Risk-Adjusted Performance of Malaysian Real Estate Investment Trust Funds

(Prestasi Terlaras Risiko Pelaburan Dana Amanah Hartanah Malaysia)

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ABSTRACT

This study evaluates performance and risk features of Malaysian REIT funds from 2007-2012. Performance evaluation methods employed are Sharpe, Treynor, Jensen, and M-squared measures. The results indicate that beta values are all less than one and that the total risk of REIT funds comes mostly from the unsystematic risk component. While the results emphasize the importance of embedding risk into performance analyses, the findings also provide caution that differences in the risk measures employed give rise to contradictory performance rankings. The low R-squared values for REIT funds suggest low reliability of beta coefficients. The findings therefore imply that the Sharpe ratio and the M-squared measure which quantify risk using standard deviation of return provide more convincing and meaningful performance evaluation than the Treynor and Jensen measures. The results of M-squared measure also illustrate how leverage can be applied as a tool in achieving optimal REIT performance. The findings provide good insights to managers in assessing REIT performance and to investors who are considering REIT as a potential investment vehicle.

Keywords: REITs; performance rankings; systematic risk; unsystematic risk; leverage factor

ABSTRAK

Kajian ini menilai prestasi dan ciri-ciri risiko dana REIT Malaysia dari tahun 2007-2012. Kaedah penilaian prestasi yang digunakan adalah ukuran Sharpe, Treynor, Jensen dan M-squared. Hasil kajian menunjukkan bahawa nilai beta adalah kurang dari satu dan jumlah risiko dana REIT kebanyakannya terdiri daripada komponen risiko tidak sistematik. Walaupun keputusan menekankan kepentingan untuk menerapkan risiko dalam analisis prestasi, penemuan juga menunjukkan bahawa penggunaan ukuran risiko yang berbeza menghasilkan kedudukan prestasi yang bercanggah. Nilai R-square yang rendah untuk dana REIT mencadangkan tahap kebolehpercayaan yang rendah untuk pekali beta. Oleh itu, implikasi hasil kajian menunjukkan bahawa nisbah Sharpe dan ukuran M-squared yang mengukur risiko dengan menggunakan sisihan piawai pulangan memberikan penilaian prestasi yang lebih meyakinkan serta bermakna berbanding dengan ukuran Treynor dan Jensen. Hasil penemuan ukuran M-squared juga memberi gambaran tentang bagaimana leveraj boleh digunakan sebagai alat dalam pencapaian prestasi yang optimum untuk REIT. Hasil kajian memberikan maklumat yang baik kepada pengurus dalam menilai prestasi REIT dan juga kepada pelabur yang sedang mempertimbangkan REIT sebagai alternatif pelaburan yang berpotensi.

Kata kunci: REITs; kedudukan prestasi; risiko sistematik, risiko tidak sistematik; faktor leveraj

INTRODUCTION

Real Estate Investment Trust (REIT, hereafter) is a trust fund that pool money from investors to invest in income-producing properties such as office or commercial buildings, retail, industrial, and residential buildings, resorts or hotels, healthcare facilities and specialty-built buildings, among others. REITs hold and manage rental properties, and pay out most of its taxable profits as dividends to investors of REITs, called unit holders. REIT units are traded on the stock exchange and can be considered as an attractive income-generating asset for investors. REITs have become an increasingly popular investment vehicle among investors because it provides investors exposures to the real estate market without having investors to commit a large sum of capital or acquire expertise in property management.

In Malaysia, REITs were formerly known as listed property trusts and Malaysia was the first country in Asia to have listed property trusts in 1989 with the listing of Arab-Malaysian Property Trust. However, the listed property trusts in Malaysia observed poor performance and slow growth due to some underlying local structural and regulatory impediments (Newell et al. 2002; Ooi et al. 2006; Lee & Ting 2009). To facilitate an orderly development of the REIT sector, Securities Commission of Malaysia in early 2005 issued revised guidelines on REITs that replaced and superseded the guidelines for property trust funds. The previously used term of listed property trusts was renamed REIT and the first REIT in Malaysia i.e., the Axis-REIT was listed on the then Kuala Lumpur Stock Exchange in August 2005. As interests on and demand for REIT investments grow, information on the performance of REIT funds is becoming more important to

potential investors. While the performance of mutual funds or unit trust funds has been widely studied in Malaysia, there are limited studies that investigate the performance of REIT funds possibly due to the availability of small number of REIT funds. As at 31 August 2013, there are 17 listed real estate investment trusts in Malaysia (Securities Commission Malaysian n.d).

