THE RISK-ADJUSTED PERFORMANCE OF MALAYSIA LISTED PROPERTY COMPANIES: A COMPARATIVE ANALYSIS

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is 32,570.

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Last but not least, we would like to appreciate all our group members for their hard effort in completing this research project. Even though we had faced problems in the progress of our study, our cooperation had hampered all the obstacles and lead to the success of this project.

DEDICATION

First of all, we would like to dedicate this research project to our lovely supervisor, Ms. Zuriawati Binti Zakaria for the efforts of precise commentary and heartfelt supervision to help us to complete this research project.

Besides, we would like to dedicate this research project to our family members and friends to share our accomplishment in this research project as a gratitude of their support and encouragement.

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LIST OF ABBREVIATIONS

CAPM	Capital Asset Pricing Model
DIBS	Developer Interest Bearing Scheme
EPS	Earnings per Share
E-views 6	Electronic Views 6
FBMEMAS	FTSE Bursa Malaysia EMAS Index
FBMKLCI	FTSE Bursa Malaysia Kuala Lumpur Composite Index
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
KLIA 2	Kuala Lumpur International Airport 2
KLPI	Kuala Lumpur Property Index
LRT	Light Rail Transit
MHPI	Malaysian House Price Index
MM2H	Malaysia My Second Home
MRT	Mass Rapid Transit
PSP	Malaysian property stock price
RA	Risk-adjusted Return
REIT	Real Estate Investment Trust
RN	Return
ROA	Return on Asset
ROE	Return on Equity
S&P 500	Standard & Poor's 500 Index
S&P	Standard & Poor's

SD	Standard Deviation

PREFACE

The prospect of property investments in Malaysia is sharp shooting due to the attractive return on investment. However, direct property investment requires large initial capital which is a burden for low and middle class income investors. Consequently, investors might look for an alternative for direct property investment using the indirect property investment.

Investment in property stocks is an alternative to participate in property investment due to the low cost of capital. However, there is less researches which study about the indirect property investment in Malaysia. Hence, this research aims to study the performance of property stocks in Malaysia to provide an outlook for investors who desires indirect property investment. Besides that, this research also study on the substitution potential and diversification benefits of property stocks.

Moreover, various types of information about property stocks investments are provided in this research. Furthermore, this research project touches on the background of property sector in Malaysia, data analysis, empirical major findings and the recommendations for future research.

ABSTRACT

This research examines the performance of listed property companies in Malaysia for the period of 2003 to 2013. There are 81 listed property companies selected in this study and their performances are compared across the three sub-periods: pre-, during and post-crisis. By using Sharpe's Index to evaluate the performance, the result shows that the number of listed property companies outperforms the aggregate market and broader market is increasing gradually. None of the listed property companies outperformed the direct residential market (MHPI) throughout the crisis and post-crisis period. Most of the property stocks do not provide diversification benefits as they are highly correlated with the aggregate market and broader market. Property stocks could not substitute direct property investment since they are negatively correlated. Although there were more companies showing average positive return in post-crisis period than pre-crisis period, the property stocks could not provide positive risk-adjusted returns. The individual and institutional investors must consider the excess returns between two investments before any property stock is included in their portfolio.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This chapter outlines the general picture of the study context and reviews the field of study. There are five main sections in this chapter: research background, problem statement, research objectives and questions, significance of study as well as chapter layout. In the first section, a brief introduction on the field of study and its characteristics is delivered. Subsequently, the problem statement addresses issues of direct and indirect property investment. The research objective provides the aims of study, while the significance of study highlights the contribution of this research. Lastly, the following chapters of this research are summarized in chapter layout.

1.1 Research Background

1.1.1 Malaysia Property Market Trend

In recent years, Malaysia government has showed their intention in real estate development, rural area urbanisation and involve partnership with private sector to redevelop high-potential government-owned land and properties, which majority located in Peninsular Malaysia while minority in Sabah and Sarawak. As a result, large number of real estate developers shifted their investment to focus in Penang, Johor, Pahang, Sarawak and Sabah along this year. Consequently, when demand for the hot spot

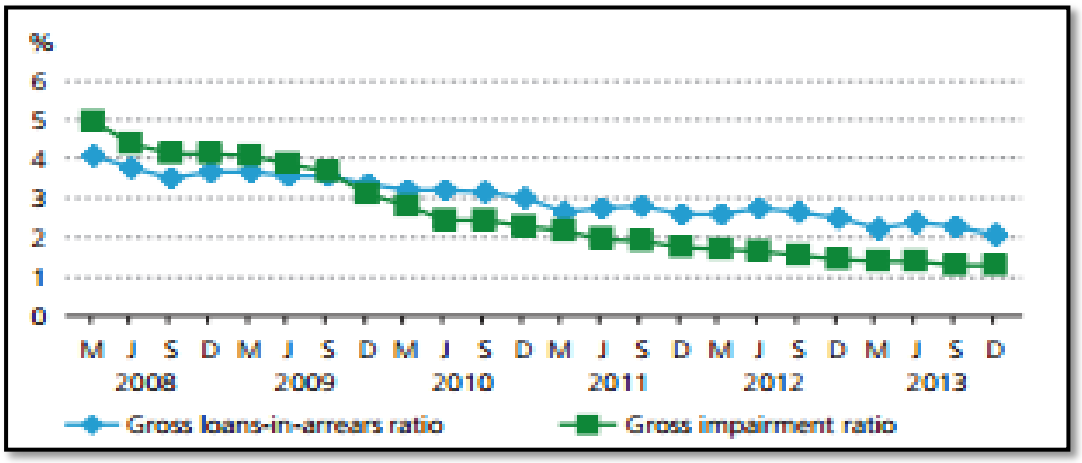
exceeds the supply, land and space become the limiting factors for the estate developer, driving the price of real estate to shoot high the roof in these hot spots.

This phenomenon was due to the release of the Tenth Malaysia Plan in year 2011, which focused on national and regional real estate growth in Malaysia, mainly for the conurbation of each state's city, ensuring that each satellite city or town surrounding the core city centre is a vibrant place to live, work, attractive to tourist and efficient in business making. As a result of urban conurbation which stated in Tenth Malaysia Plan, Malaysia experienced high population growths in urban cities and these urban cities are expected to accommodate approximately six million of new residents between 2010 and 2020. Malaysia government will put priority on plans and channel resources to ensure optimal growth in Georgetown, Johor Bahru, Kuantan, Kuching, Kota Kinabalu, Seremban and the Greater Kuala Lumpur, which comprises of Kuala Lumpur, Putrajaya, Klang, Kajang, Subang Jaya, Selayang, Shah Alam, Ampang Jaya and Sepang. Indirectly, the government's move has piquant the interest of local and global investor to invest in this golden opportunity, as all of these cities have the right ingredients to build on such as a vibrant mix of cultures, a uniquely Asian heritage and strong infrastructure to accommodate for economic growth.

As the land required for development is scarce in above cities, the demand will finally outstrip the supply of land available for development, making price appreciation easier and faster for the investor who urge return in short term circumferences. Over the period from 1Q 2010 to 2Q 2012, there was an average annual increase of 9.1% on Malaysian House Price Index (MHPI), which surpassing the average annual growth of 3.2% in

past 10-years period. Along the period, there was also robust growth on bank financing for property acquisition and development expanding since February 2008. Addition, the delinquencies of household loans from the banking system have improved in quality in term of gross loan-in-arrear ratio and gross impairment ratio across the period from year 2008 to 2013 (Bank Negara Malaysia, 2013). The delinquencies improvement on housing loan can be shown on Figure 1.1.

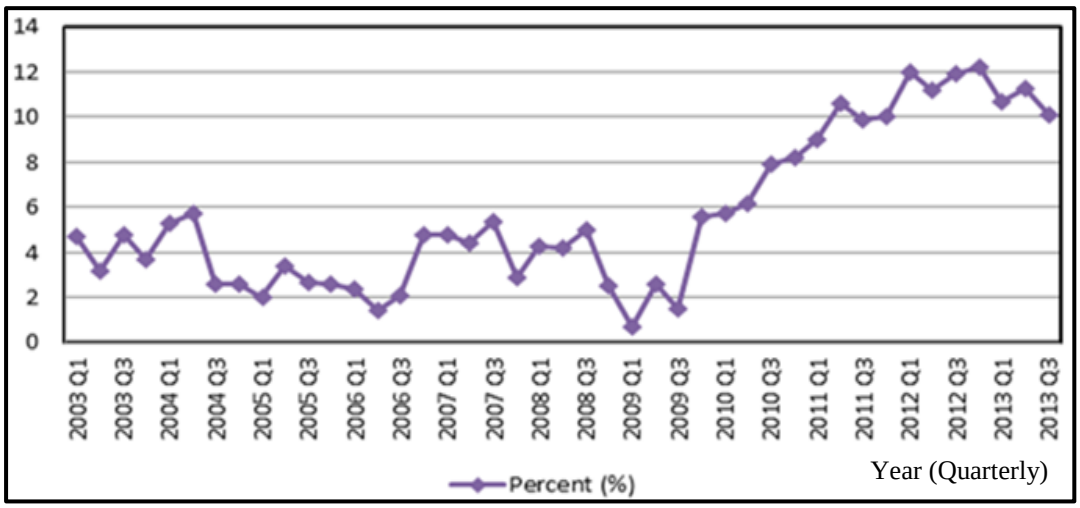
Figure 1.1: Housing Loan Delinquencies Measure from Year 2008 to 2013



Source: Bank Negara Malaysia.

Consequently, an upward trend on commercial and residential property prices were shown since year 2009 (Quarter 3) and the subsequent years after the release of Tenth Malaysia Plan. However, the past performance of Malaysia property market was blue, the property prices exhibited large fluctuation within the period of year 2003 to year 2009 (Quarter 2) in term of prices (Bank Negara Malaysia, 2012). These statements illustrated in the form of index graph as shown in Figure 1.2 representing the housing index in Malaysia from year 2003 to 2013, reported by Bank Negara Malaysia. The house price index was measured in percentage change with the based year of 2000. A raising trend can be detected since quarter three in year 2009 till year 2013.

Figure 1.2: Malaysia House Price Index from Year 2003 to 2013

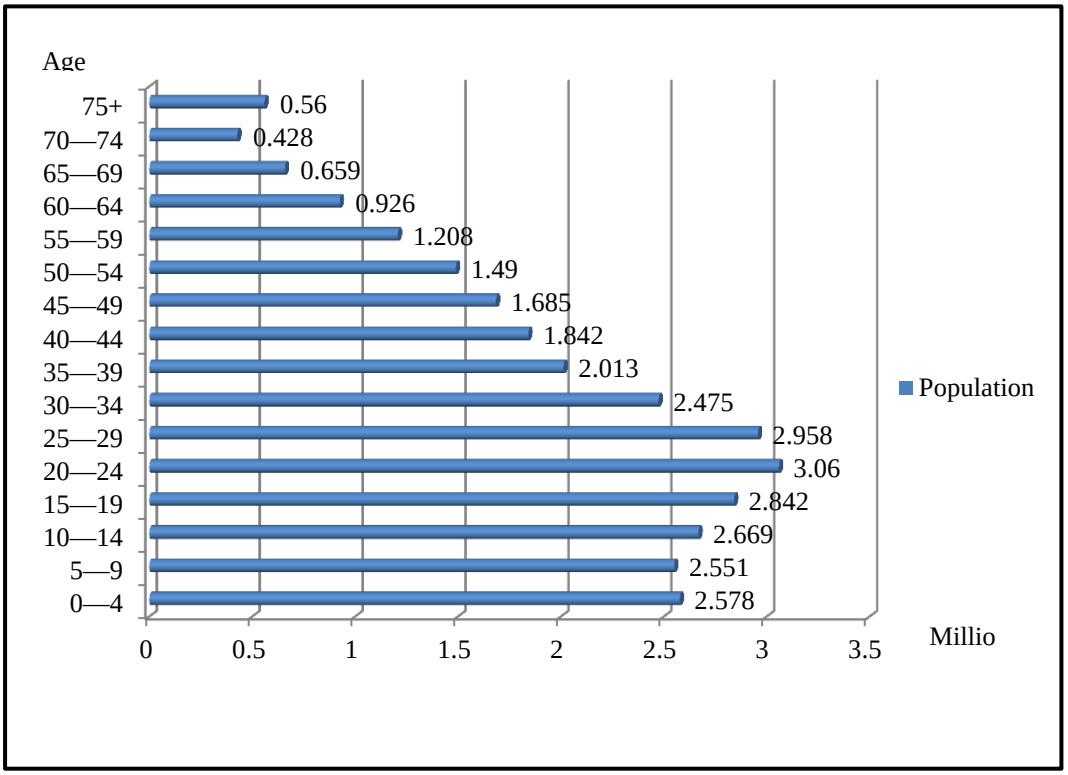


Source: Bank Negara Malaysia.

Besides, with the expectation of high population growths in young age population, ranged from age 20 to 24 and 25 to 29, the urban cities in Malaysia are expected to accommodate approximately 9 million of new residents in urban cities between 2010 and 2020. According Department of Statistic Malaysia, in year 2013 there are 2.958 million of young age workforce ranged between 20 to 24 years old and 3.06 million of young age workforce range between 25 to 26 years old respectively in year 2013 as shown in Figure 1.3. A robust growth in commercial and residential property is expected in the coming future as approximately six million of these young aged workforce will purchase their first residential property for family establishment. With the higher population density in young aged workforce, it will increase the demand for local real estate. This opportunity was believed to create wealth to the local developer as well as facilitate growth of real estate sector, as the developer will ride on this opportuity to boost their revenue by fullfiling the raising demand. With continuious growth in young age population, the demand for residential and commercial property will finally outstrip the supply of land available

for development, making price appreciation more easier and faster for the investor who urge return in short term circumferences.

Figure 1.3: Malaysia Number of Population According to Age Group in Year 2013



Source: Department of Statistic Malaysia.

1.1.2 Property Investment

1.1.2.1 Direct Property Investment

Direct property investment refers to buying or possessing a direct property that can generate fairly constant total returns which includes a mixture of income and capital appreciation. Woychuk (2014a) claimed that direct property investment can be viewed as a coupon paying bond due to the stable income received from the property invested. Property or real estate is seems like a component of stock due to the features of volatility in its values. In addition, from the prospect of an investor, they would like to hold a long-term investment that the value will go up consistently instead of going down. The rentals that paid by the tenants represent the income generate from property or real estate. After subtracting the property operating costs and financial installment payments from the rental received, the residuals become the total returns of investment. Therefore, it is important for an investor to ensure his or her property fully occupied to maximize the returns.

Besides, the strength of the leasing market can determine the supply and demand of property to lease and it may influence the total returns produced from the property. When there is oversupply of vacancies or poor demand, the leasing market is considered in the weak form. As a result, it may force an investor to reduce the rent payments in order to attract the tenants to stay in their property which will reduce the total returns that investors can earn. Property appraised determined the capital appreciation of a property. Positive capital growth will be earned when the appraiser justify that the property is worth more than the price of purchase. The appraiser judges the

value of property based on the past transaction records thus the sale market of property is related to the capital returns. Furthermore, the volatility in property returns is mainly due to the components of capital appreciation returns. The prices of property will fluctuate more compared to the rental received thus capital appreciation returns is unstable than income returns.

Direct property investment provides consistent return and minimizes the risk of portfolio at the same level of return. It is because the correlations between returns of property with other assets such as stocks and bonds are comparatively low. Thus, it can diversify portfolio risks and maximize the returns. Besides, property investment has the potential to generate very high returns compares with others investment given the same level of risks. In other words, direct property investment can enhance the portfolio returns at the same time decrease the risks. Furthermore, direct property investment can hedge against inflation. Owner of a property can adjust the rental rates as they like to meet the inflation when the lease term is expired. Hence, the rental income will increase further before the owner is facing the pressure caused by the inflation. Last but not least, direct property investors can modify or decorate a property to raise its value since it is a tangible asset. For instances, improving the facility and services provided in a property can increase the return generated due to higher rental charged. In a nutshell, investors can have a higher control level that build up the values and performance of a property compared to other types of investments (Plaizier, 2009; Webmaster, 2013; Woychuk, 2014b).

1.1.2.2 Malaysia Property Industry Policy

The change of government policy will certainly impact on the industry performance and growth. There are several significant implementation declared by the government of Malaysia in the recent Budget 2014. In order to restrain property speculation, the Real Property Gains Tax (RPGT) for gains on properties disposed within the holding period of up to 3 years has been increased to 30 % (Abdul Razak, 2013). Likewise, for disposals within the holding period up to 4 and 5 years, the RPGT are raised to 20% and 15%, respectively. However, there will be no RPGT imposed on citizens in the sixth and subsequent years. For non-citizens, RPGT is imposed at 30% on the gains from properties disposed within the holding period of up to 5 years and for disposals in the sixth and subsequent years, RPGT is imposed at 5%.

Table 1.1: RPGT Rate for Budget 2013 and 2014

Year	Budget 2014			Budget 2013
	Companies (%)	Individuals (Citizens &Permanent Residents)	Individuals (Non-citizens)	From 1st Jan 2013 (%) (Apply for all categories)
1	30	30	30	15
2	30	30	30	15
3	30	30	30	10
4	20	20	30	10
5	15	15	30	10
6	5	0	5	0

Source: Chan and Chan, 2013.

On 1 July 2012, state government of Penang had initiated higher floor price for foreign purchasers at between RM1, 000,000 and RM2, 000,000 depending on the location and the type of property. Subsequently, the recent Budget 2014 states that the floor price of property which can be

purchased by foreigners has been increased from RM500, 000 to RM1, 000,000. This is however contradicting with the Malaysia My Second Home Programme (MM2H) which encourages foreigners to own a house in Malaysia. Thus, the raise of property floor price will affect the sales of low and medium-cost houses to foreign buyers (Chan & Chan, 2013).

The next significant policy implemented by the government is to advocate the transparency in property sales price, in which property developers will have to disclose detailed sales price including all incentives and benefits offered to buyers. For instance, the incentives are the exemption of legal fees, sales agreements, stamp duty, free gifts and cash rebates. To prevent developers from incorporating interest rates on loans in house prices during the construction period, government prohibits developers from implementing projects that have features of Developer Interest Bearing Scheme (DIBS). As a result, financial institutions are prohibited from supplying final funding for projects consists of the DIBS.

From the Budget 2014, the public anticipates a large scale of housing development of an estimated 223,000 units of new houses will be built by the Government and the private sector (Chan & Chan, 2013). In order to facilitate the well-being of urban area, the Government will also introduce the Private Affordable Ownership Housing Scheme (MyHome) as a step to foster the supply of low and medium-cost houses by private sector. The scheme allocates a subsidy of RM 30,000 to private developers for each unit built, but the preference is only given to high demand area and limited to 10,000 units in 2014.

1.1.2.3 Indirect Property Investment

Indirect property investment is defined as "a way of investing in real estate without actually investing in the property". It can be done in several ways such as purchasing securities, funds, or private equity, which the most commonly adopted are real estate investment trusts (REITs), shares in property companies, and property funds. Indirect property investment generates income in two forms, dividends and capital gain from sale of shares. A share is an equity investment that represents ownership in a company, and listed on stock exchange. Purchasing a share in the company entitles the owner to become a shareholder who is also a joint-owner of the company. A shareholder is given the right to participate in the profits of a firm where the profits are distributed to them via dividend. Shares have been performing better than cash, bonds, and property in the long-term ("Property investment," n.d.). Despite of the attractive return of shares, the associated risk is also higher as share prices can fluctuate quickly and greatly. Hence, share is considered as a relatively high risk investment.

Indirect property investment is an investment with low level of capital expenditure. It is because indirect property investment does not need to purchase a physical property which requires huge capital, but it involves in investment by purchasing securities or share. The main source of income of indirect property investment is from dividend and interest payment. In addition, it provides investment with diversification potential since it is an investment of shares, funds, and bonds which can be included in a diversified portfolio. Besides that, indirect property investment is relatively liquid due to the ability to sell the owned share in stock market without affecting the share price. Next, it does not require investors to manage and refinance the investment as there are professionals who undertake the

responsibility. Furthermore, with the help of professional fund management, the performance of indirect investment can be improved to provide higher yields to investors. Moreover, the performance of indirect property investment is monitored by other investors, analysts and media as it is shared among all the shareholders and bondholders.

However, there are risks associated in indirect property investment. Indirect property investment such as Real Estate Investment Trusts (REITs) is usually managed by fund manager instead of the investor personally. Hence, there may subject to an agency problem which agent is not acting to maximize the gain of investors. In fact, the investment is relied on the professionalism of the fund manager in order to capitalize on the profit of investors. Also, the protection of minority holdings and the effectiveness are essential to look after the investors during an investment.

1.1.2.4 Comparison between Direct Residential Property Investment and Property Stocks Investment

According to Sanlam (2011), investors who are searching for regular income can make investment in direct residential property or listed property company stocks since both investments provide relatively high yields for investors.

Property stock possesses the characteristics of equity due to its high liquidity that can be easily traded in the market. It benefits the investors who need to liquidate their stocks to meet short-term needs. In contrast, direct residential property investment is less liquid so it is more suitable for investors that are planning to make long-term investment. Risk adverse

investor who prefers low risk will be more favoured to invest in direct residential property since it is less volatile than property stocks. Next, the cost of investing in property stocks is relatively smaller compared to direct residential property investment. Investors who have only limited capitals will be more preferable to invest in property stocks since investors can buy low quantity of shares without the necessity to own a real property. In contrast, direct residential property investment requires investor to have sufficient capital in order to buy a property otherwise they have to take a loan.

The risks that direct residential property investors exposed in the direct residential property market is high since investors need to deal with the tenants individually. Besides, they have to concern about the generated monthly income in order to cover the costs of loans. Thus, the ability to communicate with tenants is necessary in order to fulfill their needs so that more tenants are attracted. On the other hand, property stock investment is managed by professionals in property market. Hence, investors do not need to worry about the daily management which in turn save the costs and time. Moreover, property stocks investments provide diversification benefits to investors that well spread out across property, industry and location in an assets portfolio (Purnell, 2013). Investors can also gain income and growth potential from the indirect property investment which the return generated is same as the returns from global equities.

In short, property is more heterogeneous in nature compared to other asset classes (Abdullah & Wan Zahari, 2008). Apparently, there are differences in the risk and return characteristics between direct and indirect property investments and even among the similar property types. However, property stock investment is relatively attractive as it can eliminate many of the

disadvantages of direct residential property investment and at the same time providing similar goal to gain return like direct residential property investment (Holland, 2006).

1.1.3 Equity Market Index

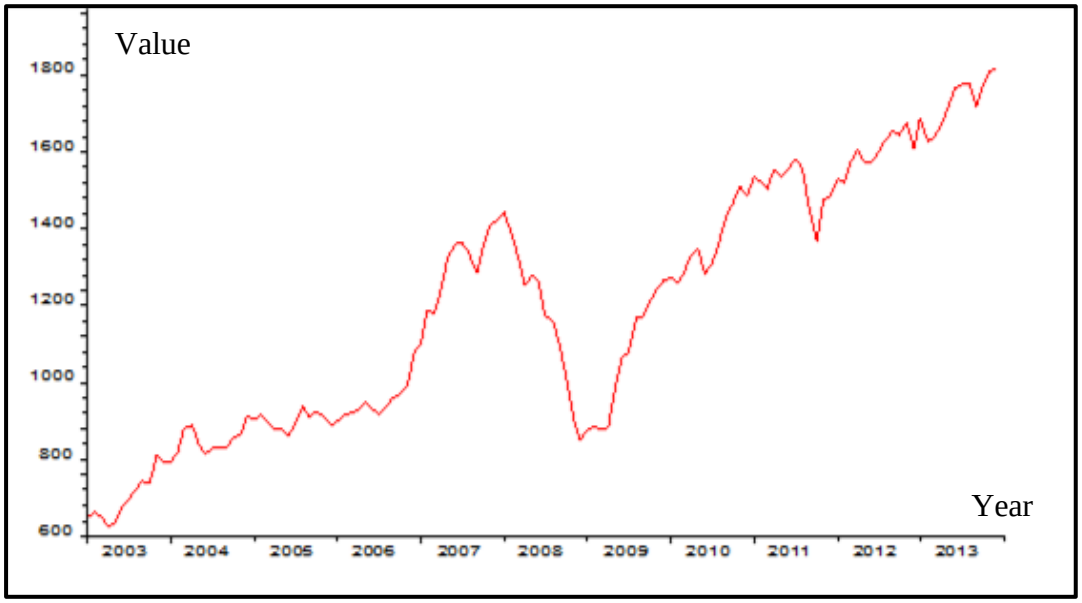
1.1.3.1 FTSE Bursa Malaysia Kuala Lumpur Composite Index

On 2 January 1970, the industrial index that comprises of 30 industrial stocks with the base year of 1970 was launched and introduced to the Malaysian stock market. In 1985, owing to the rapid development of the stock market, the industrial index was regarded no longer reflective of the changes in the market performance that caused by changes in market's expectation and policy as well as market structure. Therefore, the exchange and industry representatives at that time agreed to construct a new index which is sensitive to the important changes in the market environment. Consequently, the Kuala Lumpur Composite Index (as known as KLCI) was eventually launched to replace the industrial index under such situation.

