia. Therefore, it could be concluded that CAPM does hold for the Malaysia stock market.

Table 1. Individual stock's beta coefficient

No	Code	Company	Beta		$\square^{\square}$	No	Code	Company	Beta		$\square^{\square}$
1	7054	AASIA	1.5768	***	0.1931	31	5062	HUAYANG	1.3311	***	0.0953
			(0.2007)						(0.2553)		
2	7131	ACME	0.8474	**	0.0027	32	1597	IGB	0.6747	***	0.1156
			(0.3464)						(0.1161)		
3	5014	AIRPORT	0.7740	***	0.1931	33	3336	IJM	1.0323	***	0.2961
			(0.1302)						(0.0991)		
4	2658	AJI	0.6185	***	0.0910	34	4723	JAKS	1.5280	***	0.1655
			(0.1217)						(0.2136)		
5	7293	YINSON	1.0546	***	0.0627	35	4383	JTIASA	0.8898	***	0.0929
			(0.2539)						(0.1731)		
6	6351	AMWAY	0.2956	***	0.0562	36	6769	KELADI	0.6419	***	0.0413
			(0.0754)						(0.1925)		
7	6888	AXIATA	0.9879	***	0.3631	37	9083	JETSON	0.8320	***	0.0531

No	Code	Company	Beta		R^2	No	Code	Company	Beta		R^2
			(0.0814)						(0.2188)		
8	4162	BAT	0.8326	***	0.1785	38	3476	KSENG	0.8742	***	0.1040
			(0.1112)						(0.1598)		
9	4863	TELEKOM	0.8130	***	0.2501	39	2445	KLK	0.8353	***	0.2356
			(0.0876)						(0.0936)		
10	2836	CARLSBG	0.7521	***	0.0914	40	1643	LANDMRK	1.3494	***	0.1325
			(0.1476)						(0.2149)		
11	8982	CEPAT	0.8094	***	0.1244	41	3859	MAGNUM	1.1115	***	0.1962
			(0.1336)						(0.1400)		
12	2828	CIHLDG	0.9960	***	0.0318	42	8583	MAHSING	1.3518	***	0.1790
			(0.3419)						(0.1802)		
13	5094	CSCSTEL	0.91311	***	0.1460	43	4707	NESTLE	0.3764	***	0.0784
			(0.1375)						(0.0803)		
14	8176	DENKO	0.2272		0.0016	44	4634	POS	1.0802	***	0.1135
			(0.3499						(0.1879)		
15	6947	DIGI	0.6654	***	0.0684	45	4588	UMW	0.7580	***	0.1755
			(0.15284						(0.1022)		
		DRBHCO									
16	1619	M	1.4133	***	0.1497	46	5142	WASEONG	0.9199	***	0.1007
			(0.2097)						(0.1711)		
17	7233	DUFU	0.7775	***	0.0409	47	4677	YTL	0.9753	***	0.1920
			(0.2345)						(0.1245)		
18	3026	DLADY	0.5510	***	0.0648	48	5355	DAIMAN	0.7674	***	0.0803
			(0.1302)						(0.1616)		
19	8877	EKOVEST	1.0369	***	0.0718	49	5141	DAYANG	1.3655	***	0.1549
			(0.2321)						(0.1985)		
20	3417	E&O	1.4519	***	0.1576	50	7277	DIALOG	1.2728	***	0.0473
			(0.2090)						(0.3556)		
21	3689	F&N	0.4487	***	0.0560	51	7229	FAVCO	1.4928	***	0.1326
			(0.1146)						(0.2376)		
22	7210	FREIGHT	0.6488	***	0.0675	52	3255	GAB	0.5174	***	0.0652
			(0.1501)						(0.1219)		
23	4715	GENM	1.1951	***	0.2726	53	7022	GTRONIC	1.2710	***	0.1197
			(0.1215)						(0.2146)		
24	7382	GLBHD	0.6471	***	0.0588	54	7668	HAIO	0.8343	***	0.1243
			(0.1612)						(0.1378)		
25	5020	GLOMAC	1.3683	***	0.2664	55	3441	JOHAN	1.4535	***	0.0905

No	Code	Company	Beta		$\bar{R}^2$	No	Code	Company	Beta		$\bar{R}^2$
			(0.1413)						(0.2868)		
26	1503	GUOCO	1.4722	***	0.1770	56	3522	KIANJOO	0.8531	***	0.1146
			(0.1976)						(0.1476)		
		HARBOU									
27	2062	R	0.2977		0.0072	57	7153	KOSSAN	0.5912	***	0.0244
			(0.2170)						(0.2329)		
28	5008	HARISON	0.9418	***	0.1415	58	5878	KPJ	0.7279	***	0.0388
			(0.1444)						(0.2254)		
29	5072	HIAPTEK	1.0522	***	0.1360	59	6012	MAXIS	0.4141	***	0.1549
			(0.1651)						(0.0602)		
30	6238	HSL	1.4558	***	0.2551	60	5347	TENAGA	0.8550	***	0.2136
			(0.1548)						(0.1021)		

