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Why do Sukuks (Islamic Bonds) need a different pricing model?

Abstract

The global interest in sukuk, an Islamic alternative to bond financing, has grown rapidly, particularly after the 2008 global financial crisis, due to its distinctive features and investment quality. Sukuk were first launched in Malaysia and are presently available in 29 countries, including the United Kingdom, United States, Singapore, Hong Kong, and Luxembourg. Despite the global market prevalence of sukuk, asset pricing literature has not yet addressed the pricing mechanism of sukuk, which is inherently different from bonds and equity due to the contractual differences. However, analysts use LIBOR, or the Islamic interbank benchmark rate (IIBR), as the ad-hoc benchmark to evaluate sukuk performance. In this study, we develop a basic pricing model that captures the common risks in sukuk returns. We identify two risk factors for sukuk that require risk premiums: (i) sukuk market risk and (ii) information asymmetry risk. Using these two common sukuk risks factors, investment analysts can estimate the fair value of sukuk more precisely than other ad hoc measures available.

Key Words: Sukuk pricing; Reference rate; Systematic risk factors; Two factor model.

1. Introduction

The debate over what determines a security's return is one of the central debates of capital market theory. Researchers have long sought to identify common risk factors that systematically affect the returns of common stocks (Sharpe, 1964; Linter, 1965; Mossin, 1966; and Black, 1972; Fama and French, 1993 and 2015). In addition, Fama and French (1993) identify the common risk factors of bonds. However, asset pricing literature has not yet offered guidance on the fair pricing of Islamic financial securities such as sukuk, which have been modeled to comply with Islamic jurisprudence (*Shari'ah*[1]) on the principle of forbidding the payment and receipt of interest. Sukuk has been developed as a debt-alternative asset to circumvent bond interest by replacing the debt contract with a business-type financing contract between sukuk issuers and holders. Hence, the relationship between the parties of a sukuk contract is, in principle, different from that of the bond contract. Firms issue a sukuk as an alternative fundraising instrument by providing holders with ownership rights on sukuk-financed assets, yet the sukuk is not corporate equity, because sukuk holders are not firm owners who have a residual claim on corporate earnings. Given that the sukuk is an engineered financial asset that is inherently different from both conventional bonds and corporate equity, it is imperative to identify the risk drivers of sukuk and, hence, develop a pricing model.

[1] Islamic laws deriving from the divine book of Al-Quraan, sayings of prophet Muhamad PBUH (*hadith*), contextual judgements (*ijmah*), and opinions of Islamic theological scholars (*quias*).

Sukuk have persistently emerged from a niche product into an integral part of global financial markets over the last two decades. They were first launched in Malaysia and are presently available in 29 countries, including the United Kingdom, United States, Singapore, Hong Kong, and Luxembourg, among the major international markets. The global interest in sukuk as an alternative to debt assets for portfolio diversification is also manifested globally in the launch of several sukuk indices to track sukuk performance, such as the FTSE Sukuk Index, S&P Dow Jones Sukuk Index, and Citi Sukuk Index. The outstanding market value of sukuk has reached US$434 billion in 2017 (IIFM, 2018).

In the absence of a pricing model, analysts use LIBOR, or a similar interbank interest rate, as a benchmark, which is an inappropriate practice, because the underlying risk parameters of sukuk are different from those of conventional assets (Ghauri, 1999; Opalesque, 2009; Jallad, 2015; SCM, 2016); and it is also inappropriate on the grounds that *Shari'ah* law forbids the payment of interest (Usmani, 1998, p. 118). An Islamic interbank benchmark rate (IIBR[2]) has been developed recently to correct this shortcoming and, thus, provides an expected return on fund placements in the Islamic interbank market that approximates the risk-free time value of money, because daily interbank lending is assumed to be a nearly riskless transaction. Therefore, an interbank lending rate might provide an estimation of the risk-free time value of money, but the pricing of sukuk as a financial asset requires an estimate of its risk premium above the risk-free rate, stemming from the undiversifiable common risk factors. The formal research question thus emerges from this debate: what are the common risks of sukuk investment?

To the best of our knowledge, no study has yet examined this fundamental research question. An investigation of this issue is crucial given that sukuk is not a bond *per se*, although it is structured to generate a bond-like cash flow without breaching the Islamic principles of interest forbiddance, gambling avoidance, and asset specification, among others, in financial transactions. Given the typical contractual arrangements of sukuks traded in the market, a sukuk certificate grants a proportionate ownership of the sukuk-financed business asset, as well as the periodic distributions predicted to be generated from that asset. On the other hand, a typical bond is purely a debt contract whose periodic coupons represent obligatory interest payments to creditors. Therefore, these two financial assets are fundamentally different in their

[2] Details of IIBR is available at http://gifr.net/gifr2015/ch_12.pdf (accessed on November 11, 2017)

contracting methods (Arif & Safari, 2012; Hoassin *et. al*., 2018; Ariff, *et al.*, 2013). Furthermore, sukuk is susceptible to the risk of breaching Islamic *Shari'ah* regulations that are not yet standardized across countries, while a debt-based asset like a bond does not carry any *Shari'ah* risk. Hence, the risk parameters of the sukuk should be, in principle, different from those of the conventional bond. Furthermore, sukuk cannot be treated in the same way as common equity, because sukuk provides temporary ownership of an asset on the balance sheet, whereas common equity confers permanent ownership of a proportion of the company itself, giving its holder a residual claim on corporate earnings. Therefore, it is also probable that sukuk risk factors are different from those of equities.

Empirical studies comparing conventional and Islamic financial markets show mixed results. Some studies find an interconnection between Islamic and conventional assets (Hoque *et al.*, 2016; Ahmed & Elsayed, 2018; Sclip, *et al*., 2016; Naifar *et. al*, 2016), which could be due to similar macroeconomic factors affecting all financial assets in the market (Hassan *et al*., 2018). In addition, other empirical studies that find the equity market reacts negatively when firms issue sukuk, while the reaction is neutral when firms issue bonds (Godlewski *et al*,. 2013); information from the stock market transmits to the sukuk market, but the sukuk market is unlikely to send information to the stock market (Maghyereh & Awartani, 2016); and the sukuk market offers an effective portfolio diversification opportunity for fixed income investors in the global market due to insignificant correlation between bonds and sukuk across countries (Bhuiyan *et al*., 2018), as well as in domestic markets such as Malaysia (Hoassin *et al*., 2018). Therefore, the mixed empirical results are consistent with our analysis that the underlying risk drivers of Islamic sukuk are different from those of the conventional financial assets (stock and bonds) due to material differences in their contracting mechanisms.

Since sukuk is a different class of financial asset from a conventional bond or corporate equity, it is our assumption, according to the market efficiency theory, that sukuk investors are aware of their intrinsic risks and price sukuk to incorporate their risks. Therefore, we can track the common market risk of an individual sukuk from its sensitivity to movements in the sukuk market. We assume that the market knows more about the behavior of a sukuk if its price moves closely in step with the market, compared to those that do not correlate. Thus, it is easier to value a sukuk with a beta closer to one (sukuk market beta) than those with significantly higher or lower values, because the returns of the former are driven predominantly by market movements. What determines the returns of sukuks that do not closely move with the market are largely unknown; hence, investors experience greater uncertainty when determining a fair

price for these sukuks. Thus, we assume an asymmetrical information environment in the sukuk market based on the proposition that investors know less about sukuks if their prices do not closely move with the market. Based on this theoretical premise, we identify two undiversifiable common risks that determine the risk premium for sukuk: sukuk market risk and information asymmetry risk.

To this end, we consider two sukuk common risk factors and test them using the Fama and Macbeth (1973) method. First, we run sukuk-by-sukuk time-series regressions for sukuk excess returns against (i) the excess sukuk market return and (ii) the excess return on a high information asymmetry portfolio minus a low information asymmetry portfolio. In this step, we estimate risk factor loadings (coefficients) for the market risk and information asymmetry risk. Next, we estimate week-by-week cross-sectional regressions for sukuk returns against the factor loadings (coefficients of the time-series models) to determine the risk premia for the market and information asymmetry risks. For the first stage time-series regressions, we estimate excess market return based on the sukuk market return, minus the risk-free rate. In this regard, we develop an appropriate sukuk market benchmark to compute the excess market return. The excess return for sukuk information asymmetry is based on two extreme-beta sorted portfolios. We construct a total of 10 beta-sorted sukuk portfolios where portfolio-1 and portfolio-10 are the two extreme-beta portfolios with the lowest and highest average beta values, respectively. The difference between the returns of portfolio-1 and portfolio-10 tracks the excess return of the highest information asymmetry sukuk portfolio over that of the lowest.

We test these two common sukuk risks factors in the context of the Malaysian market, in which sukuks were first listed in 2000, and it is currently the market leader with 57 percent of the total outstanding global sukuk market value as of 2015 (Appendix A). Hence, the empirical validation of the two common sukuk risk factors from this market is significant for enhancing our knowledge of Islamic financial assets. The results using 627 sukuk-by-sukuk time-series regressions show that the average coefficient for the excess market return (loading for the market risk factor) and the excess return for information asymmetry (loading for information asymmetry) are statistically significant at the five percent level. Thus, our study demonstrates that movements in the sukuk market and the variations in information asymmetry for sukuks determine the returns of sukuks. Results using 377 week-by-week cross-sectional regressions show that the average risk premia for both the common market risk and information asymmetry risk are statistically significant at the one percent level. The findings are consistent for all subsample tests across different types of sukuk, issuer categories, and industry groups,

providing evidence that these two common sukuk risk factors apply to all types of sukuk, irrespective of their characteristics.

The development of a pricing model for sukuks, an Islamic financial asset, advances the body of asset pricing literature, since the pricing of sukuk, which is inherently different from both bonds and equity, is currently underdeveloped in the literature. In the Islamic finance literature, our sukuk pricing model represents a breakthrough; for the first time, we can determine the non-diversifiable, common sukuk risk factors that require risk premiums. In the absence of a pricing model, market analysts have been relying on LIBOR, IIBR, or any similar benchmark, to assess sukuk performance. Using our two-factor model, analysts can measure the risk of an individual sukuk more accurately and, hence, determine its fair value. Also, the identification of two sukuk risk factors will help analysts to review the assessment criteria based on which they provide sukuk risk ratings. In addition, by identifying two sukuk risk premia, we open the door for further development in the Islamic asset pricing literature. Finally, this study helps continue a trend of original research on Islamic finance within the broader spectrum of the finance discipline.

The remainder of the paper is organized as follows. Section 2 reviews the theoretical background and develops hypotheses. Section 3 discusses the two-factor sukuk pricing model. Section 4 discusses the data and sample. Section 5 presents and discusses empirical results and findings. Section 6 presents concluding remarks.

