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Malaysia REITs: First Decade Development and Returns Characteristics

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Real estate investment trusts (REITs) are a niche alternative investment class. Since their introduction in Asia at the turn of the millennium, the REIT market in the region has experienced phenomenal growth. In particular, the Malaysia REIT (M-REIT) market capitalisation has seen a spectacular growth of close to 20 folds from its inception in 2005 until the end of 2013. This paper chronicles the development of the M-REIT market which is rather unique as it provides a common platform for the existence of both conventional and Islamic REITs. Empirical tests are also conducted to uncover the returns characteristics of the M-REIT market. M-REIT returns are significantly correlated with domestic stock markets but only weakly correlated with changes in interest rate, with long-term proxies having a stronger impact than short-term proxies. The results from a correlation analysis are further confirmed by regression testing which shows that M-REIT returns are most significantly driven by domestic stock market returns while only mildly by changes in interest rates and not significantly driven by returns in regional REIT markets. These findings possibly imply that M-REITs (i) subscribe more to the characteristics of equity than those of bonds, (ii) are not 'pure' yield-play instruments, (iii) are often regarded as long-term investment, and (iv) may not be fully integrated with global and regional REIT markets.

Keywords

REIT, Malaysia, REIT Returns, Interest Rate, Equity, REIT

1.   Introduction

Real estate investment trusts (REITs) are a recent innovation in many financial markets, especially those in the Asia and European regions, even though they have over half a century of history in the United States (U.S.) (Stevenson, 2013). It is noteworthy to learn that mature and developed markets such as Japan and the United Kingdom (U.K.) introduced their maiden REITs only after the turn of the millennium in 2000 and 2007 respectively. In its simplest form, a REIT is a legal entity created under a specific regulation to *own and actively manage a portfolio of income producing commercial real estate* (Newell, 2012). Some of the benefits brought about by REITs include increasing liquidity in a traditionally illiquid real estate market (Newell, 2012), enriching diversification in a mixed-asset portfolio (Wechsler, 2013) and enhancing information transparency in an often elusive real estate market (Lecomte and Ooi, 2013).

The year 2015 is a significant milestone for the Malaysian REIT (M-REIT) market as it marks the first decade of its existence. Since the debut of the Axis REIT, the first M-REIT, in August 2005, the market has grown by leaps and bounds in terms of both market capitalisation and the number of listed REITs. With an enriched set of data, which are both deeper (i.e. close to 10 years) and wider (i.e. 17 listed M-REITs at the end of 2013), it is now timely to take stock of the development of the M-REIT market as well as to empirically assess its returns characteristics in relation to the global REIT markets.

The total market capitalisation of the M-REIT market has experienced phenomenal growth from a mere RM1.8 billion at the end of 2005 to a considerable size of RM33.2 billion on 31 December 2013, which represents close to a 20 fold increase. In the same period, the nominal gross domestic product (GDP) of Malaysia grew slightly less than two folds from RM519.6 billion to RM952.6 billion. This shows that the growth in the M-REIT market outpaced the growth in the general economy by close to 10 times. The M-REIT market has been recognised as one of the leading Asian REIT markets, surpassing even Hong Kong in terms of the number of listed REITs (HK-FSDC, 2013). Securities Commission Malaysia (SC) in its 2013 Annual Report has noted that the M-REIT market has matured over the years, particularly in the period post-global financial crisis 2008/09 (GFC) (SC, 2013).

Based on global experience, the M-REIT market at this stage holds great potential in helping to enlarge the local financial market as a whole. The share of M-REITs in relation to the total Malaysian stock market capitalisation stood at about 2.0% as of the end of 2013, which is below those of the advanced markets, such as the U.S at 3.7% and Singapore at 5.4%. In order to continue the growth momentum of the M-REIT market, it is imperative to produce more research works which are comparable to the extant REITs so as to create a higher quality, more informational and conducive market environment for REITs to continue to flourish in Malaysia.

This paper is devoted to charting the development of the M-REIT market from its inception in August 2005 until December 2013, during which Malaysia has successfully become one of the leading Asian REIT markets (HK-FSDC, 2013; Newell, 2012). Besides that, this paper also aims to uncover the dynamic inter-relationships between M-REITs and stocks, interest rates and global equity and REIT markets. In addition, we also attempt to identify the significant drivers of M-REIT returns.

In order to achieve the set-out objectives in a meaningful and focused manner, we endeavour to determine the answers for the following five research questions: 1) Are M-REIT returns[1] sensitive to changes in local interest rates? 2) Are M-REIT returns more susceptible to long-, medium- or short-term interest rate changes? 3) Are M-REIT returns driven by returns in the local stock market in general and property sector stocks in particular? 4) On the global front, are M-REIT returns correlated with changes in global stock and REIT markets? and 5) Which of these factors i.e. interest rate changes, stock market returns or REIT market returns, are more significant in explaining M-REIT returns?

In view of the unprecedented meltdown in the global financial markets in 2008/09, we have separated the whole sample period into three subsample periods, centring on the GFC to cater for any structural changes in market dynamics. At the same time, we harness on the uniqueness of the M-REIT market, which contains both conventional and Islamic REITs within a common platform, by comparing the returns characteristics between the two types of REITs. In the absence of an official M-REIT index, we have constructed one with a market-capitalisation-weighted method in order to test our hypotheses which are formed in conjunction with the research questions.

First, we find that M-REIT returns are weakly correlated (negatively) with changes in local interest rates, which in turn, fail to support the notion that REITs are a form of pure yield-play instrument (Ooi et al., 2006; SC, 2013). Secondly, we report evidence that M-REIT returns are more strongly correlated with long-term than short-term interest rate changes in the post-GFC period which lends support to the notion that REITs are a form of long-term investment as argued by Newell (2012).

Among the various types of interest rates, M-REIT returns are correlated strongest with changes in government bond (MGS) yields and interbank offered rates (KLIBOR). In contrast with Swanson et al. (2002), we do not find any significant correlations between M-REIT returns and changes in credit spread and interest rate term structure. Next, we report that M-REIT returns are

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[1] As a Malaysia-focused study, we measure nominal rate of returns in terms of the local currency unit. More details are provided in Section 4 when the data descriptions are presented.

significantly and positively correlated with the local stock market and property sector stock returns. We have also found that M-REIT returns are significantly, although weakly, correlated with changes in global equity and REIT indices.
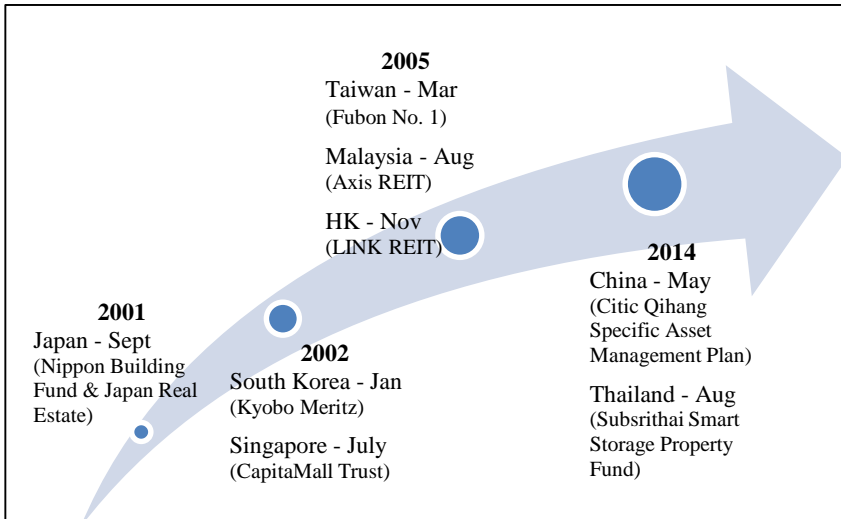
Finally, we find that M-REIT returns are most significantly driven by domestic stock market returns while only moderately significant by changes in local interest rates, and are not significantly driven by returns on regional REIT markets. The impact of regional REIT markets could have been subsumed by the domestic stock market factor as evident by the results under the robustness check. Overall, the regression results suggest that M-REITs *behave more like stocks and less like bonds*, which is consistent with Glascock et al. (2000).

The remainder of this paper is organised as follows: Section 2 is a review of the related literature while the development of the M-REIT market is chronicled in Section 3 which is then followed by elaboration on the research design and methodology in Section 4 before the empirical results are unveiled and discussed in Section 5, and finally, Section 6 concludes.

2.   Literature Review

REITs have been extensively researched, especially those that are listed on the more developed markets, such as those of the U.S., Europe and Australia. This is partly due to the strong encouragement and attractive inducement from well-established trade associations related to REITs, such as the U.S. National Association of Real Estate Investment Trusts (NAREIT), International Real Estate Society (IRES), American Real Estate and Urban Economics Association (AREUEA), European Public Real Estate Association (EPRA) and Asia Pacific Real Estate Association (APREA). Goddard and Marcum (2012), who have recorded the global development of REITs, trace the origin of REITs to as far as the early 19th century in the U.S. in the form of the Massachusetts Trust, but also acknowledged that the first modern REIT was not created until 1961.

Nevertheless, the U.S. REIT market only experienced robust growth in the early 1990s upon the passage of the Tax Reform Act 1986 (Stevenson, 2013; Goddard and Marcum, 2012). In seeing the benefits of REITs to the property market and the general health of the economy, many countries started to develop a REIT market in their respective jurisdictions. The Australian REIT market, which started in 1971 with the listing of the General Property Trust, is the next largest and most successful REIT market globally after the U.S. (EPRA Survey, 2013). Asian countries formally instituted REIT markets beginning in the new millennium with the first REIT listed in Japan in the year 2001 (Ooi et al., 2006). Figure 1 charts the timeline of when Asian countries institutionalised their REIT market with the first listed REIT.

Figure 1   Asian REIT Markets and Their Maiden REITs

2005
Taiwan - Mar
(Fubon No. 1)

Malaysia - Aug
(Axis REIT)

HK - Nov
(LINK REIT)

2014
China - May
(Citic Qihang
Specific Asset
Management Plan)

Thailand - Aug
(Subsrithai Smart
Storage Property
Fund)

2001
Japan - Sept
(Nippon Building
Fund & Japan Real
Estate)

2002
South Korea - Jan
(Kyobo Meritz)

Singapore - July
(CapitaMall Trust)

Note: Japan is the first country in Asia which introduced REITs in their modern form in 2001. Prior to 2005, the Malaysian REIT market was technically non-existent even though there were some listed property trusts on the Malaysian stock exchange, Bursa Malaysia, since 1989. China and Thailand are the two latest countries which have added listed REITs to their respective stock markets in 2014.

As seen in Figure 1, China entered the fray only as recent as 2014 with the listing of the Citic Qihang Specific Asset Management Plan on the Shenzhen Stock Exchange in May 2014. Despite being a latecomer, some of the China-based assets have actually already been securitised as REITs with listings in different jurisdictions (e.g. CapitaRetail China Trust and Mapletree Greater China Commercial Trust in Singapore and RREEF China Commercial Trust and Yuexiu REIT in Hong Kong). In addition, the Hong Kong-listed Hui Xian REIT is the first Chinese yuan (CNY) denominated REIT since its listing in 2011.

According to Ooi et al. (2006), the robust growth in Asian REIT markets are attributed to various supply-side (e.g. alternative sources of financing for firms with large real estate holdings) and demand-side factors (e.g. segment of investors who prefer instruments with higher yield than bonds but lower risk than stocks). Moreover, Newell (2012) and Ooi and Wong (2013) have shown that the major Asian REIT markets provided superior risk-adjusted returns to stocks for the period of 2003 to 2012. Also, Newell (2012) identified attractive dividend yields as one of the key benefits of investing in pan-Asia REITs.

