

## DOES FAITH HAVE IMPACT ON INVESTMENT RETURN: EVIDENCE FROM REITs

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**Abstract.** This paper investigates whether faith has impact on investment returns. Specifically, we choose the Shariah compliance and REITs investment for the purpose of investigation. Synthetic Shariah compliant portfolios are constructed with various interpretation of compliance. We compare the performance of Shariah compliant portfolios with US Equity REIT portfolio during 1993–2017 by examining the abnormal returns using CAPM and Carhart four-factor model. We find no evidence of underperformance or outperformance of the Shariah compliant investments. This is also true during the financial crisis periods which is confirmed by the sub-sample analysis. Our findings suggest that Shariah compliant REIT investor faces no cost or gain in his investments as a result of his faith.

**Keywords:** Shariah compliance, Real Estate Investment Trusts (REIT), faith-based investment, Islamic finance, risk-adjusted performance.

### Introduction

The concept of “faith” and “investing” may seem to have little to do with each other. The very notion that rational and precise calculations of self-interest in financial markets overlap with the abstract world of religion and belief may even seem absurd. However, the two concepts are undeniably linked and faith-based investing has grown significantly since the second half of the 20th century. Despite the robust growth, faith-based investments are an understudied and poorly explored facet of finance. One reason for this is because, unlike other investment practices, faith-based investing involves a plethora of different faiths, with myriad ways of interpretation. Hence, uniform guidelines or prescriptions regulating this investment practice are starkly absent. For instance, with regards to the Christian faith, Evangelical and Protestant denominations of the religion have very different interpretations of what constitutes Christian investment practices from investors of the Roman Catholic or Methodist Christian denominations. Similarly, Islamic investors belonging to the Sunni sect of the religion may have different explanations of what is and is not Shariah compliance compared to investors belonging to the Shia sect of the same religion.

Additionally, even within each sect of any one religion, there remain varying gradations of interpretation as to what constitutes compliance, such interpretations varying widely across jurisdiction and investor type.

The aim of this paper is to examine whether faith has impact on investment returns. Faith-based investors are restricted on the choice of asset due to their faith, it is important to understand such restriction will incur a cost for them. To overcome the complexity of studying the impact of faith on investment returns, the choice of the faith and investment asset class are crucial. Firstly, the chosen faith must have a uniform guideline on the investment. This study chooses Islamic faith, in particular, Shariah compliance investment. Shariah compliance investment is clearly guided by two principles, namely sectoral screens and financial screens. Furthermore, Islamic faith has played a prominent role in the field of alternative finance in the last 20 years. Secondly, previous studies (Abdullah, Hassan, & Mohamad, 2007; Hakim & Rashidian, 2004; Kok, Giorgioni, & Laws, 2009) investigated the impact of faith on investment by using equity investment. The drawback for equity investment is that the characteristics and industry of the companies are different which make the compliance

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and non-compliance investment not directly comparable. Thus, this study chooses Real Estate Investment Trust (REIT) which focus on real estate investment. Real estate is uniquely compatible with Shariah finance. Unlike stock and bonds, property investments are least likely to be linked with the elements of “Usury” and “Riba” (interest bearing speculation) which is considered Haram or Un-Islamic. As such, the vast majority of Shariah investments are made within the real estate space. Furthermore, the past decade has seen an increasing application of REITs as a vehicle for Shariah investments. This is particularly among smaller scale individual Islamic investors and smaller Islamic funds that would not otherwise be able to acquire large-scale commercial real estate (Rozman, Azmi, Mohd Ali, & Mohamed Razali, 2015).

When it comes to Shariah finance, it is worth noting the subtle yet important difference between Islamic investment and Shariah compliant investment. Islamic investment for instance, involves investing in assets or securities that have already been categorized as Islamic by an external market regulator (Ibrahim & Ong, 2008). For example, investing in the Islamic REITs of Malaysia would constitute Islamic investing as the REITs were established and operate in line with Islamic law and officially meet the Shariah guidelines determined by the Malaysian Securities Commission (Malaysia’s Islamic Finance Marketplace [MIFC], 2014). Shariah compliant investment however, involves Shariah investors applying their own screens to determine if an asset is Shariah compliant or not. Such assets are varied and need not be deemed Islamic by external regulator. Investing in US REITs based on individually applied Shariah frameworks for screening would be an example of Shariah compliant investment. As such, when it comes to Shariah compliant investment within the REIT space, Shariah investors face varying guidelines as to what does constitute compliance.

In order to study how various degree of Shariah compliance affects investment returns, this study focuses on Shariah compliant investment in US REITs. Since US has the largest REITs market, it acts as an investment vehicle for global Shariah investors. According to various interpretation of Shariah compliance, Shariah investors can apply their own screening on the investment in US REITs. Following various guideline of Shariah compliance, we categorized Shariah complaint REITs by going through their financial statement.

This study contributes the literature in two folds. Firstly, unlike previous studies (Ibrahim & Ong, 2008; Alhenawi & Hassan, 2013) who only used either sectoral screen or financial screen to interpret Shariah compliance, this study uses both sectoral and financial screen to create “synthetic” portfolios at various degree of Shariah compliance, namely strict Shariah compliance, light Shariah compliance and regular Shariah compliance. This allows us to test the impact of faith on investment returns with various interpretation of Shariah compliance. Secondly, previous studies (Ibrahim & Ong, 2008; Alhenawi & Hassan, 2013) tested the Jensen’s alpha of Shariah compliant

portfolios by using conventional asset pricing models such as CAPM and multifactor models. The conventional asset pricing models do not yield unbiased inferences which are subject to the bad model problem (Fama, 1998). Bad model problems arises from two aspect. Firstly, any asset pricing model does not completely describe the expected returns. This is especially important for asset pricing in REIT since there are industry specific factors exist. Secondly, the asset pricing model prediction of expected return may subject to the sample period selection. In addition of using the conventional asset pricing models, this study adopted an estimation method proposed by Chiang, Kozhevnikov, Lee, and Wisen (2008) to overcome the bad model problem. The idea is regressing the return spread between two portfolios on the risk factors to test the incremental changes in Jensen’s alpha. The detailed estimation method is explained in the methodology section.

With both conventional asset pricing model and the estimation method proposed by Chiang et al. (2008), we find no evidence of underperformance or outperformance of the Shariah compliant investments. This is also true during the financial crisis periods which is confirmed by the sub-sample analysis.