The objective of this study is to examine the investment performance of REIT funds using both unadjusted returns and risk-adjusted performance measures. The study also analyses the risk features of REITs by segregating the total risk into systematic and unsystematic components. This study expands existing scarce literature on Malaysian REIT funds by employing the *M*-squared performance measure of Modigliani and Modigliani (1997) and comparing it with the standard performance measures of Sharpe (1966), Treynor (1965), and Jensen (1968) in examining REIT performance. This is the first study that uses *M*-squared measure in the context of REIT performance evaluation to illustrate how leverage can be employed to achieve optimal REIT performance. The *M*-squared approach suggests that a fund's risk level can be changed and thus allowing investor to ascertain the degree of leverage that is required in achieving the highest return given the investor's preferred risk level. The findings highlight the importance of embedding risk into performance analyses and provide insights to investors who are considering REIT as a potential income-generating investment vehicle. The study illustrates the direct application of *M*-squared measure in the context of REIT funds and its major contribution is that as emphasized by Modigliani and Modigliani (1997), this study highlights leverage as the key tool that investor could employ to achieve the highest possible return given the desired risk level.

The study is organized as follows. Section 2 provides a review of the literature and Section 3 describes the data and methodology employed. Findings are reported and discussed in Section 4 and concluding remarks are provided in Section 5.

LITERATURE REVIEW

Numerous studies on REITs compare REIT performance with those of other financial assets and market benchmarks and these studies have reached varied conclusions. Smith and Shulman (1976) find that on average, REITs provide higher returns than the S&P 500 index and saving accounts for the 1963-1973 periods. However, when the year 1974 is included in the analyses, REITs underperform the S&P 500 index during the sample period of 1963-1974 due to extremely poor performance of REIT stocks in 1974. Other studies that show REITs underperform the market portfolio are Kuhle et al. (1986) and Goebel and Kim (1989). Titman and Warga (1986) find no evidence that REITs under-or-over-perform the market benchmark. Myer and Webb's (1993a) results using Jensen's alpha measures based on multifactor market model and several real estate market indices show that performances of the real estate funds are not very much affected by the choice of real estate benchmarks employed. Myer and Webb (1993b) indicate that the returns of equity REITs are more similar to the returns of common stocks and closed-end funds than to the returns of unsecuritized real estate. Likewise, Paladino and Mayo (1998) find that returns of REITs are highly correlated with stock market returns. O'Neal and Page (2000) find no evidence that on average, real estate mutual funds provide investors with positive abnormal returns. Fund expense ratio and fund age are found to be negatively related to performance while higher turnover ratio is associated with higher abnormal fund returns.

Chen and Peiser (1999) compare the return and risk features of REITs in various property categories with those of a market benchmark for mid-size companies, proxied by the S&P's MidCap Index. The findings indicate that healthcare, apartment, retail, and diversified REITs have lower returns than the market benchmark but these REITs have higher risk levels. For REITs in the hotel, storage, and office categories, the reported returns and risk are higher than those of the S&P's MidCap Index. Kim et al. (2002b) investigate the risk features of hotel REITs in terms of systematic and unsystematic risk components. The findings show that 84% of the total risk of hotel REITs is attributed to unsystematic risk and that the systematic risk is shown to be positively correlated with debt ratio and asset growth of hotel REITs but negatively with REIT's size. In other words, large hotel REITs with low levels of debt leverage and asset growth tend to have low level of systematic risk.

Kim et al. (2002a) examine the performance of hotel REITs using Jensen Index by comparing the performance of hotel REITs with those of the overall market and other REIT sectors. The results show that while the risk-adjusted performance of hotel REIT matches that of the market, the hotel REIT sector as a portfolio underperforms other REIT sectors such as office, industrial and the diversified REIT. The hotel REITs also have the highest market risk compared to other REIT sectors. While Kuhle (1987) and Gyourko and Nelling (1996) find little value of including REITs in an existing investment portfolio, the results of Lee and Stevenson (2005) indicate that investors gain diversification benefits when REITs are added into an existing portfolio that comprises a mixture of several other assets. The findings of Georgiev et al. (2003) show that REITs not only are poor substitution for direct investment in the property market but also provides no diversification benefits when invested together with stocks and bonds. On the other hand, investment in direct property is shown to generate some diversification benefits when invested with stocks and bonds. In contrast, Feldman (2003) finds that REIT and direct property markets exhibit low positive correlations and thus both can be treated as complimentary investments.

