

Do Islamic REITs Behave Differently from Conventional REITs? – Empirical Evidence from Malaysian REITs

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Abstract

This study empirically evaluates the dynamic risk and return behavior of Islamic REITs in Malaysia for the sample period from 3 August 2005 to 19 December 2014. Using the time-varying coefficient models, we estimate the stochastic abnormal returns and systematic of Islamic REITs (IREITs) and other conventional REITs listed on Malaysia's stock exchange and test if the two types of REITs behave differently over the sample period. We subdivide the sample period into three sub-periods to coincide with the three key IREIT events, which include the listing of the first IREIT (Al-Aqar Healthcare REIT), the conversion of the Axis REIT into an IREIT, and also the delisting of an IREIT (Al-Hadharah Boustead REIT), and then compare the means of the stochastic abnormal returns and betas of the IREITs vis-à-vis those of other conventional REITs. We found that IREITs in general have stronger performance in term of the abnormal returns, and they also exhibited some countercyclical attributes during the crisis periods. The systematic risks of IREITs were also lower compared to other conventional REITs. However, the spillover effects of the IREIT events are not conclusive. The findings show that IREITs could offer useful arbitrage opportunities for investors; and the lower betas would help to improve risk diversification if IREITs are added into a portfolio.

Keywords: *Islamic REITs, Shariah-Compliant Guidelines, Malaysia REITs, Stochastic Abnormal Return, Time-varying Beta, Spillover Effects*

1. Introduction

The Malaysian Islamic capital market (ICM) has experienced a phenomenal growth of 16.3% annually since 2000, and the market size has reached RM1.42 trillion as at the end December 2012.¹ Islamic REITs (IREITs) that invest primarily in Shariah-compliant income generating real estate has been actively promoted by the Malaysian government as a key vehicle in developing its ICM.

The study aims to empirically examine differences in risk and return characteristics between IREITs and conventional Malaysian REITs (MREITs). There are two competing hypotheses that may explain differences in risk-return tradeoffs of the two REIT vehicles. On one hand, if Shariah restrictions increase management costs of IREITs (Derigs and Marzban, 2009), IREITs are expected to attract higher risk premiums in order to compensate investors for assuming higher investment risks in IREITs.² Illiquidity risk due to the smaller market capitalization (distributions) is also expected to increase IREIT premiums. On another hand, if investment universe of IREITs is significantly confined by stipulated Shariah investment guidelines, systematic risks of IREITs could be significantly lower than those of conventional MREITs. Newell and Osmadi (2009) found that IREITs have lower risk-adjusted returns relative to conventional MREITs during the crisis periods. Therefore, IRET share price changes could be less correlated with stock market returns.

Based on daily excess returns data covering the periods from 3 August 2005 to 19 December 2014, we empirically estimate the time-varying risk-return characteristics of IREITs and conventional MREITs, and test if the two types REITs behave differently over the sample period. We use three key time dummies to represent key developments in IREIT markets in Malaysia as the cut-offs to define three different sub-periods and analyze if the risk-return behaviors of IREITs and MREITs during the sub-periods. The first time dummy (τ_1) starts on date 10 August 2006 that marks the listing of the first IREIT (Al-Aqar Healthcare REIT) in Malaysia, and ends on 10 August 2006 to 10 December 2008. τ_2 denotes the second non-overlapping sub-period represented by the date of the successful conversion of Axis REIT into a IREIT status on 11 December 2008. The second sub-period ends on 15 July 2013, which is one day before the announcement of the delisting of Al-Hadharah Boustead REIT. The third sub-period τ_3 spans from 16 July 2013 to 19 December 2014.

The mean abnormal returns in the sub-period τ_1 show that the performance of Al-Aqar Healthcare REIT and other MREITs was negatively affected by the US financial crisis in 2007-2008. However, Al-Aqar Healthcare REIT still out-performed Axis REIT and other MREITs by both the mean abnormal return and the beta measures. The sub-period τ_2 saw the successful conversion of Axis REIT into an IREIT, and the means abnormal return and systematic risk of Axis REIT has improved significantly relative to other MREITs. However, we could not verify if there are significant spillover effects of the IREIT conversion event on Al-Aqar Healthcare REIT. The mean abnormal return and the mean beta of both IREITs have though improved significantly during the sub-period, but other MREITs have also shown some positive changes in the performance. The delisting of Al-Hadharah Boustead REIT in the sub-period τ_3 was also coincided with general declines in the abnormal returns of both the IREITs and MREITs. However, we observe that the mean betas of IREITs remained relatively unchanged, though the mean betas of other MREITs have significantly increased during this sub-period. Again, the hypothesis on the spillover effects of the IREIT delisting event is not conclusive.

The findings of this study have important implications for investors, issuers/sponsors and asset managers when evaluating risk-return dynamics of IREITs. First, the large variations of the abnormal returns coupled with the countercyclical attributes of IREITs suggest potential arbitrage opportunities for IREITs in the down-markets. The stable systematic risks found are also an important feature of IREITs, which may offer risk hedging and diversification for institutional investors if IREITs are added to their portfolios. However, our tests of the spillover effects of the events of the addition (Axis REIT) and the removal (Al-Hadharah Boustead REIT) of IREITs were not conclusive. More empirical tests are needed in the future to verify the hypothesis.

¹ Source: Malaysia International Islamic Finance Center (MIFC), Bank Negara Malaysia (the Central Bank of Malaysia): http://www.mifc.com/?ch=ch_kc_definitions&pg=pg_kcdf_overview&ac=245

² The Shariah compliance cost hypothesis is not supported by Ibrahim and Ong (2008) and Ibrahim, Ong and Parsa (2009), who found no significant differences between the risk-adjusted returns of the synthetic SC REIT portfolios vis-à-vis the US REIT index returns.

The remainder of the paper is organized as follows: Section 2 gives a general overview of the development of IREIT in Malaysia. Section 3 presents the empirical methodology with the particular emphasis on the time-varying coefficient (TVC) model used to estimate stochastic abnormal returns and betas for the sample REITs. Section 4 covers the data sources and descriptive statistics. Section 5 discusses empirical results estimated using both the static CAPM and stochastic CAPM models. Section 6 concludes the paper.

2. Development of Islamic REITs in Malaysia

Islamic real estate investment trusts (IREITs) are REITs that are structured in accordance with the Shariah-compliant guidelines outlined by the Syariah Advisory Council (SAC) of the Securities Commission in November 2005. IREITs are required to set up Shariah committees, which will then spell out Shariah guidelines on permissible investment activities to be undertaken by IREITs. Unethical business activities and practices are screened based on a set of sector and financial guidelines (Derigs and Marzban, 2009). The sector screens, of also known as the business line screens, limit income from Haram activities, such as arms and ammunition, alcohol, tobacco, gambling (maysir) and non-halal food products (e.g. pork) to not more than 5% of the total firm revenue. The financial screens forbid business activities in conventional financial services, and investments in low gearing firms, conventional fixed income instruments (such as bonds), interest-based instruments/accounts and derivatives, as well as short selling. Some thresholds on liquidity (accounts receivables, cash and short-term investments), interest income and gearing (total debt to total asset ratio) are commonly adopted in the financial ratio screens.

In Malaysia, there are currently two IREITs that are still actively traded on the Bursa Malaysia, formerly the Kuala Lumpur Stock Exchange, which include Axis REIT, Al-Aqar Healthcare REIT. Al-Aqar Healthcare is first MREIT that was structured and listed as an IREIT on the Initial Public Offering (IPO) day on the Bursa Malaysia. Axis REIT was not originated listed as an IREIT, but the management opted to switch the status from a conventional REIT to an IREIT structure on 11 December 2008. The third IREIT - Al-Hadharah Boustead REIT - listed as an IREIT in January 2007 has been subsequently privatized and delisted from the Bursa Malaysia on 16 July 2013.

3. Empirical Methodology

3.1. Static and Time-Dependence CAPM Models

We first estimate the static single-factor CAPM model by running the regression of excess REIT return on the excess market return. The model specification could be written as:

$$R_{i,t} - R_{F,t} = \alpha + \beta_i(R_{M,t} - R_{F,t}) + \varepsilon_t \quad (1)$$

where $R_{i,t}$ is the daily total return of REIT i at time t ; $R_{M,t}$ is the daily market return at time t ; and $R_{F,t}$ is the risk-free rate of return. α and β_i are the regression parameter, which denote the abnormal return, and the systematic risk of the stock i , respectively; ε_t is the standard error term of the model that follows the *i.i.d.* distribution.