Therefore, REIT returns are supposedly sensitive to changes in market interest rate. However, the impact that arises from changes in interest rate on REIT prices are uncertain. According to standard asset pricing models (e.g. the capital asset pricing model (CAPM)), rising interest rates cause corresponding increases in required rates of return which then lead to lower valuation. The significance of changes in monetary policy rates on REIT returns has been widely documented (e.g. Bredin et al., 2007; Chang, 2011; Chang et al., 2011). On the other hand, Allen et al. (2000) explain that the relationship between changes in interest rates and REIT returns depends on the *underlying forces that cause interest-rate movements*. Interest rate hikes following improved economic conditions may result in higher valuation of REITs, hence neutralising the conventional relationship between interest rate changes and real estate value.

In support of this argument, Mueller and Pauley (1995) report a low correlation between REIT returns and interest rate changes. In addition, He et al. (2003), who analysed the relationship between REIT returns and various interest rate proxies, report that the U.S. equity REITs are only significantly impacted by changes in the long-term U.S. government bonds and high-yield corporate bonds. Allen et al. (2000) also show that REITs are more responsive to changes in long-term rather than short-term interest rates. Meanwhile, Swanson et al. (2002) find that REIT returns are more sensitive to changes in the interest-rate term structure rather than credit spread.

In the context of Malaysia, studies on M-REIT returns and interest-rate changes are scarce, which is not surprising in view of the short history of the local REIT market. Lean and Smyth (2012) investigate the relationship between individual M-REIT returns and stock market returns with interest rate as a common variable in order to circumvent potential spurious results. Their results have sparked concern that real estate prices in Malaysia might be in a bubble mode and a crash in the stock market would likely burst the real estate bubble.

Moving on, Malaysia, to a certain extent, faces some limitations in attracting global capital at a large scale due to prevailing capital control measures (e.g. foreign exchange control, ownership restriction, etc.). Therefore, Malaysia has to play to its niche, for example, in the Islamic finance sector. Malaysia introduced the world's first listed Islamic REIT in 2006 (i.e. the Al-Aqar KPJ REIT) as well as the largest stapled Islamic REIT in June 2013 (i.e. the KLCC REIT). Newell and Osmadi (2009) report that Islamic REITs were resilient in the face of the global financial crisis (GFC) in 2007/08 which implies that Islamic REITs could be a promising class of assets for portfolio diversification purposes. Lee and Ting (2009), who studied M-REIT performance over the period of 1991 to 2006,[2] also report that an equally-weighted REIT portfolio provides diversification benefits to a mixed-asset portfolio.

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[2] M-REITs are represented by listed property trusts (LPTs) prior to 2005.

These findings represent encouraging signs for further development in the M-REIT market. However, most of the studies on M-REITs employ dated information (e.g. Newell and Osmadi, 2009; Lee and Ting, 2009; Lean and Smyth, 2012) which preceded the 2010 boom of the M-REIT market. The subsequent sections of this paper serve to fill this void by providing updates on the development of the M-REIT market.

3. Development of Malaysian REIT Market

Prior to 2005, REITs existed in the form of listed property trusts (LPTs) in Malaysia. In fact, Malaysia is the first country in Asia which introduced the concept of real estate or property trust to the stock exchange in 1989 (Newell and Osmadi, 2009; Ooi et al., 2006; Newell et al., 2002). LPTs failed to take off in Malaysia for a long time mainly due to local structural and regulatory factors, such as the lack of tax incentives and unattractive properties (Newell et al., 2002). Collectively, there were only three LPTs at the end of 2004 with a relatively miniscule market capitalisation of approximately RM239.5 million.

Spurred by the robust growth in other Asian REIT markets, especially Japan and Singapore, the Securities Commission of Malaysia (SC) introduced the revamped Guidelines on REITs (RG) in 2005. Among the significant changes are favourable tax treatment, higher gearing limits, ownership relaxation on the REIT and its management company, more flexibility on acquisition activities and enhanced governance standard (Newell and Osmadi, 2009). Since then, the RG has been continuously improved upon to keep pace with market development and the latest version of the RG, at the time of writing, is dated 28 December 2012. In addition, the SC has also introduced the world's first Islamic RG which is specifically tailored for Islamic REITs. A typical REIT structure is depicted in Figure 2.

According to the RG, a REIT is defined as "*a unit trust scheme that invests or proposes to invest primarily in income-generating real estate*". As a result, a trustee has to be appointed as the legal owner of a REIT who holds the real estate assets in trust for the unit holders. In contrast to the U.S. and Australian REIT markets, Asian REITs are typically managed by an external manager. A REIT manager is responsible for the day-to-day management of the REIT as well as its long term strategic direction. REIT managers for M-REITs are all related to or owned by their respective sponsors.

Figure 2   A Typical Malaysian-REIT Structure
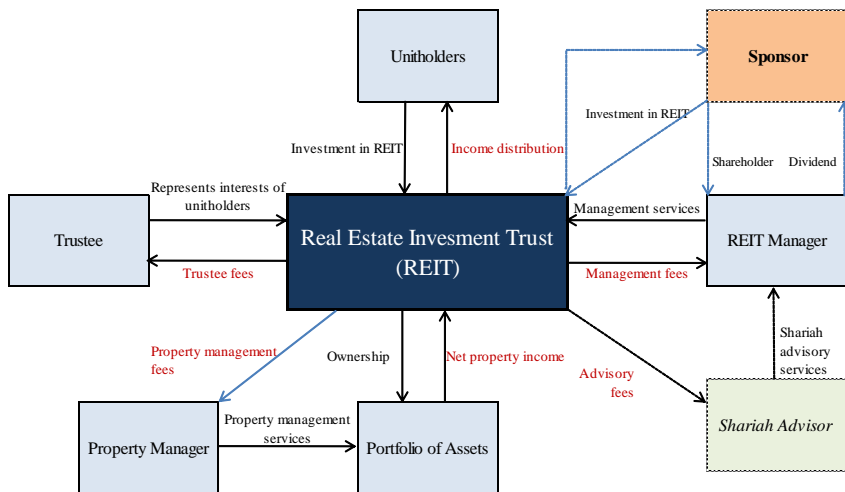
Note: Legally, REITs exist in the form of unit trusts in Malaysia. A typical M-REIT consists of a trustee who holds the units on behalf of the unitholders, a REIT manager who acts as the asset manager, and a property manager who mainly acts as the manager of the portfolio of properties. The sponsor is another key component of M-REITs as it is usually the largest unitholder of a REIT and shareholder. The sponsor is also viewed as the provider of pipeline assets to a REIT. In addition to the main components, an Islamic REIT in Malaysia must maintain Shariah advisors who comprise learned scholars in Shariah for the purpose of dispensing Shariah-related advice to the REIT manager on Islamic asset management principles. In exchange for the services rendered, all parties are entitled to a set of prescribed fees as approved by the unitholders.

A sponsor is typically a real estate company that is involved in property development activities. Sponsors provide pipeline support to the REITs and are critical in their eventual success (Wong et al., 2013; Lecomte and Ooi, 2013). In the case of M-REITs, not unlike other Asian REITs, the sponsors usually retain significant ownership in the REITs which are considered as an effective capital-recycling vehicle. In Malaysia, a REIT manager, which is set up as a fund management company, is not eligible to be appointed as the property manager for the real estate assets. Hence, this role has to be outsourced and a separate property management company ought to be appointed to provide asset management services to the properties. In most instances, the property management company is either a subsidiary of the sponsors or an independent property management company. In addition, Islamic REITs have to establish a Shariah committee which is made up of learned Islamic scholars, to advise the REIT manager on its investment actions in order for the REIT to be Shariah-compliant.

Following the introduction of the RG in 2005, the first M-REIT (i.e. the Axis REIT) was listed in August of the same year. Since then, the M-REIT market has experienced phenomenal growth in terms of the number of industry players and more importantly, the amount of market capitalisation of the sector. At the end of 2005, there were only three listed REITs, but the number grew to 17 at the end of 2013. However, the number of listed REITs dropped to 16 in the first quarter of 2014 following the privatisation of the Al-Hadharah Boustead REIT by its sponsor. Despite the marginal drop, some large property players continue to express interest in establishing REITs in the near future (e.g. Sime Darby Berhad, Malaysian Resources Corporation Berhad, WCT Holdings Berhad and Mah Sing Group Berhad).

More astoundingly, many iconic properties in Malaysia, such as the PETRONAS Twin Towers, Mid Valley Megamall, Pavilion Kuala Lumpur, Sunway Pyramid and The Ritz-Carlton Kuala Lumpur are now held under a REIT structure. This could be read as a vote of confidence from property owners to the viability of REITs in Malaysia. This development is also setting the stage for mature properties to be transformed or injected into a REIT structure in the future.
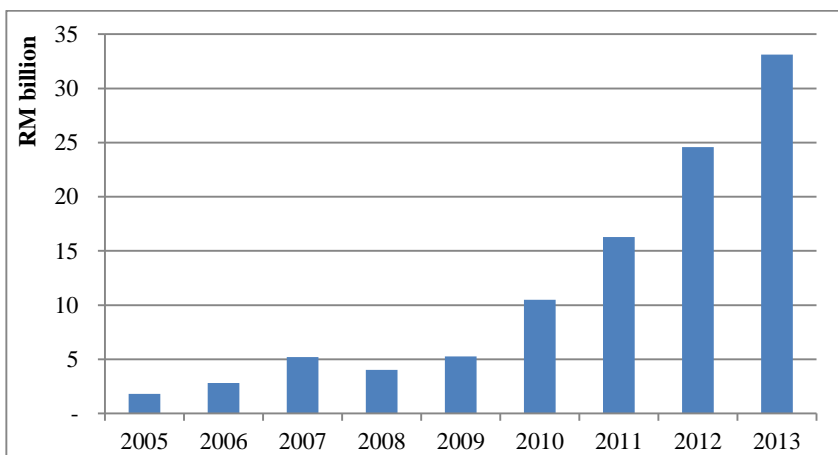
On the market capitalisation of the M-REIT market, the value has grown from RM1.8 billion at the end of 2005 to RM33.2 billion at the end of 2013. This represents an exceptional growth of over 18 times which could be translated into a compounded annual growth rate (CAGR) of approximately 44.0% per annum for the period under study. Putting this figure into perspective, the CAGR of the entire Malaysian stock market for the same period is a respectable 11.9% per annum. In other words, the M-REIT market outgrew the overall Malaysian stock market by close to four times over the sample period.

Despite its spectacular growth, the M-REIT market remains a small proportion of the overall stock market, and accounts for approximately 2.0% of the total market capitalisation of RM1.7 trillion of all stocks listed on the Malaysian stock exchange at the end of 2013. In comparison, U.S. listed REITs accounted for about 3.7% of the total market capitalisation of all the listed stocks on the NYSE-Euronext (U.S.) while Singapore REITs stood at about 5.4% of the total market capitalisation of the Singapore Exchange (SGX) listed stocks as of 31 December 2013. Viewed from this angle, it provides an indication that there are still plenty of growth opportunities for REITs in Malaysia. In its first decade of development, it must be noted that the growth in the M-REIT market is not on a straight-line basis. Figure 3 depicts the evolution of the market capitalisation of M-REITs from 2005 to 2013.

As shown in Figure 3, the growth of the M-REIT market steadily progressed between 2005 and 2007. The market capitalisation of M-REITs increased to RM2.8 billion in 2006 and exceeded RM5.0 billion in 2007. However, growth was stunted in 2008 and 2009 without any new listings and one delisting due to weak market performance. M-REITs lost about one-fifth of their value in 2008.

This market hiatus is attributed to the GFC of 2008/09. The spill-over effect from the meltdown in the U.S. property sector dampened the sentiment of global investors in real estate investments more profoundly than any other real economy sector.