2. Theoretical background and hypotheses

Fundamentally, the contractual mechanism of sukuk is different from that of debt and equity securities, thus the sources of sukuk risk may not be same as those of bonds or equity. Therefore, an in-depth analysis is necessary to reveal the drivers of sukuk risk that might determine price. This analysis is also important, because the existing asset pricing literature does not provide a clear method with which to price Islamic financial securities, which have different contractual provisions that are premised on religious doctrine. In this section, we first discuss how a sukuk is different from debt and equity in order to classify the sukuk as a unique type of financial asset, thus requiring a unique sukuk pricing model. Secondly, we construct hypotheses pertaining to the relevant risk factors that drive sukuk returns.

2.1 Analysis of theoretical background

A sukuk is a structured financial asset that ideally provides a bond equivalent cash flow to its holders while maintaining the doctrines of Islamic jurisprudence for financial transactions,

such as the prohibition of a fixed interest[3] payment and investments in illicit sectors[4]. A sukuk constitutes a lessor-lessee, buyer-seller, or a partnership relationship between the sukuk holders and sukuk originator (henceforth issuer)[5], subject to differing types of sukuk contracts[6]. Irrespective of the contract type, sukuk holders are the owners of the assets purchased by the sukuk issuers with the funds raised by the issuance. Therefore, sukuk holders' cash flows originate from the earnings of the sukuk's underlying assets (DIFCSG, 2017; Meager, 2017; AAOIFI, 2008; ISRA 2011, pp.423; Hasan *et al.* 2013, pp.272; Ahmad *et al.* 2015; Safari *et al.* 2013; Ahmad and Hassan, 2007). On the other hand, irrespective of contract type, a bond constitutes a lender-borrower relationship between the bond holders and issuers, who own the assets purchased through the bond issuance. Therefore, sukuks and bonds are different financial assets in terms of their underlying contracts: ownership as opposed to debt. We further extend our analysis to understand whether sukuk can be equated to bonds based on their cash flow patterns. A sukuk offers non-fixed cash flows to its holder if it is based on the partnership contract (e.g., mudarabah or musharakah sukuks), while it provides fixed cash flows if the sukuk is based on non-partnership agreements (e.g., ijarah or murabaha contract).

With partnership sukuks, investors participate (through a SPV) in a business venture with the sukuk issuer (the originator firm) by providing a capital contribution and sharing the profit-loss based on their capital contributions, or at an agreed rate (Trad and Bhuyan, 2015; Saripudin *et al.* 2012.b). Hence, a fiduciary relationship is created between sukuk holders and issuers (Securities Commission Malaysia, 2009, pp.226; Rahman *et al.* 2014) that may lead to a moral hazard problem (Zhang *et al.* 2016; Kolsi *et al.* 2014; Diamond, 1984), because the earnings

[3] In Islam, a fixed interest generally refers to *riba* (as mentioned in holy book of Al-Quran: 2:275-276, 2:278, 3:130, 4:161; 30:39) that is an increment on the borrowing and lending of money which is paid or received in cash or otherwise above the loan amount. The *riba* (a fixed rate of interest) is made prohibited in any kind of financial transaction, because it may lead to exploitation on the borrower due to an unjustified or excessive charge (known as *usury*) on the borrowing that has also been condemned by the other faiths such as Hinduism, Buddhism, Judaism, and Christianity in addition to Islam (Visser & McIntosh, 1998).

[4] The Shar'iah board (the committee authorized to provide rulings on the Islamic laws and practices) identify the illicit sectors of economy in which an investment is prohibited. These include the sectors like alcohol, pork, gambling, entertainments (particularly adult entertainments in all forms), weapons of mass destruction, tobacco and illegal drugs among many others.

[5] A corporate firm or a government agency originates sukuk issuance through a Special Purpose Vehicle (SPV) – an entity created by the sukuk originator. On behalf of the originator, SPV issues sukuk certificates, operates as a trustee of funds raised and asset purchased, leases or sells back the asset to the sukuk originator/issuer on behalf of the holders of sukuk (for non-partnership sukuks), enters into a partnership with the sukuk originating firm (the issuer) on behalf of the sukuk holders (for partnership sukuk), collects periodic rental payments and share of profits from the sukuk originator, and distributes them to the sukuk holders.

[6] Such as ijarah sukuk (lease contract), murabaha sukuk (sales contract), mudarabah sukuk (partnership contract), musharakah sukuk (joint venture contract), wakalah sukuk (agency contract), istisna sukuk (working capital management contract), and salam sukuk (Islamic forward contract) are among others. A more detail discussion on the different types of sukuk contractual mechanism is given by Hossain, *et. al.* (2018).

of a sukuk holder (principal) under a partnership contract are subject to the best efforts and management ability of the issuer (agent), since sukuk holders are silent partners and cannot effectively penalize the issuer (agent, or active partner) for a bad investment. In a nutshell, a partnership sukuk does not necessarily guarantee a payment, or capital return (Zakaria *et al.* 2012; Hamzah, 2016; Alshamrani, 2014). Therefore, a partnership sukuk is clearly different from a fixed income bond that contractually guarantees earnings. It is also difficult to compare a partnership sukuk with a non-fixed income bond, as the capital return is uncertain for the former. On the other hand, a non-partnership sukuk may have, *prima-facie*, similarity with the fixed coupon mortgage bond, as it has a fixed rental or installment schedule. Similar to a bond coupon, and the sukuk holders' ownership of the underlying asset serves as collateral. However, the key difference is that mortgage bond holders retain only a lien on the asset owned by the issuer, whereas sukuk holders directly own the asset. Therefore, the legal recourse of bond and sukuk defaults are different. Given the foregoing discussion, we show that sukuks and bonds represent two different classes of financial assets, irrespective of their types.

There are also differences between equity and sukuk; for example, equity holders, as owners of the company, have the right to elect its board of directors. Moreover, they receive corporate dividends from the residual earnings. On the other hand, in partnership sukuk contracts, the sukuk holders, as owners of a specific, tangible asset, share the profit and loss of a business activity in which the sukuk's underlying asset is employed. In non-partnership sukuk contracts, the holders receive either lease rentals or sales installments, which are committed payments by the sukuk-issuing company to the holders. Therefore, in both partnership and non-partnership sukuk contracts, a cash flow to sukuk holders cannot be equated to the corporate dividend.

Given the analysis above, we predict that an agency conflict between sukuk and equity holders may occur in two ways. First, within the agency relationship framework, equity holders collectively (through the corporate board) act as the agent of sukuk holders to manage the sukuk underlying asset. In partnership contracts, the sukuk holders remain silent business partners; hence, they do not control the management of the sukuk's underlying asset. Therefore, the legal remedy is not clear for the sukuk holders if the asset is poorly managed and the cash flow is affected. In non-partnership contracts, sukuk holders act as either a lessee or seller of the sukuk underlying asset against an installment schedule from the company (sukuk issuer). However, according to *Shari'ah* law, a sukuk holder's receivables from the company need to be generated from the earnings of the sukuk's underlying assets only, but the sukuk holders cannot verify whether this happens in practice. Also, *Shari'ah* law does not make it clear how sukuk holders

can be compensated for installment defaults. Second, a corporation may exploit tax-shield benefits accrued from the payments to the sukuk holders. This happens because, while the holders of the sukuk own the underlying asset[7], the asset is reported on the issuer's balance sheet, and the payments to sukuk holders are reported on the issuer's income statement as financing costs, similar to interest payments. Hence, the accounting treatment of sukuk payments effectively benefits corporate equity holders by allowing them to report a sukuk holder's asset as a corporate asset[8].

Overall, the above analysis shows how a sukuk, irrespective of its underlying contract type (partnership or non-partnership), differs from conventional bonds and corporate equity. There is much research on Islamic finance, but none has yet explored the underlying systematic risk drivers of sukuks. Narayan and Phan (2019) survey a total of 112 Islamic finance studies that are published in mainstream finance journals as of 2017. This literature review reports that a total of eight major studies examine the market price behavior of *Shari'ah* compliant firms (Narayan *et al.,* 2016a; Narayan *et al*., 2016b; Narayan and Bannigidadmath, 2017; Merdad *et al*., 2015; Hayat and Kraeussl, 2011; Białkowski *et al*., 2012; Białkowski *et al*., 2013; Abalala and Sollis, 2015). In the Islamic finance literature, Merdad *et al* (2015) and Zaremba *et al.* (2018) find the existence of an Islamic risk factor for *Shari'ah* compliant equities listed in the Saudi stock market. The literature survey of Narayan and Phan (2018) also identifies seven major studies (Azmat *et al*., 2017, 2014a, 2014b, 2014c; Naifar *et al*. 2016; Rizvi *et al*, 2015; Kenourgios *et al*. 2016) that examine the behavior of Islamic bond (sukuk) prices and broadly find that (i) religious orientation and institutional changes influence the risk rating of Islamic bonds (sukuk); (ii) an Islamic bond market exists for *Shari'ah* conscious ethical investors; and (iii) Islamic assets are more resilient than conventional assets during periods of financial crisis, but they tend to co-move during non-crisis periods. Therefore, empirical studies also imply that Islamic financial assets are different from conventional ones.

Hence, we argue that the systematic risks of investments in sukuks are less likely to be originating from the same risk sources for conventional bonds and corporate equity. In the literature, bond's common risk factors are related to its term structure and default risk (Fama

[7] The sukuk holders fully own the asset in case of non-partnership contracts (e.g. Ijarah and Murabaha). However, they own a partial ownership in case of the partnership contracts (Mudarabah and Musharakah).

[8] The tax-shield benefit arising from the interest payment belongs to equity holders, because the assets purchased with bond finance is owned by the corporate equity holders. However, they have no legal ownership, or has only a partial ownership, on the assets purchased with sukuk issuance. Therefore, if law allows a tax deductible on the sukuk payments, the accrued benefits should be passed to the owner of sukuk asset but not to the corporate owners.

and French, 1993) while those of the equity originate from the market changes, firm sizes, book-to-market value, firms operating profits and investment strategies (Fama and French, 1993 and 2015). Since a sukuk fundamentally differs from a conventional bond due to its contracting mechanism, the term structure theories couldn't explain sukuk yields. Therefore, the evidence shows that the long term sukuk profit rate does not reflect the average of future spot rates on sukuks, which rejects the application of expectation theory of term structure to explain sukuk yields (Adejoke *et al*. 2013). For default risks, sukuk differs from bond because sukuk cash flow can be non-obligatory if it is a partnership based sukuk. For non-partnership sukuks, the default consequences are much lighter as compared to conventional bonds (Uddin *et al*., 2020). Therefore, the underlying sources of sukuk risks may not be the same as those of conventional bonds.

From the equity perspective, a partnership sukuk holder has a contractual claim on the cash flows of a particular asset held by the company. On the other hand, a non-partnership sukuk holder receives periodic lease or rental payments from the company. It suggests that risk factors for common stocks could not be entirely relevant to explain sukuk returns. Hence, global evidence shows that the sukuk market is nearly ten times less volatile than the equity market (even though both markets have a low 'time-varying' correlation) – suggesting that sukuk is an alternative asset class for the investors (Sclip *et al*. 2016). Therefore, sukuk being a class of financial assets different from bond and equity, needs a different pricing model that will capture common risk factors relevant for sukuks.