Next, we add three time dummy variables, τ_k , to account for multiple structural breaks in the beta series over the full sample periods. The discrete time-dependence changes as indicated by the time dummies are widely used to model REIT beta behavior (Ghosh, Miles and Sirmans, 1996; McIntosh, Liang and Tompkins, 1991; Khoo, Hartzell and Hoesli, 1993; Liang, McIntosh and Webb, 1995; Chiang, Lee and Wisen, 2004). If sub-period coefficient, φ_{ki} , is significantly different from zero, discrete changes in estimated betas are observed across the sub-divided periods; otherwise, the static beta assumption is not rejected across the sub-periods. The time-dependence CAPM model is extended as follows:

$$R_{i,t} - R_{F,t} = \alpha + \beta_i(R_{M,t} - R_{F,t}) + \sum_{k=1}^3 \varphi_{ki} \tau_k (R_{m,t} - R_{f,t}) + \xi_t \quad (2)$$

where τ_k is sub-period dummy variables with $k = [1, 2, 3]$ that capture changes in betas across different sub-periods. τ_1 defines the first break period from 10 August 2006 to 10 December 2008; τ_2 defines the second break period from 11 December 2008 to 15 July 2013; and the τ_3 defines the third break period from 16 July 2013 to the ending sample period on 19 December 2014, such that $[\tau_1 = 1, \text{ if a period falls between 10 August 2006 and 10 December 2008; } 0 = \text{ otherwise}]$; $[\tau_2 = 1, \text{ if a period falls between 11 December 2008 and 15 July 2013; } 0 = \text{ otherwise}]$; and $[\tau_3 = 1, \text{ if a}$

period falls between 16 July 2013 and 19 December 2014; 0 = otherwise]. The three sub-periods are chosen to coincide with three significant events that are representative of the development Islamic REITs in Malaysia. Al-Aqar Healthcare REIT was the first Islamic REIT that made the debut on the Bursa Malaysia stock exchange on 10 August 2006. The second event date on 11 December 2008 was represented by the successful conversion of the listed Axis REIT into an Islamic REIT. The third Islamic REIT that was listed on 15 January 2007 was privatized and delisted from the Malaysia's Bursa Stock Exchange on 16 July 2013, and the delisting date is used as the third event date in the above CAPM model.

3.2. Time-Varying CAPM

The static CAPM models could be distorted if betas are asymmetric in the up-markets and down-markets.³ We propose to use the TVC framework of Engle and Watson (1987) that allow dynamic structures on the abnormal return (alpha term) and the beta in Equation (1). The model corrects for possible parameter instability and eliminates arbitrariness in having to a-priori fixing different break points (Ferson and Harvey, 1991 and 1993). We estimate the following local trend transition (random walk) model, where the two terms are generated by the following stochastic processes:

$$\alpha_{t+1} = \alpha_t + \zeta_t, \quad \zeta_t \sim N(0, \sigma_\zeta^2) \quad (3)$$

$$\beta_{t+1} = \beta_t + \eta_t, \quad \eta_t \sim N(0, \sigma_\eta^2) \quad (4)$$

where ζ_t and η_t are mutually uncorrelated irregular terms that are i.i.d with zero means and constant variances, σ_ζ^2 and σ_η^2 respectively. The dynamic beta model also known as structural time series model, where we could jointly estimate the stochastic level and the stochastic beta term using the Kalman filter technique (Harvey, 1989). We estimate the time-varying beta separately for the sample of 15 REITs in Malaysia including the two Islamic REITs (Axis REIT and Al-Aqar Healthcare REIT).

4. Data Analysis

4.1. Data Sources

We collect the daily total return data for 15 sample REITs that are still actively traded on the Malaysia's Busa stock exchange from Datastream. We obtain the daily price index data of the widely used Bursa Malaysia Kuala Lumpur Composite Stock Index (KLCI) and use them as the proxy of stock market returns. For the risk-free rate of return, we obtain the Malaysia's Government T-bill (Band 4) middle rate from the same source, and we normalize the annual yield to obtain the daily risk-free rate of return by dividing the yield by 260 days, which is approximately the number of trading days for the Malaysian bourse.

Based on the data, we first compute the excess returns for the sample Malaysia REITs (MREITs) including the two Islamic REITs (IREITs), which are still actively traded on the exchange. The first Islamic REIT was listed on 10 August 2006, and its property portfolio includes specialist hospitals and medical centres in different parts of Malaysia. The second Islamic REIT is a plantation REIT sponsored by Boustead Group, and the REIT was listed under the name Al-Hadharah Boustead REIT on the Malaysia's Bursa Stock Exchange in January 2007. The Al-Hadharah Boustead REIT was delisted from the exchange in 2013, and thus, it was not included in our sample REITs. However, we use the delisting date on 16 July 2013 to test if the delisting of the Islamic REIT could affect the risk-return behaviors of other REITs on the Malaysia's bourse. The third IREIT was formed as a result of the conversion of the office and industry REIT, known as Axis REIT. Axis REIT was first listed on 3 August 2005, and it has been reclassified as an Islamic REIT on 11 December 2008. The excess return of a REIT i is defined as $[R_i - R_F]$, where R_i and R_F are the total daily stock return and the adjusted daily risk-free rate of return, respectively. Based on the same equation, we compute the daily excess stock return by subtracting the stock price index return, as represented by the first-order natural log-differences of the Bursa-KLCI index, $P_{M,t}$, as $[R_M = \ln(P_{M,t}) - \ln(P_{M,t-1})]$.

³ Some studies have found evidence that EREIT betas are higher in declining markets than in rising markets (Goldstein and Nelling, 1999; Sagalyn, 1990; Glascock, 1991; Chatrath, Liang and McIntosh, 2000; Chiang, Lee and Wisen, 2004).

The data are obtained on daily frequency, and the sample period ranges from 3 August 2005 to 19 December 2014. The modernization of MREIT started in 2005, and most of the MREIT were listed after 2005; and therefore, the selection of the sample period is purely based on the data availability consideration. Many of the REITs were listed at later dates, and they would thus have shorter sample periods. Details on the sample period of each of the REIT are summarized together with the descriptive statistics in Table 1.

4.2. Descriptive Statistics

The descriptive statistics on the excess REIT returns and excess stock market return on daily basis are summarized in Table 1. We present the statistics for the full sample period, and also three different sub-periods coinciding with the events associated with IREIT development in Malaysia as described in the previous section.

[Insert Table 1 here]

The results show that Al-Aqar Healthcare REIT with a shorter listing history has also lower average daily excess return of 0.030 compared to the second Islamic REIT - Axis REIT that has an average daily excess return of 0.060. Axis REIT has the second highest excess return in the full sample period, which is slightly lower than the highest excess return of 0.068 estimated for the Pavilion REIT. The average return of Al-Aqar Healthcare REIT was higher than many other conventional REITs; and the excess return of Al-Aqar Healthcare REIT was very close to the excess return of other three commercial REITs that are CapitaMall Malaysia Trust (0.031), Hektar REIT (0.037), and Quill Capita Trust (0.030). In term of return volatility, Axis REIT has a standard deviation of 1.319, which is slightly higher than 1.291 for Al-Aqar REITs. The most volatile REITs among the sample was Quill Capita Trust (1.828), followed by Hektar REIT (1.691) and Amanah Harta Tanah PNB (1.521).

Next, we analyze the risk-return behaviors across different key periods: (1) the listing of Al-Aqar Healthcare REIT as the first Islamic REIT (IREIT) in Malaysia (10 August 2006); (2) the conversion of Axis REIT into an Islamic REIT (11 December 2008); (3) the privatization of the third Islamic REIT, Al-Hadharah Boustead REIT (16 July 2013) (hereinafter we would refer to the three periods as τ_1 , τ_2 and τ_3). For the two IREITs, we found that the excess returns increase from periods τ_1 to τ_2 , and then decline in the third sub-period τ_3 . The same patterns were also observed for all MREITs, where the 2013 is a period of significant declines in excess returns for MREITs. The stronger performance of MREITs was found in period τ_2 ; and Axis REIT recorded the highest excess return of 0.093 after switching to an IREIT status in 2008. Al-Aqar Healthcare REIT also saw a strong performance during the period when Axis REIT became the second IREIT on the Malaysia Bursa (Stock Exchange).

During the declining phase in 2013 (τ_3), while most MREIT recorded negative excess returns, the two IREITs were able to hold up against the downward pressure, especially Al-Aqar Healthcare REIT that recorded an average excess return of 0.015 during the period τ_3 . It is difficult to determine if there is no clear distinction of the risk-return behaviors of IREITs relative to other conventional MREITs. However, one observation is that the returns and volatility of IREITs were relatively more stable compared to other MREITs. We will run more tests to further separate abnormal returns and systematic risks of the sample REITs in the next section.