## 1. Background

Islamic or Shariah finance is the application of Shariah law to the workings of finance and investment. Shariah law guides the transactions to be deemed Islamic, it can only be used to fund activities that are categorized as “Halal” or Islamic by the Holy Quran. In its simplest form, Shariah guidelines have an operational and/or financial element to guide the investment. It is worth noting that because Shariah finance is fundamentally based on Quranic scriptures, it is subjected to various degrees of interpretation. As such, Shariah finance, unlike conventional finance, is uniquely placed within the financial services industry because it possesses an element of subjectivity to it (Price-waterhouseCoopers, 2017). Given this, there is yet to be a single uniform guideline that regulates how the global Islamic Finance industry should work (World Bank, 2016).

Financial guidelines tend to apply to the sources of funds and how they are used to make investments. In general, this forbids the issue and sale of any interest-bearing securities known as Usury or Riba as well as the engagement in any form of speculative investments. The main purpose of this is to reduce risks that are outside the control of the parties involved in any transactions. Additionally, securities need to be screened to ensure that they meet such financial requirements. Common financial screens from the Gulf region for example, permit the investments in securities only if they have leverage ratios under 33%, interest income amounts of less than 5% of total revenue and cash and accounts receivables not exceeding 45% of total assets (Girard & Hassan, 2008). When it applies to financial markets, financial guidelines prohibit the use of most conventional financial derivatives as well as short-selling. It is worth noting that financial guidelines

are usually only adhered to after operational guidelines have been followed (Alhenawi & Hassan, 2013).

Operational guidelines however, involves prohibiting investments into assets or securities that operate in ways that are deemed as Haram in Islam. This includes the prohibition of investing in assets linked to alcohol, tobacco, pork and potentially harmful gaming and entertainment activities such as prostitution and gambling, as well as financial services based on Riba (interest) and conventional insurance (El-Gamal, 2000). As noted above, while financial guidelines require operational compliance, depending on the interpretation of Shariah compliance, operational guidelines need not necessarily be coupled with financial compliance (Alhenawi & Hassan, 2013).

## 2. Literature review

### 2.1. Faith-based and social responsible investment

The literature on faith-based investments and socially responsible investments tend to be interlinked. However, these studies continue to present contradictory findings. One view is that adherence to faith and ethics leads to underperformance. Walley and Whitehead (1994) studied the performance of US funds that were restricted by ethical and environmental constraints in their investments in the 1980s. Their findings revealed that funds that faced constraints had on average 16% lower risk-adjusted returns compared to unconstrained funds. This finding is tied up more broadly with the efficient market hypothesis on conventional asset pricing theory which states that limits on diversification gains, yield suboptimal portfolios and lower risk-adjusted returns (Derwall, Guenster, Bauer, & Koedijk, 2005). This is also supported by Geczy, Stambaugh, and Leven (2005) that compared the risk-adjusted performance of faith-based and conventional US mutual funds in the 1990s. They found that faith-based funds have on average 21% lower risk-adjusted returns than conventional funds because of higher operational expenses. One criticism of Geczy et al. (2005) is that it failed to account for differences in managerial skills between funds. Hakim and Rashidan (2004) conducted a similar comparison between the market-weighted Dow Jones Islamic Market World Index and the Dow Jones World Index from 1999–2002 and found that on average, the index constrained by faith underperformed by a statistically significant margin.

An alternative view is that faith-based investments enhance returns (Porter & Van der Line, 1999). The argument is that adherence to ethical and social requirements generate new market opportunities for investors. This is empirically supported by Hussein and Omran (2005) who showed that both the Dow Jones Islamic Market World Index and the Dow Jones Sustainability Index outperforms the unconstrained Dow Jones World Index when compared over a 10-year period. They found that outperformance occurs when the indices are compared on an equal-weighted but not value-weighted basis. While the results contradicts the findings from Hakim and Rashid-

ian (2004), it tells us that not only a longer time-series is important, but also the way in which portfolios or indices are constructed (equal-weighted or value-weighted) can have a significant impact on how they perform. Similarly, Lightstone and Woods (2007) showed outperformance when faith-based portfolios of stocks are compared against unconstrained portfolios from the Russell 1000 and 2000 index over a 20-year period.

A final view is that adherence to faith-based investment does not alter risk-adjusted performance for investors (Hamilton, Jo, & Statman, 1993). Luther, Matatko, and Corner (1992) compared the performance between ethical and conventional US mutual funds in the 1980s and finds no statistically significant difference in risk-adjusted returns between the funds. One criticism of their approach was that his definition of what constituted compliance remained vague. Similarly, Girard and Hassan (2008) found no difference in the performance of ethical and non-ethical Malaysian mutual funds from 1996 to 2005. Finally, Białkowski, Etebari, and Wisniewski (2012) studied Ramadan stock pricing anomalies in Muslim countries, where they argued that any difference in performance and pricing between faith-linked and conventional investments is likely to stem from differing investor behaviour rather than fundamental differences in the nature of such investments. This is because faith-based investors are more risk-averse than conventional investors. However, Shamsudin, Salamon, and Abu-Hussin (2014) refuted the argument by constructing a hedonic behavioural model that showed that the risk appetite of faith-based investors is not statistically different from that of conventional investors based on their historical investment patterns.

### 2.2. Conventional Islamic finance

Most studies on conventional Islamic finance tend to look at the comparative performance of Islamic equities. Many such studies have shown that adherence to Islamic principles does not result in statistically significant differences in returns when compared with non-compliance over a long-time series. For instance, Abdullah et al. (2007) studied the Malaysian market, Hakim and Rashidian (2004) studied the US market, Kok et al. (2009) analysed the European market, Bauer, Otten, and Rad (2006) looked at the Australian and Hoepner, Rammal, and Rezec (2011) studied over 7 Asian markets, all found no statistically significant difference in the risk-adjusted performance between compliant and non-compliant Islamic equity portfolios. An important reason for arriving at the same result is because all the above authors used the same guidelines stipulated by the Malaysian and Indonesian regulators, to define Shariah compliance when they screened the individual equities (Krasicka & Novack, 2012).

