

Optimal Portfolio Determinants: Evidence from Malaysia during And Post Market Crash

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ABSTRACT

This empirical study investigates the optimal portfolio determinants during and post market crash based on Malaysian listed firms. Market crash reflects the turmoil period where a sharp decline in stock prices experienced by most of the countries especially the developed one. Nonetheless Malaysia also affected by this catastrophe that gave a negative significant effect on Malaysia Gross Domestic Product. The study considers market crash period for two consecutive years, 2008-2009 while 2010-2011 is categorized as aftermath market crash. Based on 225 sample companies, the results of this study bring difference findings during these two periods where risk is negative and significant during market crash but positive and significant after the market crash. This study helps to enhance the knowledge of the existing investors, analyst, researchers and decision maker in capital market.

INTRODUCTION

Risk and return are two distinct factors in investment decision. These two factors are theoretically proven to having a tight linear or positive relationship. Basically there are two components of risk of an investment. They are the diversifiable risk, which could be minimized or controlled meanwhile the non-diversifiable risk is the one that is out of the control by the investors. Based on asset allocation theory, it is impossible to eliminate diversifiable risk and overall mitigate the non-diversifiable risk also known as systematic risk. Traditional investors view high risk investment as high in return. However there are high risk investments that still bring low returns. So, it is crucial for investors to understand the existence and importance of relationship between the risk and return of individual stocks before deciding to invest. In addition, other important criteria need also to be considered when constructing a portfolio in order to achieve the most optimal portfolio.

In analyzing the risk and return relationship, there are several methods being used. Some common methods are relying on Capital Asset Pricing Model (CAPM), average return, standard deviation, coefficient of variation and correlation coefficient. In constructing the optimal portfolio, there are four chosen criteria. They are beta coefficient, number of stocks, correlation coefficient and the types of sectors.

In 2008-2009, world is shocked by the global market crash—a sudden dramatic decline of stock prices across a significant cross-section of a stock market. One of the most contributing factors to this phenomenon is primarily due to exposure of securities of packaged subprime loans and credit default swaps issued in the United State. This problem had severely devolved into a global crisis resulting in a number of bank failures in Europe and sharp reductions in the value of stock and commodities worldwide including Asia. Upon studying the contemporaneous co-movements of and the time-series lead/lag linkages between global stock markets after the 2008 stock market crash, Meric, Lentz, Smeltz and Meric (2012) find that the correlation between global stock markets has increased and the benefit of global portfolio diversification has decreased since the 2008 stock market crash. Moreover their results indicate that the United State stock market has substantial influence on the European and Australasian stock markets.

However most of the attention around the global financial crisis has focused on its causes and effects in the banking and broader finance sector, particularly among developed and leading emerging economies that highly dependent on trade, foreign investment, and remittances to meet economic growth and social needs. Several countries had suffered recessions when housing bubbles burst out on 2007. Some economists had called it as the biggest bubble in history. It began when the construction activity decreased markedly as house prices started to decline in 2006. Falling home prices have given a direct negative chain effect to most macroeconomics variables. The decline in the value of bank capital and stringent conditions imposed by regulators, bank supervisors, or banks themselves that require banks to hold more capital than they previously would have held has been used is associated with this credit crunch (Mizen, 2008). The huge delinquency rates had induced banks not to lend credit and giving a depressing situation to money, capital and interbank markets (Nagy, 2012)

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The effect of financial markets breakdown was impinging in real economy. The situation had boost uncertainty after the near-meltdown in the financial sector thus, led to a rise in precautionary savings, the postponement of planned investment projects and a running down of inventories. The resulting decline in aggregate demand amplified the crisis and spread it further around the world. By the second half of 2008 most of the developed world had fallen into recession globally (Riksrevisionen, 2010).

Though without doubt, there are particular countries that were adversely affected, but there were also countries where the effects of the crisis have just been minimal. Malaysia as one of the Asia developing country is also effected by 2009 market crash. According to CIA World (2011), Malaysia Gross Domestic Product (GDP) witnessed a plummet. A sudden drop of GDP (real growth rate) from 4.6% in 2008 to -1.7 in 2009 shows that the global market crash significantly marked a significant effect on Malaysia GDP in 2009. According Department of Statistics of Malaysia, the total trade in 2009 was decrease to Ringgit Malaysia (RM) 988.2 billion from RM1.2 trillion in 2008 and RM1.11 trillion in 2007. As United States stands as one of the biggest trading partners for Malaysia, thus the negative effect of crisis have to be shared together. It has been observed that the current crisis has had an impact on developing Asia through the contraction of trade and FDI inflows (James et al. 2008). It is further supported, for a country that is as dependent on trade as Malaysia is, it is obvious that if demand from the country's dominant trade partners were to decrease, its repercussions would be felt throughout the economy (Nambiar, 2009).