Figure 3   Total Market Capitalisation of M-REITs: 31 December 2005 – 2013

Note: The bars show total M-REIT market capitalisation measured on the last trading day of a calendar year. The M-REIT market has grown by close to 20 times in a relatively short span of less than one decade. As can be seen, the M-REIT market experienced robust growth in the post-GFC era of 2010. In 2010, two large REITs, namely, the Sunway and CapitaMalls Malaysia Trust REITs, were listed followed by the Pavilion REIT in 2011 and IGB REIT in 2012. The KLCC REIT, which came in the form of stapled-securities, was the latest addition to the market in 2013.

In 2010, once the financial storm receded, the M-REIT market rebounded strongly with two new mega listings (i.e. the Sunway REIT and CapitaMalls Malaysia Trust) which raised more than RM1.0 billion each. These two mega listings doubled the market capitalisation from RM5.3 billion a year ago to RM10.5 billion in 2010. More mega listings were to follow suit with one new listing each from 2011 to 2013. The Pavilion REIT came on board in 2011 while the IGB REIT in 2012 and the latest addition to the fray is the KLCC REIT in 2013. This recent rapid development has entirely changed the landscape of the M-REIT market.

In addition, the year 2013 marked a watershed moment for Islamic M-REITs following the listing of the KLCC REIT as an Islamic stapled REIT with a market capitalisation of over RM13.1 billion. Upon its listing in May 2013, the KLCC REIT has become the largest Islamic REIT in the world and further entrenched the position of Malaysia as the world's foremost Islamic financial centre as the country already possesses the largest Islamic bond (or sukuk)

market, which accounts for 69% of total global sukuk issuances (SC, 2013). On the other hand, there was a proposal to delist the Al-Hadharah Boustead REIT from the stock exchange in late 2013 and the exercise was completed in the first quarter of 2014. In the global context, 2013 is also an important year for REITs as the total market capitalisation for global REITs surpassed USD1.0 trillion in September of that year (EPRA Survey, 2013).

However, most of the recent studies on M-REITs (e.g. Newell and Osmadi, 2009; Lean and Smyth, 2012) have not included the latest additions from 2010 onwards. Hence, it is timely to record the development of M-REITs and assess their returns characteristics. Table 1 shows the listed M-REITs as of 31 December 2013 with their respective listing date and the first-day performance as well as one- to five-year returns.

As shown in Table 1, the average underpricing of M-REITs is a moderate 5.2% as measured by the first-day performance. The Axis REIT enjoyed the best first-day performance at 29.6% while at the other extreme, the AmFirst REIT flopped 12% on its first trading day. If measured against the listing price, most of the M-REITs provided positive returns at the close of the 2013 calendar year except for the KLCC and IGB REITs, which traded below their initial public offering (IPO) prices. The Axis REIT generated the highest returns at 85.2% followed by the Al-Hadharah Boustead REIT at 73.8%. On the horizon longer than one year, M-REITs offered respectable double digit returns.

However, in 2013, M-REITs as a whole registered a negative return of 3.4% as compared to a positive return of 10.5% recorded by the FTSE-Bursa Malaysia Kuala Lumpur Composite Index (FBM-KLCI). In fact, without the listing of the KLCC REIT, the total market capitalisation of M-REITs would have dropped to RM22.6 billion from RM24.6 billion a year ago. This drop represents a substantial loss of RM2.0 billion from the pockets of investors. The SC attributes the underperformance of M-REITs to the increase in long-term yield as reflected in the rise of the 10-year MGS rate during the year (SC, 2013). The movements of the M-REIT index vis-a-vis the FBM-KLCI and 10-year MGS yield for 2013 are shown in Figures 4 and 5 respectively.

The key question that arises from observing Figures 4 and 5 is whether the notion that REIT returns are chiefly driven by long term interest rates is supported. The relationships between REITs, stocks and bonds have been of special interest to both market participants and academic researchers. Even though many studies (Clayton and MacKinnon, 2003; Swanson et al., 2002; Mueller and Pauley, 1995) have been conducted on this topic, the results are not conclusive. Hence, this interesting question remains an outstanding issue.

Table 1   Listed M-REITs as of 31 December 2013 and Performance Metrics

| M-REIT | IPO date | IPO Price (RM) | Debut Market Cap (RM'mil) | First-day closing (RM) | First-day returns | 2013 Closing price (RM) | Capital Returns | | | | | |
							Since IPO	1-yr	2-yr	3-yr	4-yr	5-yr
Amanah Hartanah PNB (AHP)*	28-Dec-90	-	NA	-	-	1.13	NA	2.7%	7.3%	12.2%	21.1%	41.0%
Axis REIT	03-Aug-05	1.250	257	1.680	29.6%	2.93	85.2%	-6.6%	11.2%	21.2%	41.7%	96.2%
YTL Hospitality REIT	16-Dec-05	0.960	998	1.030	7.0%	1.01	5.1%	-9.4%	13.2%	13.8%	16.7%	33.2%
UOA REIT	30-Dec-05	1.150	262	1.180	2.6%	1.45	23.2%	5.7%	3.5%	-3.4%	12.5%	30.4%
Tower REIT	12-Apr-06	1.070	254	1.050	-1.9%	1.50	33.8%	2.7%	15.1%	20.7%	27.4%	53.3%
Al-Aqar Healthcare REIT	10-Aug-06	0.950	323	0.985	3.6%	1.33	33.6%	3.1%	14.5%	17.2%	30.0%	34.7%
Hektar REIT	04-Dec-06	1.017	336	1.007	-1.0%	1.50	38.9%	2.7%	16.0%	13.8%	32.4%	69.8%
AmFirst REIT	21-Dec-06	0.903	429	0.804	-11.6%	1.00	10.2%	-5.8%	-4.6%	-7.1%	6.3%	32.6%
Quill Capita Trust	08-Jan-07	0.840	195	0.980	15.4%	1.18	34.0%	-4.1%	8.9%	6.1%	8.9%	24.9%
Al-Hadharah Boustead REIT	08-Feb-07	0.990	396	1.120	12.3%	2.07	73.8%	12.3%	29.6%	34.9%	46.5%	73.8%
AmanahRaya REIT	26-Feb-07	0.895	165	0.980	9.1%	1.00	11.1%	8.3%	10.0%	7.3%	15.7%	31.5%
Atrium REIT	02-Apr-07	1.000	122	0.935	-6.7%	1.30	26.2%	0.8%	19.5%	21.4%	34.6%	75.7%
Sunway REIT	08-Jul-10	0.900	2,412	0.885	-1.7%	1.24	32.0%	-22.3%	-0.8%	18.6%	NA	NA
CapitaMalls Malaysia Trust	16-Jul-10	1.000	1,400	0.980	-2.0%	1.40	33.6%	-25.1%	-2.8%	23.2%	NA	NA
Pavilion REIT	07-Dec-11	0.900	2,700	1.020	12.5%	1.28	35.2%	-8.2%	16.1%	NA	NA	NA
IGB REIT	21-Sep-12	1.250	4,250	1.390	10.6%	1.19	-4.9%	-11.1%	NA	NA	NA	NA
KLCC REIT	09-May-13	7.250	13,086	7.680	5.8%	5.85	-21.5%	NA	NA	NA	NA	NA
Average Returns					**5.2%**		**28.1%**	**-3.4%**	**10%**	**14%**	**24%**	**50%**

*Note:* *AHP was re-classed from property trust to REIT in August 2005. There are 17 listed Malaysian REITs (M-REITs) as of 31 December 2013 and they are shown in Column 1. Column 2 shows the listing date of the respective M-REITs with their listing price and initial total market capitalisation presented in Columns 3 and 4. The next two columns show the closing price of the M-REITs on their first trading day and their respective returns. Meanwhile, Column 7 presents the closing price of the M-REITs as of 31 December 2013 followed by capital returns in the next six columns. The capital returns are calculated based on the differences in prices as of 31 December 2013 and the respective time horizons (i.e. since IPO, 1-year, 2-year and so on until 5-year).

Figure 4   M-REIT Index and FTSE-Bursa Malaysia Kuala Lumpur Composite Index: 2 August 2005 to 31 December 2013
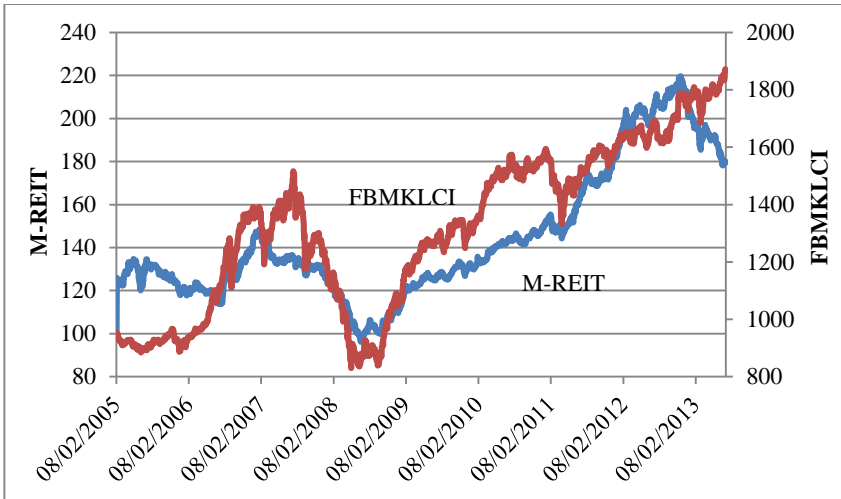
Note: The chart shows the movement of the constructed M-REIT Index viz-a-viz FBM-KLCI for the whole period. The graph shows that M-REITs closely track the movements of the domestic equity market for most of the whole period except for 2013 when there were signs of divergence between the two indices.

Figure 5   M-REIT Index and 10-year Malaysian Government Securities: 2 August 2005 to 31 December 2013
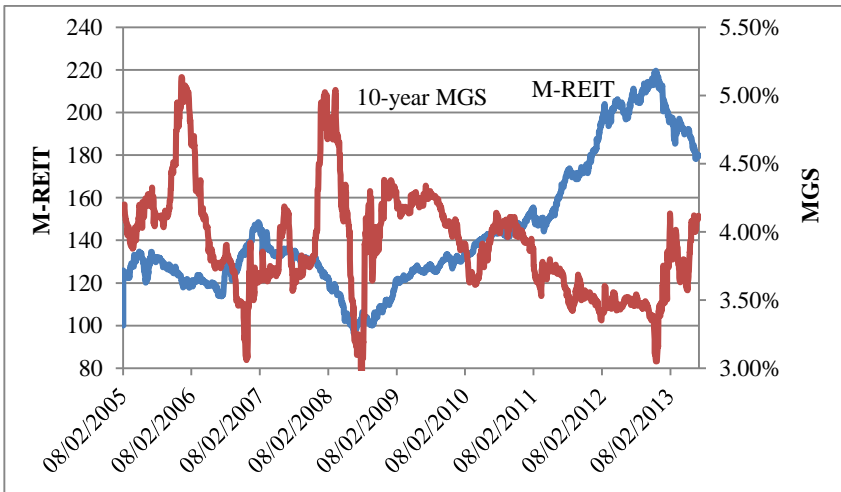
Note: The graph shows the movement of the constructed M-REIT Index viz-a-viz 10-year MGS yield. The general pattern is a mirror image between the two indices, especially in the post-GFC subperiod of 2010-2013.

In the regional context, the M-REIT market is the fourth largest in Asia after Japan, Singapore and Hong Kong (Ooi and Wong, 2013). It consists of approximately 6.0% of the total market capitalisation of the Asian REIT market. Unlike Singapore, the M-REIT market only focuses on domestic properties. Table 2 lists the key characteristics of the M-REIT market in comparison with the more advanced REIT markets in the region as well as the two most developed global REIT markets, namely, in Australia and the U.S.