Effective on 6 July 2009, the name of KLCI was changed to FTSE Bursa Malaysia KLCI (FBMKLCI). The FBMKLCI comprises of 30 largest listed companies in term of full market capitalization on Bursa Malaysia's Main Board. The fluctuation of the KLCI is updated every 15 seconds on a real time basis. The real time and closing price retrieved from Bursa Malaysia is used to calculate the FBMKLCI based on the FTSE Bursa

Malaysia Index calculation methodology. The performance of FBMKLCI in recent years is illustrated by the line chart below.

Figure 1.4: FTSE Bursa Malaysia KLCI – Price Index from 1/1/03 to 31/12/13 (Monthly)



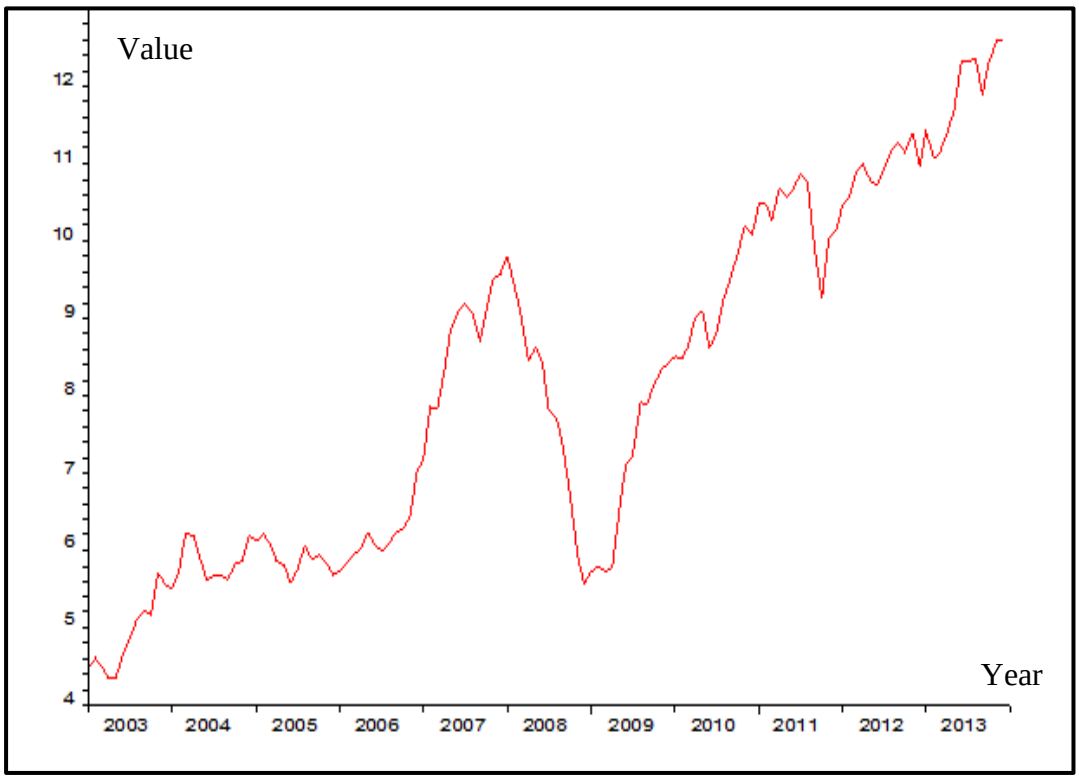
Source : Thomson Reuters Datastream.

1.1.3.2 FTSE Bursa Malaysia EMAS Index

The FTSE Bursa Malaysia EMAS Index (FBMEMAS) is a captilzation weighted index which represents the combined performance of the FTSE Bursa Malaysia Top 100 index and FTSE Bursa Malaysia Small Cap Index. FBMEMAS Index is a proxy of the performances of the all ordinary securities which are listed on the Bursa Malaysia' Main Board with a base value of 6000 as of 31 March 2006. According to Lean and Tan (2010), all of the ordinary securities covered under FBMEMAS Index are qualified for the principles of liquidity and eligibility as well as free floating. The

following line chart shows the performance of FBMEMAS Index in recent years.

Figure 1.5: FTSE Bursa Malaysia Emas – Price Index from 1/1/03 to 31/12/13 (Monthly)

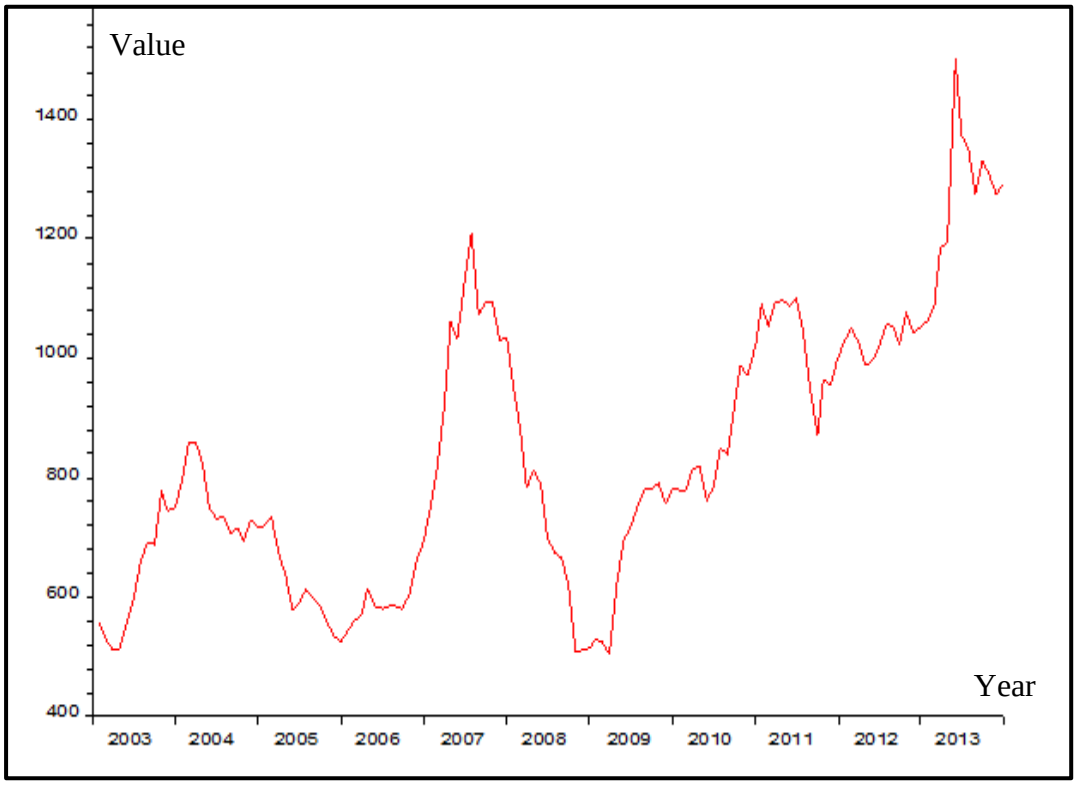


Source : Thomson Reuters Datastream.

1.1.3.3 Kuala Lumpur Property Index (KLPI)

Bursa Malaysia's property sector index, also known as Kuala Lumpur Property Index (KLPI), is one of the Bursa Malaysia index series which represents the entire performance of 85 listed property companies that listed on the main board of Bursa Malaysia with the base year of 1970. The performance of KLPI in recent years is illustrated in the following Figure 1.6.

Figure 1.6: MY Kuala Lumpur SE Property Index – Price Close



Source : Thomson Reuters Datastream.

1.1.4 Malaysia Listed Property Companies

In this research, 81 listed property companies were involved to study the research objectives. Within the study period from year 2003 to year 2013, there are numbers of property companies listed on Bursa Malaysia and delisted from Bursa Malaysia as well. During the pre-crisis period, there were 74 listed property companies in Bursa Malaysia. Additionally, two newly established property companies were listed on Bursa Malaysia during the crisis period and additional 5 property companies were listed on Bursa Malaysia for the post-crisis period, with total of 81 listed property companies in Bursa Malaysia for this 11 years period, range from year 2003 to 2013. Among the 81 listed property companies, there are three

major players in Malaysia property market namely, UEM Sunrise Bhd, IOI Properties Bhd and SP Setia Bhd followed by IJM Land Bhd and Sunway Bhd, with market capitalisation of 9.392 billion, 8.324 billion, 7.426 billion, 5.378 billion and 5.292 billion respectively (refer to Appendix 1.1). Most of these companies are involved in housing development and commercial building development projects.

1.1.5 US subprime Crisis

1.1.5.1 Causes of US Subprime Crisis

The U.S. subprime mortgage crisis was a global banking emergency that happened together with the U.S. recession from December 2007 to June 2009. The subprime crisis was generated by a great turn down in home prices, resulting in mortgage delinquencies and foreclosures and the devaluation of housing-related securities.

There were many causes of the crisis, with commentators assigning different levels of blame to financial institutions, regulators, credit agencies, government housing policies, and consumers. The contiguous cause of crisis was the rise in subprime lending. In the period of year 2004 to 2006, the percentage of lower-quality subprime mortgages increased dramatically from the historical 8% to approximately 20%. The ratio is even higher in some parts of the United States where a big proportion of these subprime mortgages were adjustable-rate mortgages. As a result of the changes, lowered lending standards and higher-risk mortgage products had become a wider trend. Moreover, the ratio of debt of U.S. households

rose from 77% in 1990 to 127% at the end of 2007, causing U.S to become gradually more indebted. Hence, the house owners faced the difficulty to refinance their loans when U.S. housing prices started to reduce sharply after the peak in mid-2006. The soaring of mortgage delinquencies and higher monthly loan repayment were caused by the reset of adjustable-rate mortgages into higher interest rates. Global firms that hold the mortgages–backed securities, including subprime mortgages, lost most of their value when the crisis happened.

1.1.5.2 Impact of US Subprime Crisis on Property Market

The effects of US subprime crisis spillover across the countries and in different level of severity. Several studies have been reviewed in order to identify the level of impact of US subprime crisis on Malaysia property market. In the Penang economic report (2007) showed that Malaysia has little affected by the US subprime crisis. The economy of Malaysia is strong enough to compete with the negative effect of US subprime crisis. One of the impacts is on the Malaysia's banks and financial institutions due to the substantially downgraded in ratings of the collateralized debt obligations because of the subprime components. When look into the performance of Malaysia's property market in the third quarter of year 2007, the property market activities remain active, especially in residential properties. The total transactions of residential properties is growing and showing positive trends in market.

However, Mohd Isa (2009) claimed that US subprime crisis affected the performance of Malaysian property market in the view of demand, supply and pricing perspectives. From the supply side, the total number housing

that was completed in year 2008 is reduced. It can be explained that developers were beware of the changing economic environment and tend to act prudently while selecting or bidding for new projects but the existing projects will be continued as committed. This statement is consistent with Abidin and Rasiah (2009), they identified that the situation of slowdown in the property industry because the developers delayed in launching new projects and performed inactively when the spending of consumers was decreasing and economic uncertainty. In the view of demand side, the transaction volume and transaction value of residential property were reduced in the last two quarters of year 2008. In terms of sales performance, there was a slight decrease in year 2008 thus increase the housing unsold units. From the pricing perspectives, the residential housing prices had sustained in the last quarter of year 2008 even though the US subprime crisis confusion.

Furthermore, Juliana (2009) identified that US subprime crisis has lesser impact on property market in Malaysia because of the banking industry in Malaysia is not highly correlated with the US banking industry. However, Malaysia economy undergoes a downward pressure in relative to reduce in exports, decrease in foreign direct investments, and shutdown of factories thus increases the unemployment rate. It will influence the confidence level of business and customers towards Malaysia property market. As a result, investors in property market will react differently or implement a "wait and see" strategy that wait for an opportunity or best timing to invest thus reduce the demand of property in Malaysia.

During Malaysian economy downturn period, the cost of materials for construction is increasing and burdens the costs and profitability of housing developers. The prices of housing will not going down even

though the property market is inactive. It is because of the foreign investors perceive that the price of property in Malaysia is considered cheap comparing to others countries. In the view of local buyers or investors, the property price level is high and unaffordable for those lower income resident groups. The effect of global financial crisis reduces the confidence level of investors toward the property market thus making the losses in delayed major property development project and decrease in sales of the properties. At the end, slow down the development of industry.

Moreover, government played an important role in promoting a healthy property market. Mohd Isa (2009) has introduced several measures and methods which provided by government in order to defend the negative effect from the volatility of economy. In order to maintain the housing supply level, government loosens the credit borrowing criteria for construction companies thus increase the availability of funds and liquidity. The availability of loan has been increased to public sector employees and tried to provide credits for those employees without stable income. Besides that, government promise to reduce the finance costs for buyers or developers in the banking system. From the demand side, the deferred of Real Property Gains Tax stimulate the investment in property sector and make attractive to investors when having a recession in stock market. Furthermore, the demand of high-end property at specific locations within the country has been increased by implementing the MM2H program. In conclusion, Malaysian financial system is relatively stable and strong enough to meet the economic challenges thus provide a sustainability condition for house prices and rental levels.

1.1.5.3 Impact of US Subprime Crisis on Stock Market

The global financial crisis had resulted in the stock market downturn around the world. Stock market reacted brutally after the collapse of U.S largest investment bank, Lehman Brothers Holding where credit availability in banking sector declined and investor confidence damaged severely. In 2008, the U.S. equity wealth dropped by 40%, from $20 trillion to $12 trillion between January and October. This event had turn out to be the worst economic crisis in U.S. since year 1932. On 9th August 2008, three investment funds amounting 2 billion Euros were suspended by French largest bank, BNP Paribas due to the problems in the US subprime mortgage sector. On the consecutive day, global stock markets remained under strong intense pressure. For instance, the London FTSE 100 index had encountered its worst plummet in four years. On 13th August 2007, European Central Bank (ECB) had its third time of cash injection into the money market of 47.7 billion Euros to ease the subprime credit crunch. Besides, in early November 2008, the S&P 500 index was down by 45 % from its peak in 2007.

Malaysian stock market was set up in March 1960, named as Kuala Lumpur Stock Exchange. The stock was commenced for public trading by the clearing house of Central Bank in May 1960. On April 14, 2004, the Kuala Lumpur Stock Exchange was renamed to Bursa Malaysia Berhad, in order to follow demutualization exercise. The purpose of the demutualization exercise was to improve competitive position as well as to react to global trends in the exchange sector by making themselves more customer-driven and market-oriented. Bursa Malaysia had remained fairly steady in 2009 regardless of the global financial crisis. The Kuala Lumpur Composite Index, KLCI fell in the months of January to March 2008, May

to October 2008 and March 2009. After falling below 1000 percentage points from October 2008 until April 2009, the index had grown strongly back to 1000 percentage points over the period from May to July 2009. Even though the Malaysian economy had experienced a recession during the global financial crisis, the stock market was not affect much as compared to Asian financial crisis in year 1997.

1.2 Problem Statement

Investment in property market remains one of the primary options for the cash-rich and savvy investors to hedge against inflation (Lee, 2014). The property market is widely perceived as an attractive market where can provide investors with more stable income and display less volatility than other markets such as stock market (Neo, 2011). However, the price and market force may promote or hinder the development of property market. Furthermore, as similar as other conventional assets like stock and bond, the price and demand in the property market are also subjected to the event that might change the market's environment and then could bring positive or negative impact to the development of the overall property market.

In Malaysia context, on one hand, the recent enforcement of a series of cooling measures (e.g. real property gains tax, foreigner ceiling price, tightening of loan approval, the elimination of Developer Interest Bearing Scheme (DIBS) announced in Budget 2014, generate both excitement and scepticism. These measures aim to slow down the property market's sentiment and thus prevent speculative bubble (Zurairi, 2013). On the other hand, the implementation of Economic Transformation Program initiatives, such as high-speed rail link to Singapore, the extension of LRT, the Mass Rapid Transit (MRT), Kuala Lumpur

International Airport 2 (KLIA2), are believed to create the new demand for the property market ("Top Property Developers", 2014). In addition, the growing young population, rising middle-income group, low rate of unemployment and relatively low rate of interest continuously form the fundamental of the demand in Malaysian property market in long term (Gambero, 2014). The property price is believed to go further higher by the market due to the combined impact of the increment in labor and material cost, shortage of skilled-worker, and rising fuel cost as a result of reduction in subsidies on petrol as well as the increase in electricity tariff. Moreover, the adoption of Good and Service Tax (GST) will compound and further increase the material cost, it finally will in turns bring negative impact to the developers' profit margin and increase the inflationary pressure on the price of the property in Malaysia ("House Buyers", 2013; "BIG Positions", 2014). In short, the growth of the Malaysian property market is expected to slow down due to the impact of cooling measures, yet the price and demand for the various types of properties will continuously expand. As a result, the investor or the buyer with limited capital will seem difficult to access to the property market. Hence, the investor with limited capital might look for another alternative market to develop and diversify their portfolio.

One might suggest the investors to invest in indirect property market which comprises of stocks of listed property companies and REITs, as alternatives for investment in direct property market. Venmore-Rowland (1989) stated that investment in property stock could be another way of accessing to the direct property without the need of introducing the excessive amount of capital (cited from Liow, 2000). As compared to direct property market which requires the investor to put in excessive equity and long term commitment (lock up) of the equity, the indirect property investment vehicles (i.e. property stocks and REITs) request the relatively lesser investment sum and lower transaction cost while providing the feature of higher liquidity to the investor. On the other hand,

investment in direct property market is continuously regarded as an effective way of hedging against inflation. In Malaysia context, Lee (2014) revealed that Malaysian residential property could provide effective hedging function against the expected inflation over the long run. However, the investments in direct property market are also characterized by illiquidity, inadequate market transparency and low information efficiency (Sebastian & Schatz, 2009; Hoesli & Oikarinen, 2012). Therefore, it is interesting and worthwhile to compare the risk-return performance of indirect property investment vehicles relative to direct property.

However, there are only few researchers conducted studies associated with the risk-return performance of property stock in Malaysia (Ting, 2002; Adullah & Wan Zahari, 2008), the majority of the publications were subject to other jurisdictions and most of those mainly focus on examining the performance of Malaysian REITs (Ting, 1999; Rozali & Hamzah, 2006; Hamzah, Rozali & Tahir, 2009; Ong, The & Soh, 2012; Aik, 2012; Yusof & Mohd Nawawi, 2012). It should be informative that Ting (2002) conducted his research by examining the performance of 10 listed property companies and 3 listed property trusts in Malaysia. After that, Adullah and Wan Zahari (2008) included all listed property companies into their research and the period of the study is from year 1996 to year 2007. Therefore, the impact of the global financial crisis on Malaysian property stock's risk and return performance remains unsettled.

1.3 Research Objectives

The problem statement has stimulated this research to achieve several objectives and these objectives form an investigation direction.

- To evaluate the risk-adjusted performance of the Malaysia property stocks, direct residential property market and aggregate market indexes across pre-, during and post-crisis.

- To compare the risk-adjusted performance of the Malaysia property stocks, direct residential property market and aggregate market indexes between pre-, during and post-crisis periods.

- To determine whether property stocks could provide diversification benefit to the investors.

- To determine whether property stock investment able to substitute the direct residential property investments.

1.4 Research Questions

- What is the performance of the Malaysia property stocks, direct residential property market and aggregate market indexes throughout the period, especially during the global financial crisis?

- Is there a difference in the performance of the Malaysia property stocks, direct residential property market and aggregate market indexes between the pre-crisis, during crisis and post-crisis period?

- Does indirect property investment provide diversification benefits?

- Could listed property companies act as substitute for direct residential property investments?

1.5 Hypotheses of the Study

This study has developed four hypotheses:

The *first* hypothesis is to examine the performance between property stocks, aggregate market indexes and direct property market across the pre-, during and post-crisis period.

The *second* hypothesis is to examine the performance of property stocks, aggregate market indexes and direct property market between the pre-, during and post-crisis period.

The *third* hypothesis is to test the relationship between property stocks and aggregate market indexes.

The *last* hypothesis is to test the relationship between property stocks and house price index.

1.6 Significance of Study

This study examines the performance of the Malaysia listed property companies in comparison to the direct residential property market performance and aggregate markets performance by using Sharpe Ratio. The comparison is made between the period before, during and after the recent financial crisis to further examine the reaction of listed property companies in terms of risk and returns.

There is always an opportunity cost in the investment assets reallocation which very much triggers the decision of an investor in selecting a suitable asset.

Particularly, the decision becomes more complicated when there are many similarities between the investment assets such as real property investment and property stocks investment. Thus, it is important to provide an informative research regarding the risk and return of the listed property companies and property market. The risk and return in the findings will cater both risk-aversion and risk-seeking investors in their decision making. For instance, risk-aversion investors will choose to invest in a listed property stock that provides greater returns than other lower returns property stock or real property at a given risk level. Furthermore, this result is vital for investors to construct an efficient portfolio which offers the best combinations of risk and return.

In 2008, Adullah and Wan Zahari conducted an extensive research on the risk-adjusted performance of the listed property companies in Malaysia from year 1996 to 2007. Their study compared the performance of listed property companies before, during and after 1997 financial crisis. However, there are very limited studies have been done to further examine the performance of Malaysia listed property companies, especially during the period of global financial crisis. Therefore, this research attempts to provide evidence on the discrepancy in performance of listed property companies and property market before, during and after the 2008 financial crisis. This past evidence is essential for the crisis management in an organization especially property sector due to the major event happened in 2008. Thus, the result helps the managers and policy makers to prepare contingency plans in advance to ensure the soundness of the property sector.

In addition, this research contributes a source of information for the policy makers to gauge the feasibility of the existing and future policy measures on the property market. The policy makers might want to utilize the past performance of property stocks market and direct residential property market to justify their past practices

or policies and to stimulate the future decision. Implicitly and explicitly, the research results assist in promoting the development and efficiency of property sector. Subsequently, this research helps policy makers to identify the condition of the property stock market and direct residential property market before designing any related programs and policies.

By investigating the correlation between listed property companies return and aggregate market return, the investors are addressed whether which property stocks provide diversification benefits. This result also facilitates the decision of both individual investors and institutional investors in selecting the property stocks into their portfolio. On the other hand, the correlation results between listed property companies return and property market return will provide evidence if the property stocks investment substitutes the real property investment. Thus, the investors will be informed whether the Malaysia property stocks investment provides an alternative investment opportunity or it is just a paradox.

In a nutshell, this study aims to provide an in-depth understanding in the performance of Malaysia property companies and property market due to their contribution to the nation development. This research humbly expects to provide a guideline for individual investor, institutional investor, managers, academicians and policy maker to invest and/or evaluate the Malaysia property companies.

1.7 Chapter Layout

This study comprises of five chapters. In the first chapter, overview to the background of research is introduced and followed by the problem statement, research objectives, hypotheses as well as significance of the study. Next, Chapter 2 will present the literature review on the performance of indirect property

investment in property stock and REITs, direct property investment, as well as the relationship between property stock, direct residential market and aggregate market indexes. Chapter 3 will introduce the methodology used to evaluate the risk-adjusted performance of property stock, aggregate market indexes, and direct residential property market. Besides, the methodology to compare these three components is shown in this chapter. Chapter 4 will demonstrate the trend and analyze the results. Lastly, Chapter 5 will discuss the major findings, policy implication, limitations, recommendations for future research, and conclusion.

1.8 Conclusion

This study aims to examine the risk-adjusted performance of the property stocks in comparison to aggregate market and direct residential property market. The period of this study has included the 2008 financial crisis to investigate its impact on the performance of property stocks and others. However, there are only a few researches have done on this topic, especially in Malaysia context.