Over a shorter time period, the returns of Islamic equities tend to differ quite significantly from conventional equities. Investments in Islamic equities perform better than conventional equities during downturns. Both Al-Khazali,

Lean, and Samet (2014) and Ho, Rahman, Yusuf, and Zamzamin (2014) found that Islamic indices outperform their conventional counterparts during crisis periods by using stock indices across different countries. On possible explanation as argued by Alam and Rajjaque (2010) is that Islamic equities that comply with financial guidelines have lower levels of leverage as opposed to conventional equities. Even equities that comply with operational guidelines alone tend to perform better due to their limited exposure to FIRE (finance, insurance and real estate) sectors of the economy which are more cyclical and vulnerable during downturns (Alam & Rajjaque, 2010).

### 2.3. Islamic finance and REITs

For Islamic REITs, the vast majority of academic research tends to focus on the Malaysian REIT market due to it being the first market to launch a Shariah certified REIT (Ong, Teh, Soh, and Yan, 2012). Newell and Osmadi (2009) compared Malaysian Shariah REITs and conventional Malaysia REITs (M-REITs). While Shariah REITs have similar characteristics as conventional REITs, such as low risk, defensive characteristics and provide diversification benefit, those characteristics of Shariah REITs are enhanced during the global financial crisis. Razali and Sing (2015) provided evidence that Shariah REITs have lower systematic risk than conventional M-REITs. Ong et al. (2012) studied Malaysian Shariah REITs using Sharpe and Treynor measures from 2006–2009, found evidence of underperformance of Shariah REITs compared to conventional REITs. Abdullah, Zahari, and Marazah (2011) however, find evidence of outperformance of Islamic REITs in Malaysia in their study. This is supported by the findings of Hamzah, Rozali, and Tahir (2010) that Islamic REITs outperforming conventional Malaysian REITs from 2005 to 2009 when portfolios are constructed on an equal-weighted but not value-weighted basis. Rozman et al. (2015) compared the portfolios between Shariah compliant and non-compliant REITs in Malaysia also found that the compliant portfolios outperformed the non-compliant portfolio over a 10-year period from 2004 to 2014 on both an equal-weighted and value-weighted basis. They argued that this was because of the specialist nature of the assets held by Islamic REITs in Malaysia that was mainly concentrated in the plantations and healthcare sector. This resulted in lower correlation of Islamic REITs ( $r = 0.29$ ) as opposed to conventional REITs ( $r = 0.70$ ) with the KLSE stock index leading to portfolio diversification gains. Chuweni et al. (2017) showed that the reason that Malaysian Shariah REITs outperform conventional M-REITs is that Shariah REITs are operating more efficiently. The above studies present completely contradictory findings because firstly the REIT market in Malaysia is very small with only 18 listed REITs inclusive of only 4 Shariah REITs as of 2016. Hence, the studies are subjected to severe idiosyncratic risks during the analysis leading to differing findings. This makes it difficult to make robust conclusions from the results. In addition, the studies present only a single interpretation of Shariah

compliance which follows the framework of the Securities Commission of Malaysia (Ajmi, Hammoudeh, Nguyen, & Sarafrazi, 2014).

A more robust analysis of Shariah compliant REIT investment is performed by Ibrahim and Ong (2008) who analysed the cost of Shariah compliance using US REIT data from 1993–2006. Their research screened US REIT data according to operational interpretations of compliance. They found that compliant portfolios showed no evidence of outperformance or underperformance on a value-weighted basis, but the compliant portfolios outperform on an equal-weighted basis. These findings contradict with Alhenawi and Hassan's (2013) study of Shariah compliant US REIT portfolios over period 1990–2010, they showed that compliant portfolios do not outperform non-compliant portfolios on both a value and equally-weighted basis. One reason for the differing results is that both studies used different interpretations of compliance. While Ibrahim and Ong (2008) used a purely operational definition of compliance, Alhenawi and Hassan (2013) used a wholly financial interpretation.

Other studies have been investigating the risk factors of Shariah compliant REITs. Sing and Loh (2014) showed that Shariah compliance risk is a significant risk factor for explaining the variation in excess return of Shariah compliant real estate portfolios. Akinsomi, Ong, Ibrahim, and Newell (2014) showed that idiosyncratic risks can explain the cross-sectional returns of Shariah compliant REITs, this is due to the inability of diversification of Shariah compliant REITs' investments.

### 3. Data

Ideally, the study of Shariah compliant REIT investment should involve the comparative study of Shariah certified REITs against non-Shariah REITs. However, the total number of Shariah certified REITs globally is less than 15, where the Malaysian market is the largest in terms of the market capitalization, and the earliest Shariah certified REIT started trading in 2006. Thus, any study looking at purely Shariah certified REITs would not be robust and would be subject to significant idiosyncratic risks. US REIT data was chosen for two reasons. First, given the long-time series and large sample size of REITs that trade in the US market, any comparative analysis involving US REITs would be more robust than other markets worldwide, making the findings more resilient. Second, as all US REITs trading are not given any Shariah compliance certification, this would enable each individual REIT to be screened according to different interpretations of compliance, allowing comparisons between different Shariah perspectives to be made.

Monthly REIT data inclusive of total returns, market capitalization and leverage ratios were collected from 1993–2017. 1993 was chosen as the starting point, given the relatively small size of the REIT industry prior to 1993 (Chan, Leung, & Wang, 2005). This data was gathered from the Bloomberg Terminal and the information

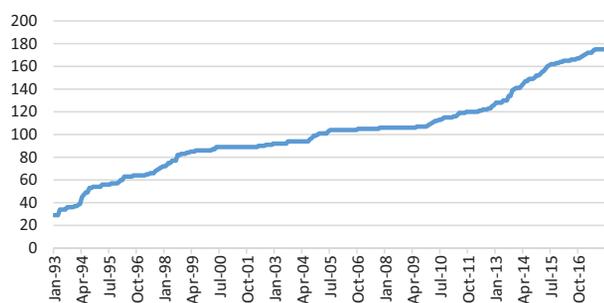


Figure 1. Monthly variation in REIT number from 1993–2007

on the REITs that were trading on the US market were crosschecked against the constituent companies of the NAREIT (National Association of Real Estate Investment Trusts) REITs index<sup>1</sup>. The number of REITs over the time period was dynamic and not static. Hence, adjustments to the sample of REITs were conducted to account for new REITs entering the market and old REITs that stopped trading. The study involved the examination of 175 Equity REITs over the period. The number of REITs across time is shown in Figure 1.