5. Empirical Results

5.1. Static Betas and Discrete Time-Dependence Betas

We first examine the static CAPM models generally made up of an alpha (abnormal return) and a beta (systematic risk) terms; and the results are summarized in the left-hand panel of Table 2. We found that Axis REIT is the only REIT with the significant alpha term of 0.001. All other REITs did not outperform the market over the sample period from the listing date to the ending date on 19 December 2014. We also found that betas are all significant and positive at less than a 1% level for all sample MREITs. However, the goodness-of-fit of the models was weak with adjusted R2 ranging from 0.006 to 0.106.

[Insert Table 2 here]

There are two interesting features we could observe from the betas of the IREITs relative to other MREITs. First, we observe that Al-Aqar Healthcare REIT has the lowest beta of 0.141 in the full sample period. Second, the betas of the two IREITs were different over the sample period. Axis REIT beta was estimated at 0.370 and its risk attribute falls within the range of systematic risks of between 0.145 (Amanahraya REIT) and 0.511 (Tower REIT) for other

MREITs. It seems like Axis REIT still retained some systematic risk attributes of other MREIT though it has been converted into an IREIT in 2008. The high beta could be caused by systematic risks of Axis REIT in the pre-conversion periods.

We use the stepped beta models by interacting the excess market return with three time dummies variables, τ_1 , τ_2 and τ_3 ; and the results are summarized in the right-hand panel of Table 2. The changing beta behavior could be clearly observed in Axis REIT, where the beta declined by -0.565 and -0.585 in the periods τ_2 (after 2008) and τ_3 (after 2013), respectively, after the REIT has converted into an IREIT status in 2008. The estimated beta for Al-Aqar Healthcare REIT is still the lowest in the time-dependence CAPM model. In period τ_3 , the returns of Axis REIT and Sunway REIT (marginally at 10% level) were negatively correlated with the excess market returns; however, the betas of Al-Aqar Healthcare REIT and other MREIT are all insignificant.

5.2. Stochastic Return and Risk Behavior of MREITs

Changing betas as shown in the time-dependence CAPM models seem to suggest the time-varying attributes of the MREIT betas. The static beta and also the discrete-stepped beta estimates will not reflect the dynamic behavior of REIT betas over time. We propose to use the Engle and Watson's (1987) time-varying coefficient (TVC) framework to estimate betas for the IREITs and other MREITs for the sample periods. The model structure and its specifications are presented in the Section 3.2. The TVC model is estimated using the unobserved component model with Kalman filter estimator proposed by Harvey (1989). We estimate stochastic alpha (level term) and stochastic (time-varying) betas for individual MREIT samples over different sample periods.⁴ We uncover the predicted stochastic level (alpha) and the stochastic beta terms for each of the sample REITs, and the properties (means and standard deviations) of the two dynamic variables are summarized in Tables 3 and 4, respectively.

Figure 1 plots the stochastic level term for all MREITs and the picture is clearly different from that estimated using a static CAPM model. The alpha is highly dynamic, and the figure shows highly volatile alphas (abnormal returns) for MREIT during the crisis period between 2007 and 2009. The stock picking strategy could be risky during the periods given the wide spread of the alpha of approximately between -0.20 and 0.20. The MREIT alphas were compressed slightly and the spreads were smaller fluctuating within a narrower range (between -0.05 and 0.05) in the post crisis periods after April 2009.

[Insert Figure 1 here]

We compute means and standard deviations of the stochastic alphas for individual MREITs for the three sub-periods (τ_1 , τ_2 and τ_3) in Table 3. The motivations for choosing the three different sub-periods are discussed as follows: First, the sub-period τ_1 represents the emergence of the first IREIT (Al-Aqar Healthcare REIT) in Malaysia, and most part of the periods was coincided with the crisis in 2007-2008. The statistics for this sub-period could potentially explain heterogeneity of the IREIT relative to other MREITs. As shown by the results, the mean abnormal returns of the Al-Aqar Healthcare REIT were negative at -0.005; but the performance were not as bad as Axis REIT that has a mean abnormal return of -0.055 before its conversion into an IREIT. During the same period, three MREITs that are Amanahraya REIT (0.009), Quill Capita Trust (0.213) and Tower REIT (0.078) outperformed the market average; and other MREITs show negative abnormal returns. Second, Axis REIT has obtained the IREIT status at the start of the second sub-period τ_2 (11 December 2008); and the impact of the addition of a new IREIT (Axis REIT) could be tested during this sub-period. The statistics in this sub-period show significant increases in the mean abnormal returns for all MREIT, which reflect the ending of the crisis in 2009 followed by the recovery of the stock markets. The converted Axis REITs recorded the second strongest mean abnormal return of 0.109 during this period, which was only marginally lower than 0.110 estimated for Atrium REIT and Pavilion REIT. Al-Aqar Healthcare REIT's abnormal return was also positive at 0.049 in this recovery phase.

[Insert Table 3 here]

⁴ As the objective of the use of the TVC model is to uncover the dynamic behavior of alpha and beta for the sample MREITs. The estimation parameters of the TVC models are not presented in the paper due to technicality nature of the models.

Third, the period τ_3 marks the departure of the third IREIT (Al-Hadharah Boustead REIT) from Malaysia Bursa Stock Exchange (on 16 July 2013), and variations in the mean abnormal returns of IREITs and other MREITs during this sub-period could be correlated with the delisting event. We observed that the alphas of all MREITs, except for Amanah Harta Tanah PNB, have significantly declined, and some MREITs underperformed the average market return during this sub-period. However, the mean abnormal returns of the two IREITs in the sub-period τ_3 were lower relative to the mean abnormal return in the sub-period τ_2 . However, the mean abnormal returns of Al-Aqar Healthcare REIT and Axis REITs were still positive and estimated at 0.017 and 0.039, respectively, in the sub-period that saw the delisting of Al-Hadharah Boustead REIT.

We estimate time-varying betas for all MREITs from the TVC model and plot the time trends of the dynamic betas in Figure 2. As in Figure 1, we observe more fluctuations in the time-varying betas during the US financial crisis period between 2007 and 2009, and few sharp spikes were represented by the time-varying betas of Quill Capita Trust during this period.

[Insert Figure 2 here]

We next examine the characteristics of the time-varying betas in the three sub-periods (τ_1 , τ_2 and τ_3) as in Table 4. Al-Aqar Healthcare REIT that made the debut on 10 August 2006 has a flat time-varying beta of 0.098 across the three different sub-periods. The result coupled with the abnormal return shown in Table 3 imply that Al-Aqar Healthcare REIT returns were mainly driven by the alpha, and the systematic component were time-invariant. In other words, the correlations of IREIT returns with the stock market returns were constant across the sample periods. We also found that the beta of the IREIT was the lowest among the MREIT during the sub-period τ_1 . The mean beta of Axis REIT before the conversion into an IREIT was estimated at 0.301, which was relatively higher than that of the IREIT (Al-Aqar Healthcare REIT). The beta of Axis REIT was more like the betas of other MREITs, except Amanah Harta Tanah PNB that has a negative beta of -0.214. During the sub-period τ_1 , the mean betas of other MREIT range between 0.126 (Amanahraya REIT) and 0.370 (YTL Hospitality REIT).

[Insert Table 4 here]

In the sub-period τ_2 , Axis REIT that was traded with its new IREIT status has a lower mean beta of 0.171 compared to the beta of 0.301 estimated in the earlier sub-period. From having the second highest beta in the sub-period τ_1 , Axis REIT's mean beta in the sub-period τ_2 has dropped significantly and was lower than other MREIT betas, except for Amanahraya REIT (0.126) and Atrium REIT (0.128). The first IREIT (Al-Aqar Healthcare REIT) was still the lowest at -0.098 during this sub-period. In the sub-period τ_3 marked by the delisting of one of the IREITs, the mean betas of the two remaining IREITs (Al-Aqar Healthcare REIT (0.098) and Axis REIT (0.170) were relatively stable. The results indicate that IREITs have relative lower and more stable time-varying betas compared to the betas for other MREITs. The low betas could imply that IREITs possess more defensive attributes in periods of volatility, and they are less responsive to general stock market shocks.

We plot the trends of the TVC-estimated alphas and betas for the two IREITs: Axis REIT and Al-Aqar Healthcare REIT, in Figures 3 and 4, respectively. The figures show significant different dynamics in the excess return generating processes of the two IREITs. The time-dependence effects of Axis REIT excess returns are driven mainly by the stochastic beta term; whereas the for Al-Aqar Healthcare REIT, the stochastic alpha term is the key factor that generates the time-dependence variations in the excess returns.