2.2 Hypotheses Development

Based on the conceptual discussion and empirical evidence above, it is clear that the sukuk is not identical to the conventional bond, or corporate equity, because of its unique contractual mechanism. Therefore, bond and equity risk factors are unlikely to determine the returns of a sukuk; instead the common risk factors specific to the sukuk should determine its returns.

Research shows that the risk and term structures of a bond determines its return. The bond risk structure depends on different risk factors, such as default or credit risk, interest rate risk, and liquidity risk, among others (Baghai *et al*., 2014; Chance, 1990); while the term structure risk depends on the changes in the expectation of short and long-term bond yields (Ang, Bekaert, & Wei, 2008; Campbell, & Viceira, 2005; Johnson, 1967). However, it is not clear yet if bond risk factors are relevant to sukuks as well.

Since the sukuk is a trustee certificate recognizing the holder's ownership of a particular tangible asset, we do not know if the risk elements of a bond should also apply in the case of a sukuk. In this regard, some researchers suggest that a sukuk may be equated to a bond, because it essentially creates a liability for the firm, in that a sukuk involves a series of periodic payments and a commitment to buy back the asset at a fixed price on the maturity of the sukuk contract (Ariff and Safari, 2012; Alam *et al*. 2013; Ahmed *et al*. 2014; Zakaria *et al*. 2013; Ulus, 2013; Trad and Bhuyan, 2015). This line of thought may imply that the bond's risk elements may be sufficient to measure the corresponding risks of a sukuk. However, the fundamental question is how the sukuk holder's ownership - as opposed to the issuer's ownership - of the underlying asset affects the liability and cost structure of sukuk-issuing firms, as well as the legal recourse to sukuk holders if the issuer defaults in making payments. Hence, it is inappropriate to make a firm assumption that bond risk factors do indeed drive the sukuk market returns.

Likewise, we cannot find a strong basis from which to argue that the equity risk factors, such as the market beta of a company, firm size premium, value premium, profitability premium, or investment patterns premium (Fama and French, 1993; 2015) can be used as risk factors for a sukuk. As explained, a sukuk is not a common stock that represents perpetual ownership of the company, and the holder of a stock is also entitled to the residual corporate. A sukuk represents a limited-period ownership of a particular tangible asset (reported on the issuer's balance sheet), and payments to the sukuk holder are not residual payments like corporate dividends (AAOIFI, 2010; SCM, 2016; Meager, 2017; Ahmad *et al*. 2015). Accounting bodies (IFRS and AAOIFI) recognize it as a finance cost, like debt payments (before tax), on the income statement. With respect to an individual equity's risk factors, beta determines the sensitivity of a company's stock return to the overall market. However, it is less likely that the market price of a sukuk is similarly sensitive to the overall equity market, because a sukuk is like synthetic debt, and its holder does not have a claim on the corporate assets, except for that purchased with sukuk's issuance. Similarly, other equity pricing factors, such as firm size, value, profitability, and investment risks, are also less likely to be directly related to sukuk, as it is not a corporate stock, but a trust-certificate for the fixed-term investment in a firm (SCM, 2009, pp.21; Zakaria *et al.*2012; McMillen,2007; Mohamed *et al.* 2015).

The preceding analyses show that the risk factors of bonds and corporate equities are unlikely to represent sukuk risks. However, based on market efficiency theory, we assume that investors recognize the risks associated with the investment in a sukuk, which is a unique financial asset,

and that this is reflected in the sukuk's market price. Literature has yet to sufficiently determine specific sukuk risk factors. We know from the classical theory of risk and return behavior (Markowitz, 1952; 1959) and systematic market risk (Sharpe, 1964; Linter, 1965; Mossin, 1966; and Black, 1972) that the level of a security's market risk determines the market risk premium. Setting aside academic criticisms and the limitations of the market risk factor, we propose that the risk premium of sukuk is driven by its degree of sensitivity to the sukuk market, rather than to the equity or bond markets, because a sukuk is neither a conventional bond, nor corporate equity, and it entails a common *Shari'ah* risk, in addition to the factors influencing the financial market as a whole.

Common or systemic *Shari'ah* risk is an important concern for sukuk investors for several reasons. First, the religious scholars who sit on the *Shari'ah* supervisory boards (SSB) of sukuk issuing companies do not always provide an identical ruling on the permissibility of the business or industrial sector in which the funds raised by a sukuk issuance may be invested. The key implication here is that if the SSB of a new sukuk issuing company does not permit investment in a sector then it may have a systematic cascading effect on the existing sukuks belonging to that sector. Second, as Islamic theological researchers in different Muslim countries have been studying business permissibility issues alongside the growth of the Islamic finance industry, *Shari'ah* rulings are not always time-invariant, and sometimes an existing *Shari'ah* compliant product may appear to be unlawful, since *Shari'ah* governance of IFIs are yet to be standardized, and the members of SSBs are not adequately competent to harmonize the religious rulings with the modern financial landscape without infringing on the tenets of Islam. As a consequence, these deficiencies may generate a systemic effect across the sukuk market if there is a change in an existing *Shari'ah* ruling, or if a sukuk contract appears to be unlawful[9]. These kinds of systemic *Shari'ah* risks may exist for other aspects of a sukuk indenture, such as the prohibition of (i) interest-type payments (*riba*), gambling (*Qimar*), information asymmetry/uncertainty (*Gharar*), and the lending-borrowing relationship; (ii) profit and loss sharing, and (iii) the existence of tangible assets[10]. Given the foregoing discussion, our first hypothesis is, accordingly, as follows.

[9] We have an example that supports our analysis: Dana Gas PJS, a company registered in the United Arab Emirates, fell into a legal deadlock with the sukuk holders when a local court declared two outstanding Dana Gas sukuks (worth USD700m) as unlawful because they appeared to be not complying with Shari'ah laws. This incidence occurred mainly due to the weakness of Shari'ah governance (Mollah and Zaman, 2015) as SSB supposed to certify that Islamic financial products are fully Shari'ah compliant before issuance, and ensure that a company maintains *Shari'ah* guidelines in practice. Market observers find that the incidence shakes the global sukuk market, as demand has dropped significantly following the event. See for details: https://www.ft.com/content/05913b66-6709-11e7-9a66-93fb352ba1fe (accessed on October 9, 2017).

[10] More details about consistency problems in *Shari'ah* rulings (fatwas) available at Malkawi (2014)

H_1: Sukuk returns have a common risk factor due to the movements in the sukuk market.

Hypothesis 1 implies that we estimate a 'sukuk beta' that captures the sensitivity of an individual sukuk price to changes in the average market price of all sukuks. However, an asset pricing model to estimate a security's expected return based solely on market movements is not appropriate when other common factors are involved (Ross, 1976; Reinganum,1981; Shanken, 1982; Connor and Korajczyk, 1988; Grinblatt and Titman, 1983; Camberlain and Rothschild, 1983; Bark,1991; Faff, 2003; Cooper, Connor, and Robert, 2008; Fama and French;1992, 1993, 2015). Earlier studies find that low beta portfolios have higher average returns, compared to those of high beta portfolios, which is a well-documented systematic beta anomaly in the literature (Fama and MacBeth, 1973; Fama and French, 1992; Allen and Cleary, 1998; Frazzini and Pedersen, 2014). These studies on asset pricing presents a challenge for us to finding additional sukuk risk factors beyond the sukuk beta since the behavior of sukuk returns is yet to be known fully.

However, we assume that a systematic beta anomaly may also exist for sukuk returns. It is because researchers suggest reasons for the low-beta anomaly that are linked to behavioral finance theory. Since low beta securities are less sensitive to the movements in the financial market, the risk-averse investors may consider investing in low-beta stocks could help to manage overall portfolio risk. Hence, there is a market momentum for the investments in so-called lottery stocks with the lower market beta as they hedge against unexpected increases in market volatility (Barinov, 2018). Although Islamic assets have different characteristics, the momentum investment strategy works well for this market segment (Narayan & Phan, 2017). It means behavioral finance theory could explain the returns of both conventional and Islamic assets; thus, the beta anomaly will also exit in the sukuk market.

Provided that beta anomaly exists in sukuk market, an investor would have more information about the return behavior of those sukuks that are more closely correlated with the sukuk market and which have less information asymmetry, as compared to those sukuks with a weaker correlation to the market. In other words, a sukuk with a low beta is likely to be less correlated with the market and have high information asymmetry, and vice versa. In addition, sukuk information asymmetry could be linked to the contractual variations of sukuks, which may not be fully known to uninformed investors. For example, in partnership sukuks, the cash flow to sukuk holders comes from the earnings of a particular real asset (on the issuer's balance sheet) that is being used in the business operation of the issuing firm; however, the sukuk

holders, not being equity owners, have no access to the accounts of the issuer firm. Hence, the performance of the asset to which a sukuk is linked remains mostly unknown to the sukuk holders. However, the level of information asymmetry may not be same for all sukuks, as some issuing firms may disclose more information than others about the earnings from the sukuk's underlying asset, and all sukuk investors are not equally informed about the operational dynamics of different types of sukuks. Information asymmetry may also exist in non-partnership sukuks in which the sukuk holder's cash flows are pre-determined. This occurs because *Shari'ah* requires that the cash flows to sukuk holders are to be ideally generated from the actual earnings of the underlying real assets, but the sukuk investors cannot verify this in practice, because a sukuk investor has no access to the issuer's corporate accounts.

Overall, the prevailing asymmetrical information environment in the sukuk market could lead to a beta anomaly in sukuk returns, as prior studies find that the performance of securities that move closely with the market belong to the firms with a record of good governance and high information disclosure (Chahine and Zeidan, 2014; Sivaramakrishnan and Yu, 2008). These results imply that sukuks which are highly corrected with the market have less information asymmetry. Following the same argument, sukuks that are less correlated with the market have more information asymmetry. Thus, it is likely that the low-beta sukuks are those that have a low relationship with the market and high information asymmetry, and vice versa. Investors may therefore have higher uncertainty and, thus, require an additional risk premium for a low-beta sukuk than for a high-beta sukuk due to the systematic difference in information asymmetry between the low- and high-beta sukuks. Hence, we construct the second hypothesis as follows:

H_2: Sukuk returns have a common risk factor due to the information asymmetry in the sukuk market.

3. Model Specifications

We argue that sukuk investors require a risk premium for bearing two common risks: sukuk market risk and information asymmetry risk. Fama and McBeth (1973) adopt a two-step procedure to estimate asset-pricing model parameters, based on time-series regressions in the first step (Equation 1) and estimations of the risk premia based on cross-sectional regressions in the second step (Equation 3). In this study, we follow the Fama-McBeth approach to estimate the risk premia for common risk factors in the returns on a sukuk investment. First, we regress each sukuk's time-series returns against the corresponding excess returns of the sukuk market and information asymmetry to estimate sukuk betas for these two common risk factors. Then

we cross-sectionally regress the returns of all sukuks against the risk factor betas estimated by the time-series regressions.