## 4. Methodology

### 4.1. Portfolio construction

To investigate the research question, in the spirit of Geczy et al. (2005), synthetic Shariah compliant were manually constructed using the different interpretations of Shariah law as it applied to REIT investments. This involved individual, sectoral and financial screens of the 175 US Equity REITs.

#### 1. SC-R (Shariah Compliant Regular Portfolio)

The first portfolio was constructed based on an operational framework of compliance laid down by the Islamic Regulators in the Gulf Cooperative Council (GCC) and was called the Shariah Compliant Regular portfolio. Although, in practice, there remain varying compliance differences between GCC member countries, this interpretation of compliance is loosely adhered to by individual investors in countries such as Bahrain, the UAE, Qatar, Saudi Arabia, Oman, Yemen, Kuwait and Brunei (MIFC, 2014). This operational framework forbids the investment in REITs that operate within industries that are typically considered to be haram (Ibrahim & Ong, 2008) such as conventional financial services, casino gambling, hotels, bars, theaters and facilities that deal with the storage, preparation and distribution of pork and alcohol. From a sectoral perspective, this prevents investments into all retail, diversified and hotel REITs without exception. As per the reasoning of Ibrahim and Ong (2008), office RE-

ITs were deemed to be Shariah compliant despite the fact that banks and conventional financial institutions may be tenants. This is because offices tend to facilitate the operations of these tenants and not the sale of their services (which is considered haram). Each industrial REIT was also screened to ensure that REITs that invest in breweries or pork processing factories were excluded. The storage REITs were screened individually as well to see if they were involved in the storage of alcohol and pork. From 175 REITs screened, a total of 93 REITs came under this category of compliance which comprised of residential, healthcare, office, industrial, storage and specialty (timber and data centre) REITs.

#### 2. SC-L (Shariah Compliant Light Portfolio)

The second portfolio is called the Shariah Compliant Light Portfolio (SC-L). This portfolio allowed for a less-restrictive interpretation of Shariah compliance, typically adhered to by individual Shariah investors in South East Asian countries like Indonesia, Malaysia and Singapore as well as some individual investors in Pakistan (MIFC, 2014). In this interpretation, diversified, hotel and retail REITs were not immediately excluded from the portfolio. Instead, REITs are deemed as Shariah compliant as long as less than 20% of their total income every year came from the earnings of operations traditionally deemed Haram (MIFC, 2014). This followed the guidelines stipulated by the Shariah advisory council of the Malaysian Securities Commission, Shariah framework of the National Shariah Board of Indonesia and the Shariah committee of the Monetary Authority of Singapore (MIFC, 2014). Screening was conducted by looking at the annual reports for each REIT every year. For any given year, compliance was determined by looking at annual reports that went back 5 years to ensure that the companies satisfy compliance criteria for the past 5 years. In cases where the financial breakdown was not apparent, REITs were categorised as compliant if less than 20% of their total floor space owned was reserved for non-compliant activity. From the 175 REITs screened, 124 were deemed to fit within this categorization of compliance. This portfolio was also based on a purely operational framework of compliance.

#### 3. SC-S (Shariah Compliant Strict Portfolio)

This portfolio applied both operational and financial guidelines of Shariah compliance in its screening. Such a guideline for compliance tends to be typically adhered to by institutional investors in Muslim majority nations both in the GCC and in Asia. Examples would include the pilgrimage funds of Muslim majority countries such as the EPF Fund in Malaysia as well as some sovereign funds in Muslim majority nations such as the Government Pension Fund of Bahrain. It is important to note, that in most cases, operational compliance is a precursor for financial compliance (Alhenawi & Hassan, 2013). As such, REITs that were screened to be financially compliant had to already be operationally compliant in the first place.

<sup>1</sup> NAREIT website provides dynamic constituent companies of NAREIT REITs index. Retrieved from <https://www.reit.com/data-research/reit-indexes/monthly-index-constituents>

For this portfolio, the SC-R definition of operational compliance was used. To be considered financially compliant however, a REIT must have (in order of descending importance) 1) debt to asset ratio less than 33% and/or 2) an interest expense ratio of less than 5%, and/or 3) an interest income ratio of less than 5%, and/or 4) a cash and accounts receivable ratios of less than 45% (Lahsasna & Hassan, 2012). The number of such requirements that are adhered to in order to achieve financial compliance depends on the interpretation of compliance, with GCC institutional investors adhering to more constraints than Asian investors. For the purpose of this research, it was decided to only apply the guideline that debt to asset ratios had to be less than 33%. This is because it was found that once all financial guidelines were applied, the resulting investable set was too small (less than 5 REITs) to make any meaningful inference. As such, only the first guideline for financial compliance was applied and the resulting portfolio consists of 19 REITs that adhered to both financial and operational elements of compliance.

4. ER (Equity REIT Portfolio)

Finally, an Equity REIT portfolio that consisted of all US REITs trading from 1993 to 2017 was constructed. The main purpose for this portfolio was to act as a control throughout this study, Shariah compliant investment cannot involve Usury and Riba (interest bearing speculation), Mortgage REITs should be excluded. Thus, the control group only consists of Equity REITs. This portfolio consisted of the full set of 175 US Equity REITs.

Based on different interpretation of Shariah compliance, both equally-weighted and value-weighted portfolios are constructed. With equally-weighted portfolio, each REIT is given the same weight. With value-weight portfolio, the weight of each REIT is based on its market value of outstanding shares. To make sure that the performance of our synthetic portfolio is not driven by certain sectors in real estate, Figure 2 shows the property type composition of all the portfolios. All the portfolios are diversified across different property type.

4.2. Statistical methods

CAPM and Carhart four-factor models (Carhart, 1997) are used to measure abnormal return performance. The portfolio excess return is regressed and the CAPM equation is depicted as below in Equation (1):

$$R_{p,t} - R_{f,t} = \alpha_p + b_p (R_{m,t} - R_{f,t}) + \varepsilon_{p,t} \tag{1}$$

where:  $R_{p,t}$  refers to the monthly portfolio return at month  $t$ ;  $R_{m,t}$  is the market benchmark return at month  $t$ ;  $R_{f,t}$  is the yield of one-month US Treasury bill used as a proxy for the risk-free rate at month  $t$ ;  $\alpha_p$  and  $b_p$  are the regression parameters and  $\varepsilon_{p,t}$  represents the error term. The intercept  $\alpha_p$  known as the Jensen's alpha is a measure of the average monthly abnormal return. Since the sample in this study is REITs, a REIT industry benchmark is used as the market return. In particular, this study

uses NAREIT index which is an index track the return of all equity REITs and Mortgage REITs<sup>2</sup>.