Using standard performance measures of Jensen (1968), Sharpe (1966) and Treynor (1965), Benefield et al. (2009) examine the differences in risk-adjusted

performance between diversified and specialized REITs. The results show significant performance differences between diversified and specialized REITs and the differences depend on the overall market condition. During good market conditions REITs that diversify by property type show better performances than those that specialized in their property holdings. There is some evidence that when the overall market conditions are less favourable specialized REITs have better performance than their diversified counterparts. The findings of Eichholtz et al. (2000) indicate that diversified REITs under perform property-type specialized REITs based on Jensen's alpha using both single and multifactor market models.

In the Malaysian context, while there are many studies on risk-adjusted performance of mutual funds or unit trusts, there is very little evidence on the investment performance of REIT funds. Newell et al. (2002) examine the performance of four listed property trusts over the period of 1991-2000 and find that the listed property trusts underperformed the market benchmark. The result of unfavourable performance is consistent with those obtained by Kok and Khoo (1995) and Ting (1999) for listed property trusts. The findings of Hamzah et al. (2010) indicate that the risk-adjusted performance and systematic risk levels of REITs vary across different economic cycles. In particular, the results based on a sample of four REITs show that REITs outperform the market portfolio during the financial crisis period (1997-1998) but underperform during both the periods of pre-crisis (1995-1997) and post-crisis (1998-2005). The findings of Lee and Ting (2009) show that in a mixed-asset portfolio, diversification benefits can be derived from investment in REITs but not from investment in property stocks. Based on the commonly employed performance measures of Sharpe (1966), Treynor (1965) and Jensen (1968), Aik (2012) finds that Malaysian REITs over-perform the market portfolio during the 2008 US subprime mortgage crisis. However, REITs show inferior performance results in the pre-crisis (2001-2007) and post-crisis (2009-2010) periods. Additionally, the overall risk levels of REITs are shown to be lower than that of the market.

The present study expands understanding on the investment performance of Malaysian REIT funds by applying the *M*-squared measure of Modigliani and Modigliani (1997) and comparing it with the classical performance measures of Sharpe (1966), Treynor (1965) and Jensen (1968). This is the first study that employs *M*-squared measure to evaluate REIT performance byshowing that leverage serves as important tool for investors in achieving optimal performance for a desired risk level. The *M*-squared measure has been employed by Low and Chin (2013) to evaluate Malaysian equity funds and by Arugaslan et al. (2008) to assess the performance of international funds. As noted in these studies, although *M*-squared is a modified version of the Sharpe ratio, both are very different risk-adjusted performance measures.

DATA AND METHODOLOGY

The sample in this study comprises 12 REITs with relevant data available over the 5-year study period from April 2007 to March 2012 as shown in the Appendix. The sample comprises several REIT categories reflecting different functional property types which include 5 office REITs, 2 retail REITs, 2 industrial REITs, 2 specialty REITs and 1 diversified REIT. The 2 specialty REITs represent health care and plantation sectors. Diversified REIT has an exposure to several property types and thus, the return from investing in such REIT does not depend solely on the cash flow variation of one particular property type. For each REIT, the weekly returns are calculated based on data gathered from the Bloomberg database. The 3-month KLIBOR (Kuala Lumpur Interbank Offered Bank) rate is employed to proxy for risk-free rate and the weekly returns of the FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBM KLCI) serves as a proxy for market return. Both the 3-month KLIBOR rate and market returns are sourced from the Bloomberg database. Since the reported 3-month KLIBOR rate is an annualized holding period yield, and in order to be consistent with the weekly returns of REITs and the market index, the 3-month annualized KLIBOR rate is converted to its weekly equivalent using the formulation of $(1+\text{annualized yield})^{1/52}$.

The variance of return or the total risk for each REIT is decomposed into its systematic and unsystematic risk components based on the following Equation (1) as shown in Levy and Sarnat (1984) and employed by Kim et al. (2002) in the context of REITs.

$$\sigma_j^2 = \beta_j^2 . \sigma_m^2 + \sigma_e^2 \qquad (1)$$

where σ_j^2 is the total risk or the variance of return for REIT j; β_j is the beta of REIT j; σ_m^2 is the variance of return of the market portfolio; $\beta_j^2 . \sigma_m^2$ is the systematic risk component of REIT j; and σ_e^2 is the unsystematic risk component of REIT j which also represents the portion of the total risk that can be diversified away. Additionally, as explained in Levy and Sarnat (1984) and Kim et al. (2002b), a measure of diversifiability can be computed by taking the ratio of unsystematic risk to total risk i.e., σ_e^2 / σ_j^2. This ratio provides information on whether or not further diversification is needed and the ratio is also equivalent to one minus the R-squared value (1 -*R*-squared). If the ratio is close to 0, this means that not much unsystematic risk remains in the portfolio and the portfolio's risk consists mainly of systematic risk which is not diversifiable. However, if a portfolio's diversifiability measure has a ratio that is close to 1, this indicates that the portfolio has a large portion of unsystematic risk remaining to be diversified away.