Among the most universal indicators used when assessing the progress of an economy in any area of economic activity are the growth rate for exports and imports. Exports has recorded negative figure in October 2008 that was -2.6% and further declined in December 2008 to -14.9%. In January 2009, the figure worsened and was registered at -27.8%. It same goes to imports figure, the figure had fell to negative territory from October 2008 to January 2009. It recorded -5.3% and -32% respectively (Department of Statistics, Malaysia). It is understandable that imports should fall along with exports because imports of intermediate goods are required to meet the production of exports. The strong demand for exports that comes from Malaysia's major trading partners (US, Japan, and the EU) having fallen, it should be expected that exports from Malaysia would also fall (Nambiar, Shankaran, 2009). The most affected sector within the trade activity is the manufacturing sector which comprises of electronics, electrical machinery, and appliances are about 53% of the exports share.

This study will serve findings that will enhance the knowledge of the existing investors for a better decision making in the future. Knowledgeable investors will be able to make the best decision when choosing the investment vehicles. Besides that, this study will emphasize the differences between the investment in individual stocks and the portfolios in which the investors will have a better chance to maximize return by diversifying the unsystematic risk when choosing a portfolio investment especially during market difficulties

Therefore the main objective of this study is to examine the optimal portfolio determinants during and post market crash based on Malaysian listed firms. The findings will be expected to be consistent with the investment theory which stated that high risk can be offset by a higher return and the risk for a portfolio investment is more diversified compared to the investment in individual stocks. Specifically this study has comes out with two main research objectives.

LITERATURE REVIEW

The credit crunch effect has had an impact on the Malaysian local financial sector. A small exposure to subprime mortgages and structured credit products has made Asia's commercial banks less affected to this credit crisis (James et. al. 2008). Particularly for Asian countries, they were less exposed to the financial stress since their financial markets and investors are less integrated with the countries in the core of the financial crisis. The developing Asia including Malaysia will face a more permanent negative shock to its trade activities (Adams, C.& Park, D. 2009). However, the financial sector had witnessed loan approval fallen and stood at negative figure (-2.9%) in September 2008. It is further declined to -44% at November 2008 as well as January 2009 recorded a negative figure of -35.9% (Bank Negara Malaysia, 2009).

Campbell and Viceira (2005) propose an empirical model that the changes in investment opportunities can alter the risk-return tradeoff of bonds, stocks and cash across investment horizons from the US stock and bond markets. Their studies find that the asset return predictability has important effects on the variance and correlation structure of returns followed by Yakob, Diana and Sarath (2005) find that the CAPM still holds in explaining the risk-return relationship in China and Malaysia. The significant positive risk parameter coefficient suggests a positive linear relationship, which indicates that investors are compensated for assuming high risk.

Portfolio is about managing the risk among shareholder. Market crash may force any portfolio risk to expand greater. Fischer and Jordan (1995) posit that the main objective of constructing the portfolio is to diversify the risk. This is due to the risk of a portfolio investment will be lower than the risk of single assets. According to Kapusuzoglu and Karacear (2009), portfolio is a collection of financial assets consisting of investment tools such as

stocks, bonds, gold, foreign exchange, asset-backed securities, real estate certificates and bank deposits which are held by a person or group of persons. Zarazila (1997) studies the risk and return of stocks among top 5 Malaysian local banks. She finds that the return for Finance Stocks is 60% more than the return on the Composite Index (KLCI) as reflected by the Beta Coefficient. Finance Stocks have high positive correlations relative to the KLCI. The study has also corroborated the hypothesis that the return of securities with high betas to be greater than the returns of the securities with low betas, consistent with risk-return theoretical relationship. Dagi, Sivri and Bank (2011) posit that international portfolio diversification should enable the reduction of systematic risk through diversification assets across other national markets. However, reduction of systematic risk and attaining diversification gains through portfolio diversification requires a relationship not being co-integrated among stock markets. This relationship, which is an indicator of interdependencies and common trends among international stock markets, allows the determination of diversification opportunities.