We define the following time-series model that determines (i) the sensitivity of a sukuk's return to the sukuk market and (ii) information asymmetry arising due to the systematic deviation of sukuk returns from the security market line:

$$R_t - R_{ft} = a + b_1\left[R_{mt} - R_{ft}\right] + b_2 HLIA_t + e_t, \quad (1)$$

where, $R_t - R_f$ is the excess return of a sukuk for the period *t*; $R_m - R_f$ is the sukuk market excess return; and *HLIA* (high minus low information asymmetry) is the difference between the return on a sukuk portfolio with high information asymmetry and that with low information asymmetry. We use weekly sukuk returns[11] (R_t), sukuk market returns (R_{mt}), and corresponding period treasury bill rates (R_{ft}) to estimate the sukuk excess returns and sukuk market excess returns. The high minus low information asymmetry variable, *HLIA*, is constructed by subtracting the return of the portfolio with the lowest average beta from that of the portfolio with the highest average beta, and the procedure for beta-sorted portfolio construction is defined later. We estimate the time series Equation 1 to determine the sukuk risk factor loadings b_1 and b_2 that measure return premiums associated with sukuk market risk and information asymmetry. However, in the absence of guidance from prior research, the key challenge for us is to select an appropriate sukuk market benchmark for estimating the equation, which is required to determine the market risk premium for a sukuk and to determine the risk premium for the information asymmetry of a sukuk.

We explain earlier that sukuk market risk originates from the likelihood of variation in *Shari'ah* rulings by different SSBs and the changes in *Shari'ah* rulings over different periods on the permissibility of a business project under Islamic law, in addition to the common factors affecting the financial market in general. It is also important to note that, to be *Shari'ah* compliant, sukuk holders must have an ownership in the underlying asset, and their cash flows ideally must come from the earnings of an asset employed in a particular business project approved by Islamic law (Afshar and Muhtaseb, 2014; Alam *et al.* 2013; Trad and Bhuyan, 2015; Ahmed *et al.* 2014; Rauf and Ibrahim, 2014; Muhamed & Radzi, 2011). Therefore, we need to consider carefully if the comprehensive sukuk market index is an appropriate

[11] Weekly data has an advantage over daily data, as it partly overcomes the problems related to infrequent trading and data normality in the daily trading data, while allowing us to estimate models based on sufficient observations. Monthly data could be better than weekly data, but sukuk has a short trading history, yet to yield adequate data observations for parameter estimations. However, we recheck the results based on monthly data.

benchmark. Since a *Shari'ah* approved business project belongs to a specific industry, the performance of respective industries significantly influences the performance of a corresponding sukuk (Hossain *et al.* 2018). This suggests that an industry-based market benchmark could be a better choice than a comprehensive benchmark to estimate a sukuk's beta[12].

To generate an industry-based benchmark, we carefully examine the indenture of the sukuks in our sample and determine the nature of the underlying assets and align the sukuk with a particular industrial sector. In this way, we have developed a total of nine industry-based market benchmark sukuk portfolios. Then, we estimate the individual sukuk betas with respect to these benchmarks to determine the excess market return by subtracting the return on the T-bill, which is regarded as proxy for the risk-free rate of return.

Next, we create *HLIA*, which measures the excess return of the sukuk portfolio with high information asymmetry over that with low information asymmetry. As demonstrated earlier, sukuks that are underpriced, relative to the market, generally have higher information asymmetry than those that are overpriced. We first estimate the following market model to determine the individual sukuk betas by regressing the sukuk time series return on the market benchmark developed above:

$$R_{it} = \alpha + \beta R_{mt} + e_t , \qquad (2)$$

where R_{it} is the return of sukuk *i* for week *t* and R_{mt} is the sukuk market return of the industry-based benchmark described above.

We arrange all sukuks into 10 portfolios sorted by market beta (estimated from Equation 2). According to the theoretical analyses above, the portfolio that has the lowest average beta will have the highest information asymmetry, and the portfolio with the highest average beta has the lowest information asymmetry. Hence, the time series of excess returns of the sukuk portfolio with high information asymmetry over that with low information asymmetry is calculated by subtracting the return of the high and low beta-sorted portfolios.

Having determined the market and information asymmetry excess returns, we estimate the sukuk risk factor loadings b_1 and b_2 for individual sukuks by running time series regressions as defined in Equation 1. Following the Fama and Macbeth (1973) approach, we then calculate

[12] We also check the test results by estimating sukuk betas based on the comprehensive sukuk index.

the expected risk premia for the two sukuk risk factors by running the week-by-week cross-sectional regression as follows:

$$R_{it} = \Upsilon_t + \Upsilon_{1t}\hat{b}_{1i} + \Upsilon_{2t}\hat{b}_{2i} + \eta_{it}, \quad (3)$$

where, $\hat{b}_{1i}$ and $\hat{b}_{2i}$ are the estimated sukuk risk factor loadings for the market and information asymmetry risks determined by the time series regressions defined in Equation 1. The coefficient estimates Υ_{1t} and Υ_{2t} provide the expected risk premia for the sukuk market and information asymmetry risk factors. If the average values of these two coefficients from the week-by-week cross-sectional regressions are significant, then we suggest that sukuk investors require compensation for bearing (i) common market risk that originates from the uncertainty of *Shari'ah* rulings, in addition to general financial market factors, and (ii) information asymmetry risk that exists, because sukuk investors are not equally informed with the operational dynamics of different types of sukuks and the implications of heterogeneous underlying contracts.

4. Sample and Data

The sample includes a total of 627 Malaysian sukuks over a period from January 2010 to March 2017, which are available from the Thomson Reuters Eikon database. We retrieve the daily, weekly, and monthly return data for 627 sukuks, resulting in a total of 1,724 daily, 377 weekly, and 87 monthly observations. The sample sukuks includes both partnership and non-partnership sukuks. The *mudarabaha* and *musharakah* are partnership-based sukuks, while *ijarah* and *murabaha* sukuks are non-partnership type sukuks. In partnership contracts, *mudarabah* sukuk holders provide funds to the sukuk issuer, who acts as an entrepreneur and manager of the business venture, while *musharakah* sukuk holders participate in a joint venture with the sukuk issuer. The non-partnership *ijarah* sukuk is based on a financing lease contract, but the *murabaha* sukuk is based on a sales contract. Irrespective of contract type, the sample includes both government and corporate sukuks. Finally, we ensure that the sample covers all industrial sectors. Therefore, the study sample represents the full sukuk market.

Overall, the sample covers 81% of the sukuk market in Malaysia. The sample statistics are presented in Table 1, in which Panel A describes the distribution of sukuk contract types, Panel B describes the distribution of issuer types, and Panel C describes the distribution across industries. Panel A shows that a total of 283 sukuks (45.13%) are based on *murabaha* contracts, followed by 197 (31.42%) *musharakah* contracts, while 97 (15.47%) are *ijarah* contracts and the remaining 50 (7.98%) are *mudarabaha* sukuks. As a whole, the samples include about 380

(60.50%) non-partnership sukuks (*ijarah* and *murabaha*) and the remaining 247 (39.50%) are partnership sukuks (*mudarabaha* and *musharakah*). Panel B shows that a total of 398 (63.48%) are corporate sukuks, whereas the remaining 229 (36.52%) are government sukuks. Panel C shows that a total of 185 sukuks (29.51%) are from the trade and the service sector, while 119 (18.98%), 109 (17.38%), and 71 (11.32%) are from the construction, finance and property sectors, respectively. Among the remaining sample, 55(8.77%), 39 (6.22%), 32 (5.1%), 14 (2.23%) and 3 (0.48%) belong to the mining, industrial product, technology, plantation, and consumer product sectors. Overall, the sample ranges across nine different industrial sectors, while the majority are from finance, construction and the trade & service sectors.

[Insert Table 1]

Descriptive statistics of the weekly data are reported in Table 2, and it shows that the skewness and kurtosis of the weekly return data for the sample are -0.626 and 0.811, respectively, suggesting that the distribution is slightly skewed left and platykurtic. This pattern of return behavior is largely maintained across the different sub-samples. Other statistics, such as the mean, median, and standard deviation of sukuk returns are mostly consistent across all types of sukuk. Hence, we expect reliable results from the empirical tests using this dataset.

[Insert Table 2 Here]

5. Results and Discussions

To identify the common risk drivers for sukuk pricing, in line with Fama and Macbeth (1973), we first estimate the beta for all individual sukuks and arrange them into 10 beta-sorted portfolios to track their average returns and market risk over the study period. Next, we estimate the time series regressions that determine the factor loadings for (i) market risk and (ii) information asymmetry risk for sukuk investments, as described in previous sections. Finally, we measure the risk premia for these two factors, based on cross-sectional regressions.

5.1. Beta-sorted sukuk portfolios

The results presented in Table 3 show that the average return of the beta-sorted portfolios monotonically increases from the low-beta portfolios to high-beta ones. Sukuk portfolio 1, which has the lowest average beta (0.35) earns the highest average weekly return (0.032) during the study period, while portfolio 10, which has the highest average beta (1.53) provides the lowest average weekly return (-0.009). The monotonically increasing pattern of average return from low to high beta-sorted portfolios applies across sukuk type and issuer groups, as it does

in relation to all sukuks. This evidence for sukuk return and beta relationship is consistent with existing studies with respect to the return-beta anomaly in equity returns (Fama and MacBeth, 1973; Fama and French, 1992; Allen and Cleary, 1998; Frazzini and Pedersen, 2014). The underlying reasons for these results are not yet explored thoroughly, but early research generally suggests that other equity risk factors, beyond market risk, have contributed to this anomaly.

Given the return-beta anomaly in sukuk returns, we argue that a sukuk with a low beta has high information asymmetry, compared to one with a high beta, because the low beta sukuks have low correlation with the market movements, making it more difficult for investors to understand the return behavior of these sukuks. Thus, they are likely to be underpriced, due to the possibility of higher information asymmetry risk; the opposite holds true for high beta sukuks. Our conjecture for sukuk return behavior is consistent with the studies of Khalil *et al.* (2019), Easley *et al*. (2002), and Kelly and Ljungqvist (2012), that information asymmetry risk in the security market affects the returns of bonds and equities.