The Carhart four-factor model consist of Fama-French three-facand momentum factor, the model is equation (2) below:

$$R_{p,t} - R_{f,t} = \alpha_p + b_p (R_{m,t} - R_{f,t}) + s_p SMB_t + h_p HML_t + u_p UMD_t + \varepsilon_{p,t}, \tag{2}$$

where:  $\alpha_p$ ,  $b_p$ ,  $s_p$ ,  $h_p$  and  $u_p$  represent the regression parameters.  $\alpha_p$ ,  $b_p$ ,  $s_p$ ,  $h_p$  and  $u_p$  are zero-investment portfolios representing the excess return in the market portfolio ( $R_{m,t} - R_{f,t}$ ), the difference between a portfolio of small stocks and a portfolio of big stocks (SMB), the difference between a portfolio of high book-to-market stocks and a portfolio of low book-to-market-stocks (HML), and the difference in the average returns between stocks with the best performance in the year before and stocks with the worst performance (MOM). All four factors have proven to be relevant in explaining comparative REIT portfolio performance in past studies, particularly as it relates to Shariah compliance (Ibrahim & Ong, 2008). The monthly data on the Fama-French three-factor model with momentum factor is obtained from Ken French's website (<http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/>) where Fama-French North American factors were downloaded for this study given the use of US REIT data.

To investigate the statistical margin of difference between Shariah compliant portfolio and the Equity REIT portfolio, we employ a control mechanism which is proposed by Chiang et al. (2008) to test abnormal return differences and the factor coefficient differences between two portfolios. As we mentioned earlier, both the regular CAPM and the multi-factor model can yield biased inferences which are subject to the bad model problems (Fama, 1998). The specification of the model is depicted in Equation (3) and Equation (4):

$$R_{er,t} - R_{c,t} = (\alpha_{er,t} - \alpha_{c,t}) + (b_{er,t} - b_{c,t})R_{m,t} + (\varepsilon_{er,t} - \varepsilon_{c,t}) = \Delta\alpha_p + \Delta b_p R_{m,t} + \varepsilon_{p,t}; \tag{3}$$

$$R_{er,t} - R_{c,t} = (\alpha_{er,t} - \alpha_{c,t}) + (b_{er,t} - b_{c,t})(R_{m,t} - R_{f,t}) + (s_{er,t} - s_{c,t})SMB_t + (h_{er,t} - h_{c,t})HML_t + (u_{er,t} - u_{c,t})UMD_t + (\varepsilon_{er,t} - \varepsilon_{c,t}) = \Delta\alpha_p + \Delta b_p (R_{m,t} - R_{f,t}) + \Delta s_p SMB_t + \Delta h_p HML_t + \Delta u_p UMD_t + \varepsilon_{p,t}, \tag{4}$$

where:  $R_{er,t} - R_{c,t}$  is the return spread between the monthly return on the Equity REIT portfolio against each type of Shariah compliant portfolio. Under two controlled

<sup>2</sup> We also tried Fama-French market index, the Wilshire Index and the S&P 500 stock index, it was found that the NAREIT index give the most conservative abnormal returns estimates. Additionally, when the NAREIT index was used, the market betas and adjusted R-squares were the highest, thus indicating its fit within the models.