CHAPTER 2: LITERATURE REVIEWS

2.0 Introduction

In this chapter, the relevant underlying theories that are related with this study will be firstly discussed. After that, the literature review for the previous studies will be conducted through summarization and description. In addition, the evaluation for the literature review will be also carried out. It should be informed that the main concerns of this study are examining the risk-adjusted performance of property stocks and their correlations with the equity market and direct residential property market. Therefore, the related researched must be reviewed. Furthermore, in order to construct and deliver a clearer picture about the direction and the relationship among the variables, the conceptual framework will therefore be constructed and depicted. Finally, the hypothesis for this study will be also outlined and they are necessary to relate with previous study.

2.1 Theoretical Framework

2.1.1 Efficient Market Hypothesis

In 1969, Fama, Fisher, Jensen and Roll conducted a research to investigate the adjustment of common stock prices to the new information (if any) that is associated in a stock split. More specifically, they tend to examine whether there is abnormal return on a common stock incurs around the months of the split happens. In addition, the relationship between the split

and changes in other more fundamental variable is examine, if the is abnormal behavior in the stock returns. The evidence shows that the past stock splits have been related with significant increase in dividend. Subsequently, the result shows that the market will aware of this impact and utilize the announcement of a split to reappraise the expected return of the securities. Furthermore, the price of a common stock will fully reflect the information indication of a split due to market's judgment mostly after the announcement date or at least by the end of the split month. Thus, the equity market is concluded to be "efficient" as stock price adjust immediately to new information (stock split announcement). Moreover, the stock price will adjust to the split announcement only if the market anticipates there is a change in future dividend payout. Later, there are many researches (such as, Brown & Warner, 1985; Brinson, Hood & Beebower, 1986; Keim & Stambaugh, 1986; Campbell and Shiller, 1988; Ippolito, 1989; Harvey, 1991; Elton, Gruber, Das & Hlavka, 1993) were done on market efficiency but a full review is unattainable, and is not attempted in this study.

Fama (1970) defines efficient market as a market in which the security prices always "fully reflect" available information. For the first time, the efficient market model is discussed along with the "fair game" or expects return model, the sub martingale model and the random walk model. Besides, the sufficient conditions are determined for market efficiency theory, such as, (1) there are no transaction costs in trading securities, (2) all available information is costlessly available to all market participants, and (3) all agree on the distributions of future prices of each security and implication of current information for the current price.

The market efficient theory is then empirically tested at three forms depending on the nature of the information subset of interest. First, weak form test, in which the available information that is fully reflected is historical prices or return. Although there is persistent evidence of dependence in price changes and stock returns, it is irrelevant for testing the efficient market model (Fama, 1970). For instance, the large daily price change is dependent to the following daily changes. But the initial adjustment of prices to the information (historical prices) is still unbiased. This is due to the unexpected sign of price change and cause difficulty in evaluating the relevant information immediately. Second, semi-strong form tests assume the prices will fully reflect undoubtedly publicly available information. For example, the information can be new issues of common stock and annual earnings announcement by firm. Third, strong form tests, is concerned on whether market participants can privately access to any information relevant to the price formation. Niederhoffer and Osborne (1966) and Scholes (1969) determine that specialists and corporate insiders have private access to information respectively (cited from Fama, 1970).

After the efficient market theory was introduced by Fama (1970), there are many researchers extended the work independently at different forms or jointly discussed the three forms. For instance, Keim and Stambaugh (1986), Campbell and Shiller (1988) and Harvey (1991) discussed on weak form test; Brown and Warner (1985) examines on semi-strong form test; and Ippolito (1989), Elton, Gruber, Das, and Hlavka (1993) and Brinson, Hood, and Beebower (1986) examine on strong form test.

Keim and Stambaugh (1986) and Campbell (1987) find that a common set of stock market and term structure variables able to forecast stock and

bond return. More specifically, Keim and Stambaugh (1986) investigate the ability of difference between yields on long-term low-grade corporate bonds and short-term U.S. Treasury bills to forecast the risk premium on corporate bond. This ex ante variable is related inversely to the asset price levels and positively correlated with expected returns. Moreover, the returns on portfolios of foreign common stocks and S&P return can be forecasted by the dividend yield on the S&P 500 portfolio and U.S. term structure variables (Harvey, 1991). On the other hand, Brown and Warner (1985) investigate the event study of daily stock return and the impact of firm-specific events on stock prices. The results suggest that the non-normality of daily returns has no obvious impact on event study.

In exception, the corporate officials who have monopolistic access to information tend to achieve abnormal return (Jaffe, 1974). Similarly, Seyhun (1986) finds that insiders possess special information and tend to purchase common stock prior to an abnormal rise in price. Furthermore, the result indicates that outsiders unable to gain abnormal return by using the publicly available information about insiders' transactions. Moreover, the evidence for 1-factor benchmarks of Sharpe-Lintner model is that mutual fund managers have monopolistic information that leads to positive unusual return (Ippolito, 1989). In contrast, Elton, Gruber, Das, and Hlavka (1993) and Brinson, Hood, and Beebower (1986) find that the investment managers on average underperform the passive portfolio. Elton, Gruber, Das, and Hlavka (1993) point out the modern theory of efficient in which the investor will only gain a return sufficiently to compensate the cost of acquiring the information in an efficient market.

An extended work on market efficiency was continued after the original work from Fama (1970). The categories of market efficiency are changed

from weak-form tests, semi-strong tests and strong form tests to tests for return predictability, event studies, and tests for private information respectively (Fama, 1991). The proposed change in title of weak form tests to tests for return predictability is to cover more general area of research in predicting returns and include variables such as interest rates and dividend yields. However, there is no change in coverage for the second and third categories, but the change in title only. Furthermore, Fama (1991) argues that there is joint-hypothesis problem when using dividend yields, past returns and various term-structure variables to forecast the return. The application of these variables have resulted inconsistency with market efficiency-constant expected returns model. Thus, Fama (1991) supported the negative result of the investment managers' access to monopolistic information leads to abnormal returns.

2.1.2 Theory of Risk and Return Relationship

"An expected return is a desirable thing for the ordinary investor, while variance of return or risk is an undesirable thing" (Markowitz, 1952). Thus, he concerned that investors should take into account the maximum expected return and variance of return simultaneously when considering the future performances and selection of portfolio. There are five pertinent assumptions related to the variance of the rate of return being a meaningful measure of portfolio risk (Brown and Reilly, 2006, page 202): (1) The probability distribution of expected returns over some holding period is indicated when investors deliberate each investment alternative; (2) The utility curves of investors will illustrate diminishing marginal utility of wealth, and investors maximize one-period expected utility; (3) The variability of expected returns is used to estimate the risk of the portfolio

by investors; (4) The utility curve is a function of expected return and expected variance of returns, since the investors are assumed to make their decision merely on expected return and risk; (5) Investors desire lower risk than higher risk for a given level of expected return. Likewise, investors desire higher returns than lower return for a given level of risk.

From economic and finance perspective, a higher risk investment must be compensated with higher rewards and this implies that the risk is positively associated with return. Nevertheless, there are contradicting results showed by the strategic management researchers on the relation between risk and return, such as Bowman (1980) and McNamara and Bromiley (1999). According to Bowman (1980), risk captures the uncertainty or more specifically the probability distribution in the event of investment. He also stated that risk may be emphasized before the investment, while the effect and variance in returns can only be addressed over time. Despite the study done by Bowman (1980) describes the relation between risk and return based on the behavior of firm and its managers, it is likely to provide an oblique linkage to the capital and securities market. He argued that the negative relation between risk and return can be eliminated by the pricing of securities in the equity market. For instance, the company with lower risk and higher achieved returns may price its securities at relatively higher price than the market place, therefore decreasing its reward to the investors. Besides, Bowman (1980) addressed the negative relation between risk and return might be due to an excellent management which attained higher returns and lower risk within the particular industry. Subsequently, McNamara and Bromiley (1999) found a similar finding regarding the negative relation between risk and expected return. They explained that the investors or decision makers may have anticipated adequate

indemnification in terms of returns for undertaking extra risk, yet systematically erred in their assessment of the risk and return.

The work of Markowitz had provoked more future researches on performance measurements for investment portfolios. Sharpe (1966) was one the pioneers who introduced a measurement for the performance of mutual funds. He suggested reward-to-variability ratio or better known as Sharpe Ratio, to measure the expected return for a given unit of risk. Sharpe Ratio computed mean and standard deviation (total risk) of a differential return involved in the portfolio. According to Sharpe (1994), performance measures can be computed by using ex post value or ex ante value for practical implementations and theoretical discussion respectively. Anyhow, the historic results are assumed to provide some predictive ability (Sharpe, 1994).

A particular assumptions underlying capital theory is discussed in Sharpe (1966), where the investors decide the selection of portfolios solely emphasized on the preference of risk and expected return. Inevitably, investors able to find efficient portfolios which provide maximum expected return for a given risk level but the last decision is still based on their desirability on risk and return. Furthermore, Sharpe (1994) underlined that Sharpe Ratio does not consider correlation into its measurement. He stated that the correlation between assets in portfolio was important to deliver the comparisons based on Sharpe Ratio.

2.2 Review of the Prior Empirical Studies

2.2.1 Review on Indirect Property Investment

Indirect property investment via purchasing stock of property stocks and real estate investment trusts (REIT) are widely adopted by investors. The literatures devoted to examine the risk and return performance of property stocks and REITs relative to the stock market are extensive. The studies regarding to the performance of property stocks and REITs could be seen from the works of Liow (1997), Liow (2000), Ooi and Liow (2004), Lee and Ting (2009), Liow and Adair (2009), Newell and Razali (2009), Nguyen (2010a), Nguyen (2010b), Emele and Umeh (2013) and so on.

In Singapore, Liow (1997) analyzed the risk-adjusted performance of 16 property stocks in Singapore over a time period from year 1975 to 1995. Four risk-adjusted performance indicators (i.e. Sharpe Index, Treynor Index, Jensen and Adjusted Jensen Indices) and correlation measure (i.e. Spearman Rank Correlation) were included in the study. The SES ALL-share Price index and the Urban Redevelopment Authority (URA)'s quarterly All-Property index (PPIA) were included in the study as proxies for measuring the performance of stock market and property market followed by a performance comparison with the property stocks was made. The key finding of study showed that the performance of Singaporean property stocks was not better than the stock market on nominal and risk-adjusted basis.

Extended on the earlier study in 1997, Liow (2000) included time-varying Jensen Index to assess the performance of property stocks and direct

properties under the varying market condition over a same study period in Singapore. He found that the performance of direct properties was better than the performance of property stocks and stock market on a risk-adjusted basis over the entire study period. Moreover, the performance of property stocks was significantly different from direct properties. Although the result showed that higher excess returns could be offered by direct properties investment in the long run, investment in property stocks was claimed could be act as a substitute for investment of real estate market when the market was depressed. In addition, the study also revealed that the direct property market's performance was led by the performance of property stocks.

Similar studies on the risk-adjusted performance of property stocks were also carried out in other countries such as Vietnam and Nigeria. In Nigerian context, Abdul-Rasheed and Tajudeen (2006) evaluated the risk-adjusted performance of one listed property development company and six listed construction companies in Nigerian through Sharpe ratios over eight years period from 1998 to 2005. The results showed that the performance of both listed property and construction companies were worse than the performance of the aggregate stock market.

Emele and Umeh (2013) also conducted a similar study in Nigeria from year 2003 to 2009 but they additionally involved four stocks which are from the food and beverage sector, banking sector, oil and gas sector, and insurance sector in their study for performances comparison with property stocks. The findings showed that property stocks failed to provide higher returns as compared to those selected common stocks.

In Vietnam, Kang, Maysami, Mensah and Pham (2013) examined the financial performance of property stocks to provide an insight of the

property stock market on portfolio management. Five large real estate companies namely Hoang Anh Gia Lai Joint Stock Company (HAG), Tan Tao Investment Industry Corporation (ITA), Kinh Bac City Development Share Holding Corporation (KBC), Thu Duc Housing Development Corporation (TDH), and Vincom Joint Stock Company (VIC) that were publicly traded in the Vietnamese stock market were selected to carry out the study, with the Ho Chi Minh City Stock Exchange Index (HOSE Index) as the entire stock market benchmark. Results from the study showed that the average returns of the property stocks were greater than the entire Vietnamese stock market. Three of the five property stocks were slightly riskier whereas the other two were safer than the entire stock market on behalf of portfolio investment.

In Malaysia context, Neoh (1990) examined the stock performance of five property stocks namely IGB, Bandar Raya, I&P, Sime Property and Pelangi in Malaysia from year 1981 to 1990 (cited from Ting, 2002). His result indicated that the shareholders of these five listed property companies were only able to gain an average annual return of 6.9%. The author attributed that the poor performance was because of the diminishing profit margin resulted from the maturing housing industry, the increasingly competitive business environment, and the low asset turnover ratios.

Ting (2002) extended the study of Neoh (1990) by examining the stock performances of listed property development and property investment companies as well as listed property trusts in Malaysia over the period of year 1991 to 2000. He compared the performance of stocks of those listed property companies with the performances of stock market and direct residential property market through Sharpe Index while evaluating the diversification benefit of those listed property companies. The KLCI,

EMAS Index and Second Board Index were adopted as proxies for the performance of general stock market, Kuala Lumpur Stock Exchange and small capitalization stocks. In addition, the property index and Malaysian House Price Index were also utilized to represent the property stock market and direct residential market.

The result of Ting (2002) showed that the performances of property investment companies and listed property trust were worse than the performance of the property development companies. Besides, several selected property development companies and investment companies' stocks were found to outperform the market. The overall property sector underperformed the stock market but outperformed the direct residential property market which was represented by the Malaysian House Price Index. Hence, he suggested that the property stock were not appropriate to be added into the portfolio for diversification purpose due to the high positive correlation with the stock market. Furthermore, the investment in property stocks failed to acts as substitutes for conventional direct residential property investment because the low negative correlation between property stocks and Malaysian House Price Index returns.

The work of Ting (2002) was extended by Abdullah and Wan Zahari (2008) who studied the risk adjusted performance of property stocks in Malaysia for the period of year 1996 to 2007. The authors segregated the sampling period into three distinctive period categories, namely pre-crisis period, during crisis and post crisis. The Sharpe Index, Adjusted Sharpe Index, Treynor Index, Jensen Index and Adjusted Jensen Index were adopted in this study. Their result indicated that property stocks outperformed the aggregate market and the property stock sector. In addition, they also discovered that the performance of the property stocks was different to the

aggregate market and property stock sector before, during and after the 1997 Asian financial crisis. Furthermore, most of the individuals including property stocks and property stocks sector as a whole as well as aggregate market were found showing negative return on average in the whole study period.

Nevertheless, there were a few studies that examined the risk-adjusted performance of property stock traded in different countries. For example, Ooi and Liow (2004) examined the risk-adjusted performance of property stocks traded in seven developing countries including Malaysia, Singapore, Hong Kong, Indonesia, South Korea, Taiwan, and Thailand over the period of year 1992 to 2002. They concluded that the property stocks in five countries including Malaysia, Hong Kong, Singapore, Indonesia and Thailand performed worse than respective general stock market over the study period covered. The results were supported and extended in the study of Liow and Adair (2009). Liow and Adair (2009) included 13 Asian countries (i.e. Australia, China, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan and Thailand), US and UK real estate market in their study to examine the risk-return performance of those markets and to explore the international diversification potential from the perspective of US and UK investors over the period from year 1996 to 2005. Their results showed that Asian property markets, excluding Japan, had inferior risk-adjusted performance as compared to respective stock markets.

In addition, Nguyen (2010b) carried out a similar study that involving multiple property stocks from 13 countries in Asia from the perspective of US investors from year 1999 to 2009. The results showed that the property stocks in Asia had better performance than the stocks and real estate in US

on a risk-adjusted basis. Moreover, Brounen and Koning (2012) analyzed Real Estate Investment Trust (REIT) returns using 210 listed REITs total return data in Australia, Hong Kong, Japan, Singapore, France, Netherlands, U.K., Canada, and the U.S. from year 1990 to2010. Capital Asset Pricing Model (CAPM) was conducted and the results showed that REITs had outperformed the national indices in year 2000 to 2007 with positive abnormal returns which appeared to be less volatile than the overall stock market. The sensitivity of REITs was differed by country to tendencies in the wider stock market, such that the U.S. being the lowest while Asia was the highest.

Apart from that, there are several researchers who take into account of the effect of global financial crisis when studying the performance of property stocks and REITs. For instance, Nguyen (2010a) from Vietnam had split the study period into two sub-periods, namely pre-crisis period and during crisis period, for the purpose of analysing the impact of global financial crisis on the performance of property stocks market in Vietnam. The results showed that the property stocks market underperformed the aggregate stock market and bond market over the period prior to the global financial crisis. However, the performance of property stocks market was better than stock market during the crisis period. In addition, the global financial crisis was found to have adverse impact on those property companies in Asia. Newell and Razali (2009) also provided similar findings for the impact of global financial crisis on Malaysian property stocks. Their study indicated that the stock performance of Malaysian property stocks dropped by 44.6% in December 2008 due to the close relationship with the stock market.

Besides, Hamzah, Rozali and Tahir (2010) employed three performance measurement methods, namely Sharpe Index, Treynor Index and Jensex

Index to examine the performance and the systematic risk of REITs. While investigating whether REITs could offer higher return than market portfolio, they separated the period of 1995 to 2005 into pre-crisis, crisis, and post-crisis. The KLCI and KLPI were included in this study as proxies for returns on the market portfolios for performance comparison. The results indicated that there were changes in the risk-adjusted performance and systematic risk of REITs over time. The REITs in general performed better than the market portfolio during the crisis however underperformed the market portfolio in the pre-crisis and post-crisis period. Furthermore, the result also indicated that the systematic risks of REITs on average were slightly higher than the market portfolio during the period of pre-crisis and crisis.

Furthermore, Pham (2011) examined and compared the risk-adjusted performance and the correlation of Korean REITs with bond, shares, and property companies in Korea for the period from January 2002 to December 2010. The author broke down the time frame of the study into three sub-periods for the purpose of examining the impact of global financial crisis. Dow Jones South Korea REIT Total Index and Down Jones South Korea Stock Market Index as well as a market-weighted property total return index were used to measure the performances of REITs, aggregate stock market, and property market respectively. The performances of those markets were ranked in terms of Sharpe's ratio. The findings indicated that K-REITs underperformed the shares, bond and property companies over the entire period. Besides that, the performance of the K-REITs was found more sensitive to the global financial crisis as compared with shares and property companies. The results showed the risk level of K-REITs was found to increase significantly (from 13.6 % to

36.1%) as compared to the shares (from 22.5% to 31.5%) and property companies (from 30.0% to 41.8%).

Finally, there were few studies that explored the factors which could influence the performance of property stocks. For example, Tai (2009) investigated the factors that affect the performance of property stocks listed in four stock markets in the Middle East, namely Kuwait, Saudi Arabia, and the United Arab Emirates (UAE) between the year of 2004 to 2008. The author pointed out that the returns of property stocks were significantly affected by the firm size, book-to-market value, and market performance. A similar study was implemented in Malaysia by Thim, Choong and Asri (2012) who conducted their study by analyzing the performance of 36 property stocks in Malaysia over the period of 2003 to 2007. Their findings indicated that ROA, ROE, and EPS were the important factors that significantly affect the performance of listed property companies in Malaysia. In addition, Brounen and Koning (2012) observed the factors of the risk adjusted performance and riskiness of REITs via regression of the CAPM model with various variables. Evidence showed that risk adjusted performance was notably influenced by firm size while riskiness was influenced by regional differences and firm leverage.

In short, most of the previous studies come to make a conclusion that the property stocks failed to offer excess return as compare to general stock market either on nominal basis or risk-adjusted basis. In addition, the global financial crisis on property stock market was also proved to have a negative impact on the performance of property stocks. However, few studies shows that the investment in property stocks could offer higher return during the period of crisis and the investment in Asian property

stock could also provide a higher return than investment in U.S stock market and real estate market.

2.2.2 Review on Direct Property Investment

Malaysia housing price level is increasing when the demand of house is high and the relative income level is remaining constant. It is important to study the interrelation between direct residential property and the performance of listed property companies that provide an insight for investors when deciding their investment strategies or portfolios. There are several reasons that attracting investors to invest in real estate or property stock rather than others financial instruments and becoming popular recently (Dhar & Goetzmann, 2006). First of all, the tax advantages that earned by the investors or buyer especially for owner-occupied homes. Next, matching different types of real estate with different characteristics in a portfolio will be more liquid and make it easier for investors to invest. For instance, Real Estate Investment Trust securitizes physical real estate and mortgages and may favour those investors with limited capital to invest since the initial capital required is lower. Besides that, government sponsored entity offered a range of mortgages that in pleasant term for homebuyers in order to stimulate the demand for housing.

However, everything has pros and cons, due to variety products of real estate with different characteristics; some may not have favourable conditions or not located in a good environment or situation that is attractive to investors or buyers. Hence, it might incur high transaction and search costs that become illiquid in the market. Moreover, the rise of mishandling of asymmetric information emerged due to the lack of

transparency in direct property investment. For example, subprime mortgage crisis in US, the causes of this crisis due to the decreased in real estate prices, liquidity problems of the housing and high leverage financial ratio of some buyers or investors.

Francis and Ibbotson (2009) measure the returns of physical and financial real estate in the U.S. by comparing stock, bond, and commodity investments that include the effects of inflation from the years of 1978 to 2008. Real estate can be divided into three categories which are residential, business, and farms. By employing the S&P/Case-Shiller Home Price Index, U.S. Office of Federal Housing Enterprise Oversight (OFHEO) and Real Estate Investment Fiduciaries (NCREIF) Property Index, the returns from different real estate categories can be calculated. The measurement of total returns is combining cash income and price-change income in annually basic. The result showed that among the three categories of real estate, there are highly positive and significantly correlated but generated different average returns over the sample periods. Furthermore, the correlations between the physical real estate with respect to real estate stock, bond, and commodity investments have been determined and identified that the low correlation represents the possibility of diversification benefits.

There are some relevant information needed to be highlighted in the study of Francis and Ibbotson (2009). The annual returns provided by residential real estate was the lowest among the three categories (residential, business, and farms) because of the features of government subsidies in U.S. Residential real estate having less variability and lower standard deviation in returns compare to others. The probability of getting a negative return during holding periods is small thus less risky and more attractive than

others categories. Other than that, another reason that granted the willingness of investors to spend their money in a relatively long investment period is the inflation hedge that provided by physical real estate. Francis and Ibbotson (2009) claimed that the returns of physical real estate and inflation rate have a positive correlation. It is because inflation represents the prices is increasing or rising which means if market undergoing an increase in inflation simultaneously the price of physical real estate will increase also and showing a capital gain. Additionally, the factors that will influence the values of residential real estate have been discovered in the study of Francis and Ibbotson (2009). The military activity that happened within the sample period did not have a significant impact on the values of real estate. The physical real estate's prices will negatively be influenced by federal legislation. Recession and subprime mortgage crisis are negatively affected market values of all types of physical real estate. The values of physical real estate will drop substantially and the subprime mortgage crisis incurs house prices fall far surpasses than before.

Lizieri and Satchell (1997) attempted to investigate the relationship between security-backed property vehicles, the overall equity market, and the underlying direct real estate investment market. Other than that, they further examined the role and significance of commercial property in the overall economy. To do this, they conducted their research in U.K. based on the data from equity market and property company share data. They were using monthly index values from the Financial Times All Share Index (FTAS) and the Financial Times Property Sector Index (FTPROP) for their analysis over the period of June 1972 to May 1992. A granger causality test has been implemented in order to examine the interrelationship between property and equity market. The result identified

that there is a two-way strong causality with equity market Granger-causing property market either in short or long term. Nevertheless, property market has Granger-causing equity market but the effect is less strongly and need longer period to identify the effect. Furthermore, scrutinizing the impact of property market on equity market, the effects is weak and positive but need longer time to identify the effect. However, the longer the period, the impact of property market on equity market has changed from positive to significantly negative. In contrast, the result of the impact of equity market on property market is unclear and inconsistent. At the end, Lizieri and Satchell (1997) concluded that the relationship between property and equity market show strong lead and lag structures and real estate does have an impact on the corporate sector.