Table 2   Characteristics Comparison between M-REIT and Key REIT Markets

| Characteristics	Malaysia	Singapore	Japan	Hong Kong	U.S.	Australia
Legal structure	Unit Trust	Trust	Trust or corporate (in practice, corporate type)	Trust	Corporate	Unit Trust
Manager	External	External or internal	External	External or internal	External or internal	External or internal
Asset level	At least 50% of the total asset value must be invested in real estate and/or single purpose companies investing into real estate at all times	At least 75% of deposited property should be invested in income-producing real estate	At least 50% of total assets are invested in qualified assets	Primarily in real estate that generate recurrent rental income	At least 75% of total assets must be comprised of real estates, government securities or cash items	No restriction except for public unit trust which must only carry on an eligible investment business
Property development activities	Not more than 10% of total asset value	Not allowed unless intends to hold upon completion and subject to 10% cap of deposited property	Restricted by income-producing criterion	Prohibited	Allowed	Allowed
Overseas investments/ geographical restrictions	No restriction but subject to regulatory approvals	No restriction	No restriction	No restriction	No restriction	No restriction
Distribution and tax exemption	Provided that 90% of total income is distributed, REIT enjoys tax transparency	Provided that 90% of taxable income is distributed, REIT enjoys tax transparency	Provided that 90% of distributable profit is distributed, REIT enjoys tax transparency	Must distribute at least 90% of audited annual net income. Tax exempted	At least 90% of ordinary taxable income must be distributed. Tax exempted	No minimum distribution limit but in order to be fully tax transparent, REIT distributes all the trust income
Leverage Cap	50% of total asset value	35% of deposited property. Up to 60% for rated REITs	No cap	45% of total gross asset value	No cap	No cap
Top 3 REITs as at Aug 2013	IGB REIT. Pavilion REIT. SunwayREIT	CapitaMall Trust. Ascendas REIT. CapitaCommercial Trust	Nippon Building Fund. Japan REIT. Japan Retain Fund Investment	Link REIT. Hui Xian REIT. Champion REIT	Simon Property. American Tower. Public Storage	Westfield Group. Westfield Retail Trust. Stockland
% of global REIT market as at Aug 2013	0.70%*	4.23%	5.98%	2.22%	57.68%	8.00%

Sources: European Public Real Estate Global REIT Survey 2013 and Asia Pacific REITs: A Comparative Regulatory and Tax Study, APREA, June 2014.
Note: * KLCC REIT excluded.

Some of the noteworthy characteristics of M-REITs include management type, restrictions on development activities, tax structure, minimum dividend pay-out ratio and leverage cap. M-REITs must be externally managed unlike some other more developed markets (e.g. in the U.S., Australia and Singapore) which allow for either an external or internal management structure. However, it must be noted that an external management structure is more prevalent among Asian REIT markets (Ooi and Wong, 2013). On potential development activities, M-REITs are only allowed to undertake such works provided that the value is not more than 10% of their total asset value. This condition is used to protect the interest of investors as REITs are supposed to generate stable dividend pay-outs. Like the REITs in Singapore and Japan, M-REITs must distribute at least 90% of their total income in order to qualify for a tax-free status. Due to the lack of retained earnings that result from high pay-out ratios, REITs rely heavily on external funding sources, such as borrowings or issuances of new units to grow their asset base. Therefore, a borrowing cap of 50% of the total asset value is imposed onto M-REITs to avoid over-leveraging.

Shifting back the focus on returns characteristics, the M-REIT market, as a small emerging economy, could likely be influenced by the development of the more advanced markets. Strangely, there has been no study, to the best of our knowledge, which investigates whether M-REIT returns are associated with these leading global REIT markets (J-REIT, S-REIT, HK-REIT, A-REIT and US-REIT). Figure 6 depicts the performances of the M-REIT and the five major REIT markets from 2 August 2005 to 31 December 2013.

Figure 6   M-REIT Index and Major REIT Indices: 2 August 2005 to 31 December 2013
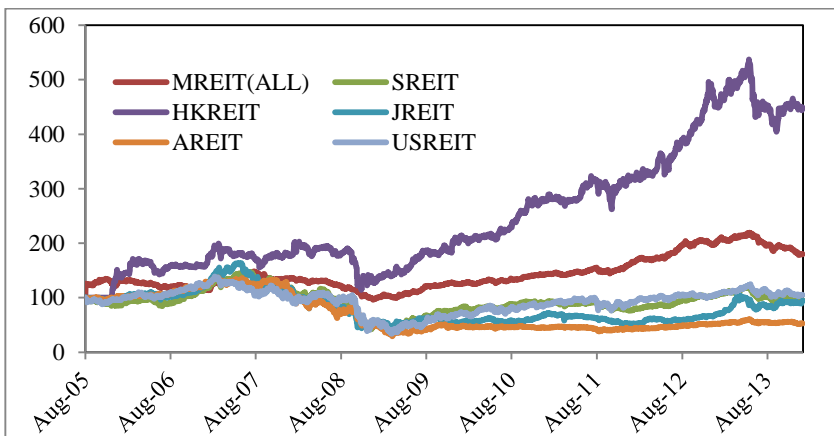
Note: The chart shows the movement of the constructed M-REIT Index viz-a-viz the indices of major REIT markets, such as Singapore (S-REIT), Hong Kong (HK-REIT), Japan (J-REIT), Australia (A-REIT) and the United States of America (US-REIT). In the whole period, the M-REIT market appears to be the second-best performing REIT market behind the HK-REIT market.

From Figure 6, it is evident that the M-REIT market is the second best performer after the HK-REIT market. Except for these two outperformers, most of the other developed REIT markets track one another rather closely. Section 5 will be a discussion on the statistical significance of these relationships. However, before that, we shall discuss the research design and methodology in the following section.

4.   Research Design and Methodology
4.1   Data and M-REIT Index Development

All numerical data used in this paper are retrieved from Bloomberg. We use the nominal[3] price data measured in the domestic currency, Malaysian ringgit (MYR), for all of the M-REITs which are listed on Bursa Malaysia as of 31 December 2013. Based on the theory of uncovered interest-rate parity (UIP), any interest differential between two countries shall be offset by the opposite movement in the exchange rates (Fama, 1984; Sarno, 2005), therefore supporting the validity of our results regardless of the choice of currency adopted to measure returns.[4] As reported in the previous section, there are 17 M-REITs with 4 of them categorised as Islamic REITs while the rest are conventional.

Our study commences on 2 August 2005, which coincides with the listing of the first M-REIT, the Axis REIT, until 31 December 2013. Our daily data are filtered to only weekday observations, hence resulting in 2,224 days of data points. The whole sample period is further separated into three subsample periods; namely, pre-GFC (i.e. 2 August 2005 to 31 December 2007), GFC (i.e. 1 January 2008 to 31 December 2009) and post-GFC (i.e. 1 January 2010 to 31 December 2013). Our choice of the breakpoints for each subsample period is selected based on eyeball analysis of the S&P 500 Volatility Index, or better known as the VIX. The movement of the VIX is depicted in Figure 7. The VIX peaked during the GFC subsample period and abated since 2010, hence justifying our choice of the subsample breakpoints.

As we are interested in investigating the general characteristics of M-REITs as a whole, we require aggregate data in the form of an index. In the absence of an official M-REIT index, we construct one based on the market-capitalisation-weighted method. The same approach is extended to construct sub-indices for

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[3] Throughout the sample period, Malaysia recorded a relatively mild inflation rate of approximately 2.6% p.a., hence justifying the use of nominal rate of returns. Some recent studies which use nominal returns include Chang et al. (2011) and Hott and Monnin (2008).

[4] Even though the failure of the UIP has been rather widely documented and given rise to the forward-bias puzzle (e.g. Froot and Thaler, 1990; Bansal and Dahlquist, 2000), there have been some recent studies that have reported the validity of the UIP over the long run (e.g. Chinn, 2006; Ahmad et al., 2012).

conventional and Islamic M-REITs respectively. The details of the index construction process are provided in Appendix 1.

Figure 7   S&P500 Volatility Index: 2 August 2005 to 31 December 2013
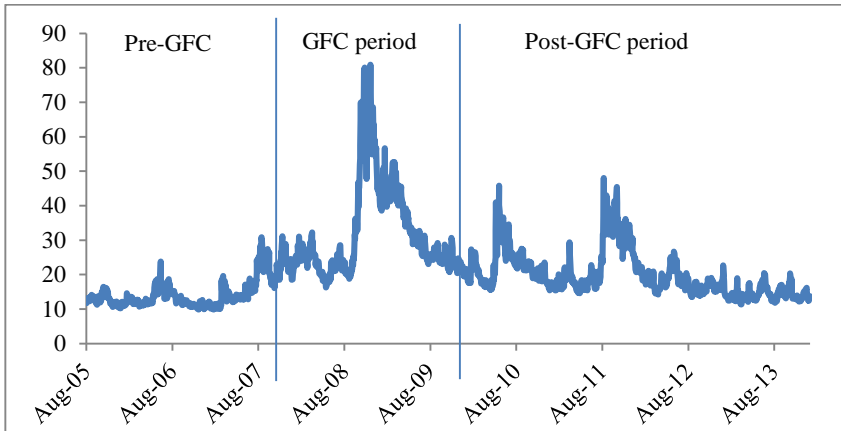
Note: The chart shows the movement of the S&P 500 Volatility Index (VIX) for the whole period. The VIX is generally used to measure the risk sentiment of market participants. A high level of VIX indicates market jitters and is often associated with risk-off sentiment while the opposite indicates market stability and risk-on sentiment. The GFC subperiod is identified as between 1 January 2008 to 31 December 2009 due to the peak of VIX in the middle of this period.

The other variables employed include FBM-KLCI and FBM-Property Index (FBMKLPRP) which are used as proxies for the Malaysian equity and property markets. Meanwhile, S&P500 represents the global equity market and the established global REIT markets are represented by the FTSE-NAREIT All Equity REITs Index (U.S.-REIT), Tokyo Stock Exchange REIT Index (J-REIT), S&P/ASX 200 REIT Index (A-REIT), FTSE-STI REIT Index (S-REIT) and Hong Kong REIT Index GPR250 (HK-REIT). All the indices are re-based as 100 on 2 August 2005 for meaningful comparison.

We follow He et al. (2003) and categorise the interest rate proxies into three types based on their tenure, i.e., long (10 years), medium (five years) and short (< one year) terms. In the long and medium term spectrum, we used MGS, interest rate swap (IRS), high-grade private debt securities (PDS) (i.e. AAA-rated) and low-grade PDS (i.e. BBB-rated). At the other end of the spectrum, we employ the Kuala Lumpur Interbank Offered Rate (KLIBOR) of one-month, three-months and six-months as the short-term interest rate proxies. The MGS yield is the lowest, in its respective tenure, as it is a risk-free asset while IRS and KLIBOR are imputed with banking-sector risk premium. On the other hand, PDS is a form of a debt instrument issued by corporations with AAA being the highest rating and BBB the lowest among the investment grade. The interest-rate proxies used in the study are on an aggregate basis based on data collated

and published by the Bank Negara Malaysia, the central bank, and hence the proxies are not influenced by any single issuance. In addition, the Malaysian bond market is highly liquid with an annual trading volume that exceeds RM1.0 trillion since 2010 with a large proportion (>90%) in MGS.

In line with He et al. (2003) and Swanson et al. (2002), we have also employed two additional interest rate proxies, namely, the interest-rate term structure and credit spread or default premium. The term structure, in our paper, is defined as the difference between 10-year MGS and 3-month KLIBOR, and indicates the steepness of the yield curve. As widely reported (e.g. Fama, 1986; Estrella and Trubin, 2006), a yield curve has significant predictive power of the economic outlook with a steep curve that signifies a bullish state while a flattened curve warns of an upcoming recession. Meanwhile, credit spread is defined as the difference between 10-year MGS and 10-year BBB PDS. Credit spread is a measure of the likelihood of default with a large spread indicative of weakness in the economy while a thin spread a strong one.