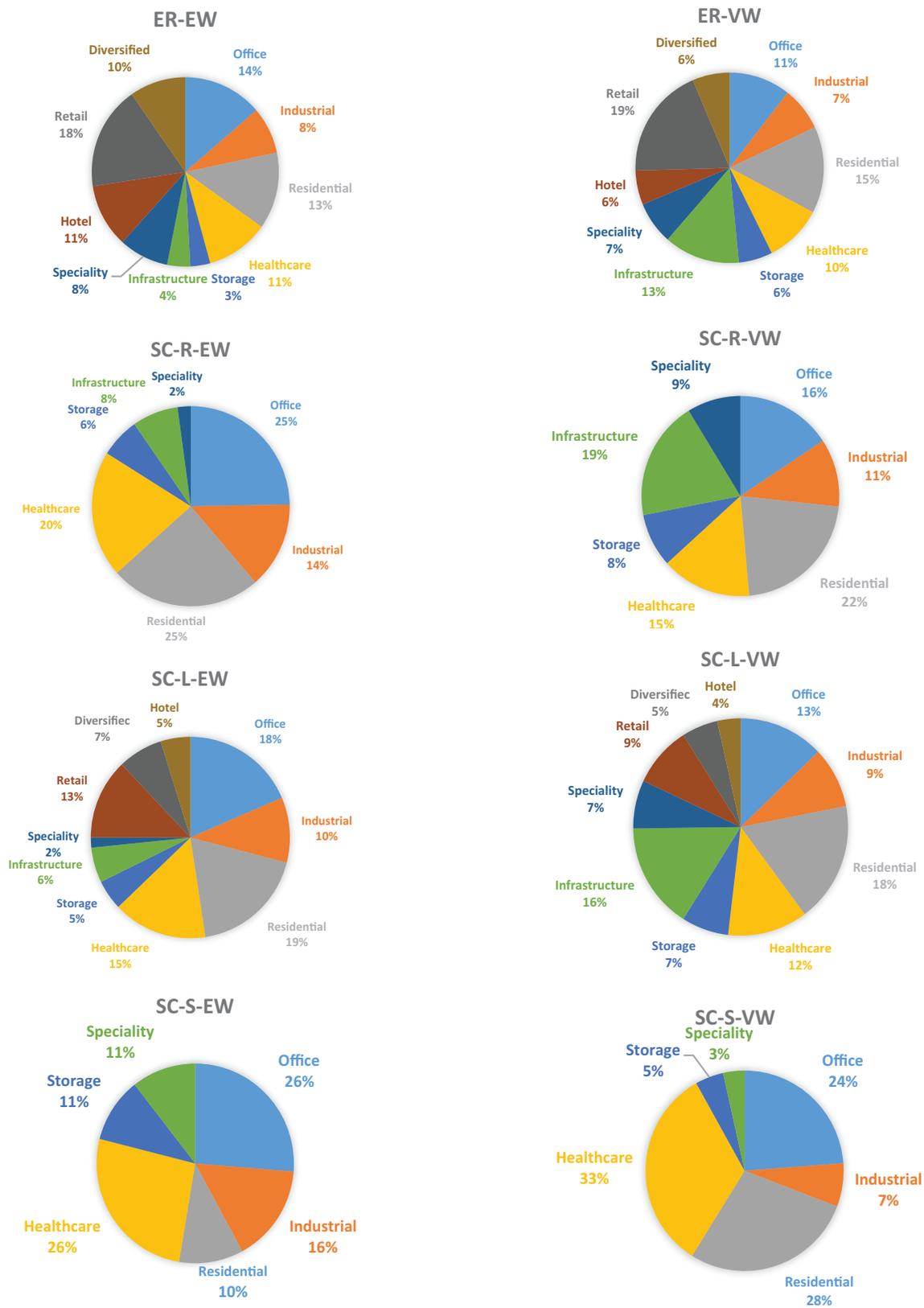


Figure 2. Property type composition of portfolios

specifications, positive (negative)  $\Delta\alpha_p$  measures the incremental (decremental) average monthly abnormal return of the Equity REIT portfolio; that is, the Equity REIT portfolio outperforms (underperforms) the Shariah compliant REIT portfolios by a statistically significant margin. If the Equity REIT portfolios perform and generate alphas that are not statistically different from those of the Shariah compliant REIT portfolios, we would expect  $\Delta\alpha_p$  to be zero and infer the Shariah compliant REIT portfolios and the Equity REIT portfolios do not have significantly different performances. Moreover, other factor coefficients including  $\Delta b_p$ ,  $\Delta s_p$ ,  $\Delta h_p$  and  $\Delta u_p$  also provide statistically significant margins for each relevant coefficient in the portfolios. These control specifications can add an additional layer of robustness to the analysis.

Furthermore, since Al-Khazali et al. (2014) and Ho et al. (2014) claim that Shariah REITs possess defensive properties during crises, we also performed sub-period analysis cover the time period 2000–2003 (dot-com bubble crash) and 2007–2009 (global financial crisis).

### 5. Empirical results

Table 1 shows the summary statistics for the returns of 8 constructed portfolios over the entire sample period from 1993–2017. On an equal-weighted basis, SC-L portfolio outperforms the Equity REIT portfolio whereas both SC-R and SC-S portfolios underperform the Equity REIT portfolio. When size (value-weighted) is considered, the findings appear to be different. Both SC-R and SC-S portfolios outperform the Equity REIT portfolio whereas SC-R portfolio underperforms the Equity REIT portfolio.

Table 2 shows the t-test for the difference in returns between various Shariah compliant portfolios and the Equity portfolios. The results reveal that all differences in returns are statistically insignificant for the entire time period as well as during the sub-periods.

Table 3 shows the estimation results of the CAPM model. The Jensen’s alpha is statistically insignificant for all portfolios except for the SC-R-EW portfolio. However, it is only significant at the 10% level. Since the Jensen’s alpha is a measure of abnormal return, the findings do not give much evidence of outperformance or under-performance in relation to the market index for all our constructed portfolios. Additionally, all market betas are positive and statistically significant at the 1% level.

In looking at the sub-period analysis, we find no evidence of abnormal returns from 2000–2003 since all the Jensen’s alphas are statistically insignificant. Similarly, we find no evidence of abnormal returns from 2007–2009. since all the Jensen’s alphas are statistically insignificant. These findings are different from Al-Khazali et al. (2014) and Ho et al. (2014) who find evidence of Shariah compliant funds outperforming the market during the crisis period.

Table 4 shows the estimation results of the Carhart four-factor model. Similar to the CAPM model, the alpha generated by four-factor model is statistically insignificant for all portfolios except the SC-R-EW portfolio. The negative statistically significant coefficients of SMB for the value-weighted portfolios suggest that those portfolios consist more of large cap rather than small cap stocks, while the opposite is true for most of the equal-weighted portfolio. The negative and significant coefficients of HML for all the value-weighted portfolios indicate that they consist

Table 1. Descriptive statistics for returns (%) of constructed portfolios

Portfolio	Mean	Std. Dev.	Median	Max	Min	# of REIT
SC-R-EW	0.8408	3.7109	1.1156	15.47	-17.84	93
SC-L-EW	0.8651	4.5546	1.1506	31.81	-21.24	124
SC-S-EW	0.6941	5.6126	1.0554	26.65	-30.27	19
ER-EW	0.8441	4.3621	1.1206	21.65	-22.29	175
SC-R-VW	0.9102	4.4682	1.1200	16.79	-18.26	93
SC-L-VW	0.9479	4.8075	1.1386	21.24	-22.40	124
SC-S-VW	1.0243	5.9305	0.9078	21.15	-23.79	19
ER-VW	0.9315	4.8999	1.0242	21.24	-23.40	175

Note: ER is Equity REITs portfolio, SC-R is Shariah compliant regular portfolio. SC-L is Shariah compliant light portfolio. SC-S is Shariah compliant strict portfolio. EW is equally-weighted. VW is value-weighted.

Table 2. T-test for the difference in average returns (%)

Portfolio	$\Delta$ ER-SCR. EW	$\Delta$ ER-SCR. VW	$\Delta$ ER-SCL. EW	$\Delta$ ER-SCL. VW	$\Delta$ ER-SCS. EW	$\Delta$ ER-SCS. VW
1993–2017	0.0033	0.0213	-0.0210	-0.0164	0.1500	-0.0928
2000–2003	0.3905	0.1480	-0.0930	-0.0696	0.6985	0.3973
2007–2009	-0.4344	-0.0725	-0.0439	-0.0617	-0.5528	-1.0196

Note: ER is Equity REITs portfolio, SCR is Shariah compliant regular portfolio. SCL is Shariah compliant light portfolio. SCS is Shariah compliant strict portfolio. EW is equally-weighted. VW is value-weighted. \*Significant at the 10% level. \*\*Significant at the 5% level. \*\*\*Significant at the 1% level.