Note: Number in parentheses is standard error. Significance at 1 percent (***), 5 percent (**), 10 percent (*)

Table 2. Estimates of individual companies by Ordinary Least Square

Model	1	2	3	4	5
Constant, γ_0	- 0.0046	- 0.0044	- 0.0043	- 0.0043	- 0.0021
(t-value)	-4.22222	-6.4594	-6.7609	-7.6528	- 0.7172
(Sig)	0.0000***	0.0000***	0.0000***	0.0000***	0.4763
Beta, γ_1	0.0007				- 0.0045
(t-value)	0.6559				- 0.766
(Sig)	0.5145				0.4464
Beta Square, γ_2		0.0004			0.0020
(t-value)		0.8014			0.6866
(Sig)		0.4262			0.4952
Unique Risk, γ_3			0.2025		0.3803
(t-value)			0.6935		- 0.4917
(Sig)			0.4908		0.6249
Interaction, γ_4				0.2472	0.5915
(t-value)				1.0238	0.7105
(Sig)				0.3102	0.4804
R^2	0.0074	0.011	0.0082	0.0178	0.0298
F-stat	0.4302	0.6422	0.4809	1.0481	0.4227
(Sig)	0.5145	0.4262	0.4908	0.3102	0.7915

Significance at 1 percent (***), 5 percent (**), 10 percent (*)

Table 3. Beta coefficient in the portfolio

Portfolio	Average Excess Return	Portfolio Beta
1	- 0.00355	1.1226***
		(0.0374)
2	- 0.00436	0.6596***
		(0.0313)

* Note: Number in parentheses is standard error. Significance at 1 percent (***), 5 percent (**), 10 percent (*)

Based on Table 3, portfolio 1 beta is 1.226 and portfolio 2 beta is 0.6596 significant at level 1 percent. Therefore, it can be concluded that the stocks of Malaysia combine together to form a portfolio, the CAPM still applicable to it. However, the portfolio result does not support higher systematic risk to yield higher excess return. Worth to highlight that Markowitz Model supposes to yield higher return, however, the average excess return in the portfolio surprisingly turns to negative which is contradicted with portfolio diversification theory. Thus, it shows that investors diversify investment in difference Malaysia stocks do not necessary yield higher return compared to only invest in one individual stock.

This study further examines the effect of risk in the portfolio by adding more stocks in the portfolio. As presented in Figure 1, it is shown that with the increasing number of stocks in a portfolio, the risk is reducing. It also clearly supports Markowitz Theory that unsystematic can be minimised with increasing number of stocks up to a risk of ± 3 percent. This shows that initially a single stock's risk is more than 20 percent (could be reduced by around 17 percent) to approximately 3 percent which is the market risk. This is consistent with the research by Gupta (2001), which indicated that increase the number of stocks in a portfolio could reduce the risk.

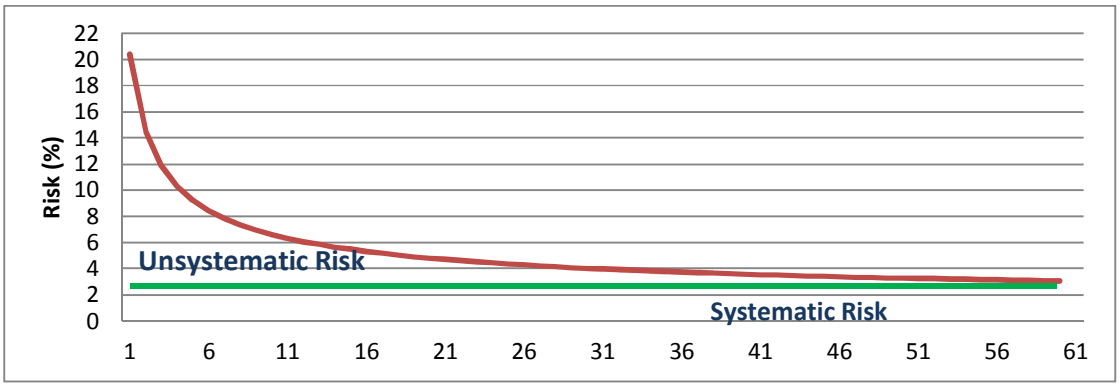

Figure 1. The effect of number of stocks on risk of the portfolio in Malaysia

CONCLUSION

This research studies the validity of the CAPM on individual stocks as well as on portfolio investment. It also evaluates the suitability of Markowitz Model to evaluate the performance of the investment portfolio within the framework in Malaysia by using the stocks listed in Malaysia's main stock market.