Several measures are employed to assess REIT performance including the standard fund performance measures of Sharpe (1966), Treynor (1965) and Jensen's (1968) alpha, as well as the *M*-squared measure proposed by Modigliani and Modigliani (1997) which is a refinement to the original Sharpe ratio. The Sharpe ratio of REIT j is

defined as the average excess return of REIT j divided by its standard deviation of return and is given as follows:

$$S_j = \frac{\overline{R_J} - \overline{R_f}}{\sigma_j} \qquad (2)$$

where $\overline{R_J}$ and σ_j are the average return and standard deviation of return of REIT j, respectively; and $\overline{R_f}$ is the average risk-free return. The Treynor ratio is the ratio of the average excess return to the systematic risk of REIT j as shown below:

$$T_j = \frac{\overline{R_J} - \overline{R_f}}{\beta_j} \qquad (3)$$

where $\overline{R_J}$ is the average return of each REIT; $\overline{R_f}$ is the average risk-free return; and β_j is the beta coefficient of each REIT. The following regression specification is employed to estimate each REIT's Jensen's alpha:

$$R_{jt} - R_{ft} = \alpha_j + \beta_j (R_{mt} - R_{ft}) + s_{\varepsilon it} \qquad (4)$$

where α_j is the Jensen's alpha representing each REIT's risk-adjusted performance; R_{jt} is the rate of return of each REIT at time t; R_{ft} is the risk-free return at time t; R_{mt} is the rate of return of the market portfolio at time t; β_j is the beta coefficient of each REIT; and $s_{\varepsilon it}$ is the random error term.

The *M*-squared measure of each REIT is obtained by multiplying the original Sharpe ratio as shown in Equation (2) with the standard deviation of market return and then adding the resulting term with the average risk-free return as shown below:

$$M_j^2 = \frac{\overline{R_J} - \overline{R_f}}{\sigma_j} \sigma_m + \overline{R_f} \qquad (5)$$

where the definitions of $\overline{R_J}, \overline{R_f}$, and σ_j apply as in Equation (2); and σ_m is the standard deviation of market return. The *M*-squared measure that is built on Markowitz's (1952) portfolio theory highlights the idea of using leverage as a key tool for achieving optimal fund performance for any desired level of risk. In other words, the measure allows each REIT to be levered or unlevered in order to make its risk equivalent to that of the market and the leverage factor of each REIT is computed as $L_j = \sigma_m / \sigma_j$. A leverage factor of less than one means that the REIT has a higher risk than the market portfolio and therefore investors should unlever by selling (1-L_j) percentage of the REIT and investing the proceed in a risk-free asset. On the other hand, if the leverage factor of the REIT is greater than 1, this indicates that the REIT has a lower risk than the market and thus investors should increase the REIT investment by (L_j-1) percentage through borrowing at the risk-free rate.Arugaslan et al. (2008) and Low and Chin (2013) also employ the *M*-squared measure but in the context of equity unit trust funds. As emphasized by Modigliani and Modigliani (1997), although Sharpe ratio and *M*-squared measure produce the same fund ranking orders, both are very different risk-adjusted performance measures. That is, unlike the Sharpe measure which is expressed as a ratio, the *M*-squared measure which is expressed in basis points is more easily understood by investors and it can be readily compared to the returns of other investment alternatives. Furthermore, the *M*-squared measure allows investors to use the concept of leverage to alter the fund's risk to match investor's risk preference.

EMPIRICAL FINDINGS AND DISCUSSION

Table 1 presents descriptive statistics of weekly returns over the 5-year period from April 2007 to March 2012 for each REIT and for the market portfolio proxied by the FTSE Bursa Malaysia Kuala Lumpur Composite Index (FBM KLCI). As reported, the overall average weekly return for all the REITs is 0.107% which is very close to the average weekly return of 0.102% for the market portfolio. The Al-Hadharah REIT of the plantation sector observes the highest average weekly return of 0.201% and