[Insert Figures 3 and 4 here]

We also compare the stochastic alphas and betas of the two IREITs by separately plot the stochastic components in Figures 5 and 6. Figure 5 shows no discernible differences in the alpha trends for the two IREITs, whereas the time varying beta trend of Al-Aqar Healthcare REIT in Figure 6 is relatively flat compared with the time-varying beta trend of Axis REIT.

[Insert Figures 5 and 6 here]

To sum up the dynamic behavior of IREITs relative to other conventional MREITs, we computed alphas and betas of the time-varying model for the equal-weighted IREIT portfolio and equal-weighted MREIT portfolio, and plot the

alpha and beta trends for the two portfolios in Figures 7 and 8, respectively. We observe in Figure 7 that IREITs have larger variations in the stochastic abnormal returns, which mean that there is stronger arbitrage opportunity in IREIT market relative to the conventional MREIT market. The results were consistent with those found by Newell and Osmadi (2009). However, the systematic risks of IREITs were also relative lower than those estimated for conventional MREITs. The lower correlation of IREIT returns with the stock market returns will imply that investors could increase diversification benefits by including IREITs in their portfolios.⁵

[Insert Figures 7 and 8 here]

6. Conclusion

Unlike conventional REITs, IREITs are bound in their investment activities by the guidelines stipulated by Shariah Committees set up by management boards. The smaller market share of IREITs at this stage may also impose illiquidity risks on IREITs. However, the importance of IREITs is not understated, especially in Malaysia, where IREITs are deemed as an important vehicle in the government's efforts of promoting the Islamic capital market. How would the IREIT behave in terms of risk-return trade-off relative to other conventional REITs? This study empirically evaluates the dynamic behaviors of IREITs and compares them with conventional REITs using daily data for the period spanning from 3 August 2005 to 19 December 2014.

The results show heterogeneity in the abnormal returns (alphas) and systematic risks (betas) of IREITs, when the first IREIT, Al-Aqar Healthcare REIT was listed on 10 August 2006. Like other Malaysia REITs, the IREIT showed a negative abnormal return during the sub-period that coincided with the financial crisis in 2007 and 2008. However, the beta of the IREIT was the lowest during this sub-period. In the second sub-period that saw the conversion of the Axis REIT into an IREIT, we found that IREITs outperformed other MREITs in term of the mean abnormal returns and the mean betas. In the sub-period after the delisting of the IREIT, Al-Hadharah Boustead REIT, the mean abnormal returns and the mean betas of Al-Aqar Healthcare REIT and Axis REIT were relatively stable and unchanged, though other MREITs showed deteriorations in the performance during the sub-period. Our results do show significant differences in dynamic risk-return behaviors of IREITs relative to conventional REITs. However, our findings could not conclusively explain the spillover effects relating to the events of a new IREIT addition (Axis REIT) and a deletion of an "old" IREIT (Al-Hadharah Boustead REIT). More empirical tests using micro-firm level data will need to be conducted in future studies.

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⁵ Yusof and Majid (2007) and Kok, Giorgioni and Laws (2009) showed that Shariah-Compliant investment vehicles usually have lower variance relative to other conventional investment vehicles, when they tested the hypotheses using empirical data on Rashid Hussain Berhad Islamic Index and Shariah-Compliance Funds, respectively.

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Table 1: Descriptive Statistics

REIT Name	Symbol	Individual sample period (with different starting periods)			Sub-period with common ending on 12/19/2014					
		Sample period:	Obs.	Statistics	Starting period: 8/10/2006		Starting period: 12/11/2008		Starting period: 7/16/2013	
					Obs.	Statistics	Obs.	Statistics	Obs.	Statistics
A) Islamic REITs										
Al-Aqar Healthcare REIT	ERALAQAR	8/10/2006	2182	0.030	2182	0.030	1572	0.045	374	0.015
		12/19/2014		(1.291)		(1.291)		(1.291)		(1.230)
Axis REIT	ERAXIS	8/3/2005	2448	0.060	2182	0.051	1572	0.093	374	0.003
		12/19/2014		(1.319)		(1.214)		(1.046)		(1.172)
B) Conventional REITs										
Amanah Harta Tanah PNB	ERAHARTA	8/3/2005	2448	0.027	2182	0.033	1572	0.039	374	-0.004
		12/19/2014		(1.521)		(1.566)		(1.310)		(1.157)
AMFirst REIT	ERAMFIRST	12/21/2006	2087	0.017			1572	0.033	374	-0.034
		12/19/2014		(0.915)				(0.745)		(0.688)
Amanahraya REIT	ERARAYA	2/26/2007	2040	0.012			1572	0.017	374	-0.050
		12/19/2014		(1.383)				(1.136)		(0.656)
Atrium REIT	ERATRIUM	4/3/2007	2014	0.024			1572	0.061	374	-0.024
		12/19/2014		(1.262)				(0.944)		(0.726)
CapitaMalls Malaysia Trust	ERCMM	7/16/2010	1156	0.031					374	-0.030
		12/19/2014		(1.399)						(1.328)
Hektar REIT	ERHEKTAR	12/4/2006	2100	0.037			1572	0.062	374	0.003
		12/19/2014		(1.691)				(0.898)		(0.819)
IGB REIT	ERIGB	9/21/2012	586	0.007					374	-0.001
		12/19/2014		(0.011)						(0.010)
Pavilion REIT	ERPAVILION	12/7/2011	793	0.068					374	0.014
		12/19/2014		(1.434)						(1.276)
Quill Capita Trust	ERQUILL	1/8/2007	2075	0.030			1572	0.040	374	0.003
		12/19/2014		(1.828)				(1.423)		(0.837)
Sunway REIT	ERSUNWAY	7/8/2010	1162	0.048					374	0.008
		12/19/2014		(1.185)						(1.164)
Tower REIT	ERTOWER	4/12/2006	2268	0.021	2182	0.030	1572	0.042	374	-0.074
		12/19/2014		(1.216)		(1.227)		(0.858)		(0.811)
UOA REIT	ERUOA	12/30/2005	2341	0.024	2182	0.028	1572	0.042	374	-0.014
		12/19/2014		(1.294)		(1.323)		(1.091)		(0.705)
YTL Hospitality REIT	ERYTL	12/19/2005	2350	0.015	2182	0.023	1572	0.038	374	0.007
		12/19/2014		(0.952)		(0.946)		(0.836)		(0.815)
Excess Market Return	($R_M - R_F$)		2448	0.013	2182	0.016	1572	0.034	374	-0.023
				(0.753)		(0.783)		(0.599)		(0.491)

Note: The table summarizes the descriptive statistics of the monthly excess returns of the sample REITs including two Islamic REITs (Axis REIT and Al-Aqar Healthcare REIT). The means are standard deviations (in parentheses) statistics are computed and given in the table. The statistics are computed for the full sample period, which varies depending on the date of listing of the REITs. Different sub-periods are also computed, which are identified by different start dates as indicated in the table, and the ending date is the final cut-off date as on 19 December 2014. R_M is the market return represented by the Bursa Malaysia-Kuala Lumpur Composite Index (KLCI) and R_F is the Government Treasury-Bill rate (Band 4).

Table 2: Constant and Time-dependence Systematic Risks

Dependent variable	Sample period:	Single factor CAPM			CAPM with interactive time dummy variables					
		C	$R_M - R_F$	Adj. R^2	C	$R_M - R_F$	$\tau_1 \times (R_M - R_F)$	$\tau_2 \times (R_M - R_F)$	$\tau_3 \times (R_M - R_F)$	Adj. R^2
A) Islamic REITs										
Al-Aqar	8/10/2006	0.000	0.141	0.007	0.000	0.130			0.154	0.007
Healthcare REIT (ERALAQAR)	12/19/2014	(1.008)	(3.996)		(1.036)	(3.573)			(1.098)	
			***			***				
Axis REIT (ERAXIS)	8/3/2005 12/19/2014	0.001 (2.099)	0.370 (10.695)	0.044	0.001 (2.192)	0.857 (4.712)	-0.459 (-2.443)	-0.565 (-2.954)	-0.585 (-2.577)	0.047
		**	***		**	***	**	***	***	
B) Conventional REITs										
Amanah Harta	8/3/2005	0.000	0.223	0.012	0.000	0.388	-0.228	-0.101	-0.058	0.012
Tanah PNB (ERAHARTA)	12/19/2014	(0.779)	(5.491)		(0.729)	(1.817)	(-1.033)	(-0.450)	(-0.218)	
			***			*				
AMFirst REIT (ERAMFIRST)	12/21/2006 12/19/2014	0.000 (0.696)	0.276 (11.224)	0.057	0.000 (0.835)	0.295 (9.043)		-0.080 (-1.532)	0.143 (1.440)	0.058
			***			***				
Amanahraya REIT (ERARAYA)	2/26/2007 12/19/2014	0.000 (0.387)	0.145 (3.753)	0.006	0.000 (0.402)	0.131 (2.539)		0.006 (0.075)	0.160 (1.041)	0.006
			***			**				
Atrium REIT (ERATRIUM)	4/3/2007 12/19/2014	0.000 (0.808)	0.275 (7.668)	0.028	0.000 (0.795)	0.242 (4.895)		0.044 (0.583)	0.214 (1.529)	0.028
			***			***				
CapitaMalls Malaysia Trust (ERCMM)	7/16/2010 12/19/2014	0.000 (0.656)	0.416 (5.563)	0.025	0.000 (0.682)	0.387 (4.437)			0.110 (0.648)	0.025
			***			***		***		
Hektar REIT (ERHEKTAR)	12/4/2006 12/19/2014	0.000 (0.925)	0.239 (5.162)	0.012	0.000 (0.794)	0.151 (2.468)		0.215 (2.182)	0.149 (0.793)	0.013
			***			**		**		
IGB REIT (ERIGB)	9/21/2012 12/19/2014	0.000 (0.172)	0.363 (4.163)	0.027	0.000 (0.253)	0.197 (1.417)			0.276 (1.548)	0.029