All the data, except for interest-rate proxies, are converted into log difference as returns series for analysis purposes. The interest rate proxies, except for term structure and credit spread, are first-differenced as a measure of change. The summary statistics of the variables are shown in Table 3.

4.2   Hypotheses and Econometric Models

We develop eight hypotheses to determine the answers for the five research questions mentioned earlier. The development of these hypotheses is based on the findings reported in the extant literature. REITs have often been cited as a type of yield-play instrument (Newell, 2012; Ooi et al., 2006) and the slump in M-REIT prices in 2013 has also been attributed to the rise in the long term interest rate (SC, 2013). From these observations, we hypothesise that M-REIT returns are significantly and negatively correlated with changes in interest rate (Hypothesis 1) and more strongly correlated with changes in the long term rather than the short term interest rate (Hypothesis 2).

Another often-cited important factor which affects REIT returns is equity market returns (e.g. Glascock et al., 2000; Mueller and Pauley, 1995). We conjecture that M-REIT returns are significantly and positively correlated with changes in the domestic stock market and in particular, the property sector index (Hypothesis 3). We also believe that the M-REIT market is integrated with global stock and REIT markets, hence a significant correlation with these markets is expected (Hypothesis 4). Due to the close proximity between Malaysia and Singapore, we suppose that M-REIT returns are more significantly correlated with S-REIT returns than any other global and REIT indices (Hypothesis 5). Hypotheses 1 to 5 are tested through a Pearson correlation analysis.

Table 3   Summary Statistics of Key Variables

Desciptive Statistics	Daily Returns									Daily Change			
	M-REIT	FBM-KLCI	FBMKLPRP	S&P500	S-REIT	HK-REIT	J-REIT	A-REIT	US-REIT	10-yr AAA	5-yr AAA	10-yr BBB	5-yr BBB
Mean	0.0268%	0.0312%	0.0340%	0.0180%	-0.0020%	0.0684%	-0.0024%	-0.0293%	0.0023%	-0.0004%	-0.0001%	0.0006%	0.0004%
Median	0.0000%	0.0218%	0.0000%	0.0452%	0.0134%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%
Maximum	23.03%	4.26%	6.21%	10.96%	18.92%	13.60%	10.64%	8.05%	16.88%	0.65%	0.20%	1.23%	0.75%
Minimum	-4.81%	-9.98%	-9.67%	-9.47%	-16.56%	-13.57%	-12.78%	-12.13%	-21.53%	-0.63%	-0.17%	-1.43%	-0.89%
Std. Dev.	0.0081	0.0078	0.0110	0.0135	0.0144	0.0141	0.0164	0.0159	0.0246	0.0003	0.0002	0.0006	0.0004
Skewness	10.46	-1.29	-0.66	-0.32	0.28	0.00	-0.37	-0.73	-0.13	0.07	1.20	-1.77	-2.42
Kurtosis	305.61	19.33	11.99	13.38	29.80	18.32	11.47	10.42	14.66	321.69	57.33	225.22	225.84
Jarque-Bera (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Desciptive Statistics	Daily Change											
	10-yr MGS	5-yr MGS	10-yr IRS	7-yr IRS	5-yr IRS	3-yr IRS	2-yr IRS	6M KLIBOR	3M KLIBOR	1M KLIBOR	Term Structure	Credit Spread
Mean	0.0000%	0.0001%	0.0000%	-0.0001%	0.0000%	0.0000%	0.0001%	0.0002%	0.0002%	0.0001%	0.7349%	9.2692%
Median	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.0000%	0.5720%	9.4000%
Maximum	0.40%	1.02%	0.46%	0.30%	0.31%	0.28%	0.32%	0.27%	0.25%	0.22%	2.26%	10.73%
Minimum	-0.28%	-0.90%	-0.46%	-0.40%	-0.35%	-0.36%	-0.44%	-0.62%	-0.64%	-0.69%	-0.54%	7.27%
Std. Dev.	0.0004	0.0005	0.0006	0.0005	0.0004	0.0004	0.0003	0.0002	0.0002	0.0002	0.0063	0.0081
Skewness	1.12	1.43	-0.29	-0.27	-0.42	-0.70	-1.21	-18.13	-19.15	-18.89	0.82	-0.37
Kurtosis	15.02	97.39	13.06	10.81	12.45	16.53	34.63	590.12	619.19	614.77	2.85	1.89
Jarque-Bera (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: The table shows the descriptive statistics of the key variables employed in this study. The equity indices used are M-REIT - the constructed Malaysian REIT index, FBM-KLCI – the FTSE Bursa Malaysia Kuala Lumpur Composite Index which consists of 30 large Malaysian stocks and often referred to as the key indicator of the performance of the Malaysian stock market, FBMKLPRP - the FTSE Bursa Malaysia Kuala Lumpur Property Stocks Index, and S&P 500 - Standard and Poor's global top 500 stocks. Meanwhile, the global REIT indices used are from Singapore (S-REIT), Hong Kong (HK-REIT), Japan (J-REIT), Australia (A-REIT) and the United States of America (US-REIT). The equity and REIT indices are measured based on daily log-differences which yield daily returns. The long term (>1 year) interest rate proxies used are high- and low-grade private debt securities (AAA and BBB), Malaysian government securities (MGS) and interest rate swap (IRS) while the short term interest rate proxy is the Kuala Lumpur Interbank Offered Rate (KLIBOR). Interest rate series are measured based on first-difference. Lastly, Term structure is defined as the difference between 10-year MGS and 3-month KLIBOR and Credit Spread as the difference between 10-year BBB and 10-year MGS.

In line with Clayton and MacKinnon (2003) and Allen et al. (2000), we also test for the significance of some of the systematic factors in driving M-REIT returns. Besides the two widely reported systematic factors, namely equity market returns and interest rate changes, we also include global REIT market returns as another important factor due to the infancy status of M-REIT market.[5] Hypotheses 6 to 8 conjecture that all these factors are individually significant in driving M-REIT returns and these are tested with the following multifactor model:

$$\Delta MREIT_t = \alpha + \beta_1 \Delta FBMKLCI_t + \beta_2 \Delta FBMKLPRP_t + \beta_3 \Delta STIR_t$$
$$+ \beta_4 \Delta MTIR_t + \beta_5 \Delta LTIR_t + \beta_6 \Delta SREIT_t + \beta_7 \Delta HKREIT_t$$
$$+ \beta_8 \Delta JREIT_t + \beta_9 \Delta AREIT_t + \varepsilon_t$$

(1)

$\Delta MREIT$ is the daily returns for the M-REIT index and similarly, the daily returns of regional REIT indices are abbreviated as $\Delta SREIT$ (Singapore), $\Delta HKREIT$ (Hong Kong), $\Delta JREIT$ (Japan) and $\Delta AREIT$ (Australia). $\Delta FBMKLCI$ and $\Delta FBMKLPRP$ refer to the daily returns for the FTSE-Bursa Malaysia Composite Index and FTSE-Bursa Malaysia Property Index respectively while $\Delta STIR$, $\Delta MTIR$ and $\Delta LTIR$ stand for daily change in yield in the short-, medium- and long-term interest rate proxies. The correlations of the selected independent variables are shown in Table 4. All correlations, except for the one between the returns of FBM-KLCI and FBMKLPRP, are below 0.50.[6]

In order to identify the individual contribution of each of the factors, namely, stock market, interest rate and regional REIT markets, the relevant proxies for each factor are exclusively regressed with M-REIT returns. Besides the full model (Model 1), we also test for three other factor-specific models, namely, the market-factor model which consists of only stock market proxies (i.e. Model 2), the interest-rate factor model with only interest-rate proxies (i.e. Model 3) and finally, the regional REIT factor model which contains only regional REIT returns (i.e. Model 4). All four models are estimated with ordinary least-squares with White's heteroscedasticity-consistent covariance matrix.

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[5] Macroeconomic variables are another class of significant factors which have been identified in the literature to drive REIT or real estate returns (e.g. Agarwal and Hu, 2014; Chang et al., 2013; Chang et al., 2012; Fei et al., 2008). This class of factors, however, is not adopted in our model for parsimony reasons as there are already nine variables that are being included.

[6] To avoid multicollinearity, we have excluded FBMKLPRP from the equation due to its high correlation with FBM-KLCI, but the results are qualitatively unaffected except for a decrease in the coefficient of determination, R^2. Hence, we decided to retain both of these factors in the model for better explanatory power.

Table 4   Correlations between Independent Variables

	FBM-KLCI	FBMKLPRP	3M KLIBOR	5-yr IRS	10-yr MGS	S-REIT	HK-REIT	J-REIT
FBMKLPRP	0.7524							
3M KLIBOR	-0.0269	-0.0039						
5-yr IRS	0.0613	0.0626	0.1414					
10-yr MGS	-0.0681	-0.0740	0.1082	0.3982				
S-REIT	0.4520	0.4140	-0.0431	0.0774	-0.0467			
HK-REIT	0.2834	0.2361	-0.0286	0.0069	-0.0195	0.3445		
J-REIT	0.3217	0.2581	-0.0375	0.0732	0.0002	0.3535	0.3002	
A-REIT	0.3138	0.2538	-0.0899	0.0794	0.0015	0.3861	0.2274	0.3084

Note: The independent variables are selected based on the results from the correlation analysis. The variables which display reasonably strong correlations with M-REIT indices are selected for use in the regression analysis. Generally, the selected independent variables are weakly correlated with each other except for FBMKLCI and FBMKLPRP. The exclusion of FBMKLPRP from the model does not qualitatively affect the subsequent regression results. An exploratory factor analysis based on the principal component method is used as an alternative and robustness check to reduce the number of factors as well as to assuage any potential multicollinearity concerns.

For robustness check on the multifactor model, we have adopted the principal-component method by following Leung et al. (2006).[7] Besides being able to reduce the number of relevant factors in a model, the principal component method also helps to address the multicollinearity concern of a particular model which contains correlated independent variables. Upon conducting the principal component analysis on all of the independent variables, the principal components with an eigenvalue above 1 are selected as the latent factors to be used in subsequent regression analyses. The next section presents the empirical results and offers some ensuing discussions.

5.   Empirical Results and Discussions

5.1   Correlation Analysis

5.1.1   M-REITs and Interest Rates

A correlation analysis is a good starting point for understanding the drivers of M-REIT price movements. Table 5 shows the results of the correlation analysis between M-REIT returns and interest-rate changes.

Panel A of Table 5 illustrates the results for the overall composite M-REITs while Panels B and C present the results related to conventional and Islamic M-REITs respectively. Column 2 shows the results for the whole period while the next three columns show the subsample period results.

In Panel A, M-REIT returns generally show very weak correlation with interest rate changes. Under the whole period, M-REIT returns are negatively and significantly correlated with only 10-year MGS on the long-term spectrum while significantly correlated with all the KLIBOR which are proxies for short-term interest rate. Despite their significance, the correlation coefficients with the interest-rate proxies are very low, and range between -0.04 and -0.05.

In order to determine whether these relationships are stable over time, we move on to the results under the sub-sample periods. The M-REIT returns are only significantly correlated with KLIBOR during both the pre-GFC and GFC subsample periods, but this significant relationship disappears in the post-GFC subperiod and the significant correlations shift to longer term interest-rate proxies, like the 10-year MGS. Interestingly, the correlations with medium-term interest rate proxies (i.e. 5-year MGS and 5-year IRS) are significantly positive which implies that higher returns in M-REITs are associated with higher medium-term interest rates.