Gyourko and Keim (1992), Eichholtz and Hartzell (1996) and Vetsch (2010) provided the similar findings. The returns of direct and indirect real estate markets are highly correlated and the listed property companies are leading the returns of direct real estate. It was supported by Crowe and Krisbergh (2009), they determine the correlation between direct and listed property market performance. The result showed that UK, US and Hong Kong having a correlation value of 0.72, 0.58 and 0.64 which are highly correlated since the correlation value is greater than 0.5. In other word, the changes in property stocks returns can be utilized as an indicator that to estimate the performance of direct real estate investment. It can be explained by the inefficient transfer of information in the direct real estate markets. When the problems of asymmetric information become more severe, it will enlarge the gap in term of returns. Cremers (2013) further determined that direct investing in real estate would have provided significant diversification benefits compare to traditional portfolio that comprised only public equity and government bond. In a nutshell, by

studying property shares, it may get better understanding of the real estate market.

2.2.3 Review on the Relationship between Property Stock Return and Aggregate Equity Market Return

Generally, people believe that property investment provide substantial return in term of price appraisal return basis, act as future inflation hedge as well as offer portfolio's risk diversification (Abdul-Rasheed & Tajudeen, 2006). Thus the public, corporation and institutional investor as well as international investor have always shown a widespread of attention on real estate and property market to look for favourable investment opportunities.

Real estate investment (regardless of direct or indirect form) perceived as an important determinant for building wealth. A huge number of researches have been carried out to further study the investment nature of real estate and property market. For example, Miles and Mccue (1984), Miles, Cole and Guilkey (1990), Lizieri and Satchell (1997), Liow (1997), Tse (2001), Hui, Ooi and Wong (2007), Ryan (2011), Lin and Lin (2011), Liow (2012) conducted research on real estate investment trust (REIT), securitized real estate properties and direct real estate investment return with respect to other investment option like stock market.

According to Abdul-Rasheed & Tajudeen (2006), direct investment in real estate market would subject to illiquidity, high transaction cost and large initial capital investment. Alternatively, to gain on the potential benefit in real estate and property market, it involve acquired an indirect property

investment vehicles such as listed property company's stock, securitized real estate product or real estate investment trust (REIT) share.

For investor with limited capital, indirect property investment through REIT share and listed property stock has served as an only choice to invest in property market (Liow, 1997). Thus, it is important for the investor to understand the return nature of these indirect investment vehicles with respect to the aggregate equity market (aggregate stock market). First, whether REIT share and property stock do outperform the aggregate equity market. Second, the return volatility of REIT share and property stock with respects to the whole stock market. Third, the relationship and correlation between REIT share, property stock and the aggregate stock market.

By examine the listed real estate and property company's stock performance relative to the aggregate stock market, Neoh (1990), Eichholtz and Hartzell (1996), Liow (1997), Ting (2002) Brounen and Eichholtz (2003), Ooi and Liow (2004), Abdul-Rasheed and Tajudeen (2006), Newell, Chau and Wong (2009), Balatbat, Lin and Carmichael (2010), Kang, Maysami, Mensah and Pham (2013) have reported mixed findings.

In year 2013, Kang, Maysami, Mensah and Pham have conducted a study to investigate the financial performance of publicly traded real estate equities in Vietnam between a time period of 2009 and 2011. Five representative real estate stocks in Vietnam were used to determine the relationship between real estate stock and whole Vietnamese aggregate stock market, including the return volatility as perceived in portfolio investment. The authors found a positive relationship where the real estate stocks' returns move in the same direction as the whole Vietnamese stock

market does. This finding aligned with earlier study by Eichholtz and Hartzell (1996), there is strong and positive relationship between property share and their stock markets in Canada, United State and United Kingdom. This strong positive relation was mainly due to three reasons. Firstly, there was a large real estate component in the value of corporate assets. Second, both the real estate and the value of corporate assets were influenced in the same direction by the changes in the discount rate and in expectations of long-term economic growth. Third, the property shares are included in the stock market indices. However, Brounen and Eichholtz (2003) find contradict result, the property shares and common stock movement on opposite directions. When the stock market boomed, property shares were been less demanded by most of the institutional and private investors, even the property stocks offer an attractive income yields and vice versa. And this nature is known as positive feedback trading strategies and intentional herding.

Additionally, Brounen and Eichholtz (2003) also found a declining cross correlation between common stock and property stock over time in both United States and United Kingdom. In both countries, the cross correlation coefficients fall from 0.8 in year 1990 to 0.2 in year 2000. It shows that property stock do offer increasing diversification overtime for a common stock investors. Similarly, Abdul-Rasheed and Tajudeen (2006) find that Nigeria's listed property and construction stocks in an equity investment portfolio help achieve portfolio diversification for investor. It is due to their low correlation with the stock market which determined through inter-return correlation metric. Kang, Maysami, Mensah and Pham (2013) also determined a similar result. However, the authors stated that the diversification characteristic of property stock was not due to low correlation to the aggregate stock market. It happen because of real estate

stocks does exhibit maximum and minimum returns and large price fluctuation that exceed other stocks in the aggregate stock market. This implied that investing real estate stocks may diversify a portfolio's return and risk structures. However, Eichholtz and Hartzell (1996), and Liow (1997) do conclude that return on listed property stock and return on broad stock market index exhibit a strong correlation. Property share will not provide diversification effect when included in an equity investment portfolio due high correlation to the common stocks (Ting, 2002).

Furthermore, Liow (1997) examine the performance of property stocks from a period of 1975 to 1995, and shown that Sharp and Treynor indices indicated the property stocks underperformed the entire equity market on a risk-adjusted basis by a margin of 22% and 15% respectively. This finding was then confirmed by later studies conducted by Ting (2002), and Abdul-Rasheed and Tajudeen (2006) but contradict to Kang, Maysami, Mensah and Pham (2013). The authors found that majority real estate stock in Vietnam outperform the whole Vietnamese stock market benchmark in daily average return. On the other hand, Ooi and Liow (2004) have concluded a mix finding on their studies. They found that real estate securities in Thailand and South Korea have performed better than the general equities markets. Those in Hong Kong, Indonesia, Malaysia, Singapore and Taiwan low perform than the general stocks on risk-adjusted basis.

In addition, real estate and property stocks in different country do shared similar characteristic, high return volatility and risk level. Real estate stocks exhibit higher standard deviation. The stock experienced significant high return volatility than the whole stock market as measured by conditional standard deviation from a standard GARCH model (Kang,

Maysami, Mensah and Pham, 2013). The risks for property company consistent with other investment opportunities but above the risk of stock market by 40.42% (Abdul-Rasheed and Tajudeen, 2006).Securitized real estate securities like REIT do exhibit similar characteristic as real estate and property stocks do as mentioned by Mull and Soenen (1997), Mueller and Pauley (1995), Oppenheimer and Grissom (1998), Chandrashekaran (1999), Newell, Ting, Acheampong (2002), He, Webb and Myer (2003), Newell and Osmadi (2009), Pham (2011), Lee and Ting (2009), Case, Yang, Yildirim (2012).

Recent study in year 2011, Pham investigate the risk and return characteristic of Korea REIT and it correlation to shares, bonds and property companies including diversification potential in a portfolio. The result stated that REITs exhibit a low correlation to shares ($r = 0.28$) and property companies ($r = 0.18$) for the study period from January 2002 to December 2010. This implied that REIT could certainly offer diversification benefit to equity investors in the stock market. Besides, REIT also offers greater portfolio diversification benefit as compared to property companies. There is a higher correlation between shares and property companies ($r = 0.51$). The result consistent with Lee and Ting (2009), REIT offer portfolio diversification potential than property shares in a mixed asset portfolio.

In the case of Malaysia, Newell and Osmadi (2009) found that Islamic REITs offer greater portfolio diversification potential compared to conventional REIT in a portfolio (mixed asset). Islamic REITs have less correlated with the stock market ($r = 0.29$) than conventional REITs with the stock market ($r = 0.60$).

In addition, Chandrashekaran (1999), Clayton and MacKinnon (2001) and Conover et al. (2002) found that REIT-stock correlations generally declined. In contrast, Newell, Hwa and Acheampong (2002) found that correlation matrix over period 1991 to 2000 do showed a high correlation between the performance of REIT and the Kuala Lumpur stock market in Malaysia. Likewise, Mueller and Pauley (1995), Mull and Soenan (1997) and Oppenheimer and grissom (1998) also showed a positive correlation between stock and REIT and less diversification potential.

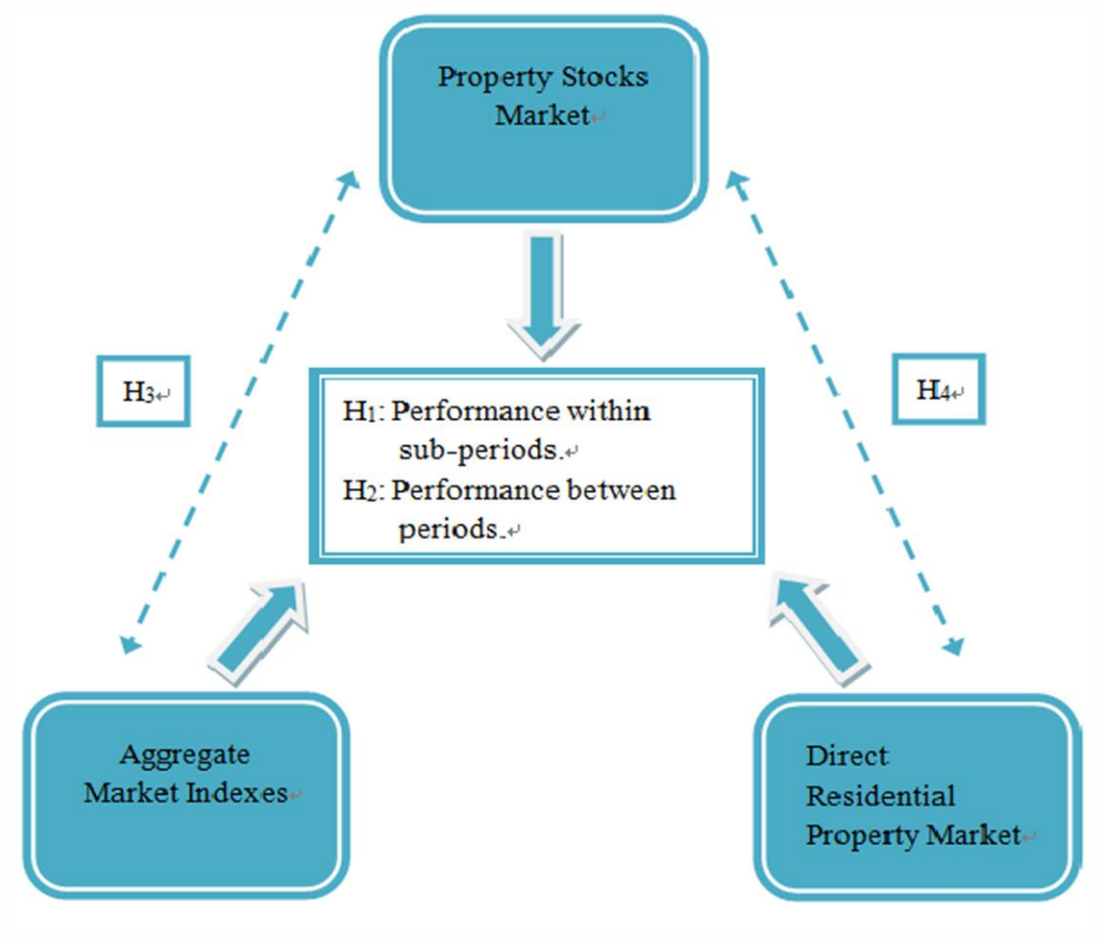
In term of return volatility and performance, a mixed finding was concluded. Newell and Osmadi (2009) found that REIT exhibit low risk level compare to the overall stock market and outperform the overall stock market. However, Basse, Friedrich and Bea (2009) studies showed that investing in United States REIT is risky than investment in utility stock. It aligned with Newell, Ting and Acheampong (2002) which stated that the property trusts underperform the overall Kuala Lumpur stock exchange. The risk-return ratio for each property trust were greater than the overall Kuala Lumpur stock market and real estate companies over period 1991 to 2000 in Malaysia.

2.3 Proposed Theoretical / Conceptual Framework

Reader will acquire some picture about the characteristics and relationship between each market through study the literature review. The conceptual framework below is representing the hypotheses that are going to examine in our study. The performance of property stocks market, aggregate market indexes and direct residential property market within and between each sub-period will be identified and determined. Additionally, the diversification benefits between

property stocks market and aggregate market indexes will be explored and the substitution effects between property stocks market and direct residential property market will be justified also.

Figure 2.1: The Performance and Relationship Analysis between Property Stocks Market, Aggregate Market Indexes and Direct Residential Property Market



2.4 Hypotheses Development

According to Sarantakos (1993), hypothesis was defined as a tentative statement relative to the research problem, a possible research's outcome, or a prediction on the research outcome. Besides, Creswell (1994), define hypothesis as a conjectural statements that represent the expected relationship between an independent and dependent variable. Cooper and Schindler (2008) stated that, a hypothesis exists when an interested proposition is subjected for empirical testing to formulate declarative statements about the relationship between two or more variables. Thus, to examine the relationship between independent and dependent variable, a hypothesis must be formulated. In this research, four hypotheses were established to fit the proposed research objectives. It is necessary to be informed that the crisis involve in this study is global financial crisis of 2008-2009.

Hypothesis 1

To examine whether property shares perform better than direct property market or aggregate market indexes within each sub-period, the hypothesis was suggested as below:

H_1: There are differences in performance between property stocks, direct residential property market and aggregate market indexes within the three sub-periods: pre-, during and post.

H_{1A}: Malaysia property stocks underperform aggregate market indexes within each sub-period.

Liow (1997), Ooi and Liow (2004), Abdul-Rasheed and Tajudeen (2006), Liow and Adair (2009), Nguyen (2010a) and Emele and Umeh (2013) have found the similar results which indicate that property stocks underperform the aggregate

market. The property stocks do not provide a higher return as compared to aggregate market.

H_{1B}: Malaysia property stocks outperform direct residential property market within each sub-period.

According to Ting (2002) the Malaysia property stocks are found to outperform direct property market based on risk-adjusted performance. Thus, the property stocks tend to provide a higher return than the direct property investment after they have adjusted to its risk.

Hypothesis 2

To examine whether each individual, including property stock, direct property market, aggregate stock market, exhibits different risk-adjusted performance between the three sub-periods. The following hypothesis was suggested:

H_2: There are differences in performance of property stocks, direct residential property market and aggregate market indexes between the pre-, during and post-crisis periods.

Adullah and Wan Zahari (2008) found that the risk-adjusted performance of Malaysian property stock in the period prior to and the period during the Asian financial crisis of 1997 performed poorer than in the period after the crisis. The result indicated that there were differences in performance between three sub-periods.

Hypothesis 3

To examine the relationship associate between property stock and aggregate market indexes, the hypothesis was suggested as below:

H_3: Malaysia property stocks will provide diversification benefits.

Brounen and Eichholtz (2003) concluded that the property shares exhibited low correlation with the common stock overtime in both United States and United Kingdom, where the cross correlation coefficient fell from 0.8 in year 1990 to 0.2 in year 2000. Additionally, Abdul-Rasheed and Tajudeen (2006) concluded a similar finding where listed property and construction stocks in an equity investment portfolio helps to achieve portfolio diversification for investor due to very low correlation (0.14) with the stock market. Therefore, diversification benefits can be achieved by low positive correlation or negative correlation to the market portfolio.

Hypothesis 4

To examine the relationship associate between property stocks and Malaysia housing price index, the hypothesis was suggested as below:

H_4: Malaysia listed property stock is positively correlated with housing price index.

Gyourko and Keim (1992), Eichholtz and Hartzell (1996), Crowe and Krisbergh (2009), Francis and Ibbotson (2009) and Vetsch (2010) found that the return performance of direct property investments and financial property investments are positively correlated. This result indicated that the property stocks can be the alternative investment for direct property investment if they are highly positively correlated.

2.5 Conclusion

In this chapter, the most relevant underlying theories are first discussed, followed by the literature reviews on the researches which studied the risk-adjusted performances of property stocks and their correlation with equity market

portfolios and direct property markets. In addition, the researches that studied the risk-adjusted performance of the property stock are also reviewed. The methodologies and findings that used in the previous literatures are then summarized and presented. The conceptual framework is also outlined in order to delivery clear picture to conduct the research. In addition, the hypotheses for this study are also constructed to provide the assumptions for the followings chapters.

CHAPTER 3: METHODOLOGY

3.0 Introduction

In this chapter, the research methodology consists of research design, data collection method, sampling techniques, data processing and data analysis to conduct the research objective and research question scientifically. This chapter will show how the empirical data are collected and used in mathematical computation for analysis. The four research objectives will be examined through several scientific ways of methodology to provide convincing results.

3.1 Research Design

According to Robson (2002), research design is a process of transforming research question. It consists of research strategy, data collection techniques, specific timeframe over a research period and analysis procedures (Saunders, Lewis & Thornhill, 2007).

According to Aliaga and Gunderson (1998), "explaining phenomena by collecting numerical data that are analyzed using mathematical based method" was classified as quantitative research. Addition, quantitative methods are procedures and techniques used to analyze numerical data (Antonius, 2003). In later studies, Saunders et al. (2007) stated that, quantitative method was referred as the use of data collection technique or data analysis procedure that produces and uses numerical data. Thus, these statements have confirmed that this research is a quantitative research as it does involve qualitative method in mathematical

computation for Sharpe's Index (comparison purpose), and the quantitative data (measurable evidence) used were collected from Thomson Reuter Data Stream which is subscribed by University Tunku Abdul Rahman.

Besides, according to Parlow (2010), a panel data was defined as a cross sectional repeated observation over multiple time periods for the same individuals in the sample. The individuals can be classified as person, company, state and country. The time periods generally involve weekly, monthly, quarterly and annually observations.

In this research, the data structures are panel data as all the 81 property stocks, FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBMKLCI), FTSE Bursa Malaysia EMAS Index (FBMEMAS Index), Kuala Lumpur Property Index (KLPI) and Malaysian House Price Index (MHPI) were covered for the period from year 2003 to year 2013, in term of quarterly basis for all the property stocks and indexes.

In this research, the performance of property stocks were analyzed and compared to several equity indices for the sample period covered from year 2003 to 2013. In addition, this study period was divided into three sub periods which are pre-crisis (year 2003 to 2007), during crisis (year 2008 to 2009) and post-crisis (year 2010 to 2013), to examine the performance of property stocks relative to direct property investment and aggregate market indexes. First of all, the performance of property stocks were computed with the equity indices by using Sharpe's index to examine how property stocks perform relative to the equity indices performance. Secondly, the performance of property stocks were compared to equity indices in term of risk adjusted return. Thirdly, Pearson's correlation coefficient was used to examine the correlation of property stocks with respect to aggregate market indexes for diversification potential. Lastly, the correlation between property

stocks and direct residential property market was identified to test for substitution potential.

This research is covering 11 years of sample period, starting from year 2003 to 2013. It consists of property stocks from 81 listed property companies which were traded on Bursa Malaysia. All the data including quarterly property stocks, Malaysian 3-month Treasury bill and equity indices were collected from Thomson Reuter Data Stream that subscribed by University Tunku Abdul Rahman, to compute for average quarterly return, standard deviation and Shape's ratio for the property stocks and equity indices respectively. Furthermore, the Malaysian 3-month Treasury bill was used as a proxy for the risk free interest rate to obtain the risk premium for computation of Sharpe's Index for each property stocks.

3.2 Data Collection Methods

Secondary data is the main source for this research. The secondary data used are panel data covering 81 property stocks on Bursa Malaysia from year 2003 to 2013. All the secondary data are in quarterly basis including property stocks, FBMKLCI, KLPI, FBMEMAS Index, 3-month Treasury bill and collected via Thomson Reuter Data Stream in University Tunku Abdul Rahman.

3.3 Sampling Design

3.3.1 Target Population

Cooper and Schindler (2008) proposed that target population referring to the people, news, or incidents which enclose relevant or useful information with the purpose to solve the measurement questions. The target population focused in this study is the property stocks sector in Malaysia. The Malaysian property stocks sector is examined due to the underlying direct property market continuously shows an upward trend after the global financial crisis. This property stocks sector consists of a total of 85 stocks listed on Bursa Malaysia's main board. However, there are only 81 property stocks to be selected to examine. The reason of excluding the 4 companies is due to the insufficient data and suspension problem. Specifically, Golden Plus Holdings and IOI Properties are the suspended companies during the sampling period. Matrix Concept Holdings and Titijaya Land are the companies with insufficient data problem because they were newly listed in year 2013 (refer to Appendix 1.1). The samples are consistent with Rasheed and Tajudeen (2006) who investigated the listed property and construction companies in the view of investment performance by using property stocks. Besides, Kang et al. (2013) determine the Singapore property stocks performance in long-term by using property companies too.

The motivation to conduct this research is to expand the study of Abdullah and Wan Zahari (2008) which investigated the performance of listed property companies in Malaysia with respect to the financial crisis in year 1997. Hence, in order to advance the study on the performance of property

stocks in Malaysia, the effects of subprime mortgage crisis are being considered in this research. Furthermore, the importance to explore desired diversification opportunities between property stocks and aggregate market indexes and the potential of substitutions effect between property stocks and direct residential property market are the essential elements for the study. The sampling period for this study is from year 2003 to 2013. In order to consider the effects of US subprime crisis, the sampling period is separated into three sub-periods which are pre-crisis period (2003-2007), during crisis period (2008-2009) and post-crisis period (2010-2013). The reason to choose year 2008 and 2009 as during crisis period is supported by the study of Nambiar (2009) and Ibrahim (2011). They identified that the subprime mortgage crisis has a negative impact on Malaysian economy which particularly in the year of 2008 and 2009. It is proved by the facts of dropping in the value and volume of total export to developed country and declining in the growth of gross domestic product. Moreover, in order to avoid the effects of 1997 Asian financial crisis onto the computed result, the examined period starting from year 2003 is more preferable since it provides a 5 years buffering period for the crisis (Zhu et al., 2012).

3.3.2 Sampling Size

Sampling size represents the total amount of data or the periods of time frame that to be chosen as sample in a research (Smith, n.d.). Panel data are employed in this study which consists of cross-sectional and times series data. There are a total of 85 property companies listed on Bursa Malaysia's main board. However, four companies are excluded from the samples due to insufficient data (Matrix Concepts Holding & Titijaya Land) and Suspension (Golden Plus Holdings & IOI Properties). As a result, this

study examines the remaining 81 companies for the period from year 2003 to 2013. Specifically, for the pre-crisis period, there are total of 74 companies will be examined. For the crisis period, there are total of 76 companies will be assessed. It should be informed that the additional two companies (TA Global and UEM Sunrise) listed on Bursa Malaysia's main board in year 2008 and 2009 respectively. Lastly, there are total of 81 companies will be determined for the post-crisis period. Ivory Properties Group, Sentoria Group Sunway, Tambun Indah Land and UOA Development are the five companies that listed on Bursa Malaysia's main board in post-crisis period. The data is showed in quarterly basic and a total of 3,564 final observations are examined for the purpose of identifying the performance, diversification benefits and substitutions potential. Table 3.1 represents the total number of final observations after filtering out inappropriate data. Table 3.2 shows the total number of observations in pre-, during and post-crisis.

Table 3.1: Number of Observations

	Number of Companies	**Number of Observations**
Original Data	85	85 x 11 x 4 = 3,740
Missing Data	4	4 x 11 x 4 = 176
Final Data	81	81 x 11 x 4 = 3,564

Table 3.2: Number of Observations in Pre-Crisis, During Crisis and Post-Crisis Periods

Crisis Periods	**Pre-Crisis**	**During Crisis**	**Post-Crisis**
Number of New Listed Companies	-	2	5
Total Number of Observations in Differences Periods	74	76	81

3.4 Data Processing

3.4.1 Dependent Variables

To achieve the primary objective of this study, three dependent variables are included. The first dependent variable is the respective return of each individual including 81 property stocks, property stock market index (KLPI), aggregate market indexes (FBMKLCI and FMBEMAS Index) and direct residential property market (MHPI). Next, the second dependent variable is regarding to the respective variability of return of each individual and it is measured by standard deviation. Finally, the last dependent variable is pertaining to the respective risk-adjusted performance of each individual and it is assessed by Sharpe's Index.

3.4.2 Independent Variables

There are five independent variables to be selected and examined, namely Malaysian property stock, FTSE Bursa Malaysia Kuala Lumpur Composite index (FBMKLCI), FTSE Bursa Malaysia EMAS index (FBMEMAS Index), Kuala Lumpur Property Index (KLPI) and Malaysian House Price Index (MPHI). It is necessary to be informed that the FBMKLCI and FBMEMAS Index are used to represent the performance of aggregate market and broader market. FBMKLCI is the index that represents the performance of the largest 30 Malaysian listed companies on Bursa Malaysia's Main Board. In contrast, FBMEMAS Index comprises the broader range of Malaysian public listed companies. The FBMKLPI on

the other hand is used to represent the performance of entire property stocks sector in Malaysia. Besides that, the performance of direct residential property market is represented by MPHI.