Pavilion REIT (ERPAVILION)	12/7/2011 12/19/2014	0.001 (1.278)	0.450 (4.419)	0.023	0.001 (1.224)	0.537 (3.864)			-0.189 (-0.924)	0.023
			***			***				
Quill Capita Trust (ERQUILL)	1/8/2007 12/19/2014	0.000 (0.661)	0.394 (7.881)	0.029	0.000 (0.741)	0.451 (6.778)		-0.154 (-1.453)	-0.009 (-0.045)	0.029
			***			***				
Sunway REIT (ERSUNWAY)	7/8/2010 12/19/2014	0.000 (1.252)	0.474 (7.573)	0.046	0.000 (1.170)	0.544 (7.475)			-0.268 (-1.888)	0.048
			***			***			*	
Tower REIT (ERTOWER)	4/12/2006 12/19/2014	0.000 (0.559)	0.511 (16.400)	0.106	0.000 (0.890)	0.658 (16.251)		-0.392 (-5.921)	-0.146 (-1.153)	0.119
			***			***		***		
UOA REIT (ERUOA)	12/30/2005 12/19/2014	0.000 (0.702)	0.317 (9.229)	0.035	0.000 (0.877)	0.415 (9.290)		-0.256 (-3.483)	-0.147 (-1.043)	0.039
			***			***		***		
YTL Hospitality REIT (ERYTL)	12/19/2005 12/19/2014	0.000 (0.500)	0.356 (14.451)	0.081	0.000 (0.647)	0.391 (12.193)		-0.117 (-2.218)	0.079 (0.776)	0.083
			***			***		**		

Note: The table summarizes the results of the two regression models on excess returns of REITs. The left-hand panel shows the results of the single factor CAPM, where the excess return of each REIT, $(R_i - R_F)$ is regressed against excess stock market return, $(R_M - R_F)$, where R_i is the total return of REIT; R_M is return of Bursa Malaysia – Kuala Lumpur Composite Index (KLCI); R_F is the risk-free rate of return as represented by Government T-Bill rate (daily). For the second right-hand panel model, we add three time dummy variables: τ_1 denotes period from 10 August 2006 to 10 December 2008; τ_2 denotes the period from 11

*December 2008 to 15 July 2013; and τ_3 denotes the period from 16 July 2013 to 19 December 2014. Regression coefficients are given in first row, and t-statistics are given in the parentheses. * denotes significance at 10% level; ** denotes significance at 5% level, and *** denotes significance at 1% level.*

Table 3: Stochastic Level Terms of REIT excess Returns

REIT Name	Symbol	Sample period			
		Starting period:	8/10/2006	12/11/2008	7/16/2013
		Ending period:	12/10/2008	7/15/2013	12/19/2014
A) Islamic REITs					
Al-Aqar Healthcare REIT	LEVELALAQAR	-0.005 (1.285)	0.049 (1.306)	0.017 (1.226)	
Axis REIT	LEVELAXIS	-0.055 (1.177)	0.109 (0.876)	0.039 (1.065)	
B) Conventional REITs					
Amanah Harta Tanah PNB	LEVELAHARTA	-0.102 (1.559)	0.032 (1.138)	0.050 (1.022)	
AMFirst REIT	LEVELAMFIRST	-0.019 (1.195)	0.057 (0.719)	-0.021 (0.641)	
Amanahraya REIT	LEVELARAYA	0.009 (1.993)	0.031 (1.246)	-0.047 (0.645)	
Atrium REIT	LEVELATRIUM	0.036 (1.656)	0.110 (0.867)	0.000 (0.592)	
CapitaMalls Malaysia Trust	LEVELCMM		0.055 (1.406)	-0.018 (1.300)	
Hektar REIT	LEVELHEKTAR	-0.008 (2.917)	0.067 (0.873)	0.012 (0.791)	
IGB REIT	LEVELIGB		0.042 (1.313)	0.026 (0.875)	
Pavilion REIT	LEVELPAVILION		0.110 (1.509)	0.026 (1.239)	
Quill Capita Trust	LEVELQUILL	0.213 (1.635)	0.025 (1.054)	-0.002 (0.667)	
Sunway REIT	LEVELSUNWAY		0.054 (1.151)	0.016 (1.155)	
Tower REIT	LEVELTOWER	0.078 (1.322)	0.085 (0.754)	-0.022 (0.649)	
UOA REIT	LEVELUOA	-0.024 (1.574)	0.087 (1.073)	0.007 (0.669)	
YTL Hospitality REIT	LEVELYTL	-0.021 (1.006)	0.045 (0.806)	0.032 (0.752)	

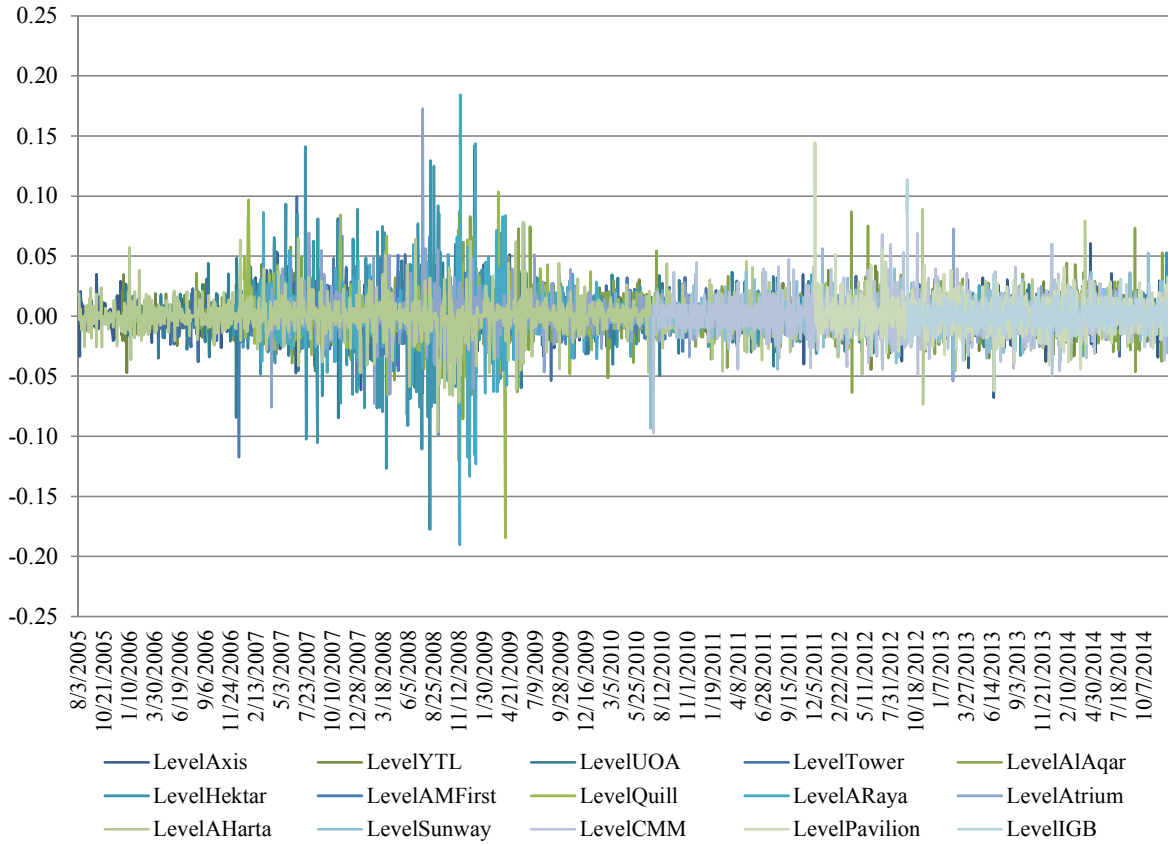
Note: the table summarizes the means for the stochastic level terms estimated from the time-varying CAPM model with stochastic level and stochastic beta terms. The mean and standard deviation (in parentheses) statistics are computed for three sub-periods: (i) from 10 August 2006 to 10 December 2008; (ii) from 11 December 2008 to 15 July 2013; and (iii) from 16 July 2013 to 19 December 2014. Some cells in the table are left blank, especially in sub-period (i), because those REITs were only listed outside the sub-periods, and data are not available during the sub-period.