Table 3. Single factor CAPM

	SC-R-EW	SC-R-VW	SC-L-EW	SC-L-VW	SC-S-EW	SC-S-VW	ER-EW	ER-VW
1993–2017								
$\alpha$	0.1570*	0.1607	0.1069	0.1177	-0.1946	0.2119	0.0755	0.0886
MKT-RF	0.6402***	0.7270***	0.7385***	0.8339***	0.9115***	0.8104***	0.7520***	0.8465***
Adj. R <sup>2</sup>	0.8133	0.7213	0.7196	0.8203	0.7196	0.5083	0.8123	0.8154
2000–2003								
$\alpha$	0.0190	0.0060	0.4906	0.1408	-0.1444	-0.4289	0.4172	0.0589
MKT-RF	0.7453***	0.6062***	0.7540***	0.6664***	0.8239***	0.7410***	0.7398***	0.6753***
Adj. R <sup>2</sup>	0.7438	0.3707	0.1815	0.5310	0.4681	0.2574	0.3191	0.5662
2007–2009								
$\alpha$	-0.0614	0.0169	-0.3815	0.0819	0.2307	1.0153	-0.4132	0.0328
MKT-RF	0.5828***	0.6187***	0.7159***	0.7619***	0.9111***	0.7156***	0.7388***	0.7857***
Adj. R <sup>2</sup>	0.9158	0.9231	0.9590	0.9484	0.9410	0.7088	0.9593	0.9586

Note: ER is Equity REITs portfolio, SC-R is Shariah compliant regular portfolio. SC-L is Shariah compliant light portfolio. SC-S is Shariah compliant strict portfolio. EW is equally-weighted. VW is value-weighted. \*Significant at the 10% level. \*\*Significant at the 5% level. \*\*\*Significant at the 1% level.

Table 4. Carhart four-factor model

	SC-R-EW	SC-R-VW	SC-L-EW	SC-L-VW	SC-S-EW	SC-S-VW	ER-EW	ER-VW
1993–2017								
$\alpha$	0.1581*	0.0996	0.1708	0.0749	-0.1846	0.1922	0.1242	0.0594
MKT-RF	0.6364***	0.7843***	0.7133***	0.8865***	0.9148***	0.8715***	0.7308***	0.8974***
SMB	0.0787**	-0.0832*	0.0953*	-0.0947**	-0.0536	-0.2604***	0.0815**	-0.1140**
HML	-0.0429	-0.1754***	-0.0417	-0.1723***	0.0032	-0.1350*	-0.0298	-0.1674***
MOM	0.0108	0.1183***	-0.0820	0.0897***	-0.0188	0.0384	-0.0655***	0.0707***
Adj. R <sup>2</sup>	0.8196	0.7516	0.7265	0.8397	0.7182	0.5178	0.8173	0.8300
2000–2003								
$\alpha$	0.0469	0.1022	0.6586	0.2377	-0.0471	-0.2567	0.5759	0.2451
MKT-RF	0.7592***	0.8018***	0.5850***	0.8142***	0.7309***	0.7004***	0.6378***	0.8130***
SMB	0.1000*	-0.0818	0.1974	-0.0474	-0.0143	-0.1383	0.1138	-0.1070
HML	-0.0702*	-0.2089***	-0.0110	-0.1772***	0.0421	0.0012	-0.0362	-0.1923***
MOM	0.0033	0.1426***	-0.1826*	0.1020***	-0.0993*	-0.0703	-0.1231	0.0745**
Adj. R <sup>2</sup>	0.8203	0.5562	0.1962	0.6778	0.4933	0.2681	0.3350	0.6567
2007–2009								
$\alpha$	-0.1847	0.0948	-0.6354	0.1246	-0.2071	1.2091	-0.6816	0.1137
MKT-RF	0.5118***	0.5972***	0.6260***	0.7428***	0.7786***	0.6468***	0.6510***	0.7757***
SMB	0.1776	0.1581	0.2680	0.0147	0.5161*	0.3137	0.2180	0.0133
HML	0.2707	0.2293	0.1935	0.1881	0.1732	0.6894	0.1679	0.1819
MOM	-0.0146	0.0903	-0.0660	0.0330	-0.1049	0.2080	-0.0875	0.0536
Adj. R <sup>2</sup>	0.9130	0.9201	0.9610	0.9436	0.9445	0.6993	0.9611	0.9553

Note: ER is Equity REITs portfolio, SC-R is Shariah compliant regular portfolio. SC-L is Shariah compliant light portfolio. SC-S is Shariah compliant strict portfolio. EW is equally-weighted. VW is value-weighted. \*Significant at the 10% level. \*\*Significant at the 5% level. \*\*\*Significant at the 1% level.

of growth rather than value stocks. Finally, most value-weighted portfolios had evidence of possessing a positive momentum factor. Overall these results on abnormal return concur with Alhenawi and Hassan (2013) that show that once relevant factors have been accounted for, there isn't any significant evidence of abnormal returns for Shariah compliant portfolios.

In looking at the sub-period analysis, we find no evidence of abnormal returns from 2000–2003 since all the

alphas are statistically insignificant. Similarly, we find no evidence of abnormal returns from 2007–2009 since all the alphas are statistically insignificant.

Table 5 shows the estimation results for margin difference by using the CAPM model. None of the alphas are statistically significant, hence there is no evidence of underperformance or outperformance of Shariah compliant portfolios in comparison with Equity REIT portfolios. The difference in market betas between Equity REIT

Table 5. Statistical margin of difference with CAPM

	$\Delta$ ER-SCR. EW	$\Delta$ ER-SCR. VW	$\Delta$ ER-SCL. EW	$\Delta$ ER-SCL. VW	$\Delta$ ER-SCS. EW	$\Delta$ ER-SCS. VW
1993–2007						
$\alpha$	-0.0599	-0.0470	-0.0098	-0.0040	0.2917	-0.0981
MKT-RF	0.1074***	0.1131***	0.0090	0.0062	-0.1639***	0.0297
Adj. R <sup>2</sup>	0.0876	0.1213	-0.0012	-0.0026	0.0592	-0.0012
2000–2003						
$\alpha$	0.3982	0.0529	-0.0734	-0.0819	0.5616	0.4879
MKT-RF	-0.0055	0.0691	-0.0142	0.0089	-0.084	-0.0658
Adj. R <sup>2</sup>	-0.0217	0.0122	-0.0209	-0.0203	-0.0183	-0.0179
2007–2009						
$\alpha$	-0.3519	0.0159	-0.0317	-0.0491	-0.6440	-0.9826
MKT-RF	0.1560***	0.1670***	0.0229***	0.0239***	-0.1724***	0.0701
Adj. R <sup>2</sup>	0.7082	0.77997	0.2696	0.2445	0.3325	-0.0104

Note: ER is Equity REITs portfolio, SCR is Shariah compliant regular portfolio. SCL is Shariah compliant light portfolio. SCS is Shariah compliant strict portfolio. EW is equally-weighted. VW is value-weighted. \*Significant at the 10% level. \*\*Significant at the 5% level. \*\*\*Significant at the 1% level.