Table 3.3: Definition of Dependent Variables

Dependent Variable(s)	Name	Definition	Measurement Method	Reference
RN	Return	The return is computed for each individual, including 81 Malaysia property stocks, aggregate market indexes, property stocks sector and direct residential property market.	Quarterly return (%)	Ting (2002); Abdul-Rasheed & Tajudeen (2006). Adullah & Wan Zahari (2008);
SD	Variability of return	The variability of return is computed for each individual, including 81 Malaysian property stocks, aggregate market indexes, property stocks sector and direct residential property market.	Standard deviation (%)	Abdul-Rasheed & Tajudeen (2006). Liow & Adair (2009); Emele & Umeh (2013)
RA	Risk-adjusted performance	The Risk adjusted return is computed for each individual, including 81 Malaysian property stocks, aggregate market indexes, property stocks sector and direct residential property market.	Sharpe's Index (also known as Sharpe ratio)	Liow (1997); Liow (2000); Ting (2002); Ooi & Liow (2004); Abdul-Rasheed & Tajudeen (2006); Adullah & Wan Zahari (2008); Liow & Adair (2009); Nguyen (2010a); Nguyen (2010b); Emeh & Umeh (2013).

Table 3.4: Definition of Independent Variable

Independent variable (s)	Name	Definition	Unit Measurement	Reference
PSP	Malaysian property stock price	Consist of stock prices of 81 property stock listed in Bursa Malaysia.	Price (RM)	Ting (2002); Abdullah & Wan Zahari (2008); Newell and Razali (2009); Thim, Choong and Asri (2012)
KLCI	FTSE Bursa Malaysia Kuala Lumpur Composite index (FBMKLCI)	Represents the performance of the largest 30 companies (big-cap stocks) listed on Bursa Malaysia's Main Board.	Index value	Ting (2002); Abdullah & Wan Zahari (2008); Hamzah, Rozali and Tahir (2010)
EMAS	FTSE Bursa Malaysia EMAS index (FBMEMAS Index)	Represents the performance of broader range of public listed companies in Bursa Malaysia. It consists of the large and middle cap constituents of the FTSE Bursa Malaysia 100 Index and the FTSE Bursa Malaysia Small Cap index.	Index value	Ting (2002);
KLPI	Kuala Lumpur Property Index (KLPI)	Represent the overall performance of property stocks in Bursa Malaysia	Index value	Ting (2002); Abdullah & Wan Zahari (2008); Hamzah, Rozali and Tahir (2010)
MHPI	Malaysian House Price Index (MHPI)	It is a transaction based house price index, which captures and represents the change in price of "average" house.	Index value	Ting (2002);

3.4.3 Measurement of Data

There are numerous series of data being used to examine the performance of each individual. For example, 81 series of quarterly stock price data are respectively used to examine the quarterly stock return of 81 property stocks in Malaysia. On the other hand, the quarterly index value of the FBMKLCI, FBMEMAS Index and KLPI are also adopted to assess the average quarterly return for the aggregate stock market, broader market and property stocks sector respectively. Furthermore, this study also computes the standard deviation of return for all individual along with the Sharpe's Index for performance comparison.

The methods for performance measurement, such as return, standard deviation and Sharpe's Index, have been extensively used in previous studies (Liow, 1997; Liow, 2000; Ting, 2002; Ooi & Liow, 2004; Abdul-Rasheed & Tajudeen, 2006; Adullah & Wan Zahari, 2008; Liow & Adair, 2009; Nguyen, 2010a; Nguyen, 2010b; Emele & Umeh, 2013). For instance, Abdul-Rasheed and Tajudeen (2006) used the share price of one property development company and six construction companies in Nigerian to measure the performance of those companies respectively by using the measurements such as return, standard deviation and Sharpe Ratio.

In Malaysia context, Ting (2002) computed the return, standard deviation and Sharpe Index for property stocks to measure and compare their performance with the market portfolios (represented by FBMKLCI, FBMEMAS Index, Second Board Index), overall property sector, plantation sector, and the direct residential property market (represented by MPHI). In addition, Abdullah and Wan Zahari (2008) also applied the

same performance measurements of return, standard deviation and Sharpe Index to examine the performance of Malaysian property stocks relative to the market portfolio and property stock sector.

3.4.3.1 Return

According to Ting (2002) and Abdullah and Wan Zahari (2008), the return for each property stock, property stock index, aggregate market indexes (i.e., FBMKLCI and FBMEMAS Index) and Malaysian House Price Index could be computed by using the equation one and equation two respectively. Both equations are shown and discussed in the following parts.

The quarterly return for Malaysian property stock is obtained by computing the difference between two consecutive quarterly prices for each property stock, and dividing it by the previous quarterly price of the particular stock, finally multiplying the result by 100%. The equation for computing the return of each property stock is illustrated as below:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}} * 100\% \quad (1)$$

Whereby,

R_t= Quarterly return of Malaysian property stock for quarter t. (%)

P_t = Share price of Malaysian property stock for quarter t. (%)

P_{t-1} = Share price of Malaysian property stock for the quarter prior to quarter t. (%)

The quarterly returns for each index including FBMKLCI, FBMEMAS Index, KLPI and MPHI are obtained by computing the difference between two consecutive quarterly index values for each index, and divided by the previous quarterly value of the particular index, finally multiplied the result by 100%.The equation for computing the return of each index is illustrated as below:

$$R\ index_t = \frac{Index_t - Index_{t-1}}{Index_{t-1}} * 100\% \qquad (2)$$

Whereby,

$R\ index_t$= Quarterly Return of individual (i.e., FBMKLCI, FBMEMAS Index, KLPI, MPHI) for quarter t. (%)

$Index_t$= Index value for quarter t. (% for MPHI)

$Index_{t-1}$ = Index value for the quarter prior to quarter t. (% for MPHI)

Next, this study follows the same measurement used in the work of Ting (2002) to calculate the average return for each individual. However, it is important to note that the data used in this study is on quarterly basis, the average quarterly return is therefore determined. Specifically, the average quarterly return for each individual (Malaysia property stock, FBMKLCI, FBMEMAS Index, KLPI, or MPHI) for each year (2003 to 2013) are computed respectively by summing up all quarterly returns and divide the result by the total number of quarter for particular year for the individual.

3.4.3.2 Standard Deviation

Standard Deviation, σ, is normally applied to measure the extent of the volatility or variability of the return in an investment. Generally, the higher

the value of standard deviation, the greater risk for the return of the investment. Standard Deviation comprises of broader range of risk including systematic and unsystematic risk in comparison to Beta, β, which concerns only the systematic risk based on the assumption that the unsystematic risk can be diversified and therefore able to be minimized or eliminated. Specifically, standard deviation represents the dispersion of the return from the mean that caused by both systematic risk and unsystematic risk. In contrast, β measures the relationship of the performance of a security or portfolio versus the movement of the overall market. In addition to evaluation for the return for each individual, this study also takes into account of the total risk which could be classified as systematic and unsystematic risk. Under such situation, the standard deviation is therefore appropriated to be used.

It should be informed that this study follows the method by Ting (2002) to compute the standard deviation. The standard deviation for each individual is computed by summing up the total square of difference between quarterly return and mean return for each individual and divide by sample period for the year minus one. Finally the result is subsequently square rooted. The standard deviation formula is presented as below:

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n} (R_i - \mu)^2}{n-1}} \qquad (3)$$

Whereby,

σ = Standard deviation of the quarterly returns of the year (%)

R_i = Quarterly return (%)

μ = Mean return for the year (%)

n = Sample period for the year.

3.4.3.3 Sharpe's Index

Sharpe's index, also known as Sharpe's ratio, was developed by William Sharpe in year 1966 to measure risk-adjusted performance of an investment. Sharpe' index measures the excess return received per unit of total risk involved. Therefore, three components, namely portfolio or security's total return, risk-free return (risk-free rate) and standard deviation of specific portfolio or security, must be obtained before the use of Sharpe's index. Because of the use of standard deviation, the comparison of risk-adjusted performances between all categories of investment is feasible through the Sharpe's index. The decision rule of the Sharpe's index is that, the higher the value, the better the performance of an investment relative to the risk it taken. In short, Sharpe Index is a risk-adjusted performance indicator that describes how much excess return could be obtained for the additional volatility taken for holding the risky investment over the risk-free asset.

The primary objective of this study is to examine the performance of each property stock in Malaysian and taking into account the total risk simultaneously, and to compare the performance of the property stocks with the performance of overall property stock sector (i.e., KLPI), market portfolios (i.e., FBMKLCI, FBMEMAS Index) and direct residential property market (i.e., MPHI). Therefore, Sharpe's Index is appeared to be suitable in this study due to the idea of Sharpe's Index that takes into account of total risk.

This study follows the measurement employed by Ting (2002) and Abdullah and Wan Zahari (2008) to compute the Sharpe's Index for each individual. The standard deviation is used to divide the excess average

quarterly return in order to compute the Sharpe's Index for each individual. The Sharpe's Index formula using in this study is shown as below:

$$\text{Sharpe's Index} = \frac{(average\ quarterly\ return\ -\ average\ risk{-}free\ return)}{standard\ deviation} \quad (4)$$

Whereby,

Sharpe's Index = The risk-adjusted return of each individual (i.e., property stocks, property stock sector, FBMKLCI, FBMEMAS Index, FBMKLPI, and MPHI) in year n.

Average quarterly return = the average quarterly return of each individual in year n (%).

Risk-free return = Average 3-month Malaysian Treasure bill rate in year n (%).

Standard deviation = Standard Deviation of quarterly returns of each individual in year n (%).

It is important to note that the study of Abdullah and Wan Zahari (2008) used Malaysian 3-month Treasury bill as a proxy for the risk free rate. Therefore, this study follows the authors by using the data of Malaysian 3-month Treasury bill to represent the risk-free rate. It should be informed that the data for Malaysian 3-month Treasure bill is on quarterly basis.

3.4.3.4 Pearson's Correlation Coefficient

The objective of this test is to identify whether property stocks could offer portfolio diversification effect or substitution potential for direct residential property investments. To construct this test, Pearson's correlation

coefficient is used to measure the correlation between property stocks and FBMKLCI, FBMEMAS Index, and MPHI.

Pearson's correlation coefficient is a parametric statistic which was introduced by Karl Pearson. According to Lind et.al (2012), Pearson's correlation coefficient is a measurement of correlation which measures the strength of association between two variables. Besides, it can describe the linear relationship between two variables, with the assumptions on the normally frequency distribution of the variables. Moreover, the variance of the variables is assumed to be homogenous. Pearson's correlation coefficient can be used for variables measured at ratio or interval level.

Electronic-view 6 (E-view 6) is a software used to compute Pearson's correlation coefficient. The quarterly return of property stocks, FMBKLCI, FBMEMAS Index, MHPI are collected and entered into E-view 6 to run the correlation analysis. The correlation between the variables can be easily computed via the correlation function provided in E-view 6.

3.5 Data Analysis

3.5.1 Sharpe's Index

In this research, Sharpe's Index is used to measure and compare the performance of property stocks with overall property stock sector (KLPI), market portfolios (FBMKLCI, FBMEMAS Index) and direct residential property market (MPHI). The analysis of Sharpe's Index is divided into three periods which are pre-crisis, during crisis, and post-crisis in order to

provide a clear illustrative comparison where pre-crisis period is from year 2003 to 2007, during crisis period is from year 2008 to 2009, and post-crisis period is from year 2010 to 2013.

Sharpe's Index measures the performance of investment based on the risk adjusted return by calculating the ratio of risk premium to the standard deviation of return for each property companies. A positive value in Sharpe's Index indicates that returns are in excess of the total risk taken for a particular investment after considering the riskless return factor (McLeod & Van, 2004). In contrast, negative value shows that the returns are in deficit of the total risk which the return is not enough to compensate for the high risk. Higher in Sharpe's value implies that higher return for the particular level of risk taken in an investment and vice versa. Hence, positive and high Sharpe's value is always preferable as it indicates better performance in return after taking into account the total risk.

3.5.2 Pearson's Correlation Coefficient

Pearson's correlation coefficient is used to measure the association between the variables in this research. Correlation between property stocks, FBMKLCI, FBMEMAS Index, and MPHI are computed and tabulated. The correlation analysis is divided into two parts. The first part is to identify whether property stocks could provide diversification effect in portfolio investment by examining the correlation of property stock with respect to aggregate stock market and broader market, which are represented by FBMKLCI and FBMEMAS Index. The second part is to identify whether the property stocks could act as substitute for direct

investment in residential property. This can be done by examining the correlation between property stock and MPHI.

The value of Pearson's correlation coefficient ranges from -1 to +1. Positive value indicates that there is a positive correlation between the variables while negative value indicates that there is a negative correlation between the variables. Correlation value of 0 indicates that there is no association between the variables. Moreover, positive correlation implies substitution effect whereas negative correlation implies diversification effect (Ting, 2002). The strength of positive correlation increases along the value from 0 to +1, the strength of negative correlation increases along the value from 0 to -1. The magnitude of the value of correlation coefficient is categorized by Dancey and Reidy (2004) and shown in table 3.3.

Table 3.5: Pearson's Correlation Coefficient

Value of the Correlation Coefficient	Strength of Correlation
1	Perfect
0.7 - 0.9	Strong
0.4 - 0.6	Moderate
0.1 - 0.3	Weak
0	Zero

Source: Dancey, C. P., & Reidy, J. (2004). *Statistics without maths for psychology: Using SPSS for Windows*. New York: Prentice Hall.

3.6 Conclusion

The subject of this chapter is to outlay the empirical formula, procedure and method used in this research. This chapter consists of research design, sampling technique and design, data collection, data processing analysis. In this study, several scientific ways of methodology was conducted to provide convincing results with respect to

the research objective. The performance of property stocks were analyzed and computed by using Sharpe's index for comparison purpose with FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBMKLCI), FTSE Bursa Malaysia EMAS Index (FBMEMAS Index), Kuala Lumpur Property Index (KLPI) and Malaysian House Price Index (MHPI) for the sample period covered from year 2003 to 2013. And the performance of property stocks were compared with equity indices in term of risk adjusted return. In this Pearson's correlation coefficient was used to examine the correlation of property stocks with respect to FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBMKLCI), FTSE Bursa Malaysia EMAS Index (FBMEMAS Index), Kuala Lumpur Property Index (KLPI) and Malaysian House Price Index (MHPI) for diversification benefits as well for substitution potential. The results of the empirical tests conducted will be presented in detail in the next chapter.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter comprises the presentation and interpretation of the empirical results. Firstly, the return of each individual including property stocks, equity indices (i.e. FBMKLCI, FBMEMAS Index and KLPI) and Malaysian House Price Index (MHPI) is presented and compared. Next, the standard deviation of the returns is also illustrated to compare the volatility of each individual returns. Subsequently, Sharpe's Index is computed based on the returns and standard deviation to compare the risk-adjusted returns of each individual across the pre-, during and post-crisis periods. Last but not least, the result of correlation analysis between the property index, equity indices and MHPI is also exhibited to analyze the potential of diversification benefit of property stocks, and to examine the feasibility of property stocks serve as a substitutes to direct residential investment.

4.1 Analysis of Results

Throughout the interpretation of empirical results, the FBMKLCI represents the aggregate market, while the FBMEMAS Index represents the broader market which comprises of large and middle cap constituents of the FTSE Bursa Malaysia 100 Index and the FTSE Bursa Malaysia Small Cap index. Furthermore, KLPI represents overall performance of Malaysian properties companies listed on Bursa Malaysia's Main board. Finally, the MHPI represents the direct residential market in Malaysia.

4.1.1 Returns

The average quarterly returns of property stocks, FBMKLCI, FBMEMAS Index, KLPI and MHPI were computed and compared according to the three sub-periods: pre-, during and post-crisis as shown in Table 4.1. Besides, the number of property stocks which outperformed the aggregate market indexes, property sector, and direct residential market were determined. Moreover, Figures 4.1, 4.2 and 4.3 were illustrated to deliver a clear picture of the overall average quarterly return.

Table 4.1: Average Quarterly Return (%) of Property Stocks, Equity Indexes and House Price Index

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
1	A & M REALTY	8.983	-2.817	3.838
2	AMCORP PROPERTIES	5.417	-4.459	4.792
3	ASIAN PAC HOLDINGS	4.646	-5.035	3.724
4	BCB	-0.936	-4.988	4.800
5	BERTAM ALLIANCE	-1.056	-2.531	8.485
6	BERJAYA ASSETS	1.676	-1.323	5.446
7	COUNTRY HEIGHTS HDG	1.709	-6.353	5.265
8	CRESCENDO	2.580	-1.466	8.707
9	COUNTRY VIEW	-1.778	0.364	11.623
10	DAIMAN DEVELOPMENT	2.410	-1.917	5.515
11	DAMANSARA REALTY	10.506	1.554	-3.247

Table 4.1 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
12	EASTERN & ORIENTAL	12.752	0.775	5.261
13	ECO WORLD DEV.GROUP	0.665	-5.750	28.681
14	ENCORP BERHAD	9.904	-4.513	1.626
15	EUPE	3.792	-3.522	4.142
16	FARLIM GROUP	0.172	-3.027	4.466
17	GLOMAC	3.417	3.254	4.653
18	GROMUTUAL	-0.117	-1.748	7.517
19	GLOBAL ORIENTAL	11.876	-10.447	5.047
20	GUOCOLAND	10.572	-8.367	1.183
21	GRAND HOOVER	-4.020	7.555	1.916
22	HUA YANG	1.207	-2.440	16.170
23	HUNZA PROPERTIES	7.697	-7.383	4.800
24	I-BERHAD	0.270	-1.639	9.951
25	IBRACO	-3.828	7.505	5.331
26	IGB	6.742	-0.701	2.962
27	IJM LAND	12.728	6.620	2.198
28	IVORY PROPERTIES GROUP	-	-	-2.526
29	KARAMBUNAI	6.237	-3.428	7.458
30	KELADI MAJU	4.292	-2.593	3.954
31	KEN HOLDINGS	1.989	-1.525	4.969
32	KSL HOLDINGS	4.140	0.224	4.143
33	LAND & GENERAL	8.836	0.947	3.007
34	LBI CAPITAL	1.069	-0.021	5.074
35	LBS BINA GROUP	0.793	-0.994	11.831
36	LIEN HOE	-2.196	-1.107	3.762
37	MAGNA PRIMA	10.525	-4.265	4.583
38	MAH SING GROUP	15.552	-0.382	5.873

Table 4.1 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
39	MALTON	0.433	-2.721	9.541
40	MEDA	0.010	-4.592	16.867
41	MENANG	8.148	-3.431	8.728
42	MAJUPERAK HOLDINGS	0.240	3.156	7.754
43	MKH	3.021	1.391	6.589
44	MK LAND HOLDINGS	0.091	3.135	1.176
45	MALAYSIA PACIFIC	0.817	1.424	-1.341
46	MUI PROPERTIES	-0.838	-1.536	1.494
47	MULPHA LAND	7.813	-9.078	9.212
48	NAIM HOLDINGS	4.019	-2.486	6.400
49	ORIENTAL INTEREST	0.605	-0.076	5.465
50	OSK PROPERTY HOLDINGS	3.820	-1.155	7.749
51	PARAMOUNT	3.004	3.238	2.972
52	PASDEC HOLDINGS	1.507	-3.392	2.071
53	PJ DEVELOPMENT HDG	5.124	-0.499	4.086
54	PLENITUDE	2.716	1.076	5.312
55	PAN MALAYSIAN INDUSTRIES	5.403	-5.381	4.520
56	PERDUREN	-2.415	3.772	6.142
57	PETALING TIN	0.674	1.825	7.348
58	SAPURA RESOURCES	0.299	3.431	11.984
59	SBC	-0.371	0.249	7.150
60	SELANGOR DREDGING	6.364	-5.052	3.321
61	SHL CONSOLIDATED	5.447	-5.516	4.265

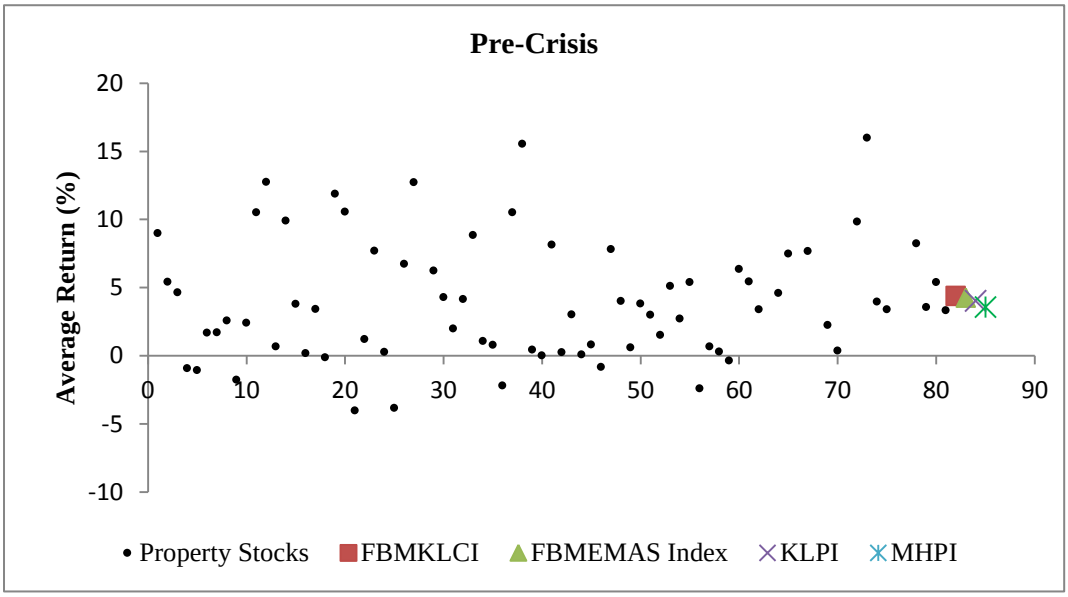
Table 4.1 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
62	SOUTH MALAYSIA INDS	3.393	-0.304	-0.379
63	SENTORIA GROUP	-	-	-0.824
64	SELANGOR PROPERTIES	4.594	-0.384	2.830
65	SP SETIA	7.483	-2.969	1.486
66	SUNWAY	-	-	4.556
67	SYMPHONY LIFE	7.662	-8.370	6.33
68	TA GLOBAL	-	-	-1.783
69	TAHPS GROUP	2.241	-1.885	3.908
70	TALAM TRANSFORM	0.359	10.750	0.036
71	TAMBUN INDAH LAND	-	-	7.462
72	TANCO HOLDINGS	9.825	-10.805	10.591
73	TEBRAU TEGUH	15.984	-0.458	6.767
74	TIGER SYNERGY	3.969	-12.707	8.593
75	TROPICANA	3.405	-0.746	3.878
76	UEM SUNRISE	-	-	6.059
77	UOA DEVELOPMENT	-	-	2.633
78	WING TAI MALAYSIA	8.227	-1.854	4.579
79	Y&G	3.559	1.773	2.325
80	YNH PROPERTY	5.400	-0.695	0.719
81	YTL LAND & DEVELOPMENT	3.318	1.088	1.327

Table 4.1 Continued

	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
FBMKLCI	4.386	-0.525	2.378
FBMEMAS INDEX	4.266	-0.580	2.664
KLPI	4.025	-1.783	3.636
MHPI	3.575	3.300	9.825
Outperform FBMKLCI	28	29	63
Outperform FBMEMAS -INDEX	30	29	62
Outperform KLPI	29	41	57
Outperform MHPI	34	6	8