Table 4: Time-varying Betas of REITs

REIT Name	Symbol	Sample period			
		Starting period:	8/10/2006	12/11/2008	7/16/2013
		Ending period:	12/10/2008	7/15/2013	12/19/2014
A) Islamic REITs					
Al-Aqar Healthcare REIT	TVCALAQAR	0.098 (0.000)	0.098 (0.000)	0.098 (0.000)	
Axis REIT	TVCAXIS	0.301 (0.874)	0.171 (0.739)	0.170 (0.920)	
B) Conventional REITs					
Amanah Harta Tanah PNB	TVCAHARTA	-0.214 (1.401)	0.220 (1.280)	0.154 (1.239)	
AMFirst REIT	TVCAMFIRST	0.313 (0.491)	0.252 (0.290)	0.490 (0.282)	
Amanahraya REIT	TVCARAYA	0.126 (0.000)	0.126 (0.000)	0.126 (0.000)	
Atrium REIT	TVCATRIUM	0.263 (1.051)	0.128 (0.814)	0.221 (0.691)	
CapitaMalls Malaysia Trust	TVCCMM		0.336 (0.191)	0.526 (0.051)	
Hektar REIT	TVCHEKTAR	0.261 (0.523)	0.304 (0.160)	0.166 (0.179)	
IGB REIT	TVCIGB		0.398 (1.133)	0.265 (0.858)	
Pavilion REIT	TVCPAVILION		0.516 (0.439)	0.005 (0.510)	
Quill Capita Trust	TVCQUILL	0.158 (2.364)	0.254 (1.664)	0.364 (1.433)	
Sunway REIT	TVCSUNWAY		0.525 (0.061)	0.357 (0.030)	
Tower REIT	TVCTOWER	0.269 (0.997)	0.179 (0.725)	0.092 (0.809)	
UOA REIT	TVCUOA	0.300 (0.534)	0.053 (0.536)	0.151 (0.360)	
YTL Hospitality REIT	TVCYTL	0.370 (0.347)	0.257 (0.212)	0.458 (0.343)	

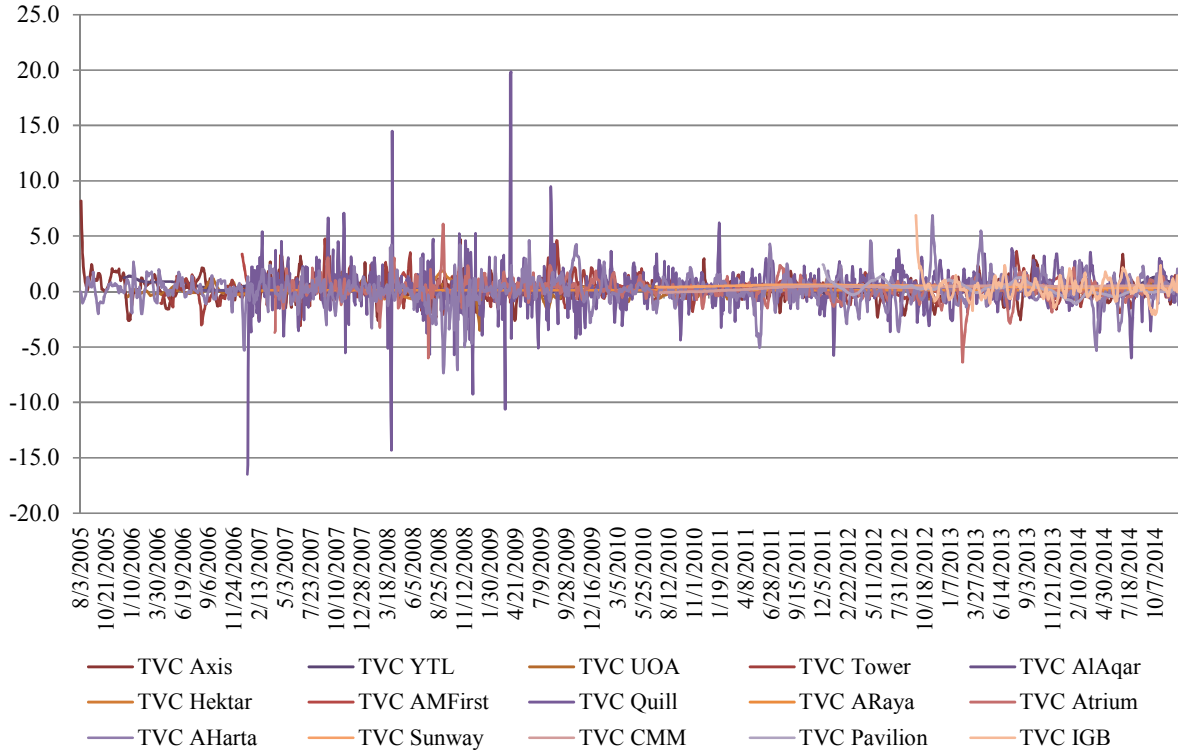
Note: the table summarizes the means for the stochastic beta terms estimated from the time-varying CAPM model with stochastic level and stochastic beta terms. The mean and standard deviation (in parentheses) statistics are computed for three sub-periods: (i) from 10 August 2006 to 10 December 2008; (ii) from 11 December 2008 to 15 July 2013; and (iii) from 16 July 2013 to 19 December 2014. Some cells in the table are left blank, especially in sub-period (i), because those REITs were only listed outside the sub-periods, and data are not available during the sub-period.

Figure 1: Stochastic Level Terms of REIT Excess Returns



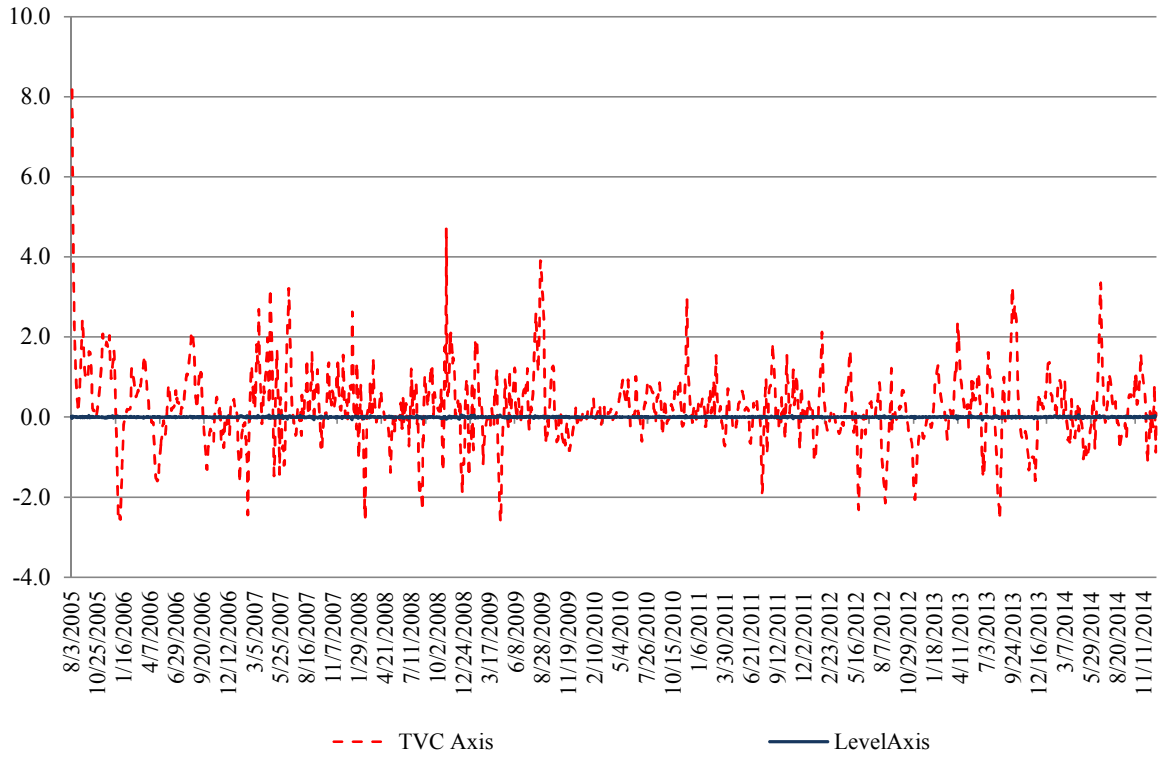
Note: The figure plots the trends of the stochastic level of excess returns estimated from the time-varying CAPM models for the sample REITs including the two Islamic REITs.