TABLE 1. Summary statistics

REIT	Average weekly return (%)	Standard deviation (%)	Minimum (%)	Maximum (%)
Al'-Aqar	0.117	2.355	-6.087	12.820
Axis	0.187	2.751	-13.333	9.166
Al-Hadharah	0.201	2.243	-8.000	7.462
AmFirst	0.125	1.787	-6.451	7.894
UOA	0.117	2.487	-10.769	9.259
AmanahRaya	0.049	2.527	-17.318	20.270
Starhill	0.002	1.895	-10.891	8.333
Hektar	0.167	3.576	-14.615	16.176
Quill Capita	-0.126	2.650	-13.815	9.909
Tower	0.185	2.898	-11.029	16.528
Atrium	0.103	2.249	-8.333	11.000
AHP PNB	0.150	2.819	-11.111	10.563
Average	0.106	2.520		
Market portfolio: FBM KLCI	0.102	2.111	-8.133	6.879
Risk-free asset: 3-month KLIBOR	0.003	0.000	0.001	0.003

it over-performs all other REIT sectors while Quill Capita, the office REIT has the lowest average return of -0.126%. In terms of standard deviation of return, the Hektar REIT of the retail sector records the highest return volatility of 3.576% while the office REIT, AmFirst has the least volatile return of 1.787%.

Table 2 reports the risk features of each REIT, the *R*-squared value, and the diversifiability measure defined as the proportion of total risk that is due to the unsystematic component. The results show that office REITs have relatively higher market risk than other REIT sectors. For example, Tower REIT has the highest percentage of systematic risk observed at 1.833%, followed by Quill Capita and AHP PNB REITs with systematic risk levels of 0.976% and 0.915%, respectively. The beta values

for the REITs are all less than one, averaging at 0.316. The low beta values are not surprising since REITs are secured by real estate properties and thus, tend to have a low level of market risk (Goebel & Kim 1989; Kim et al. 2002b). The *R*-squared value for all the REITs are very low with an average value of 0.089, indicating that all the REIT funds are very poorly diversified. On average, the total risk of REITs that is due to the unsystematic risk component is very much larger than the total risk attributed to the systematic risk component as indicated by the average diversifiability value of 0.911. The lowest and highest values range from 0.782 to 0.995 and such high diversifiability values suggest that there are tremendous opportunities for diversification.

TABLE 2. Risk features of REITs

REIT	Beta (β_j)	R-squared	Total risk (σ_j^2)	Systematic risk ($\beta_j^2 \sigma_m^2$)	Unsystematic risk (σ_e^2)	Diversifiability measure (σ_e^2 / σ_j^2)
Al'-Aqar	0.147	0.017	5.547	0.097	5.450	0.983
Axis	0.362	0.077	7.569	0.587	6.982	0.922
Al-Hadharah	0.209	0.038	5.033	0.196	4.837	0.961
AmFirst	0.293	0.119	3.196	0.383	2.813	0.880
UOA	0.362	0.094	6.185	0.587	5.598	0.905
AmanahRaya	0.084	0.004	6.387	0.032	6.355	0.995
Starhill	0.385	0.184	3.594	0.662	2.932	0.816
Hektar	0.137	0.006	12.789	0.085	12.704	0.993
Quill Capita	0.468	0.139	7.023	0.976	6.047	0.861
Tower	0.641	0.218	8.403	1.833	6.571	0.782
Atrium	0.245	0.053	5.059	0.269	4.790	0.947
AHP PNB	0.452	0.115	7.947	0.915	7.033	0.885
Average	0.316	0.089	6.561	0.552	6.009	0.911

Table 3 reports the risk-adjusted performance results of Sharpe, Treynor, Jensen and *M*-squared measures alongside their respective performance rankings. As shown, the performance rankings by Sharpe ratio and *M*-squared measure are the same as both performance measures adjust risk using standard deviation of return. Similarly, the observed rankings by Treynor ratio and Jensen's alpha are fairly consistent with each other as both Treynor and Jensen performance measures employ beta as the relevant risk measure. Contrasts in ranking orders can be observed when comparisons are made between performance measures that employ standard deviation of return vis-à-vis those that employ beta as risk measure. The two noticeable examples are the AmFirst REIT and the Hektar REIT. While the AmFirst REIT ranks second by both, Sharpe ratio and *M*-squared measure, its ranking orders decline to the sixth and seventh positions based on Treynor and Jensen measures respectively. Similarly, for Hektar REIT, Sharpe and *M*-squared measures rank it the seventh position whereas Treynor and Jensen measures rank it first and second, respectively. Such findings

suggest that differences in performance ranking orders are attributed to the differences in risk measure employed, i.e., standard deviation of return versus beta. Given that the reported R-squared values for REITs are low, this implies low reliability of the beta coefficients and thus when risk adjustments are made using beta, the resulting performance results and ranking orders are no longer meaningful. As such, both Sharpe ratio and *M*-squared measure that make risk adjustment adjust risk using the standard deviation of return yield more convincing performance rankings than the Treynor and Jensen measures that adjust risk using beta coefficient.