Table 6. Statistical margin of difference with Carhart four-factor model

	$\Delta$ ER-SCR. EW	$\Delta$ ER-SCR. VW	$\Delta$ ER-SCL. EW	$\Delta$ ER-SCL. VW	$\Delta$ ER-SCS. EW	$\Delta$ ER-SCS. VW
1993–2007						
$\alpha$	-0.0141	-0.0214	-0.0268	0.0032	0.1705	-0.1141
MKT-RF	0.0902***	0.1066***	0.0133	0.0043	-0.8246***	0.0194
SMB	0.0034	-0.0279	-0.0132	-0.0163	0.0570	0.1493**
HML	0.0173	0.0144	0.0161	0.00113	0.0141	-0.0260
MOM	-0.0712***	-0.0424**	0.0215*	-0.0139	-0.0525	0.0375
Adj. R <sup>2</sup>	0.1152	0.1364	0.0006	-0.0040	0.0651	0.0166
2000–2003						
$\alpha$	0.5290	0.1429	-0.0827	0.0074	0.6230	0.5018
MKT-RF	-0.1214	0.01124	0.0529	-0.0011	-0.0930	0.1127
SMB	0.0137	-0.0251	-0.0836	-0.596**	0.1280	0.0313
HML	0.0340	0.0166	-0.0252	-0.0151	-0.0783	-0.1935*
MOM	-0.1264*	-0.0681***	0.0595*	-0.0275*	-0.0238	0.1448**
Adj. R <sup>2</sup>	0.0037	0.2576	-0.0146	0.2483	-0.0463	0.2075
2007–2009						
$\alpha$	-0.3122	0.0189	-0.0462	-0.0109	-0.4744	-1.0954
MKT-RF	-0.3726***	0.1785***	0.0249*	0.0330**	-0.1276	0.1290
SMB	-0.1372	-0.1448	-0.0501	-0.0013	-0.2981	-0.3004
HML	-0.3734	-0.0474	-0.0255	-0.0063	-0.0051	-0.5076
MOM	-0.584	-0.0367	-0.0215	0.0206	0.0174	-0.1544
Adj. R <sup>2</sup>	0.7410	0.7991	0.2709	0.1934	0.3615	-0.0762

Note: ER is Equity REITs portfolio, SCR is Shariah compliant regular portfolio. SCL is Shariah compliant light portfolio. SCS is Shariah compliant strict portfolio. EW is equally-weighted. VW is value-weighted. \*Significant at the 10% level. \*\*Significant at the 5% level. \*\*\*Significant at the 1% level.

portfolio and SC-R portfolio is positive and statistically significant at the 1% level. Thus, the Equity REIT portfolio possesses a greater amount of systematic risk compared to regular compliant portfolios. The opposite finding is true for the SC-S-EW portfolio, the Equity REIT portfolio possesses a lower amount of systematic risk compared to the equally-weighted strict Shariah compliant portfolio. This is expected given the limited diversification potential of the SC-S-EW portfolio. For both sub-periods 2000–2003

and 2007–2009, The difference in abnormal returns are statistically insignificant for all the portfolios, suggesting that there is no evidence of underperformance or outperformance of Shariah compliant portfolios in comparison with Equity REIT portfolios during the crisis period.

Table 6 shows the estimation results for margin difference by using the Carhart four-factor model. For all the portfolios, there remains no statistical difference in abnormal returns between the Equity portfolios and the Shariah

compliant portfolios. Thus, this reinforces the view that there is no evidence of underperformance or outperformance for the Shariah compliant portfolios. In terms of the difference in market betas, it is found that Equity REIT portfolios exhibit a statistically significant higher amount of systematic risk compare with SC-R portfolios. Furthermore, the Equity REIT portfolios exhibits a lower level of market risk compare with the-equal weighted strict compliance portfolio. For both sub-periods 2000–2003 and 2007–2009, The difference in abnormal returns are statistically insignificant for all the portfolios.

Overall, the results suggest that there is no evidence of outperformance in Shariah compliant investment which contradict with Ibrahim and Ong (2008), but coincide with Alhenawi and Hassan (2013). The reason that Shariah complaint portfolios do not outperform is that the portfolios are well diversified even with the strict Shariah compliance criteria as shown in Figure 2. The risk of size and value is not different between Shariah compliant portfolios and equity REITs portfolio, but the market risk is different which is captured by the market factor. Furthermore, there is no evidence that Shariah compliant investment possess some form of defensive nature during downturns which contradict with Al-Khazali et al. (2014) and Ho et al. (2014).

## Conclusions

This study set out to investigate the impact of faith on investment return. In particular, we choose the Shariah compliance and REITs investment. Synthetic Shariah compliant portfolios are constructed using monthly REIT data from 1993–2017. To provide a comprehensive analysis of the different perspectives of Shariah compliance, that vary widely by jurisdiction and investor type, different operational and financial interpretations of compliance were considered. Performance is analysed by using the CAPM and the Carhart four-factor model. Furthermore, the performance is analysed during financial crisis periods which cover dot-com bubble crash and the global financial crisis. For robustness, a control mechanism which tested for incremental abnormal returns between the Equity REIT portfolio and Shariah compliant portfolios was employed.

The overall results show no evidence of outperformance or underperformance when all the Shariah compliant portfolios of REITs were compared against the Equity REIT portfolios. Therefore, the results indicate that the Shariah compliant REIT investor faces no cost or gain in his investments as a result of his faith. These findings are robust even when portfolios are compared during times of economic turbulence. While our findings are not consistent with Ibrahim and Ong (2008), it is consistent with Alhenawi and Hassan (2013).

While our results show that Shariah compliant investor could diversify their portfolio and only expose to systematic risk, future research could investigate the strategic portfolio formation for Shariah compliant investor.

In other word, whether any trading strategy in Shariah compliant investment may generate abnormal returns. One limitation of this research is the use of synthetic portfolios, this is due to the limited number of Islamic REITs globally. Once more Islamic REITs are established in the future, one can use Islamic REITs directly to test the effect of faith on investment returns.

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