[Insert Table 3]

Figure 1, embedded in Table 3, shows the scatter diagram of the average weekly return of 627 sukuks against their beta coefficients. In this diagram, we clearly visualize a systematic pattern in the return-beta relationship for all sukuks. The pattern shows that low beta sukuks have systemically higher average returns, compared to those of the high beta sukuks, and vice versa. Therefore, these findings are consistent with our theoretical analysis that a low beta sukuk has higher information asymmetry risk than that of a high beta sukuk. This implied that sukuk investors require a risk premium commensurate with the level of information asymmetry risk in sukuk investment. Our study generally corroborates the recent evidence of Khalil *et al.* (2019), that information asymmetry affects the returns of US bonds. Chakravarty *et al.* (1998) and Chan *et al.* (2008) also find an information asymmetry effect on Chinese B-shares. In addition, Easley *et al*. (2002) and Kelly and Ljungqvist (2012) report the importance of information asymmetry in equity pricing in the US market. Hence, we add new evidence to the body of asset pricing literature that information asymmetry is also important in the pricing of sukuk, an Islamic financial asset created as an alternative to a debt instrument.

5.2. Sukuk risk factor loadings

We run the two-factor time series regression model specified earlier in Equation 1, $(R_t - R_{ft}) = a + b_1[R_{mt} - R_{ft}] + b_2 HLIA_t + e_t)$, for 627 sukuks to determine the factor loadings

for (i) sukuk market risk (b_1) and (ii) information asymmetry risk (b_2). In this model, b_1 determines the sensitivity of sukuk i excess return, $(R_t - R_{ft})$, to the sukuk market excess return, $(R_{mt} - R_{ft})$, and b_2 measures the sensitivity of sukuk i excess return to the excess return of the highest information asymmetry portfolio over that of the lowest information asymmetry portfolio, $HLIA_t$. The average factor loadings (b_1 and b_2) of 627 sukuks are presented in Panel A of Table 4. The results show that the average values of b_1 and b_2 for all sukuks are 0.445 and 0.226, respectively, and both are statistically significant at the 5% level. These findings generally support both hypotheses of our study, confirming that variations in the average market performance of sukuk and the level of sukuk information asymmetry significantly determine the return of a sukuk investment.

[Insert Table 4]

The time series regression statistics are reported in Panel B of Table 4. These results show that a total of 587 (93.14%) coefficients for the sukuk market risk factor (b_1) and 537 (85.65%) coefficients for information asymmetry risk factor (b_2) are statistically significant the 10% level or better. With these detailed statistics on the two sukuk risk factor coefficients (b_1 and b_2) generated from the 627 time-series regressions, our study demonstrates that these risk factors are highly important in determining the returns of most sukuks in the market.

Panel B of Table 4 also shows that the average intercept of the time-series regressions is not statistically significant, providing further evidence affirming the importance of market performance and information asymmetry in explaining sukuk returns. The results show that only 145 (23.13%) intercepts are significant and 482 (76.87%) are insignificant. The insignificant time-series intercepts for the majority of sukuks indicate more idiosyncratic reasons for the variations in the time series returns of sukuk captured in the residual. Market performance and information asymmetry are able to explain 12.5% (average R^2 is 0.125) of the returns of all sukuks. Further, the time-series regressions with two risk variables report an average F-value of 26.35.

Sub-sample results for the different sukuk types and issuers are also reported in Panel A of Table 4. We find that the average values of the risk factor coefficients, b_1 and b_2, remain significant at the 5% level. The risk factor coefficients are significant, because the sukuk market risk and information asymmetry risk persist across different sukuk types, implying that

both the partnership-based (*mudaraba* and *musharaka*) and non-partnership-based sukuks (*ijarah* and *murabaha*), as well as government and corporate sukuks, are broadly exposed to the same risk sources: sukuk sensitivity to its market and the level of sukuk information asymmetry.

Next, we examine the behavior of sukuk risk drivers across different industries to get more insights into sukuk risk pricing. We check if sukuk market risk and information asymmetry risk unequivocally exist across industrial sectors. This is especially important, because sukuk cash flows should be generated from the earnings of the underlying asset that is employed in a specific *Shar'ah* compliant business. Hence, the particular industry in which the business venture belongs plays a vital role in determining sukuk performance (Hossain *et al*. 2018). We test the time-series model (Equation 1) using industry subsamples, and the findings are reported in Table 5.

[Insert Table 5]

The results of Table 5 show that the average loadings for both risk factors (b_1 and b_2) are statistically significant at the 1% level in cases of the consumer product, technology, and plantation sectors, while they are significant at the 5% percent level for other industries. Therefore, based on both full sample tests and subsample regressions across different sukuk types, issuer categories, and industry classifications, the time-series Equation 1 results confirm that sukuk has two common risk factors, sukuk market risk and information asymmetry risk, that require risk premia.

5.3. Sukuk risk premia

Having confirmed that a sukuk has two common risk factors, we now proceed to test if investors require a risk premium for these risk factors. Following Fama and Macbeth (1973), we estimate 377 week-by-week, cross-sectional regressions specified previously in Equation 3, $R_{it} = \Upsilon_{0t} + \Upsilon_{1t}\hat{b}_{1i} + \Upsilon_{2t}\hat{b}_{2i} + \eta_{it}$, where, Υ_{1t} and Υ_{2t} provide the expected risk premia for sukuk market risk and information asymmetry risk, respectively. The results are reported in Panel A of Table 6 and show that the average values of Υ_1 and Υ_2 are 0.0192 and 0.0139, respectively, which are significant at the 1% level. These results indicate that an increase in market risk by one unit requires an additional 1.92% risk premium, while a unit increase in information asymmetry risk requires a 1.39% premium. With respect to the average intercept

(Υ_0) of the cross-sectional models, the average value of Υ_0 is statistically significant at the 1% level, implying that sukuk returns may be subject to other risk factors, in addition to sukuk market risk and information asymmetry risk.

[Insert Table 6]

The cross-sectional regression coefficient statistics are reported in Panel B of Table 6, and results show that they are generally statistically significant at 10% level or better. In particular, out of 377 coefficients, 301 (301/377=79.84%), 287 (287/377=76.12%) and 285 (285/377=75.60%) are significant for $\Upsilon_{0,}$ Υ_1 and Υ_2, respectively. Our results consistently document that both risk factors (sukuk market risk and information asymmetry risk) require a significant risk premium for sukuk investors. The findings of sukuk risk premia for two factors are generally consistent across different types of sukuks and issuer categories, indicating that our model captures the risk factors that are common across different types of sukuks. However, the statistical significance of $\Upsilon_{0,}$ implies that other risk factors might also exist.

Next, we examine if sukuk risk premia persist across industries. We run week-by-week cross-sectional regressions for industry sub-samples. The results in Table 7 show that the average values of Υ_1 and Υ_2 for 627 sukuks are significant at the 1% percent level for the finance, technology, plantation, and construction sectors, and those in the industrial product, trade, and mining industry are significant at the 5% level. However, the risk premia in the property sector are only significant at the 10% level. Broadly, our risk factors perform consistently across industry sectors, indicating the wider application of our sukuk pricing model across different industries. Overall, our results clearly show that sukuk investors require a risk premium for (i) sukuk market movements specific to the sector in which the sukuk is listed and (ii) for the level of risk associated with the information asymmetry of a sukuk.

[Insert Table 7]

5.4 Robustness analysis

In this section, we address three questions that need further justification for our two-factor sukuk pricing model. First, we confirm whether sukuk is a unique class of asset that is different from both bond and corporate equity. Second, we examine if concurrent movements in sukuk and bond markets present any systematic pattern over the longer term that could provide an

opportunity for arbitrage trading. Third, we examine if the proposed two-factor sukuk pricing model is sensitive to market index selection.

5.4.1 Is sukuk a unique asset class?

The underlying premise of our sukuk pricing model is that the sukuk is neither a bond, nor corporate equity. Hence, it is logical that the common pricing factors of a sukuk are related to the risks inherent to this unique asset class. In the theoretical section, we show how a sukuk, irrespective of its underlying contract type, differs from a conventional bond and corporate equity. Some prior research compares conventional bonds with sukuk, but the findings are inconsistent. Researchers broadly differ on account of whether a sukuk and a bond are different financial asset classes. In this regard, Hossain *et al*., (2019) summarize all studies comparing the return and risk of sukuks with those of conventional bonds, and their empirical tests have not found a significant correlation between the performance of bonds and those of sukuk. The empirical studies discussed earlier in Section 2 also indicate that Islamic assets are different from conventional assets. Hence, to confirm theoretical premise of this study, we examine whether the market performances of bonds and equity have no significant effect on sukuk returns. Therefore, we estimate the following model:

$$R_t^{Sukuk} = \alpha_0 + \alpha_1 t + \sum_{i=-1}^{-p} \phi_i R_{t-i}^{Sukuk} + \sum_{i=0}^{-r} B_1 R_{t-i}^{Equity} + \sum_{i=0}^{-s} B_2 R_{t-i}^{Bond} + e_t. \qquad (4)$$

Model 4 is a time series auto regressive distributed lag (ADRL) regression, where the average return of all sukuks for period *t* is regressed on the lagged return of sukuks and the level and lagged returns of equity and bonds. R_t^{Sukuk} is the average return of all sukuks on trading day *t*; R_{t-i}^{Sukuk} is the lagged average return of sukuks for trading day *t-i*; R_{t-i}^{Equity} is the equity market return for the day *t-i*, based on Kuala Lumpur Composite Index (KLCI); and R_{t-i}^{Bond} is the average bond market return for the day *t-i*, based on Thomson Reuters BPA Malaysia bond index (TR BPAM BOND IDX), which tracks the performance of all outstanding conventional local currency bonds in Malaysia.

The relevant results based on daily return data from January 2010 to March 2017 are reported in Table 8. Results show that the average contemporaneous performance of bond and stock markets has no significant effect on the average current period return of sukuks. Irrespective of their cashflow patterns, results indicate that sukuk risk factors are different from those of bonds and corporate equities, as we mentioned earlier in our theoretical discussion. Additionally, we find that past performance in the equity and bond markets do not predict the

current sukuk returns. However, results show that sukuk returns could be predicted from its past performance only. Overall, the empirical testing of Model 4 validates the theoretical underpinning of our sukuk pricing model.

[Insert Table 8 Here]

5.4.2 Do investors have arbitrage opportunities?

Next, we empirically address whether investors require a premium if they invest in a sukuk instead of a bond. It is an intriguing question, because sukuks were introduced to the market as an alternative to the conventional bond for corporate financing without infringing upon the Islamic tenets regarding financial transactions. It is a general perception that sukuk cash flow, *ceteris paribus*, is more uncertain than bond cash flow, due to contractual differences (Zakaria *et al*. 2012; Hamzah, 2016; Alshamrani, 2014), and rational investors inherently take this higher uncertainty into account when pricing a sukuk. To examine this matter, we first examine whether the difference between sukuk and bond returns shows any systematic pattern that may create an arbitrage opportunity for investors to switch between bonds and sukuks, as they are generally deemed to be alternative assets. We construct a variable named sukuk minus bond (*SMB*) that tracks the difference between the average market returns of sukuks and bonds:

$$SMB_t = r_t^S - r_t^B, \quad (5)$$

where r_t^S is the average market of sukuk, based on the sukuk index for period *t*, and r_t^B is the average bond return, based on the bond index for period *t*. We track *SMB* on a weekly basis from January 2010 through March 2017 and plot the series in Figure 2.