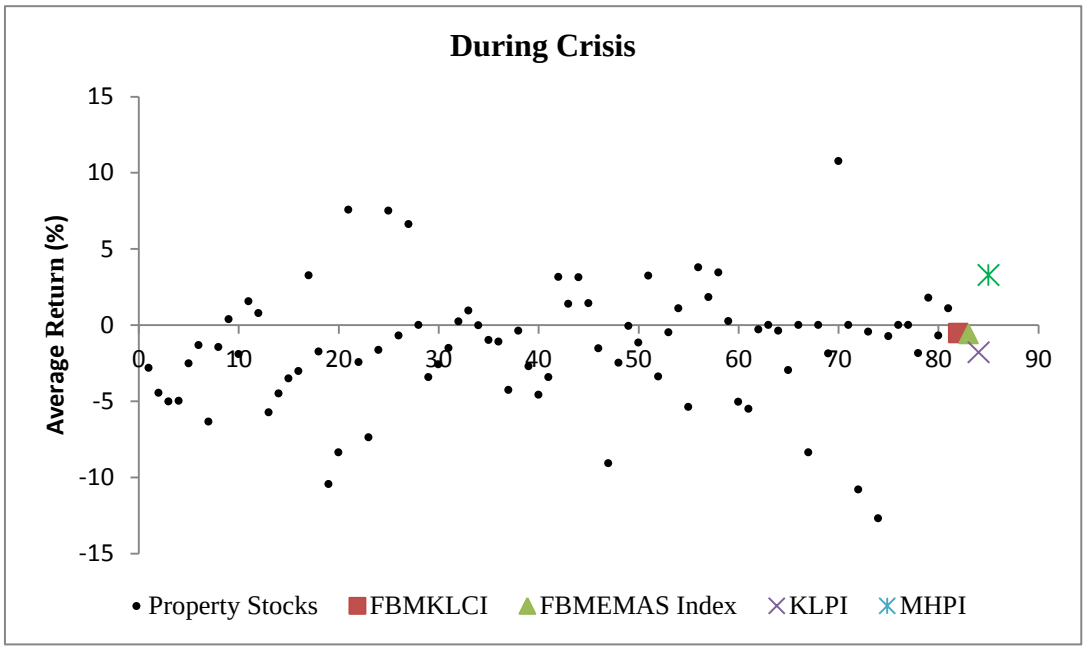
Figure 4.1: Average Returns for Pre-Crisis Period



Based on the empirical results in Table 4.1, there were 64 property stocks showed positive returns in the pre-crisis period. Among the 64 property stocks, there were 3 property stocks demonstrated high positive average quarterly return, which were Terbau Teguh (15.984%), Mah Sing Group (15.552%) and Eastern & Oriental (12.752%). However, there were 10 property stocks showed a negative average quarterly return during pre-crisis period. Among the 10 property stocks, Grand Hoover, Ibraco

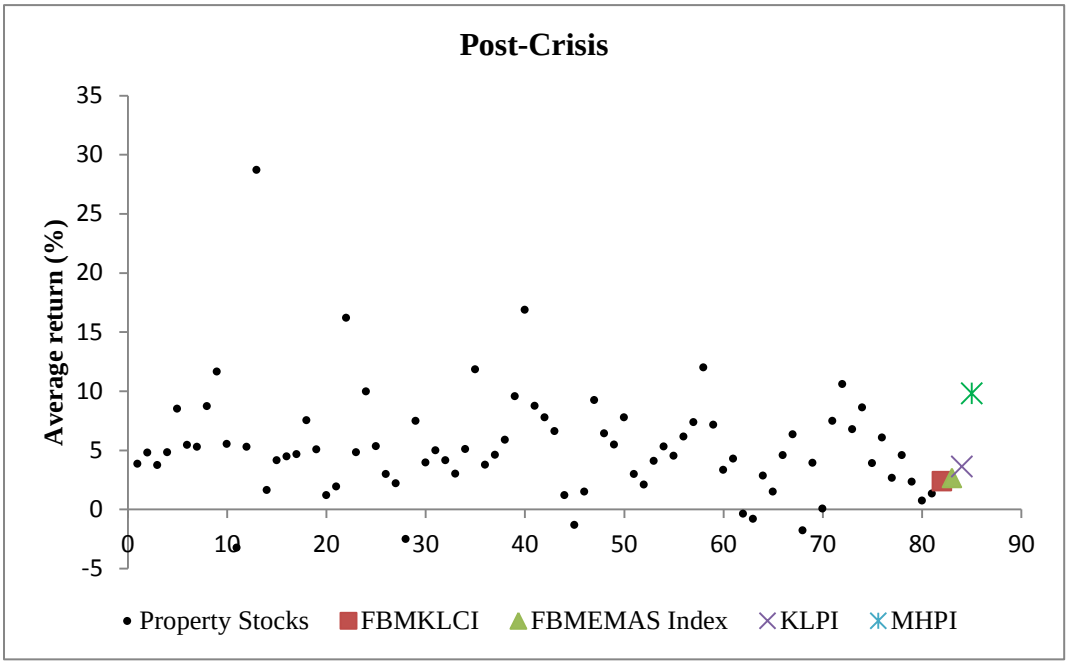
and Perduren showed the highest negative average quarterly returns of -4.020%, -3.828% and -2.415% respectively.

Figure 4.2: Average Returns for During Crisis Period



Astonishingly, the number of property stocks which offered positive returns decreased dramatically from 64 to 22 in the crisis period as shown in Figure 4.2. In addition, there were 53 property stocks showed average negative quarterly return. Among the 22 property stocks which offered positive returns, Talam Transform, Grand Hoover and Ibraco showed the highest positive average quarterly returns of 10.750%, 7.555% and 7.505% respectively. In contrast, there were 53 property stocks showed average negative quarterly returns during crisis period. Among the 53 property stocks, the three property stocks which suffered from the highest negative returns during the crisis were Tiger Synergy (-12.707%), Global Oriental (-10.447%) and Mulpha Land (-9.078%).

Figure 4.3: Average Returns for Post-Crisis Period



During the post-crisis period, the empirical results displayed that most of the property stocks provided average positive quarterly returns. Particularly, there were 75 property stocks provided average positive quarterly returns and six property stocks showed average negative returns. Among the 75 well-performed property stocks, Eco World, Meda and Hua Yang provided the highest positive average quarterly returns of 28.681%, 16.867% and 16.170% respectively.

The comparison results showed that about one third of the property stocks outperformed FBMKLCI, FBMEMAS, KLPI and house price index in the pre-crisis period. More specifically, there were 28, 30, 29 and 34 property stocks outperformed the aggregate market (FBMKLCI), broader market (FBMEMAS), aggregate property equity market (KLPI) and direct residential market (MHPI) respectively. Among the property stocks which outperformed the indexes, Eastern & Oriental, Mah Sing Group and Terbau Teguh demonstrated the strongest returns performance of 12.752%, 15.552% and 15.984% respectively. On the other hand, there were 29

property stocks outperformed aggregate market and broader market, 41 property stocks outperformed property equity market and only 6 property stocks outperform direct residential market in the crisis period. Lastly, there were more than half of the property stocks outperformed all the indexes except only eight property stocks outperformed MHPI in the post-crisis period. The eight property stocks which outperformed the MHPI in term of returns were Eco World (28.681%), Meda (16.867%), Hua Yang (16.170%) and so on.

Overall, there were apparent changes in the returns of the property stocks, property market index, and aggregate market indexes. Most of them showed declining trend between the pre-crisis and the crisis period, and upward trend between crisis and post-crisis crisis. During the crisis period, most of the individuals provided negative returns except the direct residential property market which only incurred a slight reduction in the returns. In the post-crisis period, a recovery momentum was displayed by most of the individual including property stocks, property stocks sector, aggregate market indexes and the direct residential property market, since the returns of most of these individuals rebounded from negative to positive.

4.1.2 Standard Deviation

In this study, standard deviation is calculated for the purposes of evaluating the volatility of the return for the property stocks. The volatility of the returns for the equity indices (FBMKLCI, FBMEMAS Index and KLPI) and Malaysian House Price Index (MHPI) are also reported and used as a benchmark to compare with 81 property stocks. The study period

in this study is from year 2003 to 2013 and separated into three sub-periods: pre-crisis (2003-2007), during crisis (2008-2009) and post-crisis (2010-2013). The average standard deviation of property stocks, equity indices and Malaysian House Price Index for different sub-periods will be presented respectively in the table 4.2.

Table 4.2: Average Standard Deviation (%) of Property Stocks, Equity Indexes and House Price Index

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
1	A & M REALTY	19.446	13.654	12.179
2	AMCORP PROPERTIES	21.244	28.621	14.718
3	ASIAN PAC HOLDINGS	25.467	26.522	13.669
4	BCB	6.842	4.050	12.705
5	BERTAM ALLIANCE	17.822	16.734	25.329
6	BERJAYA ASSETS	25.534	17.151	12.133
7	COUNTRY HEIGHTS HDG.	18.570	17.282	16.934
8	CRESCENDO	11.758	9.609	20.358
9	COUNTRY VIEW	11.265	17.264	21.735
10	DAIMAN DEVELOPMENT	9.148	9.266	10.613
11	DAMANSARA REALTY	28.202	34.254	13.179
12	EASTERN & ORIENTAL	34.046	34.761	15.926
13	ECO WORLD DEV.GROUP	13.613	8.587	42.496
14	ENCORP BERHAD	41.420	10.506	15.229
15	EUPE	18.124	18.253	14.854
16	FARLIM GROUP (M)	12.318	11.268	16.910
17	GLOMAC	16.263	17.541	12.631
18	GROMUTUAL	22.381	14.699	19.089
19	GLOBAL ORIENTAL	38.295	35.496	14.492
20	GUOCOLAND	11.978	24.702	18.127
21	GRAND HOOVER	12.351	41.648	15.895
22	HUA YANG	17.982	15.959	29.313

Table 4.2 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
23	HUNZA PROPERTIES	16.143	7.624	13.342
24	I-BERHAD	10.711	11.003	23.615
25	IBRACO	8.721	22.353	15.734
26	IGB	16.788	6.054	12.683
27	IJM LAND	29.560	36.396	16.922
28	IVORY PROPERTIES GROUP	-	-	18.325
29	KARAMBUNAI	36.141	25.152	38.143
30	KELADI MAJU	16.150	14.680	7.611
31	KEN HOLDINGS	12.361	10.128	14.621
32	KSL HOLDINGS	19.203	16.543	11.519
33	LAND & GENERAL	29.420	28.409	20.794
34	LBI CAPITAL	14.008	5.099	9.794
35	LBS BINA GROUP	20.492	18.223	22.242
36	LIEN HOE	11.767	10.591	11.513
37	MAGNA PRIMA	23.780	19.294	12.377
38	MAH SING GROUP	18.261	13.167	17.901
39	MALTON	15.457	10.657	24.414
40	MEDA	21.282	15.542	22.046
41	MENANG (M)	42.145	15.340	17.724
42	MAJUPERAK HOLDINGS	46.086	47.537	28.126
43	MKH	16.914	13.109	14.472
44	MK LAND HOLDINGS	21.490	44.416	15.443
45	MALAYSIA PACIFIC	14.821	19.155	11.217
46	MUI PROPERTIES	12.974	23.925	13.003
47	MULPHA LAND	32.760	19.599	25.705

Table 4.2 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
48	NAIM HOLDINGS	14.776	27.468	30.938
49	ORIENTAL INTEREST	6.962	13.281	14.792
50	OSK PROPERTY HOLDINGS	17.563	26.657	13.676
51	PARAMOUNT	10.620	9.556	9.173
52	PASDEC HOLDINGS	12.680	7.184	14.990
53	PJ DEVELOPMENT HDG.	15.750	10.414	9.981
54	PLENITUDE	7.736	14.699	11.260
55	PAN MALAYSIAN INDUSTRIES	40.032	39.615	23.315
56	PERDUREN (M)	10.727	17.458	26.180
57	PETALING TIN	20.863	20.404	32.902
58	SAPURA RESOURCES	16.512	33.390	28.589
59	SBC	13.599	12.514	14.701
60	SELANGOR DREDGING	11.702	6.804	12.429
61	SHL CONSOLIDATED	15.187	7.411	8.972
62	SOUTH MALAYSIA INDS.	15.045	28.308	14.036
63	SENTORIA GROUP	-	-	11.594
64	SELANGOR PROPERTIES	15.591	6.664	10.129
65	SP SETIA	15.963	12.701	9.994
66	SUNWAY	-	-	21.663
67	SYMPHONY LIFE	22.827	9.879	14.572

Table 4.2 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
68	TA GLOBAL	-	-	11.261
69	TAHPS GROUP	9.417	8.743	7.769
70	TALAM TRANSFORM	33.018	50.194	19.183
71	TAMBUN INDAH LAND	-	-	18.298
72	TANCO HOLDINGS	37.052	26.581	38.416
73	TEBRAU TEGUH	40.219	29.974	22.558
74	TIGER SYNERGY	25.856	12.219	34.576
75	TROPICANA	12.655	5.062	20.699
76	UEM SUNRISE	-	71.941	18.612
77	UOA DEVELOPMENT	-	-	18.103
78	WING TAI MALAYSIA	20.124	18.394	11.202
79	Y&G	23.498	23.150	32.925
80	YNH PROPERTY	10.176	26.969	8.996
81	YTL LAND & DEVELOPMET	15.900	17.101	19.986
FBMKLCI		6.112	7.844	4.730
FBMEMAS Index		6.668	8.836	5.143
KLPI		10.980	13.444	8.998
MHPI		1.115	1.603	1.027
Outperform FBMKLCI		0	9	0
Outperform FBMEMAS Index		0	11	0
Outperform KLPI		10	28	4
Outperform MHPI		0	0	0

A comparison was made between equity indices and house price index during the pre-crisis period. The results showed that the most volatile index for the period was KLPI, with the highest standard deviation of 10.980%, followed by FBMEMAS Index (6.668%) and FBMKLCI (6.112%). Nevertheless, Malaysia House Price Index (MHPI) was the least volatile index in this period with standard deviation of 1.115%. There were 10 property stocks that were less volatile than KLPI; however none of the ten property stocks were less volatile than FBMKLCI, FBMEMAS Index and MHPI, which mean that the investment in property stocks were riskier than the aggregate market (FBMKLCI) and the broader market (FBMEMAS Index) as well as the Malaysian direct residential market in the pre-crisis period. On the other hand, BCB was the least volatile property stocks with the standard deviation for the period of 6.842%, followed by Oriental Interest (6.962%) and Plenitude (7.736%). Yet, they only outperformed the KLPI (10.980%). Among the five companies (Encorp Berhad, Menang, Majuperak Holdings, Pan Malaysia and Terbau Teguh) which demonstrated volatility higher than 40%, Majuperak Holdings had the highest volatility of returns thus it is considered the riskiest property stock in pre-crisis period.

In the period of during-crisis, KLPI was the riskiest index among the equity indices and house price index with the highest standard deviation of 13.444%. In contrast, MHPI is the least volatile index for the period of during crisis as it displays the lowest standard deviation of 1.603%, followed by FBMEMAS Index (8.836%) and FBMKLCI (7.844%). The empirical results showed that there were only 9 and 11 property stocks outperformed aggregate market and broader market respectively. While, there were 28 property stocks displayed less volatile than KLPI. However, none of the property stocks showed less volatile than MHPI. In other

perspective, BCB was the least risky property stock among 81 property stocks during the crisis period with the lowest standard deviation of 4.050%, followed by Tropicana (5.062%) and LBI Capital (5.099%). Furthermore, these three property stocks were less volatile than FBMKLCI, FBMEMAS Index and KLPI but more volatile than MHPI. In contrast, UEM Sunrise was the riskiest property stocks as it has the highest standard deviation of 71.94164% during the crisis period. Notably, Encorp Berhad underwent a dramatic reduction in its volatility of returns during the crisis period, as its standard deviation shows remarkable decrease from 41.420% in pre-crisis period to 10.506% in the crisis period.

During the post-crisis period, the property stock market (KLPI) remained as the most volatile market in term of the volatility of the returns, as it displayed the highest standard deviation of 8.998%. The aggregate market and broader market continuously outperformed the property stock market, with volatility of 4.730% and 5.143% respectively. In contrast, the Malaysian direct residential market (MHPI) was the least volatile market for the post-crisis period with the least standard deviation of 1.027%. Furthermore, there were only four property stocks that had shown less variability than KLPI. However, none of the property stocks was less volatile than FBMKLCI, FBMEMAS Index and MHPI.

On the other hand, the comparison among property stocks in the post-crisis period showed that Keladi Maju, TAHPS Group and SHL were the lowest volatile property stocks with standard deviations of 7.611%, 7.769% and 8.972% respectively. These three property stocks were only less volatile than KLPI, but more volatile than FBMKLCI, FBMEMAS Index and MHPI. In contrast, the property stock which had the highest standard deviation in the post-crisis period was Eco World Dev. Group

(42.496%). This indicated that Eco World Dev. Group was the riskiest property stock in its volatility of returns. In addition, Tiger Synergy was the property stock which experienced a significant increase in the volatility of the returns, as its standard deviation increased from 12.219% during crisis to 34.576% in the post-crisis period.

The trend in the changes of standard deviation of equity indexes and house price index showed that the volatility of those indexes changed according to the prevalent market condition of the particular sub-period. For example, the standard deviation of FBMKLCI increased from 6.112% for the pre-crisis period to 7.844% in the crisis period and then decreased to 4.730% in the post-crisis period. This manner of changes in standard deviation indicated the global financial crisis affected the Malaysia aggregate market. The similar pattern of changes in standard deviation could be also observed for the boarder market and property stock market. However, the changes in standard deviation of MHPI across three periods are relatively more constant; in pre-crisis period, its standard deviation was 1.115% and slightly increased to 1.603% during the crisis period and displayed a minor reduction to 1.027% in post-crisis period. This indicated that investment in Malaysia direct residential market was less risky than investment in Malaysia capital market in term of the volatility of returns throughout the study period.

Overall, the empirical results showed that none of the property stocks performed less volatile than FBMKLCI and FBMEMAS Index during the period of pre-crisis and post-crisis. Besides that, none of the property stocks also performed less volatile than MHPI within the whole period of year 2003 to year 2013. However, during the crisis period, the number of the property stocks that performed less volatility than the FBMKLCI and

FBMEMAS Index as well as the KLPI was increasing. Among the equity markets and direct residential property market, property stock market (13.444%) was the riskiest market and direct residential property market was the least risky market in term of the volatility of return. Whereas, there were six property stocks comprised BCB, Daiman Development, I-Berhad, Oriental Interest, Paramount and TAHPS Group that displayed lower risk than the property stock market in the period of pre-crisis and during crisis. In particular, TAHPS Group was the only property stock that could maintain at lower risk level than property stock market throughout the whole period of year 2003 to 2013.

4.1.3 Risk-Adjusted Performance

In this study, the Sharpe's Index is used to measure the risk-adjusted performances of individual property stocks, equity indices (i.e. FBMKLCI, FBMEMAS Index and KLPI) as well as the Malaysian House Price Index (MHPI) according to three periods, namely pre-crisis, during crisis, and post crisis period. Figures 4.4, 4.5, and 4.6 are constructed in order to show a clear illustration of the overall risk-adjusted return. It is important to note that the Sharpe's Index measures the performance of individual by adjusting for its total risk. Sharpe's Index measures the risk premium (excess return) per unit of standard deviation of the return of individual. The positive value of Sharpe's Index means that positive excess returns after adjusted for the total risk of individual could be offered. Comparably, the higher the Sharpe's value, the higher the risk-adjusted excess returns for investor. Table 4.3 shows the risk-adjusted returns of 81 property stocks for the period of pre-crisis, during crisis, and post-crisis on average basis.

Table 4.3: Average Risk-Adjusted Returns (Sharpe's Index) of Property Stocks, Equity Indexes and House Price Index

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
1	A & M REALTY	0.011	-0.323	-0.172
2	AMCORP PROPERTIES	-0.14	-1.335	0.182
3	ASIAN PAC HOLDINGS	0.090	-1.756	0.281
4	BCB	-0.846	-1.183	0.271
5	BERTAM ALLIANCE	-0.321	-0.091	0.318
6	BERJAYA ASSETS	0.121	-0.713	0.299
7	COUNTRY HEIGHTS HDG.	-0.011	-0.523	0.074
8	CRESCENDO	-0.142	-0.447	0.402
9	COUNTRY VIEW	-0.585	-0.011	0.286
10	DAIMAN DEVELOPMENT	0.217	-0.450	0.312
11	DAMANSARA REALTY	0.335	-0.191	-0.468
12	EASTERN & ORIENTAL	0.254	-0.467	0.293
13	ECO WORLD DEV.GROUP	-0.014	-0.573	0.331
14	ENCORP BERHAD	-0.139	-0.112	-0.066
15	EUPE	-0.923	-0.494	0.025
16	FARLIM GROUP	-0.264	-0.381	0.038
17	GLOMAC	0.148	-0.263	-0.133
18	GROMUTUAL	-0.097	-0.585	0.213
19	GLOBAL ORIENTAL	-0.242	-0.642	0.243
20	GUOCOLAND (MALAYSIA)	0.575	-0.634	-0.215

Table 4.3 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
21	GRAND HOOVER	-0.583	-0.073	0.051
22	HUA YANG	-0.217	-0.200	0.582
23	HUNZA PROPERTIES	-0.130	-0.960	0.165
24	I-BERHAD	-0.371	-0.200	-0.080
25	IBRACO	-0.533	0.179	0.296
26	IGB	0.324	0.030	0.121
27	IJM LAND	0.123	-0.358	-0.082
28	IVORY PROPERTIES GROUP	-	-	-0.128
29	KARAMBUNAI	-0.131	-2.280	-0.242
30	KELADI MAJU	-0.162	-0.400	0.395
31	KEN HOLDINGS	-0.385	-0.165	0.309
32	KSL HOLDINGS	-0.315	-0.437	0.273
33	LAND & GENERAL	0.202	-0.146	-0.084
34	LBI CAPITAL	-0.018	-0.238	0.328
35	LBS BINA GROUP	-0.036	-1.272	0.492
36	LIEN HOE	-0.519	-1.009	0.211
37	MAGNA PRIMA	-0.033	-0.316	0.148
38	MAH SING GROUP	1.025	-0.078	0.408
39	MALTON	-0.152	-0.558	0.264
40	MEDA	-0.024	-0.356	0.682
41	MENANG (M)	-0.050	-0.901	0.481
42	MAJUPERAK HOLDINGS	0.007	0.170	0.039
43	MKH	0.158	0.094	0.361
44	MK LAND HOLDINGS	-0.029	-0.356	0.009
45	MALAYSIA PACIFIC	-0.018	0.121	-0.293

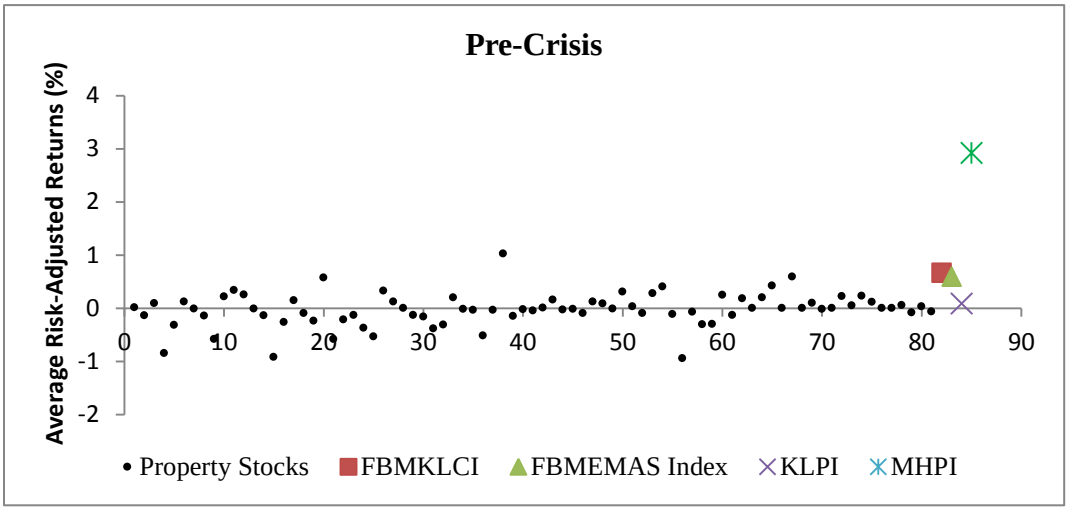
Table 4.3 Continued

No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
46	MUI PROPERTIES	-0.097	-0.395	-0.293
47	MULPHA LAND	0.123	-0.976	0.232
48	NAIM HOLDINGS	0.083	-0.531	-0.163
49	ORIENTAL INTEREST	-0.013	-0.215	-0.097
50	OSK PROPERTY HOLDINGS	0.306	-0.106	0.593
51	PARAMOUNT	0.033	0.170	0.328
52	PASDEC HOLDINGS	-0.097	-1.161	0.247
53	PJ DEVELOPMENT HDG	0.277	-0.291	0.201
54	PLENITUDE	0.406	0.079	0.253
55	PAN MALAYSIAN INDUSTRIES	-0.116	-0.914	-0.219
56	PERDUREN	-0.948	-0.057	0.211
57	PETALING TIN	-0.070	0.229	0.022
58	SAPURA RESOURCES	-0.304	-0.217	-0.049
59	SBC	-0.298	-0.271	0.409
60	SELANGOR DREDGING	0.248	-0.725	0.207
61	SHL CONSOLIDATED	-0.135	-0.676	0.746
62	SOUTH MALAYSIA INDS.	0.182	-0.300	-0.047
63	SENTORIA GROUP	-	-	-0.187
64	SELANGOR PROPERTIES	0.201	-0.279	0.212
65	SP SETIA	0.420	-0.860	-0.08