Nyberg (2009) suggests that assets with a riskier payoffs pattern should offer higher expected return by reason of higher discounting, therefore, have a lower price, than the assets that are otherwise similar but have less risky payoffs. Zarif and Ghaemi (2003) prove in their empirical study that the asset's return depends on the market return and also the linearity relationship between risk and expected return. According to Damodaran (2002), it is quite intuitive when the design of that risk and uncertainty matter for required returns of an investment and that riskier investment should have a higher expected return than the safer ones. The investors used many methods to understand and to minimize the investment risk (Beck, Goldreyer and D'Antonio, 2000).

Bakhshande (1990) find in their researches based on the Tehran stock market; there is an existence of linear relationship between systematic risk and return of common stock. Financial theory also stated that, either when low risk is associated with low return or when high risk is rewarded by high return, risk adverse behavior will be obviously appear (Fisher and Hall, 1969). Tang and Shum (2003) indicate that beta does not have significant relation with returns. Upon combining assets with low beta values, Weinraub and Kuhlman (1994) find that this combination could not minimize the portfolio's risk. Strong and Xu (1997) find that there is insignificant relationship between beta and return for stocks in the UK market. Scott and Horvath (1980) found that there is a significant positive relationship between beta and returns in up markets, but a significant negative relationship between beta and returns in down markets. This study hypothesizes that:

H1: Risk is a significant portfolio determinant during market crash

Factors like size, price /earnings ratio (P/E), cash-flow/price ratio (CF/P), book to market ratio and past growth rates have more significance with average excess returns compared to beta. Sudana and Janiarti (2000) further find the significance effect of portfolio size on portfolio return. Nonetheless smaller stocks may be riskier than the larger stocks (Elfakhani and Zaher, 1998). Therefore this study hypothesizes that,

H2: Stock size is a significant portfolio determinant during market crash

On the other hand, based on the traditional portfolio theory, increasing the number of stocks in a portfolio will reduce the risk which described as "not to put all the eggs in the same basket". The study by Worthington, Andrew, Higgs and Helen (2004) state that diversifying across markets could reduce portfolio risk while holding expected return constantly, when there is an existence of low correlations of return between various markets. Karasin (1986) and Sang and Lerro (1973) find that, it is necessary to calculate the correlation between all assets and all possible combinations of assets, together with the expected returns and risk of each asset included in the portfolio. The seminal portfolio study by Markowitz (1959) posits that the combination of assets in a portfolio which are not completely positive relationship is important in order to reduce risk of an investment. Any changes in the actual returns on a portfolio and the standard deviation or the variance of the new portfolio could be used to determine the risk of the portfolio. Thus the last two final hypotheses are,

H3: Asset correlation coefficient a significant portfolio determinant during market crash

H4: Sector is a significant portfolio determinant during market crash

METHODOLOGY

225 sample companies were chosen throughout five different sectors that are listed on the Bursa Malaysia's Main Market from 2008 to 2011. 2008 to 2009 is categorized as during market crash and 2010 to 2011 represents the post market crash period in this study the five sectors involved are Property, Technology, Finance, Trading & Services, and Consumer Products. Besides, the Kuala Lumpur Composite Index (KLCI) is chosen as the benchmark in analyzing the risk and return for each stock from the different sectors. This study uses the secondary data in term of the stock's daily closing prices of the last day of the month. The data were obtained from two (2) main sources; Bursa Malaysia's website and the DataStream. Risk, return, beta of individual stock and portfolio, number of stocks, correlation coefficient between the assets in the portfolio and sectors will be used as units of analysis.

The framework for this research is as follow:

$$\text{RETURN} = b_0 + b_1\text{BETA} + b_2\text{SIZE} + b_3\text{ACC} + b_4\text{SECTOR} + e \quad (1)$$

Where:

RETURN refers to each stock the average return

RISK refers to portfolio beta. Beta is calculated based on Capital Asset Pricing Model (CAPM) of each stock which represented as market risk. Beta is the indicator for changes in price of stocks that respond to the market forces.

$$E(r_i) = R_f + \beta_i (R_m - R_f) \quad (2)$$

where :

$E(r_i)$ is the return on individual stock, R_f is the risk free rate, R_m is the return of market, β_i is market risk of stock

SIZE refers to the number of stocks.

ACC is the asset correlation coefficient which measures the correlation between the asset in the portfolio. The degree of correlation ranges from +1 (perfectly positively correlated) to -1 (perfectly negatively correlated)

$$p_{i,m} = \beta_i (\sigma_m / \sigma_i) \quad (3)$$

where :

$p_{i,m}$ is the correlation coefficient, σ_m is standard deviation of market or KLCI, σ_i is standard deviation of stock and β_i is the market risk of the stock

SECTOR refers to where the stock sector is classified in Bursa Malaysia.