Figure 2 shows that *SMBs* fluctuate in a random pattern, suggesting that investors may not be able to find an arbitrage opportunity to switch between sukuks and bonds. Hence, investors are unlikely to require a premium for changing their investment from a bond to a sukuk. We confirm this possibility by testing *SMB* as the 3rd common risk variable, in addition to the sukuk market and information asymmetry variables identified previously. The sukuk-by-sukuk time-series coefficients for the *SMB* variable and the week-by-week cross-sectional coefficients for the *SMB* factor loadings are insignificant. These results show that investors follow the sukuk market independently from the bond market, providing further evidence that the risk profile of this Islamic security is inherently different from conventional debt.

[Insert Figure 2 Here]

5.4.3 Is sukuk pricing sensitive to index selection?

The results presented in Tables 4 through 7 are based on industry benchmarks, because Islamic law requires a sukuk's underlying asset must be used only in a *Shari'ah* compliant business sector. A sukuk contract identifies the business venture and industry sector in which the asset is employed. Therefore, the market effect on sukuk performance is channeled through the industry to which the sukuk financed asset belongs (Hossain *et al*. 2018). We re-estimate Equations 1 and 3 to observe whether the two-factor pricing model for sukuks is robust if we substitute the industry benchmark with the overall market benchmark. The re-estimated results based on an all-sukuk price index are generally consistent with those of the industry benchmarks reported in Tables 4 through 7. However, the average market risk factor beta (b_1) and the corresponding average risk premia coefficient (γ_1) based on an overall sukuk market benchmark are significant at the 10% level, rather than the 1% level achieved using relevant industry benchmarks. The re-estimation of the sukuk-by-sukuk time-series regressions (Equation 1) using market returns based on the all-sukuk market index results in a total of 254 (42.11%) sukuk betas which are insignificant. However, the corresponding results using the industry benchmarks reported in Panel B of Table 4 result in only 43 (6.83%) sukuk betas which are insignificant. These findings confirm that an industry benchmark is a better choice than the overall market benchmark for sukuk pricing due to *Shari'ah* compliance issues.

5.5 Further discussion

In this study, we have tested two risk factors that determine sukuk prices and required risk premia. However, other risk factors may also exist, as the average value of cross-sectional regression intercepts is statistically significant. There is a possibility that managerial efficiency of the sukuk issuing firm could be another risk factor for sukuk investors. As the cash flows to sukuk holders are generated from the earnings of a particular business project launched by the firm with sukuk finance, the efficiency of the sukuk issuing firm in managing the project may influence the cash flows to sukuk holders. If a firm cannot manage the sukuk financed project successfully, the partnership-sukuk holder's cash flow could be lower than their expectations, while the non-partnership sukuk holders bear the risk of payment defaults. As a consequence, investors require a premium to invest in a sukuk issued by a less efficient firm, irrespective of the nature of sukuk contracts. This line of reasoning is worthy of further investigation in future studies.

Our two-factor sukuk pricing model works well for different types of sukuks issued in Malaysia, but it would be worthwhile to confirm if the model works for other countries where sukuks are actively traded. We attempt to undertake this analysis in the context of other Muslim countries, but our data yield only 136 sukuks from 11 countries, affording insufficient data to generate reliable sukuk betas. However, there is no reason why our two-factor model should not work equally well in other markets, because the underlying complexities of sukuk contracts apply to all sukuks, irrespective of issuing countries. Hence, the information asymmetries that investors face exist in all Islamic markets. Future studies to test our sukuk pricing factors in other countries would be appropriate when sufficient data become available.

Moreover, sukuk investors globally are susceptible to *Shari'ah* risk, which is unique to Islamic assets. Therefore, we reflect on how our two-factor model captures this risk. Shari'ah risk occurs when any circumstance invalidates sukuk contract due to the non-compliance of Islamic tenet (Noor *et al*., 2019). The *Shari'ah* risk could systematically impact all the Islamic assets when investors receive a piece of news about non-compliance with Shari'ah guidelines, changes in Shari'ah rulings governing sukuk contacts, or difference of opinions between SSBs across issuers. Such information has a universal effect on the Islamic market clientele that mainly invest in sukuks for religious considerations. These investors will liquidate investments in sukuks when their spiritual purpose is not served. Conversely, they will buy more sukuks when there is a consensus in Shari'ah rulings resolving any controversial religious matter relating to Islamic investment. Therefore, *Shari'ah* risk could negatively impact the sukuk market, and sukuk beta captures *Shari'ah* risk besides other common economic risks affecting the sukuk market. Hence, in our model, sukuk's market risk premium does include Shari'ah risk premia as well.

Finally, we reflect on risk and term structure of sukuk in relation to our two-factor pricing model. A sukuk differs from a bond due to different contracting approaches (Hossain et al., 2020). Therefore, the sukuk risk structure varies from that of a similar bond (Uddin et al., 2020) because there is no obligation for payment of fixed interest in partnership sukuks. Hence, the question of default does not arise. In the case of non-partnership sukuk, issuers pay fixed coupons to the sukuk holder as lease rentals or credit purchase installments. Therefore, default risks that we usually consider for conventional bonds are less applicable for sukuks because the consequences of sukuk defaults (for non-partnership sukuks) are much lighter as compared to conventional bond defaults (Uddin et al., 2020). Therefore, the sukuk risk structure is not built on the traditional concept of borrowing. Despite this analysis, sukuk holders are exposed

to cashflow uncertainty that may affect sukuk market values. Hence, technically, sukuk beta captures the effect of cashflow uncertainty of sukuks.

Likewise, due to interest prohibition in Islamic Finance, it is unknown whether the term structure for bond yields should also apply to sukuk yields. The evidence shows that the long-term sukuk profit rate does not reflect the future spot rates on sukuks, suggesting that the expectation theory of term structure does not explain sukuk yields (Adejoke et al. 2013). It means sukuk yields are less predictable than bond yields. It is likely because sukuk cashflows are more uncertain as they are not interest payments. According to *Shari'ah*, the sukuk yield originates from asset profits, which is subject to industry market performance (Hossain et al., 2020). Therefore, surprises in market interest rates have a less impact on sukuk return than bond yields (Akhtar et al., 2017). Hence, without established knowledge of sukuk's term structure (as opposed to a bond's term structure), we cannot consider it as a pricing factor. However, our two-factor model can be extended if future research proves that sukuk term structure matters even though it is not a debt *per se*.

6. Conclusion

According to asset pricing theory, the price of a sukuk should be based on factors that capture common risk elements inherent to this security. Investors know the common risk factors for stocks and bonds, but do not yet know the risk factors intrinsic to a sukuk. This is because a sukuk is an Islamic financial asset that is fundamentally different from both common stocks and conventional bonds. A sukuk holder is entitled to a limited period proportionate ownership in the sukuk-financed asset that a sukuk issuing firm employs in a *Shari'ah* approved business venture. In compliance with *Shari'ah* guidelines, asset ownership is given to the sukuk holders, because their cash flows are supposedly generated exclusively from the earnings of the specific asset financed by the sukuk issuance. A variety of a partnership or non-partnership sukuks are available in the market, because a firm raises funds for different purposes, and Muslim investors demand *Shari'ah*-compliant assets. The underlying contracts of different sukuks are engineered to generate cash flows approximately similar to those of the conventional bonds available in the market. However, it is difficult to accurately assess the risks of investments in sukuks due to the intricate underlying contracts that make sukuk cash flows and default consequences unclear.

Furthermore, we assume an asymmetrical information environment exists in the sukuk market, because investors can predict the performance of a sukuk easily if it moves closely with market

performance. But, on the other hand, it is difficult to determine the performance of a sukuk if it is less correlated with market movements. Therefore, investors face an information asymmetry problem for a sukuk that is less correlated with the market, and vice versa. Therefore, we propose a two-factor sukuk pricing model that captures the common risks associated with the movements in the sukuk market and the level of information asymmetry for a sukuk.

We find that two common risk factors: (i) sukuk market risk and (ii) information asymmetry risk work well for the pricing of sukuks, irrespective of their contract types, issuer categories, and industry classifications. In the absence of a sukuk pricing model, investors and market practitioners are unable to estimate the fair value of a sukuk when they use LIBOR, or a similar interbank rate, as the benchmark for comparing sukuk performance, as these rates do not help them to identify the required risk premium for investment in a sukuk. Further, the use of an interest-based rate as the benchmark for assessing the performance of sukuk conflicts with Islamic jurisprudence on interest forbiddance. Hence, our two-factor sukuk pricing model is a pioneer in determining the risk premium for sukuk investment and will help analysts in their attempts to achieve greater precision in sukuk risk assessment and buy-sell recommendations. Overall, our study contributes to the broader spectrum of asset pricing literature by identifying two common risk factors for a sukuk, an Islamic financial security that differs fundamentally from conventional debts and corporate equities, thus establishing a foundation for sukuk valuation.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

References

Abalala, T., & Sollis, R. (2015). The Saturday effect: an interesting anomaly in the Saudi stock market. *Applied Economics, 47*(58), 6317-6330.

Afshar, T. A., & Muhtaseb, M. R. (2014). Do Sukuk (Islamic Bonds) Have a Role in Today's Global Capital Markets? *Journal of Structured Finance, 20(2)*, 74-80.

Ahmad, A. U., & Hassan, M. K. (2007). Riba and Islamic banking. *Journal of Islamic Economics, Banking and Finance, 3*(1), 1-33.

Ahmad, N. W., Ripain, N., Bahari, N. F., & Shahar, W. S. (2015). Growth and Prospect of Sukuk in Malaysian Market: A Review. . *In Proceeding of the 2nd International Conference on Management and Muamalah (No. 2ndICoMM)*. Kualalumpur.