Table 4.3 Continued

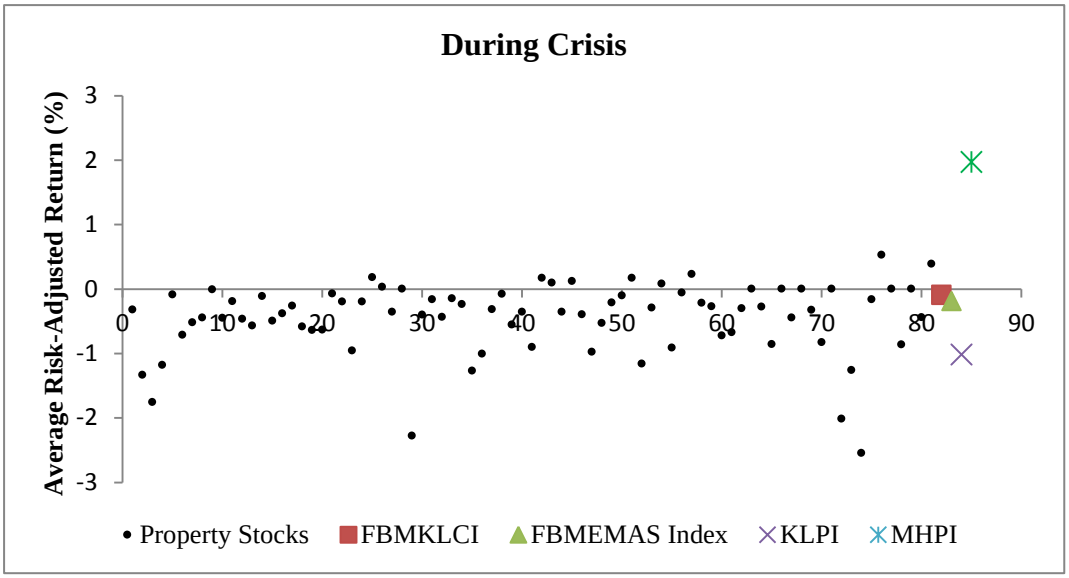
No	Company	Pre-Crisis(2003-07)	Dur-Crisis(2008-09)	Post-Crisis(2010-13)
66	SUNWAY	-	-	0.095
67	SYMPHONY LIFE	0.589	-0.444	0.485
68	TA GLOBAL	-	-	-0.740
69	TAHPS GROUP	0.098	-0.327	0.324
70	TALAM TRANSFORM	-0.019	-0.830	-0.109
71	TAMBUN INDAH LAND	-	-	0.154
72	TANCO HOLDINGS	0.223	-2.017	0.053
73	TEBRAU TEGUH	0.047	-1.260	0.215
74	TIGER SYNERGY	0.232	-2.545	-0.943
75	TROPICANA	0.115	-0.164	0.129
76	UEM SUNRISE	-	0.526	0.403
77	UOA DEVELOPMENT	-	-	0.281
78	WING TAI MALAYSIA	0.057	-0.864	-0.092
79	Y&G	-0.081	-0.001	0.011
80	YNH PROPERTY	0.033	-0.439	-0.002
81	YTL LAND& DEVELOPMET	-0.067	0.390	-0.036
FBMKLCI		0.663	-0.095	0.344
FBMEMAS Index		0.593	-0.184	0.384
KLPI		0.088	-1.015	0.380
MHPI		2.921	1.971	12.292
Outperform FBMKLCI		1	16	13
Outperform FBMEMAS Index		1	21	12
Outperform KLPI		25	66	12
Outperform MHPI		0	0	0

Figure 4.4: Average Risk-Adjusted Returns for Pre-Crisis Period



As observed in Table 4.3, Mah Sing group (1.025) was the only one stock which outperformed the risk-adjusted returns of FBMKLCI (0.663) and FBMEMAS Index (0.593) in the pre-crisis crisis. While, there were 25 property stocks outperformed the property stock sector (KLPI) in the same period. In contrast, none of them outperformed the Malaysian direct residential market represented by MHPI. In the pre-crisis period, Mah Sing offered the highest risk-adjusted return (1.025) to investor, followed by Symphony Life (0.589) and Guocoland (0.575). If a comparison was made among three of the equity indices and MHPI, the investment in Malaysian direct residential market (MHPI) was the best option as compared with others as it carried the highest positive Sharpe's value of 2.921. Furthermore, Malaysian property stock market (KLPI) was the worst market among all as KLPI displayed the lowest Sharpe's value of 0.088 for the pre-crisis period on average.

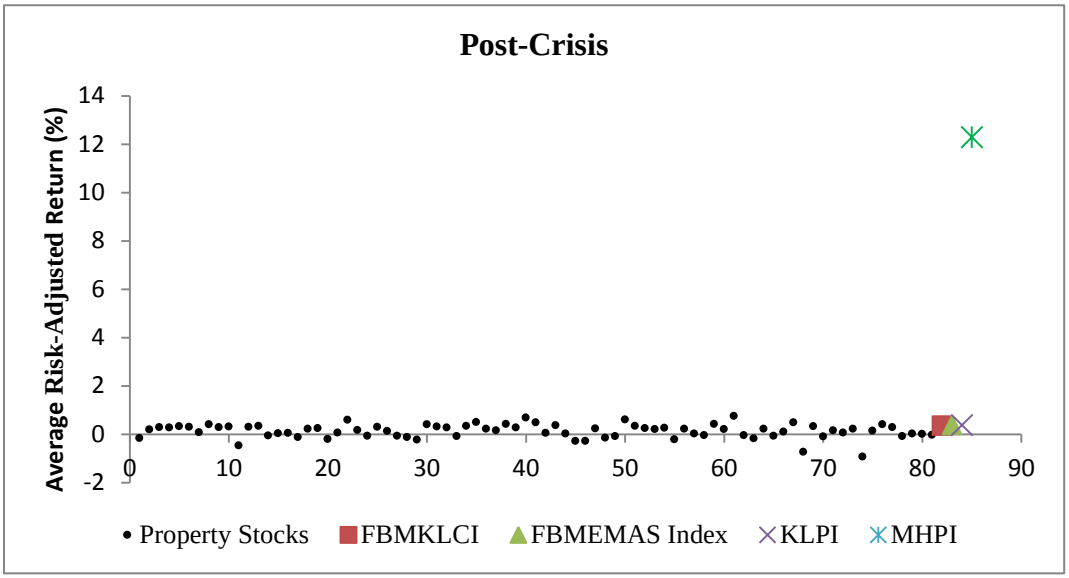
Figure 4.5: Average Risk-Adjusted Returns for During Crisis Period



In contrast, there were 16 and 21 property stocks outperformed the FBMKLCI and FBMEMAS Index respectively during the crisis. Furthermore, there were 66 property stocks outperformed the KLPI, but none of them performed better than the MHPI. An obvious observation on the performance of all individuals during the crisis period was that most of the individuals including property stocks and equity indices, showed negative Sharpe's value. The KLPI with the highest negative Sharpe's value of -1.015 indicated that the property stock market had the poorest performance during the harsh time as compared to other market indexes. Besides, the FBMKLCI and FBMEMAS Index also carried negative Sharpe's values of -0.095 and -0.184 respectively. The overall poor performance of property stock market, aggregate market and broader market might be attributed to the catastrophic impact of global financial crisis of 2008-2009 on the Malaysian stock market. Still, there were ten property stocks that showed positive Sharpe's value, namely UEM Sunrise (0.526), YTL Land & Development (0.390), Petaling Tin (0.229), Ibraco (0.179), Majuperak Holdings (0.170), Paramount (0.170), Malaysia Pacific (0.121), MKH (0.094), Plenitude (0.079) and IGB (0.030). In contrast to

the poor performance of the property stocks and aggregate market indexes, investment in Malaysian direct residential market was a better option for the investors as the market showed a positive Sharpe's value of 1.971, which indicated good performance and the global financial crisis had the least impact on the market.

Figure 4.6: Average Risk-Adjusted Returns for Post-Crisis Period



The last column of the table showed the risk-adjusted performances of the property stocks, property stocks market, the aggregate market indexes and the MHPI for the post–crisis period. The Sharpe's value for the period indicated that there were 13 property stocks outperformed the aggregate market (FBMKLCI), and 12 property stocks outperformed the broader market (FBMEMAS) Index. The lesser number of property stocks that outperformed the aggregate market and the broader market indicated that most of the property stocks performed poorer in the post-crisis period. However, there were 46 property stocks that their Sharpe's value had been turned from negative to positive as compared with the values in previous period. This phenomenon might indicate that the property stock market rebound from the effect of crisis. For example, Hua Yang showed a

change in Sharpe's value from negative value of -0.200 during crisis to positive value of 0.582 in the post-crisis period. The sign of recovery also could be found for the aggregate market and broader market as the Sharpe's value for both markets rebound from negative value to positive.

Besides, this study found that SHL displayed the greatest risk-adjusted performance with the largest Sharpe's value for the post-crisis period of 0.746, followed by Meda (0.682) and OSK property holdings (0.593). However, when a comparison was made for all individuals including property stocks, property stocks sector, aggregate market indexes and direct residential property market, the house price index (MHPI) exhibited the best performance with the highest positive Sharpe's value of 12.292. The outcome indicated that investment in direct residential market consecutively remained as the best option for the investors in the post-crisis period.

Overall, Malaysian direct residential market provided the highest risk-adjusted return to investor as compared with individual property stocks, property stocks sector and aggregate market indexes, as it consecutively exhibited positive value of Sharpe's value and surged to 12.309 in the post-crisis period. Despite the results for the property stocks and aggregate market indexes were mixed with positive and negative Sharpe's values, none of these values were higher than the Sharpe's value of direct residential property market in the crisis and the post-crisis period. In short, Malaysian property stock failed to provide higher risk-adjusted returns than Malaysia direct residential market over the whole sample period.

4.1.4 Summary of Results

This section attempts to provide a summary of the returns, standard deviation and Sharpe' Index for six property stocks and all market indexes. The six selected property stocks comprise of property stocks which strongly perform, moderately perform and negatively perform in term of risk-adjusted performance in the post-crisis period. The risk-adjusted performance in the post-crisis period provides a closer understanding in conjunction with current market conditions. All the results are presented in Table 4.4.

Table 4.4: The Overview Analysis of the Results

	Pre-Crisis(2003-07)			**Dur-Crisis(2008-09)**			**Post-Crisis(2010-13)**		
	RN (%)	**SD (%)**	**RA**	**RN (%)**	**SD (%)**	**RA**	**RN (%)**	**SD (%)**	**RA**
SHL CONS	5.44	15.18	-0.13	-5.51	7.41	-0.67	4.26	8.97	0.74
MEDA	0.01	21.28	-0.02	-4.59	15.54	-0.35	16.86	22.04	0.68
TAHPS GROUP	2.24	9.41	0.09	-1.88	8.74	-0.32	3.90	7.76	0.32
PLENITUDE	2.71	7.73	0.40	1.07	14.69	0.07	5.31	11.26	0.25
DAMANSARA REALTY	10.50	28.20	0.33	1.55	34.25	-0.19	-3.24	13.17	-0.46
TIGER SYNERGY	3.96	25.85	0.23	-12.70	12.21	-2.54	8.59	34.57	-0.94
FBMKLCI	4.38	6.11	0.66	-0.52	7.84	-0.09	2.37	4.73	0.34
FBMEMAS Index	4.26	6.66	0.59	-0.58	8.83	-0.18	2.66	5.14	0.38
KLPI	4.02	10.98	0.08	-1.78	13.44	-1.01	3.63	8.99	0.38
MHPI	3.57	1.11	2.91	3.30	1.60	1.97	9.82	1.02	12.29

Note: RN= return, SD= standard deviation, RA= risk-adjusted return

An observation was made on the risk-adjusted performance of each individual between three sub-periods was that the performances of most of the individuals changed according to the particular period. For example,

most of the individuals performed poorly in the crisis period by providing negative risk-adjusted return. Furthermore, most of the individuals on average performed more volatile in the crisis than in pre-crisis and post-crisis periods. In addition, greater returns were provided by most of the individuals in pre-crisis and post-crisis period, but lesser returns or negative returns were provided in the crisis period. These findings tend to suggest that the property stocks, and property stocks sector, aggregate market indexes were adversely affected by the global financial crisis. However, the impact of the global financial crisis on the Malaysia direct residential property market (MHPI) was relatively smaller.

In addition, the results also indicated that the individual with high volatility in returns tend to have a poorer risk-adjusted performance. For example, in the post crisis period, the return of Meda (16.86%) was higher than the return of MHPI (9.82%) on average basis. However, after adjusted to the risk respectively, Meda (0.68) showed lower risk-adjusted return than MHPI (12.29). Overall, in risk-adjusted basis, direct residential consecutively provided higher return than the rest of the individuals including property stocks and aggregate market indexes.

4.1.5 Correlation Analysis between Property Stocks and Equity Indexes

The association relationship between property stocks and equity indexes is to determine the diversification and substitution benefit via conducting Pearson's correlation test. The diversification benefit can be addressed by the negative correlation between property stocks and aggregate market indexes of FBMKLCI and FBMEMAS. On the other hand, the positive

correlation between property stocks and direct residential market represents the substitution benefit. In this research, the equity indexes employed are FBMKLCI, FMBEMAS and MHPI, excluding FBMKLPI. Table 4.5 shows the correlation matrix between listed property companies and equity indexes for the period of year 2003 to 2013.

Table 4.5: Pearson's Correlation Coefficient between Listed Property Companies and Equity Indices

No	Company	FBMKLCI	FMBEMAS	MHPI
1	A & M REALTY	0.562	0.655	0.221
2	AMCORP PROPERTIES	0.647	0.665	-0.222
3	ASIAN PAC HOLDINGS	0.623	0.714	-0.119
4	BCB	0.378	0.460	0.221
5	BERTAM ALLIANCE	0.600	0.662	0.180
6	BERJAYA ASSETS	0.721	0.665	-0.082
7	COUNTRY HEIGHTS HDG.	0.651	0.726	-0.249
8	CRESCENDO	0.771	0.852	-0.112
9	COUNTRY VIEW	0.138	0.286	0.190
10	DAIMAN DEVELOPMENT	0.792	0.868	-0.351
11	DAMANSARA REALTY	0.351	0.483	-0.088
12	EASTERN & ORIENTAL	0.752	0.849	0.058
13	ECO WORLD DEV. GROUP	0.672	0.658	-0.867
14	ENCORP BERHAD	-0.243	-0.137	0.337
15	EUPE	0.784	0.863	-0.113
16	FARLIM GROUP (M)	0.651	0.644	-0.830
17	GLOMAC	0.678	0.772	-0.080
18	GROMUTUAL	0.803	0.887	-0.155
19	GLOBAL ORIENTAL	0.683	0.762	0.007
20	GUOCOLAND MALAYSIA	0.643	0.755	0.034
21	GRAND HOOVER	0.896	0.946	-0.165
22	HUA YANG	0.699	0.783	0.068
23	HUNZA PROPERTIES	0.784	0.878	-0.098
24	I-BERHAD	0.424	0.552	0.223
25	IBRACO	-0.786	-0.699	0.774
26	IGB	0.777	0.831	-0.345
27	IJM LAND	0.888	0.935	-0.203

Table 4.5 Continued

No	Company	FBMKLCI	FMBEMAS	MHPI
28	IVORY PROPERTIES GROUP	0.772	0.868	-0.120
29	KARAMBUNAI	0.212	0.350	0.509
30	KELADI MAJU	0.805	0.881	-0.252
31	KEN HOLDINGS	0.559	0.689	0.154
32	KSL HOLDINGS	0.726	0.811	-0.048
33	LAND & GENERAL	0.840	0.824	-0.522
34	LBI CAPITAL	0.517	0.488	0.274
35	LBS BINA GROUP	0.262	0.378	0.324
36	LIEN HOE	-0.187	-0.057	-0.026
37	MAGNA PRIMA	0.598	0.570	-0.869
38	MAH SING GROUP	0.804	0.884	0.015
39	MALTON	0.676	0.774	-0.112
40	MEDA	0.801	0.888	-0.293
41	MENANG (M)	0.101	0.023	-0.831
42	MAJUPERAK HOLDINGS	0.813	0.828	-0.653
43	MKH	0.648	0.643	0.069
44	MK LAND HOLDINGS	0.767	0.792	-0.042
45	MALAYSIA PACIFIC	0.610	0.696	-0.095
46	MUI PROPERTIES	0.768	0.833	-0.472
47	MULPHA LAND	-0.278	-0.298	0.048
48	NAIM HOLDINGS	0.706	0.815	-0.027
49	ORIENTAL INTEREST	0.531	0.479	-0.880
50	OSK PROPERTY HOLDINGS	0.423	0.511	-0.044
51	PARAMOUNT	0.774	0.811	-0.287
52	PASDEC HOLDINGS	0.739	0.712	-0.508
53	PJ DEVELOPMENT HDG.	0.792	0.789	-0.698
54	PLENITUDE	-0.225	-0.114	0.290
55	PAN MALAYSIAN INDUSTRIES	0.576	0.537	-0.903
56	PERDUREN (M)	-0.080	-0.015	0.011
57	PETALING TIN	0.690	0.787	-0.247
58	SAPURA RESOURCES	0.550	0.661	0.037
59	SBC	0.783	0.866	0.021
60	SELANGOR DREDGING	0.561	0.662	-0.008
61	SHL CONSOLIDATED	0.604	0.634	-0.270
62	SOUTH MALAYSIA INDS.	0.408	0.415	-0.264
63	SENTORIA GROUP	0.148	0.288	0.343
64	SELANGOR PROPERTIES	0.812	0.857	-0.538
65	SP SETIA	0.547	0.617	0.094
66	SUNWAY	0.586	0.706	0.081
67	SYMPHONY LIFE	0.869	0.940	-0.179

Table 4.5 Continued

No	Company	FBMKLCI	FMBEMAS	MHPI
68	TA GLOBAL	0.873	0.926	-0.448
69	TAHPS GROUP	0.195	0.302	0.644
70	TALAM TRANSFORM	0.785	0.768	-0.769
71	TAMBUN INDAH LAND	0.578	0.712	0.095
72	TANCO HOLDINGS	0.765	0.847	-0.253
73	TEBRAU TEGUH	0.642	0.737	-0.129
74	TIGER SYNERGY	-0.434	-0.346	0.252
75	TROPICANA	0.610	0.680	0.002
76	UEM SUNRISE	0.512	0.621	0.003
77	UOA DEVELOPMENT	0.689	0.754	0.203
78	WING TAI MALAYSIA	0.509	0.593	0.022
79	Y&G	-0.592	-0.553	-0.017
80	YNH PROPERTY	0.217	0.230	0.169
81	YTL LAND & DEVELOPMENT	0.804	0.897	-0.042

Based on the results shown in the table 4.4, most of the property stocks demonstrate high positive correlation with FMBKLCI, and FMBEMAS Index. Particularly, Grand Hoover is the most positively correlated with FBMKLCI (r=0.896) and FBMEMAS (r=0.946).

Out of 81 listed property companies, 73 of them show positive relationship with FBMKLCI and FBMEMAS Index where more than 20 property stocks show strong correlation ($r > 0.7$). In contrast, there are only a few numbers of property stocks such as Encorp Berhad, Ibraco, Mulpha Land, Tiger Synergy, and Y&G illustrating mix results of low positive correlation and negative correlation. Generally, this empirical result shows that property stocks could not offer portfolio diversification benefit when incorporated in a market portfolio.

Moreover, property stocks have relatively low negative relationship with direct residential market (MHPI). This is shown by the large number of property stocks which more than half of them are negatively correlated

with MHPI. Furthermore, Pan Malaysian Industries show the highest negative correlation of -0.90309. On the other hand, there are property stocks like Ibraco, Karambunai, and TAHPS Group exhibit strong positive correlation which suggests that they might substitute direct residential market investment. Overall, property stocks cannot serve as alternative investments for direct residential property investment due to the low negative correlation coefficient between listed property companies and MHPI returns.

4.2 Conclusion

This chapter presents the results of this study in table form and outlines the finding by the descriptive analysis. The overall results showed that the property stocks and the aggregate market indexes performed poorly in the crisis period. In addition, overall performance of property stock performed worse than the direct residential property market across three sub-periods. The results also showed that the most of the property stock underperformed the aggregate market indexes in the crisis and before the crisis period, but outperformed the aggregate market in the post-crisis period. Furthermore, the correlation results indicated that the property stocks were positively correlated with the equity market and negatively correlated with the direct residential market.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

The purpose of the entire study is to evaluate the performance of indirect property investment which is listed property share, follow by comparison to broader market and direct residential property. Besides that, substitution and diversification benefit of listed property share are identified to provide investors and policy makers reference on the potential of listed property share for investment decision making. The study is mainly focused to the property sector in Malaysia with the sampling period from year 2003 to 2013.

The first part of chapter 5 presents the summary of major findings from previous chapter followed by precise discussion of the major findings. Next, there is discussion on the policy implication for policy makers and practitioners. After that, the limitations encountered during the research are presented together with the recommendations for future research. At the end, the overall conclusion for the whole research is stated as the ending of the study.

5.1 Summary of Statistical Analyses

The main purpose of this study is to decisively explore the performance between Malaysia property stocks, Malaysia direct residential property market and aggregate market. To determine the individual performances, Sharpe's index has been employed in order to detect and rank between all the listed property

companies and compare with direct residential property and aggregate market. Additionally, correlation analysis has been used to determine the diversification benefits between property stocks and aggregate market. Besides, substitutions effect between property stocks and direct residential property market has been determined by using correlation matrix. Ultimately, the objectives of this study have been accomplished as the performance of property stocks and aggregate market has been identified and the relationship between property stocks and aggregate market has been examined. The obtainable data has been processed and past literatures are reviewed in this study.

The listed property companies in this study were chosen based on the Bursa Malaysia main market. However, there was remaining 81 listed property companies been finalized in our sample size due to insufficient data and suspension of some listed property companies. A few measurements have been applied in this study to empirically analyse the objectives. For instances, average quarterly return and standard deviation of each listed property companies have been calculated to measure the risk-adjusted return. Pearson's correlation coefficient has been used to examine the association between property stocks, direct residential property and aggregate market. The study period of this study will be ranged from year 2003 to 2013. In order to recognize the impact of US subprime crisis towards Malaysia property and aggregate market, the sampling period has been separated into three sub-period which are pre- (2003-2007), during (2008-2009) and post-crisis (2010-2013).

The performance of each property stocks, direct residential property and aggregate market has been determined by using Microsoft Excel. The correlation between property stocks, direct residential property and aggregate market has been carried out by running E-view 6. This study intends to provide a guideline to invest and evaluate the performance of Malaysia listed property companies for individual

investor, institutional investor, managers, academicians and policy maker. The conclusion of hypothesis and the explanation of result will be summarized in Table 5.1.

Table 5.1 Summary of the Result of the Hypothesis

Hypothesis	**Conclusion**	**Explanation**
H_{1a}: Malaysia listed property companies underperform aggregate market indexes within each sub-period.	Reject H_0	▪ For the listed property companies that outperformed FBMKLCI, there is only one listed property companies outperformed in pre-crisis period, 16 listed property companies outperformed during crisis period and 13 listed property companies outperformed in post-crisis period. ▪ In short, Malaysia listed property companies underperformed aggregate market since less than half of the listed property companies were outperformed within each sub-period. ▪ For the listed property companies that outperformed FBMEMAS Index, there is only one listed property companies outperformed in pre-crisis period, 21 listed property companies outperformed in during crisis period and 12 listed property companies outperformed in post-crisis period. ▪ In general, Malaysia listed property companies underperformed broader market since less than half of the listed property companies were outperformed across all three sub-periods. ▪ For the listed property companies that outperformed KLPI, there are total of 25 listed property companies outperformed in pre-crisis period, 66 listed property companies outperformed in during crisis period and 12 listed property companies outperformed in post-crisis period.