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[7] We are grateful to an anonymous referee who suggested the principal-component method as an alternative test. The results from this alternative test reaffirm the findings of the main analysis.

Table 5   Correlations between M-REIT Index and Interest Rates

	Panel A - M-REIT (All)				Panel B - M-REIT (Conventional)				Panel C - M-REIT (Islamic)			
	Whole period Aug2005- Dec2013	Pre-GFC Aug2005- Dec2007	GFC Jan2008- Dec2009	Post-GFC Jan2010- Dec2013	Whole period Aug2005- Dec2013	Pre-GFC Aug2005- Dec2007	GFC Jan2008- Dec2009	Post-GFC Jan2010- Dec2013	Whole period Aug2005- Dec2013	Pre-GFC Aug2005- Dec2007	GFC Jan2008- Dec2009	Post-GFC Jan2010- Dec2013
LT (10y)												
MGS	**-0.0396***	-0.0569	0.0248	**-0.0906***	**-0.0504****	-0.0639	0.0110	**-0.1058***	**0.0150**	0.0413	0.0334	-0.0245
IRS	-0.0176	-0.0336	-0.0374	0.0253	-0.0199	-0.0341	-0.0523	0.0317	-0.0046	-0.0446	0.0172	-0.0108
PDS - AAA	-0.0183	-0.0025	-0.0493	-0.0468	-0.0208	-0.0051	-0.0445	**-0.0579***	-0.0040	0.0753	-0.0326	-0.0141
PDS-BBB	0.0095	0.0176	0.0257	-0.0254	-0.0022	0.0181	-0.0120	-0.0207	**0.0466****	0.0685	**0.0761***	-0.0185
MT (5y)												
MGS	0.0312	-0.0020	0.0677	**0.0746****	0.0201	0.0001	0.0350	0.0495	**0.0653****	-0.0768	**0.1312****	**0.0671****
IRS	0.0197	-0.0223	0.0507	**0.0586****	0.0170	-0.0207	0.0238	**0.0727****	0.0236	-0.0393	**0.0789***	-0.0164
PDS - AAA	-0.0056	0.0070	-0.0379	0.0124	-0.0087	0.0029	-0.0309	-0.0069	0.0089	0.0957*	-0.0375	0.0303
PDS-BBB	0.0287	0.0450	0.0400	-0.0208	0.0168	0.0468	-0.0003	-0.0166	**0.0662****	0.0924*	**0.0904****	-0.0102
ST(<1y)												
KLIB1M	**-0.0434****	-0.0540	**-0.0763***	-0.0282	**-0.0442****	-0.0525	**-0.0828***	-0.0185	-0.0231	0.0686	-0.0336	-0.0345
KLIB3M	**-0.0478****	-0.0600	**-0.0772***	-0.0412	**-0.0497****	-0.0583	**-0.0826***	-0.0412	-0.0227	0.0343	-0.0365	-0.0239
KLIB6M	**-0.0510****	**-0.0726***	**-0.0785***	-0.0299	**-0.0517****	**-0.0714***	**-0.0839***	-0.0223	-0.0263	0.0014	-0.0376	-0.0331
Term Structure	0.0179	0.0214	**0.1003****	-0.0125	0.0169	0.0220	**0.1012****	-0.0186	0.0116	0.0176	0.0546	0.0051
Credit Spread	0.0074	-0.0071	0.0559	0.0338	0.0075	-0.0086	0.0292	0.0363	0.0126	-0.0463	0.0612	0.0197

Note: The results on the correlation analysis between M-REIT indices and interest rate proxies are shown below. Three panels are presented vertically with Panel A showing the results for the composite M-REIT index; Panel B, the conventional M-REIT index; while Panel C, the Islamic M-REIT index. Bolded figures indicate significant correlations and *, ** and *** represent significance levels of 10%, 5% and 1% respectively. There are four columns, which present the results for the whole and three subsample periods, under each panel. The results generally show a weak correlation between M-REIT and interest rates.

The results for conventional M-REITs, which are shown in Panel B, are largely similar to those for the overall M-REITs. However, there are some slight differences in the results between Islamic M-REITs and overall M-REITs. The significant correlations for Islamic M-REITs are mainly observed with medium-term interest rate proxies (e.g. 5-year MGS, 5-year IRS and 5-year PDS-BBB). These significant correlation coefficients show a positive sign which implies rejection of the notion that REITs are pure yield-play instruments.

In a nutshell, the association between M-REIT returns and interest rate is weak which is consistent with the conclusion found in Mueller and Paulley (1995). It must be noted that the few significant results in the correlation reported in Table 5 are much lower in terms of absolute value than generally reported in other studies (e.g. correlation with long-term interest-rate is reported here as -0.04 while an average of -0.30 is reported in both He et al. (2003) and Mueller and Paulley (1995) who utilised US data). The M-REIT returns are also hardly correlated with the term structure of interest rate and credit spread. Hence Hypothesis 1 is rejected. The overall weak correlation between M-REIT returns and changes in interest rate could be due to the infancy stage of the REIT market in Malaysia.

In addition, the results on the correlation between M-REIT returns and the three interest-rate terms vary. While the correlations are generally negative for both the long- and short-term interest-rate proxies, M-REIT returns tend to correlate positively with medium-term interest-rate proxies with significance detected during the post-GFC subperiod. Upon decomposing the overall M-REITs, it is identified that conventional M-REITs are more closely associated (negatively) with the long-term interest rate while Islamic M-REITs (positively) with the medium-term interest rate.

From an overall perspective, Hypothesis 2 is partially rejected as M-REIT returns are significant at both spectrum of the long- and short-terms, but finds some solace during the post-GFC where significant and stronger correlations are identified at the long end spectrum of the interest-rate term. This finding suggests that market participants have started to appreciate M-REITs as a form of long-term investment consistent with global perception (Newell, 2012) as the REIT market develops in Malaysia.

5.1.2   M-REITs, Stock Markets and Global REITs

Next, we move on to the correlations of the M-REIT returns with the domestic stock market and global equity and REIT markets. The results from the correlation analysis are reported in Table 6.

Table 6   Correlations between M-REITs, Stock Markets and Global REITs

	Panel A - M-REIT (All)				Panel B - M-REIT (Conventional)				Panel C - M-REIT (Islamic)			
	Whole period Aug2005-Dec2013	Pre-GFC Aug2005-Dec2007	GFC Jan2008-Dec2009	Post-GFC Jan2010-Dec2013	Whole period Aug2005-Dec2013	Pre-GFC Aug2005-Dec2007	GFC Jan2008-Dec2009	Post-GFC Jan2010-Dec2013	Whole period Aug2005-Dec2013	Pre-GFC Aug2005-Dec2007	GFC Jan2008-Dec2009	Post-GFC Jan2010-Dec2013
FBMKLCI	0.3394 ***	0.3382 ***	0.4101 ***	0.3823 ***	0.3411 ***	0.3492 ***	0.3860 ***	0.3793 ***	0.2390 ***	0.2311 ***	0.2826 ***	0.1897 ***
FBMKLPRP	0.3403 ***	0.3408 ***	0.3914 ***	0.3586 ***	0.3397 ***	0.3505 ***	0.3538 ***	0.3566 ***	0.2490 ***	0.2753 ***	0.2742 ***	0.2020 ***
S&P500	0.0123	-0.0007	-0.0170	0.0685 **	0.0089	0.0077	-0.0211	0.0490	0.0243	-0.0451	0.0163	0.0693 **
S-REIT	0.1717 ***	0.1540 ***	0.2195 ***	0.2866 ***	0.1679 ***	0.1601 ***	0.2068 ***	0.2564 ***	0.1523 ***	0.1814 ***	0.1406 ***	0.2009 ***
HK-REIT	0.1039 ***	0.0499 ***	0.1494 ***	0.1808 ***	0.1141 ***	0.0620 ***	0.1725 ***	0.1644 ***	0.0786 ***	0.0958* ***	0.0573 ***	0.1032 ***
J-REIT	0.1421 ***	0.1494 ***	0.1609 ***	0.1788 ***	0.1489 ***	0.1504 ***	0.1722 ***	0.1810 ***	0.1043 ***	0.1598 ***	0.0821* ***	0.1017 ***
A-REIT	0.1345 ***	0.1370 ***	0.1797 ***	0.1789 ***	0.1443 ***	0.1421 ***	0.1986 ***	0.1754 ***	0.0949 ***	0.1322 **	0.0897 ***	0.0984 ***
US-REIT	0.0076	0.0022	-0.0217	0.0782 **	0.0035	0.0120	-0.0278	0.0537 *	0.0216	-0.0540	0.0170	0.0813 ***

Note: The table shows the results of correlation analysis between the M-REIT indices and the equity and global REIT indices. Three panels are presented vertically with Panel A showing the results for the composite M-REIT index; Panel B, the conventional M-REIT index; while Panel C, the Islamic M-REIT index. Bolded figures indicate significant correlations and *, ** and *** represent significance levels of 10%, 5% and 1% respectively. There are four columns, which present the results for the whole and three subsample periods, under each panel. The results show a relatively strong correlation between the M-REIT indices and equity and the global REIT indices.

M-REIT returns are significantly and positively correlated with all, except for two (i.e. S&P 500 and U.S. REITs indices), of the equity and REIT markets indices. Under the whole period, indices related to the domestic stock market and local property sector record the strongest correlation at about 0.34. Among the significant global REIT indices, M-REIT returns have the highest correlation with S-REIT at 0.17 and lowest with HK-REIT at 0.10.

Shifting attention to the results of the subsample periods, it can be noticed that there is a general pattern of increasing correlations over time. For example, the correlation coefficients with FMB-KLCI increase from 0.34 during pre-GFC to 0.38 in post-GFC. In addition, the correlation coefficients with global REIT indices also markedly improve (e.g. S-REIT: 0.15 to 0.29 and HK-REIT: 0.05 to 0.18). More notably, M-REIT returns show a significant correlation with both S&P 500 and US-REIT during the post-GFC subperiod.

Generally, similar results are noted for both conventional and Islamic M-REIT returns. However, the correlation coefficients are lower for Islamic M-REITs. There is also another notable difference where conventional M-REITs are slightly more correlated with FBM-KLCI than FBMKLPRP while for Islamic M-REITs, it is the other way around.

Overall, Hypothesis 3 is supported where M-REIT returns are significantly and positively correlated with domestic stock markets. It is also identified that conventional M-REITs are more closely associated with the general stock market while Islamic M-REITs with the property sector market. Meanwhile, Hypothesis 4 is partially rejected whereby S&P 500 and the US-REIT show no significant correlation with M-REIT returns for the whole period, but turn significant in the post-GFC subsample period. On the other hand, the conjecture that S-REITs have the highest correlation with M-REITs among the global indices is supported (Hypothesis 5).

The results provide a couple of important insights on the M-REIT market. One, M-REITs are more closely correlated with the local stock market than global equity and REIT markets. Two, M-REITs become more integrated with global markets in recent time as evidenced by increasing significance in correlations between the two in the post-GFC subperiod.

5.2   Regression Analysis

The sensitivity of interest-rate changes, stock market returns and regional REIT markets returns on M-REIT returns are investigated through a regression analysis of a multifactor model which is shown in Equation 1. While the selection of the general factors is based on the extant literature, the selection of the proxies for these factors is made based on the results from the correlation analysis.

For the stock market proxies, both FBM-KLCI and FBMKLPRP are included in the model. Meanwhile, the interest-rate factors are represented by the 3-month KLIBOR, 5-year IRS and 10-year MGS. The use of three interest-rate factors is to cover the full spectrum of the term from short to long. Lastly, the global REIT markets are proxied by REIT indices that show significant correlations with M-REIT returns for the whole period, namely S-REIT, HK-REIT, J-REIT and A-REIT. The results are tabulated in Table 7.