It is concluded that CAPM is reasonable to be the indicator of stock prices in Malaysia as well as in portfolio basket in the investment from 2000 to 2014. From individual stock, result does support that CAPM linear relationship is adequate to explain the return of the stocks. Moreover, unique risk and interaction with systematic risk are tested whether they should be important aspects in to be captured by CAPM and the result shows that systematic risk itself is adequate to explain CAPM but not unique risk and its interaction with systematic risk. The result indicated that excess return toward market return is rewarded for the investors.

For the Markowitz Model, the framework in Malaysia does not support that portfolio diversification can generate higher return and reduce the risk. This could be due to the portfolio diversification is not suitable for short term investment such as weekly investment. However, the result shows that with the increased number of stocks in a portfolio, the unsystematic risk is diversifiable but systematic risk is un-diversifiable, thus, it is suggestible that for the optimistic investor who has low risk appetite, it is

better to invest money in fixed deposit to earn risk free rate and to avoid the hassle of worrying stocks volatility that might provide them negative return. This is similar to a study by DeLong et al. (2008), where fixed deposit insurance introduction had reduced the risk of banks and trust. Fixed deposit had in return generated a greater banking system to ensure the financial stability. This is because in Malaysia, the money deposited by investor in the bank is protected by Perbadanan Insurans Deposit Malaysia (PIDM), which is a deposit insurance system that insures depositors against the loss of their insured deposits placed with member banks, in the unlikely event of a member bank failure up to with RM250 000.00 as the maximum limit of the coverage (PIDM, 2014). Hence with fixed deposits, investor can guarantee a return with the minimum amount as the same as capital amount, however compared to stocks, the investors could obtain a return lower than capital amount. Nevertheless, there is a risk and return balance among fixed deposit and stock.

In summary, investors could use CAPM to estimate the behaviour and the systematic risk of the stocks in Malaysia before investing in stock market. This could be a way to minimise their downside risk as they understand the stock trend of the company and hence invest rationally. In addition, managers in the companies of Malaysia can use CAPM as a proxy to estimate their stock return and execute the right policy in their management in order to maximise profit at the same time increase shareholder wealth maximisation. Furthermore, it is suggested to apply portfolio diversification to reduce the unsystematic risk. Overall, portfolio diversification could build up the investors' confidence towards the investment decision and to develop a sound investment financial market in assisting Malaysia to achieve its mission to be a developed country in 2020.

REFERENCES

Aleknevičiute, A., Aleknevičiute, E. & Rinkevičiene, R. 2012, "Portfolio size and diversification effect in Lithuanian stock exchange market", *Inzinerine Ekonomika-Engineering Economics,* vol. 23, no. 4, pp. 338-347.

Aletkin, P.A. 2014, "International financial reporting standards implementation into the Russian accounting system", *Mediterranean Journal of Social Sciences*, vol. 5, no. 24, pp. 33-37.

Bank Negara Malaysia 2012, *The Financial Sector That Best Serves The Malaysian Economy*. Available from: <http://www.bnm.gov.my/files/publication/fsbp/en/04_Financial_Sector.pdf. [30 July 2015].

Bank Negara Malaysia 2015, *OPR Decision and Statement*. Available from: <http://www.bnm.gov.my/index.php?ch=mone&pg=mone_opr_stmt&lang=en&eId=box1>. [30 July 2015].

Basu, D. & Chawla, D. 2010, "An empirical test of CAPM-the case of Indian stock market", *Global Business Review*, vol. 11, pp. 209-220.

Delong, G. & Saunders, A. 2008, "Did the introduction of fixed-rate federal deposit insurance Increase long-term bank risk taking?", *Journal of Financial Stability,* vol. 7, pp.19-25.

Dutt, P. & Mihov, L. 2013, "Stock market comovements and industrial structure", *Journal of Money Credit and Banking*, vol. 45, no. 5, pp. 891-911.

Elton, E.J., Martin, J.G. & Rentzler, J. 1984, "The ex-dividend day behavior of stock prices: A re-examination of the clientele effect: Comment", *Journal of Finance*, vol. 39, no. 2, pp. 551-556.

Elton, E.J,, Martin, J.G., Brown, S.J. & Goetzmann, W.N. 2014, *Modern Portfolio Theory and Investment Analysis*, 9th edn., Wiley, Hoboken, NJ.