Table 4 presents information on average weekly return, annualised unadjusted and adjusted returns, performance ranking orders, and the leverage factors of REITs. The returns are annualised by compounding the weekly average returns over 52 weeks computed as $(1+\text{average weekly return})^{52}$ -1. The calculation of the risk-adjusted return is based on the *M*-squared return figure. Thus, the reported risk-adjusted return figures represent the returns that an investor would have achieved

TABLE 3. Risk-adjusted performance measures and rankings

REIT	Sharpe ratio	Rank	Treynor ratio	Rank	Jensen's alpha (%)	Rank	M-squared (%)	Rank
Al-Hadharah	0.089	1	0.951	2	0.179	1	0.190	1
AmFirst	0.069	2	0.419	6	0.094	7	0.148	2
Axis	0.067	3	0.509	5	0.148	3	0.144	3
Tower	0.063	4	0.284	10	0.118	4	0.135	4
AHP PNB	0.052	5	0.326	8	0.102	5	0.113	5
Al'-Aqar	0.049	6	0.784	3	0.101	6	0.106	6
Hektar	0.046	7	1.195	1	0.151	2	0.100	7
UOA	0.046	8	0.315	9	0.078	8	0.099	8
Atrium	0.045	9	0.411	7	0.076	9	0.097	9
AmanahRaya	0.018	10	0.553	4	0.038	10	0.041	10
Starhill	-0.001	11	-0.002	11	-0.039	11	0.002	11
Quill Capita	-0.049	12	-0.274	12	-0.175	12	-0.100	12
Market portfolio: FBM KLCI	0.047		0.997				0.102	

TABLE 4. Unadjusted and risk-adjusted return

REIT	Average weekly return (%)	Unadjusted annualised return (%)	Rank	Adjusted annualised return (%)	Rank	Leverage factor
Al-Hadharah	0.202	11.059	1	10.385	1	0.941
AmFirst	0.125	6.733	6	7.973	2	1.181
Axis	0.187	10.210	2	7.781	3	0.767
Tower	0.185	10.058	3	7.270	4	0.728
AHP PNB	0.150	8.103	5	6.045	5	0.749
Al'-Aqar	0.118	6.318	7	5.660	6	0.897
Hektar	0.117	6.254	8	5.306	7	0.849
UOA	0.167	9.075	4	5.320	8	0.590
Atrium	0.103	5.519	9	5.181	9	0.939
AmanahRaya	0.049	2.582	10	2.174	10	0.835
Starhill	0.002	0.087	11	0.082	11	1.114
Quill Capita	-0.126	-6.343	12	-5.061	12	0.797
Market portfolio: FBM KLCI	0.102	5.458		5.458		

had he/she made changes to a REIT's risk by levering or unlevering in order to match the REIT's risk with that of the market portfolio.

Based on the annualised unadjusted return, nine out of 12 REITs outperform the market return whereas based on the risk-adjusted return, only six out of 12 REITs outperform the market return. As shown, Al-Hadharah REIT of the plantation sector over-performs the market portfolio and all other REIT sectors based on various return measures. That is, Al-Hadharah REIT has the highest average weekly return of 0.202% which is equivalent to an annualised figure of 11.059%. The corresponding figures for the market portfolio are 0.102% and 5.458%, respectively. Diversified REIT i.e., the AmanahRaya REIT is shown to have a relatively poor performance compared to most of the other specialized REIT sectors. Such finding

is consistent with those of past studies by Chen and Peiser (1999), Eichholtz et al. (2000) and Benefield et al. (2009).

On individual basis, some REITs that seems unattractive when evaluated based on unadjusted returns have shown improvement in ranking orders when evaluated based on risk-adjusted returns. This suggests that it is important to take risk into consideration when evaluating REIT performance. The two REITs that stand out with substantial differences in performance ranking orders are AmFirst and Hektar REITs representing office and retail categories, respectively. For example, AmFirst REIT ranks sixth on an unadjusted return basis but ranks second when assessed on a risk-adjusted basis. On the contrary, Hektar REIT has a more favourable ranking order (ranked fourth) when assessed using unadjusted return than when using

risk-adjusted return (ranked eighth). When Hektar REIT's performance is compared to the market performance, it outperformed the market (0.167% versus 0.102%). Hektar REIT is also more volatile than the market with weekly return standard deviation of 3.576% as opposed to 2.111% for the market as reported previously in Table 1. However, Hektar REIT's risk-adjusted return of 5.320% caused it to slightly underperform the market return of 5.458%. The leverage factor of this REIT is 0.849 suggesting that its risk is higher than that of the market. Thus, to reduce the REIT's volatility and to make it equivalent to that of the market, the leverage factor of 0.590 suggests that 41% of the fund has to be liquidated and the proceeds be invested in risk-free asset in order to achieve a risk-adjusted return of 5.320%. For AMFIRST REIT, the leverage factor of 1.181 suggests that the risk is lower than that of the market. Hence, investors could lever the REIT by borrowing at risk-free rate to increase investment in REIT by 18% in order to achieve an annualised return of 7.973%. While it is important to take risk into consideration when measuring return, the four bottom-ranked REITs that have low return figures relative to other REITs (Atrium, Amanah Raya, Starhill and Quill Capi ta Trust) show the same performance ranking orders when evaluated based on both unadjusted and risk-adjusted returns. This suggests that when the returns of REITs are low, performance rankings are not affected by the type of risk measure employed for risk adjustment.