Panel A of Table 7 shows the results for the overall M-REITs while Panels B and C present the results for conventional and Islamic M-REITs respectively. The discussion shall first focus on Panel A. In general, the full model (Model 1) explains about 14% of the variability in M-REIT returns which is comparable to the results reported for the U.S. REIT returns in Allen et al. (2000) (i.e. 21%) and Mueller and Pauley (1995) (i.e. 9%). However, the goodness-of-fit reported here is considered low when compared against those obtained by He et al. (2003) (i.e. 40%) and Clayton and MacKinnon (2003) (i.e. 65%) who also employed a similar set of factors for U.S. REITs.[8]

Upon dropping other factors, the single-type factor-specific models (i.e. Models 2-4) remain highly significant at a 1% level of significance. It is observed that Model 2 yields the highest R^2 at 13% followed by Model 4 (4%) and Model 3 (<1%) which implies that the stock market factor explains for the most of the variability in the M-REIT returns. This finding is supportive of the conclusion found in Glascock et al. (2000) that *'REITs behave more like stocks and less like bonds'*. Based on the results reported under Model 1 for the whole period, every 1% increase (decrease) in the FBM-KLCI means that the M-REIT returns will increase (decrease) by approximately 0.19%. This sensitivity is slightly larger than the sector-specific beta (i.e. FBMKLPRP) reported at 0.14. As a result, Hypothesis 6 is supported where M-REIT returns are shown to be strongly driven by stock market returns but it must be noted that sensitivity to property sector indices is weaker than that to the general stock market index.

From the subperiod analysis of Model 2, it is found that that the estimated coefficients for stock market proxies are not stable over time but the general pattern remains. For example, the sensitivity to FBM-KLCI is always larger than that to FBMKLPRP. In fact, the gap between the two betas increased from 0.09 in pre-GFC to 0.14 in post-GFC which may indicate the growing importance of general market movements and/or diminishing impact of property-sector indices to M-REIT returns. Hence, the conclusion for Hypothesis 6 remains robust over time.

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[8] Allen et al. (2000) and He et al. (2003) use both stock market and interest-rate factors as regressors for the period of 1993 to 1997 and 1972 to 1998 while Mueller and Pauley (1995) employ only interest-rate factors with varying terms as the regressors for a study period from 1972 to 1993. In addition to stock market and interest-rate factors, Clayton and MacKinnon (2003) also adopt an additional factor, namely real estate returns, in their model for the period of 1979 to 1998.

Table 7 Results on Regression Analysis

Panel A — M-REIT (All)

Panel A M-REIT (All)	Whole Period (Aug2005-Dec2013)				Pre-GFC (Aug2005-Dec2007)				GFC (Jan2008-Dec2009)				Post-GFC (Jan2010-Dec2013)			
	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT
Constant	0.0002	0.0002	0.0003	0.0003	0.0002	0.0001	0.0005	0.0004	-0.0001	-0.0001	-0.0002	-0.0001	0.0002	0.0002	0.0004	0.0003
FBM-KLCI	0.1862***	0.1995***			0.3173***	0.2926***			0.1396***	0.1570***			0.218***	0.2459***		
FBMKLPRP	0.1444***	0.1438***			0.2132***	0.2017***			0.0973***	0.0920***			0.0738***	0.0999***		
3M KLIBOR	-1.5693***		-1.9566***		-2.8859		-4.7383		-1.2801*		-1.6037**		-3.1991***		-2.5667	
5-yr IRS	0.0561		0.8917**		0.4590		0.4192		0.0000		0.6071		-0.1718		1.4605**	
10-yr MGS	-0.2014		-1.0315**		-0.9984		-1.6350		0.6527		0.1143		-0.6314		-1.9048***	
S-REIT	-0.0056			0.0625***	-0.0653			0.0928*	0.0032			0.0390**	0.0637***			0.1528***
HK-REIT	-0.0029			0.0166	-0.0310			-0.0087	-0.0018			0.0151	0.0251			0.0401**
J-REIT	0.0152			0.0369***	0.0226			0.0784**	0.0031			0.0148	0.0283*			0.0446**
A-REIT	0.0102			0.0313***	0.0149			0.0772*	0.0112			0.0225*	0.0067			0.0303**
R^2	0.1349	0.1318	0.0054	0.0411	0.1351	0.1283	0.0064	0.0366	0.1913	0.1804	0.0103	0.0649	0.1840	0.1625	0.0165	0.1012
DW	1.7079	1.7079	1.6952	1.6954	1.4270	1.4239	1.4694	1.4485	2.3060	2.2973	2.1198	2.1689	2.1414	2.1242	2.0893	2.1166

Panel B — M-REIT (Conv)

Panel B M-REIT (Conv)	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE	Model 4 S-REIT
Constant	0.0001	0.0001	0.0002	0.0002	0.0001	0.0000	0.0005	0.0004	-0.0002	-0.0002	-0.0003	-0.0002	0.0002	0.0002	0.0004	0.0003
FBM-KLCI	0.1994***	0.2174***			0.3440***	0.3173***			0.1519***	0.1814			0.2403***	0.2732***		
FBMKLPRP	0.1503***	0.1494***			0.2215***	0.2109***			0.0819**	0.0733**			0.0885***	0.1126***		
3M KLIBOR	-1.6618**		-2.1182***		-2.9148**		-4.7663***		-1.2957*		-1.7710***		-3.5301***		-2.8442*	
5-yr IRS	0.1000		0.9880**		0.6799		0.6128		-0.2284		0.3831		0.2469		2.0127***	
10-yr MGS	-0.4651		-1.3319***		-1.3041		-1.9649*		0.5946		0.1070		-1.1893*		-2.5233***	
S-REIT	-0.0141			0.0584***	-0.0688			0.0992*	-0.0013			0.0330**	0.0360			0.1424***
HK-REIT	0.0036			0.0243	-0.0223			0.0014	0.0096			0.0270	0.0230			0.0408**
J-REIT	0.0188*			0.0417***	0.0175			0.0772**	0.0058			0.0174	0.0361**			0.0558***
A-REIT	0.0170			0.0393***	0.0172			0.0833*	0.0194			0.0307**	0.0118			0.0407***
R^2	0.1369	0.1322	0.0066	0.0434	0.1428	0.1363	0.0072	0.0385	0.1701	0.1554	0.0084	0.0696	0.1784	0.1603	0.0227	0.0873
DW	1.7763	1.7787	1.7598	1.7612	1.4521	1.4488	1.4902	1.4695	2.3769	2.3636	2.2236	2.2722	2.2057	2.2006	2.1508	2.1678

Panel C — M-REIT (Islamic) (Model 3 column header notes: "Model not sig")

Panel C M-REIT (Islamic)	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE (Model not sig)	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE (Model not sig)	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE (Model not sig)	Model 4 S-REIT	Model 1 FULL	Model 2 MARKET	Model 3 INT RATE (Model not sig)	Model 4 S-REIT
Constant	0.0002	0.0002	0.0003	0.0003	0.0004	0.0003	0.0007	0.0005	0.0000	0.0001	-0.0001	0.0000	0.0002	0.0002	0.0003	0.0002
FBM-KLCI	0.1095**	0.1246***			-0.0216	0.0182			0.1611**	0.1563**			0.0880	0.1169		
FBMKLPRP	0.1180***	0.1196***			0.2055***	0.1974***			0.1067*	0.1060*			0.0693	0.0980*		
3M KLIBOR	-0.9838		-1.1467		12.6154		10.9792		-1.2969		-1.4163		-2.5387		-2.0871	
5-yr IRS	-0.3050		0.4591		-3.5341*		-3.0483		0.6774		1.3175*		-1.5397*		-0.2752	
10-yr MGS	0.9502*		0.1657		4.2624**		2.9701		0.6718		0.0074		0.5507		-0.4849	
S-REIT	0.0219			0.0686***	0.0163			0.0996**	0.0064			0.0485**	0.1167***			0.1647***
HK-REIT	-0.0105			0.0067	-0.0341			-0.0041	-0.0228			-0.0057	0.0131			0.0207
J-REIT	0.0100			0.0239	0.0516			0.0548	-0.0027			0.0120	0.0193			0.0273
A-REIT	0.0016			0.0156	0.0019			0.0357	0.0008			0.0137	-0.0010			0.0067
R^2	0.0717	0.0680	0.0013	0.0269	0.0969	0.0759	0.0097	0.0411	0.0945	0.0868	0.0088	0.0221	0.0640	0.0454	0.0013	0.0436
DW	2.2097	2.2133	2.1633	2.1862	2.1494	2.1663	2.1175	2.1408	2.2604	2.2712	2.1736	2.1883	2.2221	2.2166	2.1820	2.2198

Note: The table shows the results of the regression analysis on the identification of factors that drive M-REIT returns. Three panels are presented horizontally with Panel A showing the results for the composite M-REIT index; Panel B, the conventional M-REIT index; while Panel C, the Islamic M-REIT index. *, ** and *** represent significance levels of 10%, 5% and 1% respectively. There are four columns, which present the results for the whole and three subsample periods, under each panel. Within each sample period, there are four additional columns that show the results for each individual model. Model 1 is the full model as shown in Equation 1 while the other three models are factor-specific models which are variations of Model 1.

Similar to Mueller and Pauley (1995), the sign of the estimated beta for interest-rate proxies are mixed for both the full model (Model 1) and factor-specific model (Model 3) (i.e. negative for both short- and long-term interest rates but positive for the medium-term interest rate). However, only the beta of the short-term interest-rate (i.e. 3-month KLIBOR) is significant under Model 1. The coefficient of -1.57 implies that for every one-percentage point increase (decrease) in the 3-month KLIBOR, the M-REIT returns will decrease (increase) by 1.57%. While it appears that the impact of change in KLIBOR is much larger than all the factors combined, this estimated beta is also accompanied by a correspondingly large standard error[9] (i.e. 0.51); hence, there is the need for caution when comparing the estimated coefficients.

Looking at Model 3, none of the interest-rate proxies are significant in the pre-GFC subperiod and 3-month KLIBOR is the only significant interest-rate proxy in the GFC subperiod, but promptly loses its significance post-GFC. During post-GFC, there is some contradiction between Models 1 and 3 with regard to interest-rate proxies. While 3-month KLIBOR remains the only significant interest-rate proxy under Model 1, it becomes insignificant under Model 3, but both the medium- and long-term interest rates become significant. Therefore, something could be amiss.

Referring back to the correlation results, M-REIT returns become insignificantly correlated with any of the short-term interest rate proxies post-GFC but significantly correlated (albeit weakly) with some of the medium- and long-term interest rate proxies (i.e. 5- and 10-year MGS and 5-year IRS). Hence, we suggest that the significant impact of both the medium- and long-term interest rate proxies may have been encapsulated into the short-term interest-rate proxy and/or other factors under Model 1. In order to infer which of the interest-rate proxies are important in the post-GFC era, we should rely on the results under Model 3 which indicates the 10-year MGS to be the most influential of these three proxies. This is a more plausible interpretation as it is corroborated by the finding from the correlation analysis.

Nevertheless, the interest-rate factor has only diminutive influence on M-REIT returns as evidenced by both the weak results reported in the correlation analysis as well as the incredibly low R^2 (i.e. <1%) for the interest-rate factor model revealed under the regression analysis (i.e. Model 3). Therefore, Hypothesis 7 on the importance of interest-rate in driving M-REIT returns is only partially supported.