Figure 2: Time-varying Beta of REITs



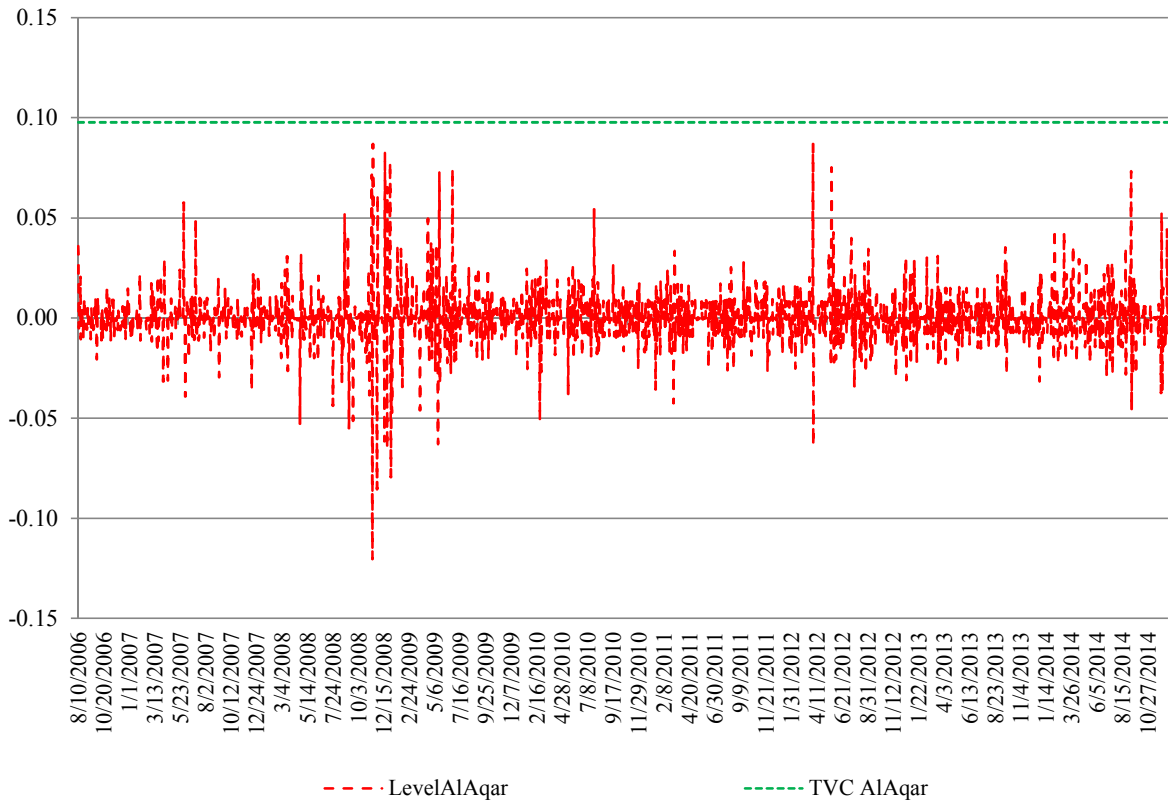
Note: The figure plots the trends of the stochastic betas estimated from the time-varying CAPM models for the sample REITs including the two Islamic REITs.

Figure 3: Dynamic Return Behavior of Axis REIT



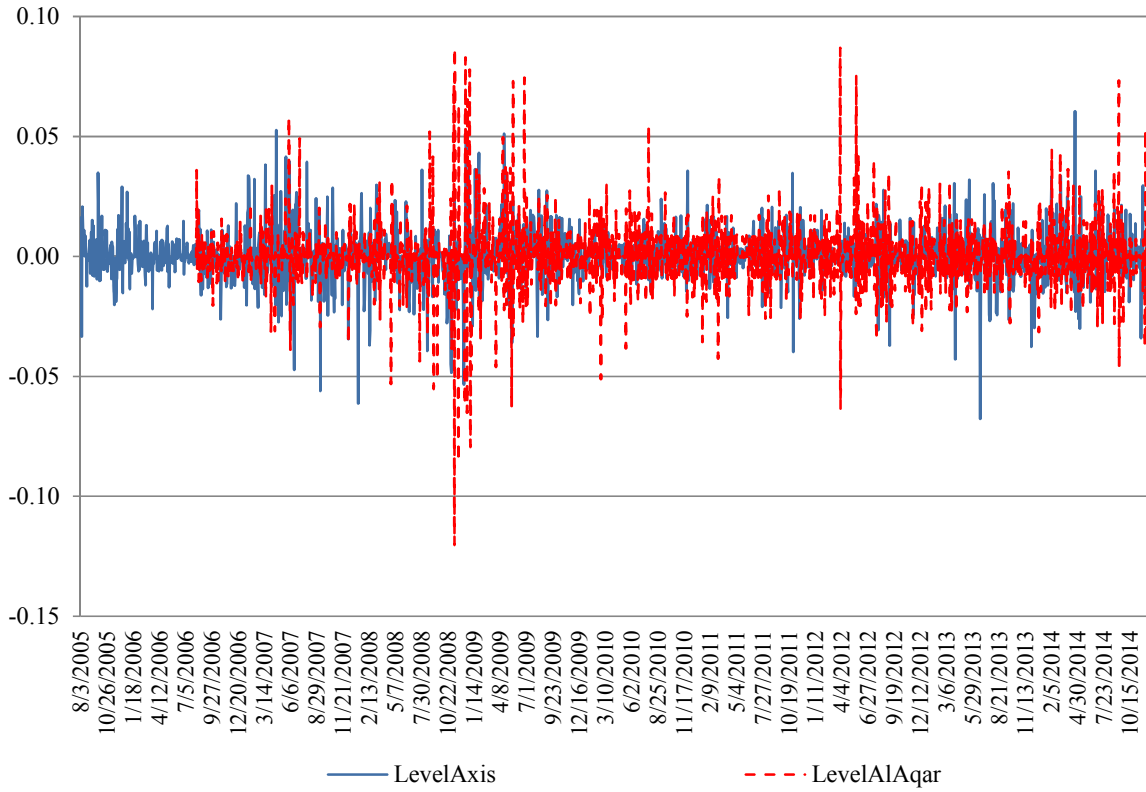
Note: The figure plots the trends of the stochastic level and beta estimated from the time-varying CAPM models for the Axis Islamic REIT.

Figure 4: Dynamic Return Behavior of Al-Aqar Healthcare REIT



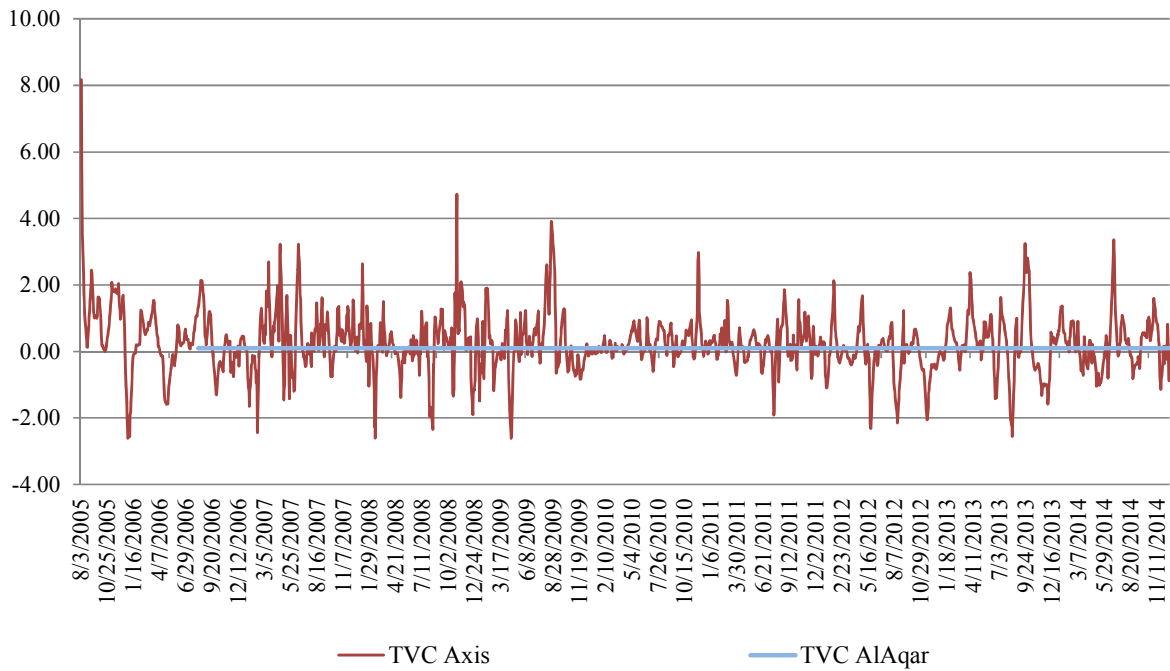
Note: The figure plots the trends of the stochastic level and beta estimated from the time-varying CAPM models for the Al-Aqar Healthcare REIT, an Islamic REIT listed on Bursa Malaysia Stock Exchange.