		▪ In brief, Malaysia listed property companies underperformed property stocks sector in the pre- and post-crisis period since less than half of the listed property companies were outperformed the property stocks sector. However, Malaysia listed property companies were outperformed the property stocks sector in the period of during crisis since more than half of the listed property companies were outperformed the property stocks sector. ▪ Overall, Malaysia listed property companies underperformed aggregate market indexes since there are two markets were underperformed by listed property companies.
H_{1b}: Malaysia listed property companies outperform direct residential property market within each sub-period.	Do not reject H_0	▪ There is none of the listed property companies outperformed direct residential property market within each sub-period. ▪ Overall, Malaysia listed property companies underperform direct residential property market.
H_2: There are differences in performance of property stocks, direct property market and aggregate market indexes between the pre-crisis, during crisis and post-crisis period.	Reject H_0	▪ Overall, the returns provided by listed property companies, direct residential property and aggregate market in each sub-period is different. ▪ In pre-crisis period, there are total of 25 listed property companies have outperformed the aggregate market indexes but none of them can outperform direct residential property market. ▪ Direct residential property market was the best option to invest during pre-crisis period since offered the highest return among all the market. However, Malaysian property stocks market had the worst performance during pre-crisis period because of the negative return provided. ▪ In during crisis period, there are total of 66 listed property companies have the potential to outperform the aggregate market indexes but none of them can

		outperform direct residential property market. ▪ Aggregate market indexes showing negative risk-adjusted returns during the crisis period which means having a bad performance except direct residential property market that provide positive risk-adjusted returns. ▪ In post-crisis period, there are total of 13 listed property companies have the potential to outperform the aggregate market indexes but none of them can outperform direct residential property market. ▪ There is an outstanding performance in direct residential property market because of the returns that provided increase dramatically. The best option to invest during post-crisis period was the direct residential property market since was the only one market that provided outstanding performance.
H_3: Malaysia listed property companies will provide diversification benefits.	Do not reject H_0	▪ Malaysia listed property companies was highly positive correlated with aggregate market indexes (FBMKLCI, FBMEMAS Index and KLPI) which were not consistent with our expectation. ▪ Malaysia listed property companies may not have the potential to provide diversification benefits in a portfolio.
H_4: Malaysia listed property stock is positively correlated with housing price index.	Do not reject H_0	▪ Malaysia listed property companies was relatively low negative correlated with house price index which was not consistent with our positive assumption. ▪ Malaysia listed property companies was not a substitution for direct property investment.

5.2 Discussions of Major Findings

5.2.1 Risk-Adjusted Returns

Generally, the findings of this study revealed that most of the property stocks underperformed the aggregate market indexes (i.e., FBMKLCI and FBMEMAS Index) over the three sub-periods on risk-adjusted basis. The result is consistent with H1a this study where the property stocks are expected to underperform the aggregate stock market. The result could be supported by the findings of Liow (1997), Ooi and Liow (2004), Abdul-Rasheed and Tajudeen (2006), Liow & Adair (2009), Nguyen (2010a) and Emele and Umeh (2013). The poor performance of property stock over three sub-periods might be explained by Neoh (1990) who attributed the poor performance of property stock is probably due to the declining profit margin that resulted by maturing property market and stiff competition in the business environment along with low asset turnover ratios (cited from Ting, 2002).

In addition, this study also discovered that the property stocks generally underperformed the Malaysian direct residential property market over three sub periods. More specifically, over the three sub-periods, none of the property stocks outperformed the direct-residential market. This result is contrary to the H1b of this study where the property stock is expected to outperform the direct residential market. This finding could be supported by Liow (2000) where Singaporean direct property market was found that performed better than the Singaporean property stocks and aggregate stock market over the period of year 1975 to year 1995. The author stated the superior performance of direct property market was probably due to land scarce in Singapore, negligence of other fundamental factors such as mis-specification of market portfolio, and market imperfection such as high transaction cost and high information cost in property market. In Malaysia context, the price level in the direct residential property market

was continuously rising and relatively stable than the property stocks market over the whole sample period of this study. As a result, the investors were having greater confidence and more optimistic expectation toward the direct residential property market than the property stocks market. Consequently, such situation might result in the direct residential property market to perform better than the property stocks market.

Next, the results also found that there are differences in performance of property stocks, direct residential property market and aggregate market indexes between pre-crisis, during crisis and post-crisis. For examples, the aggregate market indexes were providing negative risk-adjusted return in the crisis period, but providing positive risk-adjusted return in the post crisis period. On the other hand, most of the property stocks were providing negative risk-adjusted return in pre-crisis and crisis periods, with few exceptions that performed otherwise. For instances, there were 42 of the property stocks showed negative risk-adjusted return in pre-crisis period, and then the number was increased to 65 for the crisis period. In post-crisis period, the number of the property stock that provided negative risk-adjusted return was decreased to 25. In contrast to the poor performance of property stock and aggregate market, although the risk-adjusted return provided by Malaysian direct residential market was dropped in the crisis period, however it subsequently exhibit a strong rebound in post-crisis period.

Overall, it is apparent that each individual (including property stock, aggregate market indexes and direct residential property market) exhibits different risk-adjusted performance between each sub period. Therefore, this finding is consistent with the H_2 of this study, and it could be supported by the result of Adullah and Wan Zahari (2008) where the property stocks was found that exhibited better performance in the post crisis as compared with the pre-crisis and crisis period. In addition, the poorer performance of overall property stock sector for the crisis period could be supported by Newell and Razali (2009) who discovered that the global financial crisis adversely caused the stock performance of

Malaysian listed property companies to drop by 44.6% due to the close relationship with the stock market. Furthermore, for the limited impact of the global financial crisis on the direct residential property market in Malaysia, Juliana (2009) stated that it could be due to the banking industry in Malaysia is not highly correlated with the US banking industry. In addition, the superior risk-adjusted performance of direct residential market over three sub-periods is likely due to the growing working population that has driven the growth of the direct residential property market (Syarifuddin, 2012). The growing working population would generate strong demand in property market and that in turn stimulate the price of residential property increasing to higher level (Ong, 2013).

This study focuses on examining the performance of property stock while compare it with market portfolio and direct residential market on risk-adjusted basis. According to Markowitz (1952), investors should take into account the maximum expected return and variance of return simultaneously when considering the future performances and selection of portfolio. The investors should measure the risk of the investment in term of the variability of return. Generally, the higher the risk, the higher the return is required to compensate the investor. However, given unit of risk, the investors basically desire to take the investment opportunity that could offer higher return instead of taking the other that offer lower return. Under such condition, the Sharpe ratio is therefore adopted in this study as performance measurement since it could provide the clear picture that how much the mean excess return the investors could realize given a unit of risk. The higher the Sharpe ratio mean that higher mean excess return the investment could offer given a unit of risk and vice versa. Furthermore, the investment with higher return might not be chosen as it might display higher risk in returns, consequently showing a relatively low value of Sharpe ratio. For example, this study found that Eco World development group provided relatively higher return (28.68%) than the direct residential property (9.83%) in the post crisis period. However, the investors are suggested to invest in the direct residential property market instead of the

shares of Eco World development group as the market presents a higher value of Sharpe ratio (12.292) than the group (0.331).

On the other hand, the market efficiency theory is also brought to light in this study when an observation is made on the changes in risk-adjusted performance of property stocks, aggregate market and broader market between three sub-periods. For example, the risk-adjusted return provided by aggregate market was slumped into negative value in the crisis period. This phenomenon is possibly due to the public available information regarding to the adverse impact of global financial crisis had been efficiently and quickly incorporated in the index value of the aggregate market. Similar finding could be made for the post crisis period when the Sharpe ratio of the aggregate market rebounded to positive value as the information regarding to the recovery of the market was made known. However, the market efficiency theory might not be appropriate to apply in the direct residential property market, because the transaction and information costs are high in this market, this is contrary to the conditions of market efficiency theory, in which the cost for transaction and information are required to be cheap or no exist (Fama, 1970).

5.2.2 The Relationship between Property Stocks and Aggregate Market Indexes

Diversification and substitution potential can be identified via the result of correlation coefficient. Negative correlation coefficient indicates diversification potential while positive correlation coefficient shows substitution potential.

In this study, majority of property stock have relatively high positive correlation with FMBKLCI, FBMKLPI, and FMBEMAS indices, 75 out of 83 property stock showed a positive relationship with FBMKLCI, FBMKLPI, and FBMEMAS indices with more than 20 property stock

showing strong correlation ($r > 0.7$) with respect to the aggregate market indexes. This implies that property stock could not offer portfolio diversification potential when incorporated in a share portfolio as the property stocks exhibited high positive correlation with aggregate equity market returns. This result was consistent with the studies conducted by Eichholtz and Hartzell (1996), Liow (1997), Ting (2002), Emele and Umeh (2013) and Zhixin, Maysami, Mensah, & Pham (2013).

One of the possible explanations for this outcome is due to large real estates and properties component in the total value of corporate assets (Eichholtz and Hartzell, 1996). According to Bnieggeman, Fisher, and Porter (1990), in United States one-third of component of total corporate assets of Fortune 500 is real estates. As a result, an increased in real estate and properties price will result an increase in property stocks price and indirectly facilitate a price raise for listed companies stocks which owning large proportion of real estates and properties in their total corporate asset. In year 2006, Ting mentioned that real estate is the major asset class for all Malaysia's listed non-property companies. Therefore, this might be a possible explanation for the high positive correlation between the property stocks and the aggregate market indexes (FBMKLCI and FBMEMAS indices) as majority listed non-property companies in KLCI and EMAS component maintain large ownership in real estate properties.

Addition, the high positive correlation and co-movement between property stock and the aggregate market indexes, was due to the changes of discount rate and expectations of long-term economic growth, which likely to influence the real estate and the value of corporate assets in the same direction (Eichholtz and Hartzell, 1996). As the expectation of long-term economic growth are unhealthy, the price of real estates and properties will drop, result in low share price for property stocks and indirectly lower the share price of listed non-property company shares which owning large proportion of real estate and properties in their total corporate assets.

One of the reasons that explained well on the strong positive correlation between the property stocks and the aggregate market index, is due to the inclusion of listed property shares used in the aggregate stock market index (Emele and Umeh, 2013). In Malaysia context, 10 listed property stocks are included in the aggregate stock market indexes (FBMKLCI and FBMEMAS indexes). Thus, the performance of property stocks tend to move in a direction in-phase with the FBMKLCI and FBMEMAS indexes, with 75 out of 83 property stocks shown a positive correlation with FBMKLCI and FBMEMAS indexes.

5.2.3 The Relationship between Property Stocks and Direct Residential Property Market

In Malaysia context, property stocks have relatively high negative relationship with MHPI, 49 property stocks showing result of negative correlation with MHPI, with 7 property stocks shown a strong negative correlation ($r > -0.7$). Thus, property stocks cannot be viewed as substitutes for direct investment in residential property due to the high negative correlation coefficient between property stocks and MHPI returns. This conclusive result was supported by Ting (2002), suggested that property stocks cannot serve as a substitutes for direct residential property investment due low correlation or negative correlation between property stocks and MHPI returns.

One of the possible explanations for this outcome is due to their distinctive characteristic and nature between the property stocks and direct property market. According to Brounen and Eichholtz (2003), property stocks exhibit stock market component and sentiment, while direct property market are based on valuation and appraisal, backward-looking characteristic, smoothing and lagged valuation. Thus, property stocks and direct property market only shown a low correlation with low substitution possibilities. Addition, the low correlation outcome is due to the influence

of non-fundamental factor when trading property stocks (Leimdorfer, 2011). In general, investors are subjected to asymmetric information and have limited information about the underlying property market. To some extent, direct property market will subject to smoothing and time lags in appraisal and valuation. It damped the actual effect of macroeconomic shocks on the direct property market. As a result, property shares cannot serve as a perfect substitution for direct property investment due to their distinctive characteristic and nature. Thus, low correlation is exhibit between property stocks and direct property market.

In Malaysia context, there might be high possibilities the negative correlation between property stocks and direct property market is due to the distinctive characteristic and nature of property stocks and direct residential property market, influenced by non-fundamental factor in property stocks trading, such as asymmetry information, insider trading, inefficient pricing and lemon market, smoothing and lagged biases in direct property market.

5.3 Implications of the Study

This study provides a comparative analysis on the risk-adjusted performance of property stocks, aggregate market and direct residential market in Malaysia. The major findings have contributed to parties who are interested to invest or study the property sector, such as managers, individual investors, institutional investors, academicians and policy makers.

Based on this study, the overall negative performance of the property stocks market may stipulate the losses of confidence among investors over the property stock investment and seek for other alternative investments or even foreign financial instruments. In other perspective, the financial managers of the property companies need to sustain their investment as desirable to investors as the capital market is an important source for financing. Thus, the financial managers should

examine the backlash caused by the favorable increase in returns and simultaneous unfavorable increase in risk. This study suggests that property companies need to diversify its business activities through international diversification as well as merger and acquisitions.

Next, this finding helps the investors, managers and policy makers to understand the performance of the property stock and direct residential market during the crisis. Through this study, financial crisis has resulted most of the property companies and stock market to exert negative performance, exceptionally, direct residential market still provide a positive performance. As a result, investors are encouraged to perform a hedging strategy to preserve their investment value and avoid substantial losses. Moreover, this finding may promote the investment in direct residential investments as their performance stands strong during the crisis. In addition, the empirical evidence helps the policy makers and managers to prepare for a contingency plan in property stock market as it exhibit negative performance during crisis.

In contrast, there are more property stocks demonstrated positive performance after the crisis period yet they were mostly underperformed the aggregate market indexes and direct residential market. Despite government has been promoting the country's property market during post-crisis period such as introducing the Greater Kuala Lumpur project, most of the property companies still underperformed the market. Thus, the empirical results from this study also serve as an evidence for the effectiveness of on-going practices and policies implemented by the policy makers.

The empirical result of this study suggests that majority of the property stocks in Malaysia do not provide diversification benefits to the investors over the period from 2003 to 2013. The diversification results can be derived from the low correlation or negative correlation between property stocks and aggregate market. Thus, individual investors are advised to avoid stocks with high positive correlation to the market portfolios in order to reduce their exposure to unsystematic risk. As for institutional investors who hold large mixed-asset

portfolios, the result from this study could help them to determine the property stocks which will be included into the diversified portfolios.

On the other hand, the property stocks investment cannot be regarded as substitute for direct residential investment as displayed by the low negative correlation between property stocks and MHPI return. Thus, investors may search for other alternative investments which provide the similar performance as the direct property investment. Lastly, this study provides simple and important information to managers, investors and academicians as it comprehensively discusses the usage and interpretation of risk-adjusted performance. Hence, this study wishes to initiates a direction for future study on the related field.

5.4 Limitations of the Study

There are some limitations encountered in this study. First and foremost, the secondary data of listed property companies obtained between year 2003 and 2013 are incomplete. For instance, Golden Plus Holdings and IOI properties are suspended within the study period while Matrix Concept Holdings and Titijaya Land and are started to list in the property market in year 2013. Thus, the listed property companies with incomplete data have to be eliminated from the study which will reduce the sample size and may affect the result to become inaccurate.

In addition, this study is conducted in Malaysia. So, the study of the performance of listed property companies and direct residential market is generally focused in developing country. However, the result obtained do not necessary reflect the characteristics of property market and listed property companies in other developing country as different country may exhibits different culture and practices. Moreover, the results in this study may be a biased if applied in developed countries. This implies that the study may not be applicable in developed countries such as the United States due to the dissimilar in level of technology development.

Moreover, this study only investigates the property sector in Malaysia. Hence, the information and result are only useful for the investors and policymakers in property sector. Since every sector has their own trait and culture, other sectors like agriculture, construction and consumer product sector are not encourage to apply the property sector's case into their respective sector's policy.

Besides that, the study in property sector is limited to residential property sector only without inclusion of commercial property sector. This is due to the absence of commercial property index being developed in Malaysia which hampers all the analysis on commercial property. As a result, it is unable to compare the performance of the residential property sector with commercial property sector with the lack of appropriate property performance measures.

5.5 Recommendations for Future Research

The sample size of quarterly data from year 2003 to 2013 is relatively insufficient in this study. This study is likely to recommend future researchers to prolong the sampling period and increase the sample size to monthly or daily data when determining the performance of property stocks and residential property investment as the results will be more precise and accurate for investors. It is owing to larger sample size will have a higher possibility to identify statistically important results. Meanwhile, smaller sample size could be misleading and exposed to error.

In this study, Sharpe's index is chosen to examine the individual performance of listed property companies with respect to the aggregate market and residential property market. Besides Sharpe's Index, future researchers are recommended to use measurements such as Treynor's and Jensen Alpha measures when examining a portfolio of listed property companies' performance. This is because Treynor's and Jensen Alpha measures are founded on beta of a portfolio where beta is more suitable to act as a good representation for risk of securities portfolio to provide more accurate result.

Beside, future researchers are recommended to enlarge the research area to commercial property sector to examine the performance of commercial property investment if valid property performance measures such the commercial property indices are available. Besides, it is advisable to compare the performance between commercial property and residential property to identify which sector provides greater benefits to the investors and policymakers.

Last but not lease, several researchers showed that property shares which underlie from property market exhibits strong positive contemporaneous relationship with stock markets. Hence, the relationship between the stock market and direct property market should be examined in future research to identify whether the changes in stock market exerts a significant effect on direct property market.

5.6 Conclusion

In this research, the four major objectives were determined and achieve successfully with reasonable explanation. This research concluded that Malaysia listed property companies underperform aggregate market indexes across all pre-, during and post-crisis period on risk-adjusted basis. The underperformance was due to maturing of property market and stiff competition with low asset turnover ratios. Conclusions for the second objective, Malaysia listed property companies do not outperform direct residential property market for each sub crisis-period. This is probably due to land scarce, miss specification of market portfolio, and market imperfection. Conclusion for the third objective, Malaysia listed property stock do not serve as a substitute for direct investment in residential property, due to distinctive characteristic and nature between the property stocks and direct property market. Concluding for the fourth objective, Malaysia listed property companies do not provide diversification benefits due to large real estate component in total value of corporate assets, changes in the discount rate and in expectations of long-term economic growth.

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Appendix 1.1: List of 85 Malaysia Listed Property Companies

Company Name	Market Capitalisation (RM)	P/E Ratio	EPS (RM-cent)
A & M REALTY BHD	485.53m	14.63	9.09
AMCORP PROPERTIES BERHAD	681.81m	3.98	29.40
ASIAN PAC HOLDINGS BHD	268.27m	6.91	3.98
BCB BHD	201.09m	7.92	12.31
BINA DARULAMAN BHD	144.18m	7.45	26.57
BERTAM ALLIANCE BHD	197.45m	56.85	1.68
BERJAYA ASSETS BERHAD	923.82m	30.86	2.69
COUNTRY HEIGHTS HOLDINGS BHD	410.80m	11.37	13.10
CRESCENDO CORPORATION BHD	646.61m	5.34	52.95
COUNTRY VIEW BHD	308.00m	3.71	82.92
DAIMAN DEVELOPMENT BHD	753.28m	12.03	29.52
DAMANSARA REALTY BHD	504.28m	76.17	2.14
EASTERN & ORIENTAL BHD	3.100b	27.33	9.99
ECO WORLD DEVELOPMENT GROUP BERHAD	1.287b	-	-
ENCORP BHD	366.30m	4.98	31.15
EUPE CORPORATION BHD	115.20m	8.91	10.10
FARLIM GROUP (M) BHD	95.42m	2.71	25.07
GLOMAC BHD	771.49m	6.54	16.22
GROMUTUAL BHD	182.17m	7.32	6.63
GLOBAL ORIENTAL BERHAD	229.61m	5.98	16.90
GOLDEN PLUS HOLDINGS BHD *	154.19m	7.89	13.30
GUOCOLAND (MALAYSIA) BHD	805.53m	14.63	7.86
GRAND HOOVER BHD	21.80m	-	-3.07
HUA YANG BHD	546.48m	6.65	31.12
HUNZA PROPERTIES BHD	477.42m	2.95	66.11
I-BHD	383.53m	8.50	39.43
IBRACO BHD	221.38m	5.90	29.67
IGB CORPORATION BHD	3.726b	16.9	16.15

Company Name	Market Capitalisation (RM)	P/E Ratio	EPS (RM-cent)
IJM LAND BERHAD	5.378b	10.08	34.21
IOI PROPERTIES GROUP BERHAD *	8.324b	-	-
IVORY PROPERTIES GROUP BERHAD	284.70m	17.76	3.52
KARAMBUNAI CORP BHD	548.78m	-	-0.97
KELADI MAJU BHD	246.45m	11.48	2.83
KSL HOLDINGS BHD	843.60m	4.55	47.51
LAND & GENERAL BHD	363.58m	4.65	12.05
LBI CAPITAL BHD	96.57m	9.39	14.91
LBS BINA GROUP BHD	863.09m	2.21	76.98
LIEN HOE CORPORATION BHD	130.23m	-	-0.05
MAGNA PRIMA BHD	316.25m	22.62	4.20
MAH SING GROUP BHD	3.258b	11.04	20.66
MALTON BHD	426.78m	7.19	14.04
MATRIX CONCEPTS HOLDINGS BERHAD **	1.233b	8.48	47.88
MEDA INC. BHD	359.54m	18.77	3.89
MENANG CORPORATION (M) BHD	285.80m	11.57	9.25
MAJUPERAK HOLDINGS BHD	87.20m	-	-2.10
MKH BERHAD	1.644b	13.26	29.56
MK LAND HOLDINGS BHD	573.45m	11.56	4.11
MALAYSIA PACIFIC CORP BHD	128.01m	3.18	14.01
MUI PROPERTIES BHD	164.27m	19.55	1.10
MULPHA LAND BHD	105.02m	13.26	3.47
NAIM HOLDINGS BHD	992.50m	3.40	116.88
ORIENTAL INTEREST BHD	231.80m	29.66	8.63
OSK PROPERTY HOLDINGS BHD	472.80m	6.57	29.54
PARAMOUNT CORPORATION BHD	533.74m	9.15	17.26
PASDEC HOLDINGS BHD	176.11m	11.96	7.15
PJ DEVELOPMENT HOLDINGS BHD	743.50m	7.67	21.26
PLENITUDE BHD	753.30m	5.95	46.86

Company Name	Market Capitalisation (RM)	P/E Ratio	EPS (RM-cent)
PAN MALAYSIAN INDUSTRIES BHD	37.90m	-	-2.73
PERDUREN (M) BHD	108.97m	16.77	4.77
PETALING TIN BHD	107.29m	-	-2.15
SAPURA RESOURCES BHD	136.11m	14.32	6.81
SBC CORPORATION BHD	344.46m	9.62	22.87
SELANGOR DREDGING BHD	447.43m	7.20	14.59
SHL CONSOLIDATED BHD	544.78m	9.76	23.05
SOUTH MALAYSIA INDUSTRIES BHD	39.89m	-	-8.01
SELANGOR PROPERTIES BHD	1.842b	7.96	67.30
SENTORIA GROUP BERHAD	393.80m	7.35	12.18
SP SETIA BHD	7.426b	18.55	15.90
SUNWAY BERHAD	5.292b	3.51	87.38
SYMPHONY LIFE BERHAD	316.20m	6.11	16.70
TA GLOBAL BHD	1.627b	13.11	2.44
TAHPS GROUP BHD	775.48m	16.72	61.96
TALAM TRANSFORM BERHAD	388.85m	41.30	0.23
TAMBUN INDAH LAND BERHAD	832.85m	10.60	19.43
TANCO HOLDINGS BHD	53.58m	-	-25.83
TEBRAU TEGUH BHD	897.40m	31.46	4.26
TITIJAYA LAND BERHAD **	707.20m	-	-
TROPICANA CORPORATION BERHAD	2.101b	6.44	23.45
UEM SUNRISE BERHAD	9.392b	21.86	9.47
UOA DEVELOPMENT BERHAD	2.988b	10.36	21.52
WING TAI MALAYSIA BERHAD	685.35m	7.48	28.07
Y&G CORPORATION BHD	143.10m	15.76	5.90
YNH PROPERTY BHD	846.83m	17.27	11.29
YTL LAND & DEVELOPMENT BHD	772,58m	24.80	3.69

Notes: * Suspended company; ** Insufficient data company.