Moving on, regional REITs seem to play an immaterial role in influencing M-REIT returns over the whole sample period as none of their proxies show any significance in the full model. Even though S-REIT, J-REIT and A-REIT returns are significant under the factor-specific model (i.e. Model 4), their

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[9] Standard errors of estimates are not reported in all of the tables for brevity of space. These results are available upon request.

significance could have been subsumed by the stock market factor in the full model (i.e. Model 1). For the subperiod analysis, none of the regional REIT returns are significant under the full model until post-GFC when both S-REIT and J-REIT returns significantly enter the equation. Shifting attention from Model 1 to 4, it can be noticed that the explanatory powers (i.e. R^2) of the regional REIT returns increase from 3.6% pre-GFC to 6.5% during GFC and slightly over 10% post-GFC. This exponential increment supports the notion that as the M-REIT market matures, it becomes more integrated with the regional REIT markets. However, for the whole sample period, Hypothesis 8, on the significance of regional REIT returns in driving M-REIT returns, is rejected.

Next, we move on to compare and contrast the results between conventional and Islamic M-REITs. Expectedly, Panel B which reports the results on conventional M-REITs show largely similar results as Panel A due to the large constituents of conventional M-REITs in the local REIT market (i.e. 14 out of 17). On the other hand, Islamic M-REITs display a couple of anomalies, as shown in Panel C, when compared to the overall M-REITs.

First, the multifactor models employed have unremarkably low explanatory power on the returns of Islamic M-REITs with below 10% for the whole period as well as all of the subsample periods. They record the lowest R^2 at 6.4% in recent times during the post-GFC subperiod. In addition, the pure interest-rate factor model (Model 3) is not significant at all in any of the subperiods for explaining the returns of Islamic M-REITs. Secondly, both the proxies for the stock market factor (i.e. FBM-KLCI and FBMKLPRP) are initially significant during the pre-GFC and GFC subperiods, but diminish in the post-GFC subperiod. This finding is corroborated with decreasing correlations between Islamic M-REIT returns and stock market proxies reported earlier. From this result, we suggest that Islamic M-REITs may potentially provide portfolio diversification benefits to equity funds.

Our finding also supports the argument presented by Newell and Osmadi (2009) that Islamic M-REITs are different from conventional M-REITs as they exhibit resilient characteristics in the face of crises. However, there is a real concern that the results on Islamic M-REITs, especially during post-GFC, may be skewed towards the characteristics of the KLCC REIT as it consists of two-thirds of its composition. Upon exclusion of the KLCC REIT from the Islamic M-REIT index, the results remain largely the same.

5.2.1   Robustness Check on Regression Analysis

The results of the principal component analysis among the independent variables are shown in Table 8.

Table 8   Principal Component Analysis of the Selected Independent Variables

	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6	PC 7	PC 8	PC 9
Panel A: Eigenvalues and explanatory power of each principal component									
Eigenvalue	2.79	1.47	1.03	0.90	0.76	0.67	0.59	0.54	0.24
% explained	31%	16%	11%	10%	8%	8%	7%	6%	3%
Panel B: Principal components of independent variables									
FBM-KLCI	**0.48**	-0.03	**0.37**	-0.25	-0.09	-0.05	0.14	0.11	-0.73
FBMKLPRP	**0.45**	-0.03	**0.46**	-0.29	-0.12	-0.04	0.11	0.10	0.68
3M KLIBOR	-0.05	**0.35**	**0.57**	0.68	0.28	0.06	0.10	-0.01	-0.01
5-yr IRS	0.07	**0.67**	-0.04	-0.20	0.00	-0.02	-0.65	0.30	-0.01
10-yr MGS	-0.04	**0.66**	-0.18	-0.18	-0.23	0.03	0.60	-0.30	0.01
S-REIT	**0.44**	0.00	-0.09	0.08	0.10	0.22	-0.34	-0.79	0.01
HK-REIT	**0.33**	-0.02	-0.25	0.49	-0.63	0.34	-0.01	0.28	0.02
J-REIT	**0.36**	0.05	**-0.31**	0.29	0.10	-0.82	0.05	0.02	0.05
A-REIT	**0.35**	0.03	**-0.37**	-0.03	0.65	0.38	0.25	0.33	0.04

Note: Panel A reports the eigenvalue of each principal component as well as its respective explanatory power. Meanwhile, Panel B shows the factor loadings of each independent variable on each of the principal components. Three principal components (i.e. PC1, PC2 and PC3) with an eigenvalue that is each above one are selected for the subsequent regression analysis. Based on the bolded factor loadings, PC1 implies the general equity market factor, PC2 signifies the interest-rate factor and PC3 represents the hybrid factor.

Panel A of Table 8 reports the eigenvalue and the proportion explained by each principal component while Panel B provides the factor loadings of each factor on the identified principal components. From Panel A, it can be noticed that there are three principal components, which each carries an eigenvalue of above one, and they collectively explain close to 60% of the total nine independent variables.

Based on the factor loadings provided in Panel B, we deduce that Principal Component 1 (PC1) is related to the factor of local stock and regional REIT markets (i.e. the general equity factor) while PC2 represents the interest-rate factor and lastly, PC3 epitomises a hybrid factor. The M-REIT returns are subsequently regressed on PC1, PC2 and PC3 with a constant and the results are reported in Table 9.

 Generally, the results show that M-REIT returns are significantly driven by all three selected factors. Both PC1 and PC3, which denote the general equity market and hybrid factors respectively, enter the equation highly significant for all types of M-REIT as well as for the whole and all the sub-sample periods. On the other hand, PC2, which represents the interest-rate factor, is moderately significant in driving returns on conventional M-REIT but not on Islamic M-REIT returns. In short, the results from the robustness test reaffirm the inferences drawn from the main analysis findings especially on the note that M-REITs *behave more like stocks and less like bonds*.

6.   Conclusion

REITs have been a popular instrument among investors and property developers alike since their inception. For investors, REITs represent a new class of investment alternatives, in addition to conventional instruments such as stocks and bonds, which are likely to enhance diversification benefits in a multi-asset portfolio. In particular to retail investors, REITs provide the opportunity for ownership of high quality commercial real estate which is traditionally illiquid. In the case of property developers, REITs offer an efficient fund-raising channel for better allocation of resources in this capital intensive industry. Aside from the flexibility to retain significant ownership, property developers are also able to generate additional and sustainable fee income in the form of management fees from their sponsored REITs.

In the case of M-REITs, the market has grown close to 20 times in less than a decade which is a testament to the popularity of REITs and their feasibility of thriving in Malaysia. In this paper, we have documented the development of REITs in Malaysia since its inception in August 2005 to December 2013, in which the market has been acknowledged as one of the Asian leaders (HK-FSDC, 2013). We have also examined the dynamic inter-relationships between M-REITs and stocks, interest rates and global markets. In addition, we have identified the key drivers in explaining M-REIT returns over the sample period. The summary of our results is shown in Table 10.

Table 9   OLS Regression Results with Principal Component Method

Variable	Panel A - M-REIT (All)				Panel B - M-REIT (Conv)				Panel C - M-REIT (Islamic)			
	Whole Period	Pre-GFC	GFC	Post-GFC	Whole Period	Pre-GFC	GFC	Post-GFC	Whole Period	Pre-GFC	GFC	Post-GFC
Constant	0.0003*	0.0003	0.0000	0.0003	0.0002	0.0002	0.0000	0.0003	0.0003	0.0004	0.0002	0.0002
PC1	0.0015***	0.0020***	0.0010***	0.0018***	0.0017***	0.0022***	0.0011***	0.0020***	0.0011***	0.0013***	0.0010***	0.0013***
PC2	-0.0002*	-0.0003	-0.0001	-0.0002	-0.0003**	-0.0003	-0.0001	-0.0003	0.0000	0.0004	0.0001	-0.0003
PC3	0.0010***	0.0021***	0.0005***	0.0008***	0.0010***	0.0022***	0.0004**	0.0010***	0.0007***	0.0011	0.0007***	0.0003
R^2	0.1169	0.1116	0.1524	0.1702	0.1192	0.1198	0.1404	0.1633	0.0620	0.0706	0.0676	0.0519
DW	1.7015	1.4247	2.2526	2.1387	1.7682	1.4480	2.3311	2.2030	2.2120	2.1387	2.2488	2.2352

Note: M-REIT returns are regressed by using OLS on three of the selected principal components with a constant as follows: $\Delta MREIT_t = \alpha + \beta_1 PC_{1t} + \beta_2 PC_{2t} + \beta_3 PC_{3t} + \varepsilon_t$. *, ** and *** represent significance levels of 10%, 5% and 1% respectively. The results generally reaffirm the inferences made from the main analysis findings, in particular, the suggestion that M-REITs conform more to the characteristics of equity than those of bonds.

Table 10   Summary of Results

Hypothesis	Results
H1: M-REIT returns are significantly and negatively correlated with changes in interest rates.	Rejected
H2: M-REIT returns are more strongly correlated with changes in the long term rather than short term interest rate.	Partially supported
H3: M-REIT returns are significantly and positively correlated with changes in the local stock market and in particular, the property sector index.	Supported
H4: M-REIT returns are significantly correlated with global stock and REIT market returns.	Partially supported
H5: M-REIT returns are more significantly correlated with S-REIT returns than other global stock and REIT indices.	Supported
H6: Returns on stock markets are important in driving M-REIT returns.	Supported
H7: Changes in interest rates are important drivers of M-REIT returns.	Partially supported
H8: Returns on regional REIT markets are significant factors in explaining M-REIT returns.	Rejected

Note: The table summarises the results for each hypothesis tested in this study.

The results offer several important implications to various stakeholders such as investors, policymakers and researchers. For investors, it must be noted that M-REITs conform more to the characteristics of stocks rather than bonds; hence, they are not purely yield-play instruments like bonds which are mainly driven by changes in interest rates. At most, M-REITs may be categorised as dividend-type stocks due to their high-payout nature. As for policymakers, the lack of integration between M-REIT and the regional REIT markets is a cause for concern if we wish to continue to maintain the growth momentum of the REIT market in Malaysia.

Policies and guidelines should be drawn with a clear objective to synchronise the best practices among the global and regional REIT markets in order to increase market integration and in turn, boost the appeal of M-REITs among international investors. Lastly, the findings of this paper show that the characteristics of M-REITs are unique and there are some fundamental differences between conventional and Islamic REITs (e.g. conventional REITs are more sensitive to changes in long-term yields as compared to Islamic REITs which are more responsive to changes in medium-term yields). Researchers should take note that most of the findings reported in the extant literature are based on data from conventional REITs, hence impeding generalisation to Islamic REITs to a limited extent.

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Appendix 1   M-REIT Index Construction

The following *LasPeyres* index, which is an established formula used by most indexing entities, is employed:

$$Index_1 = \frac{\sum_i P_{i,1} X Q_{i,0}}{\sum_i P_{i,0} X Q_{i,0}}$$

P is the individual REIT unit price and Q signifies its outstanding units while subscripts i represent the individual M-REIT and 0 and 1 stand for periods 0 and 1 respectively. The formula is usually presented in its modified form as follows:

$$Index\,Level_1 = \frac{\sum_i P_{i,1} X Q_{i,1}}{Divisor_1}$$

The divisor is adjusted whenever there is a change in the outstanding units of the respective M-REITs following any corporate exercise. Besides the ordinary equity-fundraising exercise, many M-REITs (e.g. the Axis, Sunway, and IGB REITs) also issue new units to their respective REIT managers as settlement of management fees, hence impacting the divisor rather frequently. In addition, the Axis REIT also initiated an income-distribution-reinvestment plan (IDRP) in 2011, hence increasing the instances for revision of the divisor. We meticulously account for all of these activities and adjust the divisor accordingly. The detailed procedures for adjusting the divisor can be found in S&P Dow Jones Indices: Index Methodology (2012).

The composite M-REIT index comprises all M-REITs while the conventional index consists of 13 M-REITs with the four Islamic balanced M-REITs as constituents of the Islamic index. It must be noted that the Axis REIT was initially conceived as a conventional REIT until its conversion into an Islamic REIT on 1 January 2008; hence, its membership was accordingly transferred from the conventional index to the Islamic index after its conversion date.