CONCLUSION AND IMPLICATION

This study examines the investment performance of 12 Malaysian REITs comprising 5 office, 2 retail, 2 industrial, 1 diversified, and 2 specialty REITs, i.e., healthcare and plantation sectors. The study period is from April 2007 to March 2012 and the performance measures employed are the three commonly employed classical measures of Sharpe (1966), Treynor (1965) and Jensen (1968) as well as the M-squared measure of Modigliani and Modigliani (1997) which is the modified version of the original Sharpe ratio. Overall, the findings suggest that it is important to embed risk into REIT performance evaluations. A REIT that seems unattractive when evaluated on unadjusted return turns out to be one of the best performing REITs when evaluated on a risk-adjusted basis. However, the findings also highlight that the application of different risk measures, i.e., standard deviation of returns versus beta lead to inconsistency in the REIT performance rankings. The findings suggest that performance evaluations using Sharpe ratio and M-squared measure yield more meaningful results than those using Treynor and Jensen methods that employ beta as the risk measure. This is because the sample REITs have low R-squared values and thus implying that the beta coefficients may not be reliable. The beta values of the REIT funds are all less than one, suggesting low level of market risk and this is not surprising since REITs are secured by real estate properties.

Office REITs are shown to exhibit higher levels of market risk than other REIT sectors. On average, about 91% of the total risk of REIT funds comes from unsystematic risk component, implying that there are still tremendous diversification opportunities. The results indicate that the plantation REIT sector is the best performing sector over the study period as it out-performed all other REITs based on various return measures. Consistent with the findings of prior studies, diversified REIT is shown to have relatively poor performance compared to most of the other specialized REIT sectors although diversified REIT has exposures to different property types. The findings of this study provide valuable insights for investors who are considering REIT as a potential investment vehicle. Since the risk component of REIT comprises mostly of unsystematic risk, investors can combine investments of several REIT sectors into a portfolio to achieve their own diversification. The findings of unreliable beta values as suggested by low R-squared figures imply that managers of REIT funds should employ Sharpe and M-squared measures in fund performance evaluations.

REFERENCES

Aik, N.C. 2012. Malaysian real estate investment trusts (M-REITS) and the financial crisis: A performance and comparative analysis. *International Journal of Research in Commerce & Management* 3(1): 13-18.

Arugaslan, O., Edwards, E. & Samant, A. 2008. Risk-adjusted performance of international mutual funds. *Managerial Finance* 34: 5-22.

Benefield, J.D., Anderson, R.I. & Zumpano, L.V. 2009. Performance differences in property-type diversified versus specialized real estate investment trusts (REITs). *Review of Financial Economics* 18: 70-79.

Chen, J. & Peiser, R. 1999 . The risk and return characteristics of REITs – 1993-1997. *Real Estate Finance* 16(1): 61-68.

Eichholtz, E., Op't Veld, H. & Schweitzer, M. 2000. REIT performance: Does managerial specialization pay? In *Performance of Financial Institutions*, edited by P. Harker & S. Zenios, 199-220. Cambridge, UK: Cambridge University Press.

Feldman, B.E. 2003. Investment policy for securitized and direct real estate. *Journal of Portfolio Management* Special Issue: 112-121.

Georgiev, G., Gupta, B. & Kunkel, T. 2003. Benefits of real estate investment. *Journal of Portfolio Management* Special Issue: 28-34.

Goebel, P.R. & Kim, K.S. 1989. Performance evaluation of finite-life real estate investment trusts. *Journal of Real Estate Research* 4(2): 57-69.

Gyourko, J. & Nelling, E. 1996.Systematic risk and diversification in the equity REIT market. *Real Estate Economics* 24: 493-515.

Hamzah, A.H., Rozali, M.B. & Tahir, I.M. 2010. Empirical investigation on the performance of real estate investment trusts in pre-crisis, during crisis and post-crisis period. *International Journal of Economics and Finance* 2(2): 62-69.