ANALYSIS OF RESULTS

Descriptive analysis

Table 1 shows the descriptive statistics of the determinants of portfolio. The mean and median for portfolio return is 0.05 and 0.03. The mean (median) of risk is 0.91 (0.87) indicates that the firms in the sample are not unusually highly geared.

Table 1: Descriptive statistics of portfolio determinants

	RETURN	RISK	SIZE	ACC
Mean	0.05	0.91	221.04	1.069
Median	0.03	0.87	197.06	1.03
Std. Deviation	0.02	0.11	101.69	0.61
Minimum	0.04	-0.071	141.27	-0.63
Maximum	0.42	1.84	440.02	2.71

Table 2: Correlation matrix of the portfolio determinants variables

	RET	RISK	SIZE	ACC
RISK	0.286**			
SIZE	-0.50*	-0.004		
ACC	0.071**	-0.251**	-0.27	
SECTOR	0.196**	-0.064**	-0.012	-0.010

Note: ** Significant at $p < 0.01$ (1-tailed) and * Significant at $p < 0.05$ (1-tailed).

As shown in Table 2, risk, asset correlation and sector were found to be significant and positively correlated to portfolio return. These results imply that portfolio return is higher wherever there is high risk, high asset correlation stock comes from different sectors. However, size shown a significant and negative effect to return since high number of stock reduces the portfolio risk. This is consistent with Elfakhani and Zaher (1998).

4.2 The effect of portfolio determinants during and post market crash

Table 3 presents the results of regressing return on risk, size, asset correlation and sector during market crash and post market crash. The pool 225 sample firms were separated into 2 categories. 112 sample firms between 2008 and 2009 were categorised as ‘during market crash’ while 113 sample firms between 2010 and 2011 were categorised as ‘post market crash’.

The results in Table 3 shows that the coefficient of risk during market crash is significant and negative while after the market crash period, the coefficient of risk turn to be significant and positive to portfolio return. Part of these mix results is supported by Scott and Horvath (1980) where they found that in good market condition, beta and return had a significant and positive relationship. The result from aftermath market crash is also supported Bakhshande (1990). Thus these results support hypothesis 1.

The coefficient of size shows that size has a significant negative relationship with portfolio return during and post market crash. The results imply that the higher number of stock in a portfolio reduce the risk of portfolio. Consistent with the theory, low risky portfolio results in low portfolio return thus size in this study show a significant and negative result to portfolio return. This result is supported by the finding by Elfakhani and Zaher (1998). These results therefore support hypothesis 2. ACC result shows that during market crash it is significant and negative to portfolio return. On the other hand sector gives a significant and positive estimation result to portfolio return. These results are consistent during and post market cash for asset correlation and sector therefore hypothesis 3 and 4 are accepted.

Table 3: Results of portfolio determinants during and post market crash

	During market crash	Post market crash
Independent Variables	Estimate (t-stat)	Estimate (t-stat)
RISK	-0.041 (-5.07)**	0.029 (3.12)**
SIZE	-0.028 (-3.18)**	-0.021 (-2.91)**
ACC	-0.038 (-3.75)**	-0.019 (-2.84)**
SECTOR	0.019 (2.89)**	0.018 (2.71)**
Constant	0.043 (5.51)	0.044 (5.72)**
Observations	112	113
Adj.R ²	0.21	0.24

Note: ** Significant at $p < 0.01$ (1-tailed) and * Significant at $p < 0.05$ (1-tailed).

CONCLUSION

The results of this study confirm the expected significant determinants of portfolio during and post market crash. From the results, it was found that risk shows a difference pattern to portfolio return during these two periods where risk is negative and significant during market crash but positive and significant after the market crash. During market crash, risk is more vulnerable. The higher the portfolio return shows a lower risk and this contradicts the risk-return trade off theory. This could happen because market players had become over cautious on the market risk and unsystematic risk. The investment risk tolerance asset allocation among the portfolios managed to strike a

balance between the risk appetites determined by the investors. Furthermore the investors' maturity and serenity among Bursa Malaysia investors help to periodically rebalance the portfolio risk and return despite the sharp decline in share prices.

The findings of this study provide evidence that portfolio determinants could vary with the market stability and condition during market crash, portfolio risk is negative to the return implying that the lower the risk the higher the return but when the market turmoil changed, the risk get back to be positively to return. Moreover, by being aware of the particular type of risk an investment is exposed to, investors can make better decisions on what is appropriate for their situation and portfolio especially in crucial times.

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