Goh, Q.R., Annuar, M.N. & Zariyawati, M.A. 2014, "The benefits of diversification in Asean stock market to Malaysia investors", *Asian Social Science*, vol. 10, no. 4, pp. 78-92.

Gupta, G.S., Ch'ng, H. K. & Shahnon, S. 2001, "How many securities make a diversified portfolio in KLSE stocks?", *Asian Academy of Management Journal*, vol. 6, no. 1, pp. 63-67.

Hasan, M.Z, Kamil, A.A., Mustafa, A. & Baten, M.A. 2011, "A validity test of capital asset pricing model for Dhaka stock exchange", *Journal of Applied Sciences*, vol. 11, no. 20, pp. 3490-3496.

Hiraki, T., Liu, M. & Wang, X. 2015, "Country and industry concentration and the performance of international mutual funds", *Journal of Banking and Finance*, vol. 59, pp. 297-310.

Kassim, S.H. & Kamil, S. 2012, "Performance of Islamic Unit Trusts during the 2007 global financial crisis: Evidence from Malaysia", *Asian Academy of Management Journal*, vol. 17, no. 2, pp. 59-78.

Lean, H.H. & Parsva, P. 2012, "Performance of Islamic indices in Malaysia FTSE market: empirical evidence from CAPM", *Journal of Applied Sciences*, vol. 12, no. 12, pp. 1274-1281.

Lintner, J. 1965, "The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets", *The Review of Economics and Statistics*, vol. 47, no. 1, pp. 13-37.

Mansourfar, G., Mohamad, S. & Hassan, T. 2010, "The behavior of MENA oil and non-oil producing countries in International portfolio optimization", *Quarterly Review of Economics and Finance*, vol. 50, no. 4, pp. 415-423.

Markowitz, H. 1952, "Portfolio selection", *The Journal of Finance*, vol. 7, no. 1, pp. 77-91.

Marshall, B.R, Nguyen, N.H & Visaltanachoti, N. 2015, "Frontier market transaction costs and diversification", *Journal of Financial Markets*, vol. 24, pp. 1-24.

Michailidis, G., Stavros, T., Demetrios, P. & Eleni, M. 2006, "Testing the capital Asset Pricing Model (CAPM): The case of the emerging Greek securities market", *International Research Journal of Finance and Economics*, vol.4, pp. 78-91.

Mossin, J. 1966, "Equilibrium in a capital asset market", *Econometrica*, vol. 34, no. 4, pp. 768-783.

Omran, M.F. 2007, "An analysis of the capital asset pricing model in the Egyptian stock market", *The Quarterly Review of Economics and Finance*, vol. 46, no. 5, pp. 801-812.

Perbadanan Insurans Deposit Malaysia 2014, *PIDM Mandate*. Available from: <http://www.pidm.gov.my/Mandate>. [30 June 2015].

Rahman, A.A. 2010, "Three-factor CAPM risk exposures: some evidence from Malaysian commercial banks", *Asian Academy of Management Journal of Accounting and Finance*, vol. 6, no. 1, pp. 47-67.

Sharpe, W.F. 1964, "Capital asset prices: A theory of market equilibrium under conditions of risk", *The Journal of Finance*, vol. 19, no. 3, pp. 425-442.

Treynor, J.L. 1962, "Toward a Theory of Market Value of Risky Assets, Unpublished manuscript", A final version was published in 1999, in *Asset Pricing and Portfolio Performance: Models, Strategy and Performance Metrics*, ed. Robert A. Korajczyk, Risk Books, London, pp. 15-22.

Tsai, Y.S., Lin, C.C. & Chen, H.Y. 2015, "Optimal diversification, bank value maximization and default probability", *Applied Economics,* vol. 47, no. 24, pp. 2488-2499.

Guermat, C. 2014, "Yes, the CAPM is testable", *Journal of Banking and Finance*, vol. 46, no.1, pp. 31-42.

Voorhis, C.R.W.V. & Morgan, B.L. 2007, "Understanding power and rules of thumb for determining sample sizes", *Tutorials in Quantitative Methods,* vol. 3, no. 2, pp. 43-50.

Zeti, A.A. 2009, '50 Years of Central Banking - Stability and Sustainability', *Governor's Keynote Address at the Ceremony for the 50th Anniversary of Bank Negara Malaysia.* (Speech). KL, Malaysia.

ABOUT THE AUTHOR

Lee Hui Shan is a PhD candidate in UPM, Faculty of Economics and Management, Department of Economics. She holds a Bachelor of Science (Hons) Actuarial Science and a Master's in Business administration (Finance). She has industrial experience, working in Risk Management for a multinational financial institution. Her area of interests are financial economics, corporate finance and risk management.