Jensen, M. 1968. The performance of mutual funds in the period 1945-1964. *Journal of Finance* 23: 389-416.

Kim, H., Mattila, A. & Zheng, G. 2002a. Performance of hotel real estate investment trusts: A comparative analysis of Jensen indexes. *Hospitality Management* 21: 85-97.

Kim, H., Zheng, G. & Mattila, A. 2002b. Hotel real estate investment trusts' risk features and beta determinants. *Journal of Hospitality & Tourism Research* 26: 138-154.

Kok, K.K. & Khoo, K.L. 1995. Performance of property trusts in the Kuala Lumpur stock exchange. *Capital Markets Review* 3(2): 1-19.

Kuhle, J.L. 1987. Portfolio diversification and return benefits-common stocks vs real estate investment trusts (REITs). *Journal of Real Estate Research* 2(2): 1-9.

Kuhle, J.H., Walther, C.H. & Wurtzebach, C.H. 1986. Financial performance of real estate investment trusts. *Journal of Real Estate Research* 1(1): 67-75.

Lee, S.L. & Stevenson, S. 2005.The case for REITs in the mixed asset portfolio in the long and short run. *Journal of Real Estate Portfolio Management* 11: 55-80.

Lee, C.L. & Ting, K.H. 2009. The role of Malaysian securitised real estate in mixed-asset portfolio. *Journal of Financial Management of Property and Construction* 14: 208-230.

Levy, H. & Sarnat, M. 1984. *Portfolio and Investment Selection: Theory and Practice*. Englewood Cliffs, NJ: Prentice Hall International.

Low, S-W. & Chin, Y-B. 2013. Refinements to the Sharpe ratio – Evidence from Malaysian equity funds. *Global Economic Review* 42(1): 72-97.

Markowitz, H. 1952. Portfolio selection. *Journal of Finance* 7: 77-91.

Myer, F.C.N. & Webb, J.R. 1993a. The effect of benchmark choice on risk-adjusted performance measures for commingled real estate funds. *Journal of Real Estate Research* 8(2): 189-203.

Myer, F.C.N. & Webb, J.R. 1993b. Return properties of equity REITs, common stocks, and commercial real estate: A comparison. *Journal of Real Estate Research* 8(1): 87-106.

Modigliani, F. & Modigliani, L. 1997. Risk-adjusted performance. *Journal of Portfolio Management* 23: 45-54.

Newell, G., Ting, H.K. & Acheampong, P. 2002. Listed property trusts in Malaysia. *Journal of Real Estate Literature* 10: 109-118.

O'Neal, E. & Page, D. 2000. Real estate mutual funds: Abnormal performance and fund characteristics. *Journal of Real Estate Portfolio Management* 6(3): 239-247.

Ooi, J.T.L., Newell, G. & Sing, T.F. 2006. The growth of REIT markets in Asia. *Journal of Real Esate Literature* 14: 203-204.

Paladino, M. & Mayo, H. 1998. REIT stocks do not diversify stock portfolio: An update. *Real Estate Review* 27: 39-40.

Securities Commission Malaysia. Available at http://www.sc.com.my

Sharpe, W.F. 1966. Mutual fund performance. *Journal of Business* 39: 119-138.

Smith, K.V. & Shulman, D. 1976. Institutions beware: The performance of equity real estate investment trusts. *Financial Analysts Journal* 32: 61-66.

Ting, K.H. 1999. Listed property trusts in Malaysia: A comparative performance analysis. *Journal of Valuation and Property Services* 2(1): 3-12.

Titman, S. & Warga, A. 1986. Risk and the performance of real estate investment trusts: A multiple index approach. *Journal of the American Real Estate and Urban Economics Association* 14(3): 414-431.

Treynor, J.L. 1965. How to rate management of investment funds. *Harvard Business Review* 43: 63-75.

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APPENDIX

The study sample of real estate investment trust (REIT) fund

Abbreviation	Complete name	Type
Al'-Aqar	Al'-Aqar Healthcare REIT	Healthcare
Axis	Axis Real Estate Investment Trust	Industrial
Al-Hadharah	Al-Hadharah Boustead REIT	Plantation
AmFirst	AmFirst Real Estate Investment Trust	Office
UOA	UOA Real Estate Investment Trust	Office
AmanahRaya	AmanahRaya Real Estate Investment Trust	Diversified
Starhill	Starhill Real Estate Investment Trust	Retail
Hektar	Hektar Real Estate Investment Trust	Retail
Quill Capita	Quill Capita Trust	Office
Tower	Tower Real Estate Investment Trust	Office
Atrium	Atrium Real Estate Investment Trust	Industrial
AHP PNB	AmanahHarta Tanah PNB	Office