Figure 5: Stochastic Level Term of Axis REIT and Al-Aqar Healthcare REIT



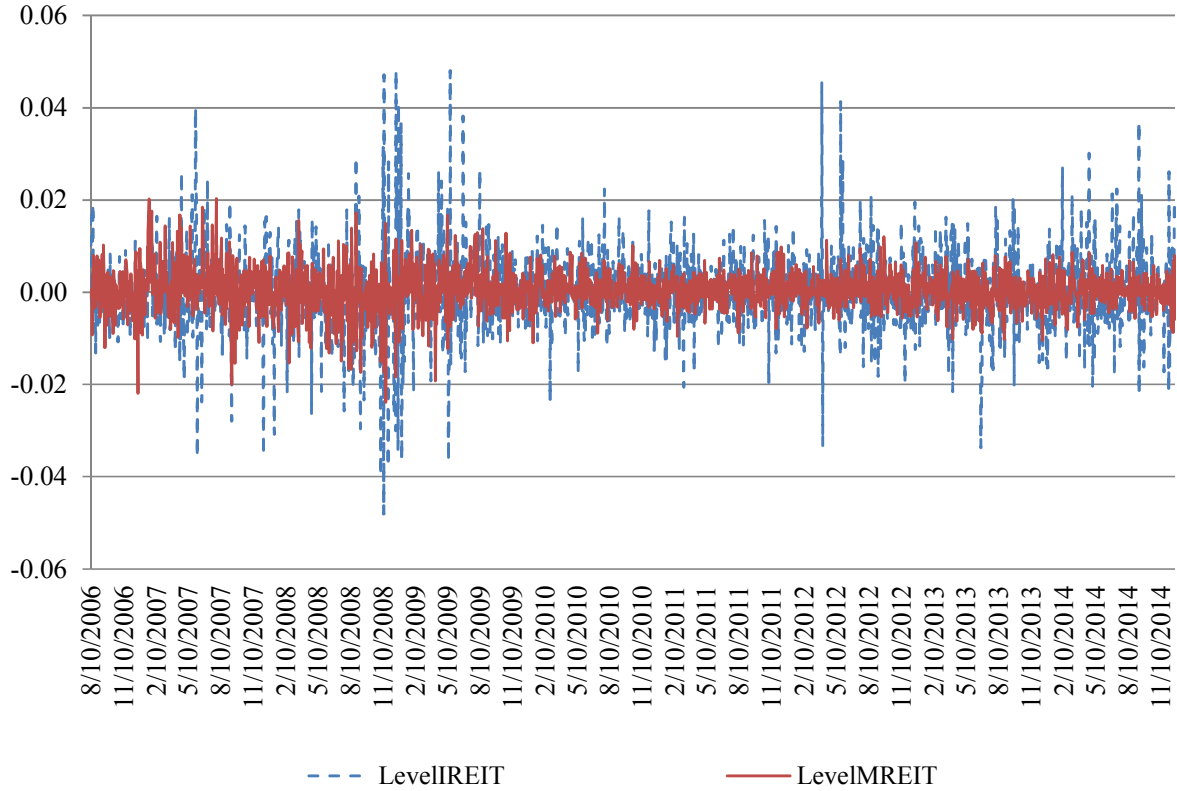
Note: The figure plots the trends of the stochastic level of excess returns estimated from the time-varying CAPM models for the two sample Islamic REITs in Malaysia that are Axis REIT and Al-Aqar Healthcare REIT.

Figure 6: Stochastic Level Terms of Axis REIT and Al-Aqar Healthcare REIT



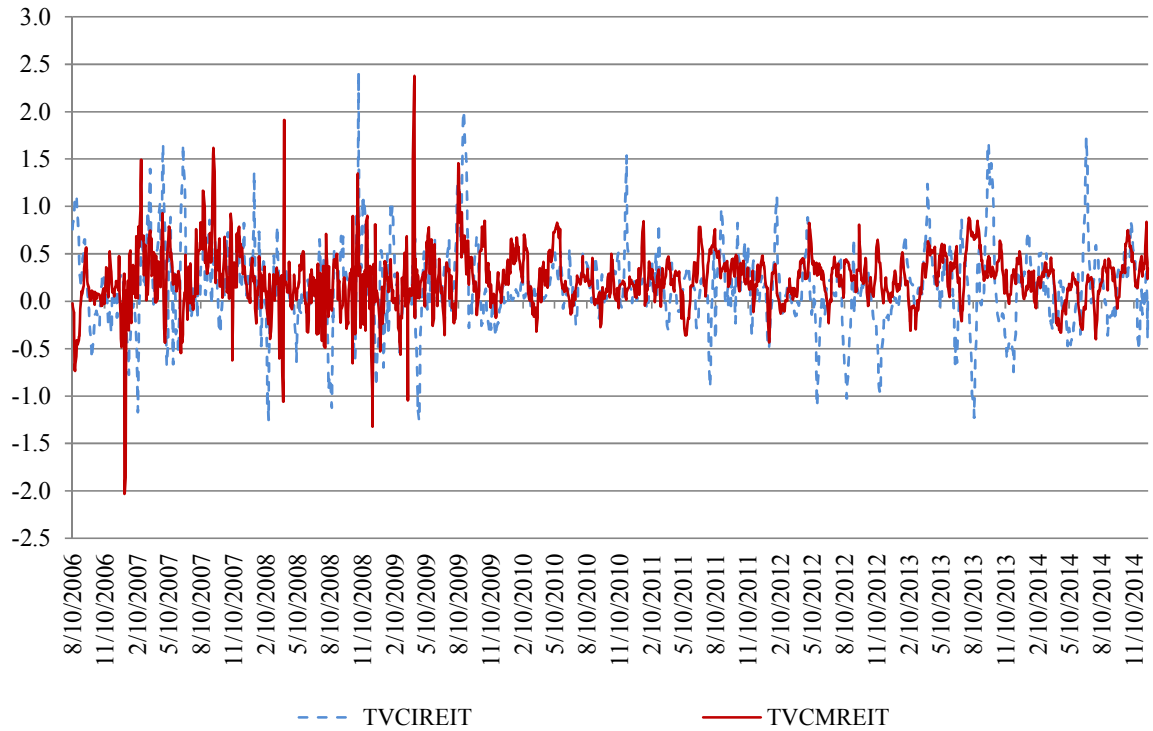
Note: The figure plots the trends of the stochastic betas estimated from the time-varying CAPM models for the two sample Islamic REITs in Malaysia that are Axis REIT and Al-Aqar Healthcare REIT.

Figure 7: Stochastic Level Terms of Equal-weighted IREITs and Equal-Weighted MREITs



Note: The figure plots the trends of the stochastic level terms for the equal-weighted IREIT (dashed line) and the equal-weighted MREIT (darken line) for the sample period from 10 August 2006 to 19 December 2014. The Equal-weighted IREIT portfolio consists of Al-Aqar Healthcare REIT and Axis REIT, and the equal-weighted MREIT portfolio include 13 sample MREITs.

Figure 8: Stochastic Betas of Equal-Weighted IREITs and Equal-Weighted MREITs



Note: The figure plots the trends of the stochastic betas for the equal-weighted IREIT (dashed line) and the equal-weighted MREIT (darken line) for the sample period from 10 August 2006 to 19 December 2014. The Equal-weighted IREIT portfolio consists of Al-Aqar Healthcare REIT and Axis REIT, and the equal-weighted MREIT portfolio include 13 sample MREITs.