Ahmed, E. R., Islam, M. A., & Alabdullah, T. T. (2014). Islamic Sukuk: Pricing Mechanism and Rating. *Journal of Asian Scientific Research, 4*(11), 640-658.
Ahmed, H., & Elsayed, A. H. (2018). Are Islamic and conventional capital markets decoupled? Evidence from stock and bonds/sukuk markets in Malaysia. *The Quarterly Review of Economics and Finance*, In Press.
Alam, N., Hassan, M. K., & Haque, M. A. (2013). Are Islamic bonds different from conventional bonds? International evidence from capital market tests. *Borsa Istanbul Review, 13*(3), 22-29.
Allen, D. E., & Cleary, F. (1998). Determinants of the cross-section of stock returns in the Malaysian stock market. *International Review of Financial Analysis, 7*(3), 253-275.
Alshamrani, A. (2014). Critical Evaluation of the Regulatory Framework for the Application of Islamic Financial Derivatives in the Kingdom of Saudi Arabia. *Journal of Islamic Banking and Finance, 2*(1), 269-303.
Ang, A., Bekaert, G., & Wei, M. (2008). The term structure of real rates and expected inflation. *The Journal of Finance*, 797-849.
Ariff, M., & Safari, M. (2012). Are sukuk securities the same as conventional bonds? . *Afro Eurasian Studies, 1*(1), 101-125.
Ariff, M., Safari, M., & Mohamed, S. (2013). Sukuk Securities and Conventional Bonds: Evidence of Significant Differences. *Social Sciences & Humanities, 21*(2), 621 - 638.
Azmat, S., Skully, M., & Brown, K. (2014a). Credit risk in Islamic joint venture bond. *Journal of Economic Behavior & Organization, 103*, 129-145.
Azmat, S., Skully, M., & Brown, K. (2014b). Issuer's choice of Islamic bond type. *Pacific-Basin Finance Journal, 28*, 122-135.
Azmat, S., Skully, M., & Brown, K. (2014c). The Shariah compliance challenge in Islamic bond markets. *Pacific-Basin Finance Journal, 28*, 47-57.
Azmat, S., Skully, M., & Brown, K. (2017). The (little) difference that makes all the difference between Islamic and conventional bonds. *Pacific-Basin Finance Journal, 42*, 46-59.
Baghai, R. P., Servaes, H., & Tamayo, A. (2014). Have Rating Agencies Become More Conservative? Implications for Capital Structure and Debt Pricing. *Journal Of Finance, 69*, 1961-2005.
Bark, J. (1991). The Arbitrage Pricing Theory: Is it Testable? *Journal of Finance, 40*, 1129–1148.
Bhuiyan, R. A., Rahman, M. P., Saiti, B., & Ghani, G. M. (2018). Financial integration between sukuk and bond indices of emerging markets: Insights from wavelet coherence and multivariate-GARCH analysis. *Borsa Istanbul Review, 18*(3), 218-230.
Białkowski, J., Bohl, M. T., Kaufmann, P., & Wisniewski, T. P. (2013). Do mutual fund managers exploit the Ramadan anomaly? Evidence from Turkey. *Emerging Markets Review, 15*, 211-232.
Białkowski, J., Etebari, A., & Wisniewski, T. P. (2012). Fast profits: Investor sentiment and stock returns during Ramadan. *Journal of Banking & Finance, 36*(3), 835-845.
Black, F. (1972). Capital market equilibrium with restricted borrowing. *The journal of business, 45*(3), 444-455.
Camberlain, G., & Rothschild, M. (1983). Arbitrage Factor Structure and Mean Variance Analysis on Large Asset Markets. *Econometrica*, 1034-1281.
Campbell, J. Y., & Viceira, L. M. (2005). The term structure of the risk-return trade-off. *Financial Analysts Journal, 61*(1), 34-44.
Chahine, S., & Zeidan, M. J. (2014). Corporate governance and market performance of parent firms following equity carve-out announcements. *Journal of Management & Governance, 18*(2), 471-503.

Chakravarty, S., Sarkar, A., & Wu, L. (1998). Information asymmetry, market segmentation and the pricing of cross-listed shares: Theory and evidence from Chinese A and B shares. *Journal of International Financial Markets, Institutions and Money, 8*(3), 325-342.

Chan, K., Menkveld, A. J., & Yang, Z. (2008). Information asymmetry and asset prices: Evidence from the China foreign share discount. *The Journal of Finance*, 159-196.

Chance, D. M. (1990). Default risk and the duration of zero coupon bonds. *The journal of finance, 45*(1), 265-274.

Cochrane, D., & Orcutt, G. H. (1949). Application of least squares regression to relationships containing auto-correlated error terms. *Journal of the American statistical association, 44*(245), 32-61.

Connor, G., & Korajczyk, R. (1988). Risk and return in an equilibrium APT: application of a new test methodology. *Journal of Financial Economics, 21*.

Cooper, N., Connor, G., & Robert, A. K. (2008). Performance Measurement with Arbitrage Pricing Theory: A New Framework for Analysis. *Journal of Financial Economics, 15*, 373–394.

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies, 51*(3), 393-414.

DIFCSG. (2017). *Sukuk Structures Guide*. Dubai: Dubai International Financial Centre Sukuk, Islamibanker. Retrieved from https://www.islamicbanker.com/education/sukuk-al-ijara

Easley, D., Hvidkjaer, S., & O'hara, M. (2002). Is information risk a determinant of asset returns? . *The journal of finance, 57*(5), 2185-2221.

Faff, R. W. (2003). Creating Fama and French Factors with Style. *The Financial Review, 38*, 311-322.

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *Journal of Finance, 47*(2), 427-465.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics, 33*(1), 3-56.

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics, 116*(1), 1-22.

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of political economy, 81*(3), 607-636.

Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. *Journal of Financial Economics, 111*(1), 1-25.

Ghauri, S. M. (1999). Why interest-rate cannot benchmark for Islamic financial product pricing? *Benchmarking: An International Journal, 22*(7), 1417-1428.

Godlewski, C. J., Turk-Ariss, R., & Weill, L. (2013). Sukuk vs. conventional bonds: A stock market perspective. *Journal of Comparative Economics, 41*(3), 745-761.

Grinblatt, M., & Titman, S. (1983). Factor pricing in a finite economy. *Journal of Financial Economics, 12*(4), 497-507.

Hamzah, S. R. (2016). Debts and Debt-Based Sukuk Related to Risk Shifting Behavior. *World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 10*(2), 558-561.

Hassan, K., Kayed, R. N., & Oseni, U. A. (2013). *Introduction to Islamic Banking & Finance: Principles and practice* (1st ed.). Pearson Education Limited.

Hassan, M. K., Paltrinier, A., Dreassi, A., Miani, S., & Sclip, A. (2018). The determinants of co-movement dynamics between sukuk and conventional bonds. *The Quarterly Review of Economics and Finance, 68*, 73-84.

Hayat, R., & Kraeussl, R. (2011). Risk and return characteristics of Islamic equity funds. *Emerging Markets Review, 12*(2), 189-203.
Hoque, H., Kabir, S. H., Abdelbari, E. K., & Manahov, V. (2016). Islamic and Conventional Equity Market Movements During and After the Financial Crisis: Evidence from the Newly Launched MSCI Indices. *Financial Markets, Institutions & Instruments, 25*(4), 217-252.
Hossain, S., Uddin, M. H., & Kabir, S. H. (2019). Sukuk and Bond Puzzle: An Analysis with Characteristics Matched Portfolios. *Emerging Markets Finance and Trade*. Forthcoming.
IIFM. (2018). *IIFM Annual Sukuk Report.* Kuala Lumpur: International Islamic Financial Market.
ISRA. (2010). *Islamic Pricing Benchmark.* International Shari'ah Research Academy . Retrieved from http://www.kantakji.com/media/8593/m319.pdf
ISRA. (2011). *Islamic Financial System: Principles & Operations.* (I. S. Academy, Ed.) Malaysia: Pearson Malaysia Sdn Bhd.
Jallad, R. (2015). What is Missing in Pricing Sukuk Securities? . *European Academic Research, 3*(2).
Johnson, R. E. (1967). Term structures of corporate bond yields as a function of risk of default. *The journal of finance, 22*(2), 313-345.
Kelly, B., & Ljungqvist, A. (2012). Testing asymmetric-information asset pricing models. *The Review of Financial Studies, 25*(5), 1366-1413.
Kenourgios, D., Naifar, N., & Dimitriou, D. (2016). Islamic financial markets and global crises: Contagion or decoupling? *Economic Modelling, 57*, 36-46.
Khalil, S., Mansi, S., Mazboudi, M., & Zhang, A. (. (2019). Information asymmetry and the wealth appropriation effect in the bond market: Evidence from late disclosures. *Journal of Business Research, 95*, 49-61.
Kolsi, M. C., & Zehri, F. (2014). Islamic banks and conventional banks within the recent global financial crisis: empirical evidence from the GCC region. *International Journal of Financial Services Management, 7*(3), 196-218.
Linter, J. (1965). The Valuation of Risk Assets and Selection of Risky Investments in Stock Portfolio and Capital Budgets. *Review of Economics and Statistics, 47*(5), 13–47.
Maghyereh, A. I., & Awartani, B. (2016). Dynamic transmissions between Sukuk and bond markets. *Research in International Business and Finance, 38*, 246-261.
Malkawi, B. H. (2014). Financial derivatives between Western legal tradition and Islamic finance: A comparative approach. *Journal of Banking Regulation, 15*(1), 41-55.
Markowitz, H. M. (1952). Portfolio Selection. *Journal of Finance, 7*(1), 77-91.
Markowitz, H. M. (1959). *Portfolio Selection, Efficent Diversification of Investments.* J. Wiley.
McMillen, M. J. (2007). Asset securitization sukuk and Islamic capital markets: Structural issues in these formative years. *Wisconsin International Law Journal, 25*(2).
Meager, L. (2017). Unlocking sukuk. *International Financial Law Review, 1*.
Merdad, H. J., Hassan, M. K., & HipplerIII, W. J. (2015). The Islamic risk factor in expected stock returns: an empirical study in Saudi Arabia. *Pacific-Basin Finance Journal, 34*, 293-314.
Mohamed, H. H., Masih, M., & Bacha, O. I. (2015). Why do issuers issue Sukuk or conventional bond? Evidence from Malaysian listed firms using partial adjustment models. *Pacific-Basin Finance Journal, 34*, 233-252.
Mollah, S., & Zaman, M. (2015). Shari'ah supervision, corporate governance and performance: Conventional vs. Islamic banks. *Journal of Banking & Finance, 58*, 418-435.

Mossin, J. (1966). Equilibrium in a Capital Asset Pricing Market. *Econometrica, 34*, 768–83.
Muhamed, N. A., & Radzi, R. (2011). Implication of Sukuk structuring: the comparison on the structure of asset based and asset backed Ijarah Sukuk. 2nd international conference on business and economic research (2nd ICBER 2011) proceeding,No. 2011-466.
Naifar, N., Hammoudeh, S., & dohaiman, M. S. (2016). Dependence structure between sukuk (Islamic bonds) and stock market conditions: An empirical analysis with Archimedean copulas. *Journal of International Financial Markets, Institutions and Money, 44*, 148-165.
Narayan, P. K., & Bannigidadmath, D. (2017). Does Financial News Predict Stock Returns? New Evidence from Islamic and Non-Islamic Stocks. *Pacific-Basin Finance Journal, 42*, 24-45.
Narayan, P. K., & Dinh Hoang Bach Phan. (2019, February). A survey of Islamic banking and finance literature: Issues, challenges and future directions. *Pacific-Basin Finance Journal, 53*, 484-496.
Narayan, P. K., Phan, D. H., Sharma, S. S., & Westerlund, J. (2016a). Are Islamic stock returns predictable? A global perspective. *Pacific-Basin Finance Journal, 40 (A)*, 210-223.
Narayan, P. K., Phan, D. H., Thuraisamy, K., & JoakimWesterlund. (2016b). Price discovery and asset pricing. *Pacific-Basin Finance Journal, 40(A)*, 224-235.
Opalesque. (2009, June 23). Discussion Board. *The Use of LIBOR by Islamic Banks*. New York. Retrieved from http://www.kantakji.com/media/8692/s210.pdf
Rahman, A. A., Abdul, L. R., Muda, R., & Abdullah, M. A. (2014). Failure and potential of profit-loss sharing contracts. *Pacific Basin Finance Journal, 28*, 136-151.
Rauf, A. L., & bt-Ibrahim, Y. (2014). A Sectorial analysis of Sukuk market based on determinants of risk and return performances. *European Journal of Accounting Auditing and Finance Research, 2*(2), 139-155.
Reinganum, M. R. (1981). Misspecification of capital asset pricing: Empirical anomalies based on earnings' yields and market values. *Journal of financial Economics, 9*(1), 19-46.
Rizvi, S. A., Arshad, S., & Alam, N. (2015). Crises and contagion in Asia Pacific — Islamic v/s conventional markets. *Pacific-Basin Finance Journal, 34*, 315-326.
Ross, S. A. (1976). An Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory, 13*, 341–360.
Safari, M. (2013). Contractual structures and payoff patterns of Sukuk securities. *International Journal of Banking and Finance, 10*(2).
Saripudin, K. N., Mohamad, S., Razif, N. F., Abdullah, L. H., & Rahman, N. N. (n.d.). (2012.b). Case study on sukuk musharakah issued in Malaysia. , 12(2), . *Middle-East Journal of Scientific Research, 12*(2), 168-175.
Sclip, A., Dreassi, A., Miani, S., & Paltrinieri, A. (2016). Dynamic correlations and volatility linkages between stocks and sukuk: Evidence from international markets. *Review of Financial Economics, 31*, 34-44.
SCM. (2009). *Sukuk: Islamic Capital Market Series, Sweet & Maxwell Asia* (Vols. ISBN 978-967-5040-39-9). Securities Commission Malaysia.
SCM. (2016). *Resolution of the Shari'ah Advisory Council.* Kualalumpur: Securities Commission Malaysia. Retrieved from https://www.sc.com.my/wp-content/uploads/eng/html/icm/Resolution_SAC_2016.pdf
Securities Commision Malaysia. (2016). *Resolution of the Shari'ah advisory Council.* Kualalumpur: Suruhanjaya Sekuriti. Retrieved from https://www.sc.com.my/wp-content/uploads/eng/html/icm/Resolution_SAC_2016.pdf

Shanken, J. (1982). The arbitrage pricing theory: is it testable? , . *The journal of finance, 37*(5), 1129-1140.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance, 19*(3), 425-442.

Sivaramakrishnan, K., & Yu, S. C. (2008). *On the Association between Corporate Governance and Earnings.* Financial Accounting and Reporting Section (FARS). Retrieved from https://pdfs.semanticscholar.org/67f3/c11ef9942d090ce076e29ee43bcac39fc4cf.pdf

Trad, S., & Bhuyan, R. (2015). Prospect of Sukuk in the Fixed Income Market: A Case Study on Kuwait Financial Market. *International Journal of Financial Research, 6*(4), 175-186.

Ulus, S. (2013). Fixed Income Investment (Sukuk) in Islamic Finance. *Afro Eurasian Studies, 2*, 298-305.

Usmani, T. M. (1998). *An Introduction to Islamic Finance.* Karachi: Idaratul Ma`arif.

Visser, W., & McIntosh, A. (1998). An evaluation of the historical condemnation of usury. *Accounting, Business & Financial History, 8*(2).

Zakaria, N. B., Isa, M. A., & Abidin, R. A. (2012). The construct of Sukuk, rating and default risk. *Procedia-Social and Behavioral Sciences, 65*, 662-667.

Zakaria, N. B., Isa, M. A., & Abidin, R. A. (2013). Sukuk rating, default risk and earnings response coefficient. *Advances in Natural and Applied Sciences, 7*(2), 131-137.

Zaremba, A., Karathanasopoulos, A., Maydybura, A., Czapkiewicz, A., & Bagheri, N. (2018). Dissecting anomalies in Islamic stocks: Integrated or segmented pricing? *Pacific-Basin Finance Journal, In press*.

Zhang, D., Cai, J., Dickinson, D. G., & Kutan, A. M. (2016). Non-performing loans, moral hazard and regulation of the Chinese commercial banking system. *Journal of Banking & Finance, 63*, 48-60.

Table 1: Sample Description

Panel A:
Distribution of sukuk across contract types

Sukuk Type	No	%
Ijara	97	15.47%
Murabaha	283	45.13%
Mudarabah	50	7.98%
Musharaka	197	31.42%
Total	627	100%

Panel B:
Sukuk classification by issuers

Sukuk issue type	No	%
Government sukuk	229	36.52%
Corporate sukuk	398	63.48%
Total	627	100%

Panel C:
Sukuk classification by industry areas

Sukuk industry	No	%
Construction	119	18.98%
Trad/Services	185	29.51%
Technology	32	5.10%
Plantation	14	2.23%
Mining	55	8.77%
Industrial Product	39	6.22%
Consumer Product	3	0.48%
Finance	109	17.38%
Property	71	11.32%
Total	627	100%

This table outlines the sample description based on the data set of the study (7 years' weekly data for 627 sukuk). Panel A shows the distribution of sukuk across different contract types. Panel B shows the classification of sukuk across different issuers. Finally, Panel C shows the list and percentage of nine sukuk industry areas in which sukuk underlying asset belong to.

Table 2: Descriptive statistics of sukuk returns across different portfolios based on contract types and issuer categories

Sukuk portfolios		Mean	Median	Std Dev	Minimum	Maximum	Skewness	Kurtosis
All sukuks		0.01189	0.0138	0.0309	-.1036	0.0794	-0.626	0.811
Contract types	Ijarah	0.0092	0.0119	0.0308	-0.0662	0.0811	-0.109	-0.509
	Murabaha	0.01133	0.0128	0.0312	-0.0954	0.0785	-0.500	0.504
	Mudarabah	0.01197	0.0152	0.0352	-0.1251	0.0882	-0.700	1.419
	Musharaka	0.0125	0.0137	0.0360	-0.0973	0.0814	-0.422	0.320
Issuer	Government	0.01135	0.0136	0.0300	-0.0980	0.0765	-0.585	0.706
	Corporate	0.0121	0.0139	0.0310	-.1068	0.0836	-0.637	0.868

The statistics are based a total of 377 weekly observations for 627 sukuk.

Table 3: Return and market risk of 10 beta-sorted sukuk portfolios across the sukuk types and issuer categories

Portfolios groups			Portfolio groups based on the sukuk betas (from low to high)									
			1	2	3	4	5	6	7	8	9	10
All sukuks		Return	0.0322	0.0255	0.0194	0.0167	0.0160	0.006	0.0011	-.0061	-.0072	-.0098
		Beta	0.35	0.55	0.70	0.78	0.96	1.09	1.16	1.24	1.32	1.53
Sukuk types based on underlying contract categories	Ijarah	Return	0.0217	0.0158	0.0105	0.0040	0.007	0.0020	-0.0038	-0.007	-0.009	-0.0094
		Beta	0.30	0.56	0.68	0.79	1.02	1.10	1.18	1.28	1.37	1.70
	Murabaha	Return	0.0353	0.0279	0.022	0.0186	0.0163	0.0112	0.0038	-0.0034	-0.0048	-0.0091
		Beta	0.33	0.50	0.64	0.78	0.99	1.11	1.18	1.25	1.33	1.52
	Mudarabah	Return	0.0269	0.0246	0.022	0.0129	0.0135	0.0098	0.005	-0.0043	-0.0104	-0.0124
		Beta	0.32	0.57	0.66	0.77	0.97	1.10	1.19	1.27	1.32	1.48
	Musharaka	Return	0.040	0.0270	0.0240	0.0194	0.0174	0.0132	0.0055	-.0029	-.0032	-.0102
		Beta	0.39	0.60	0.69	0.79	0.91	1.06	1.14	1.22	1.31	1.54
Sukuks based on issuers	Government	Return	0.0337	0.0260	0.0231	0.0200	0.0177	0.0120	0.0037	-.0035	-.0058	-.0109
		Beta	0.35	0.54	0.69	0.83	1.01	1.11	1.17	1.24	1.30	1.55
	Corporate	Return	0.0363	0.0282	0.025	.0196	.0158	.0113	.0033	-.0047	-.0061	-.0097
		Beta	0.34	0.55	0.65	0.75	0.93	1.07	1.15	1.24	1.32	1.53

Figure 1: Scattered plot of sukuk return and market beta
Jan 2010 - Mar 2017

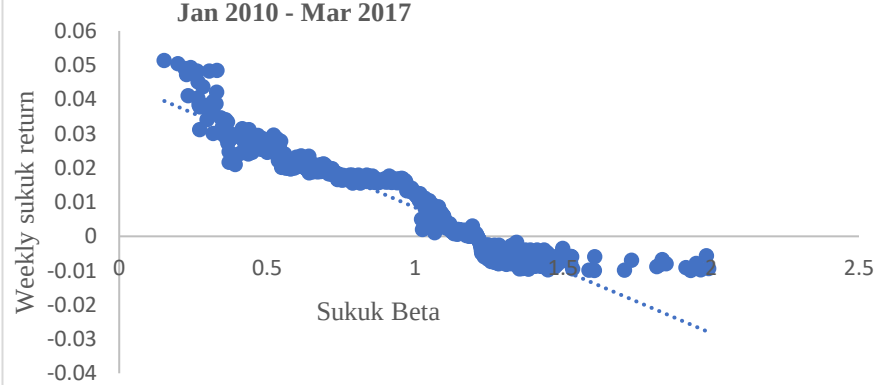


Table reports average weekly return of sukuks and market risk for the 10 portfolios sorted by the low to high market beta; in which, portfolio – 1 has the lowest average beta and portfolio – 10 has the highest average beta. We estimate the beta of individual sukuk based on the market model: $R_t = \alpha + \beta R_m + e_t$, where, R_t is weekly sukuk return and R_m is weekly return of an industry based sukuk market index that is elaborated in the paper. We embed a scattered diagram (Figure 1) within this table to visually show the behavior of the return and market risk for 627 sukuks in our sample set and compare it with portfolio results in the table.

Table 4: Time series regressions of sukuk excess return on (i) market excess return and (ii) excess return of the highest information asymmetric portfolio (with the lowest average beta) over that of the lowest information asymmetric portfolio (with the highest average beta) across (i) all sukuks, (ii) contract types and (iii) issuer categories. The time series model is specified as: $R_t - R_f = a + b_1[R_m - R_f] + b_2 HLIA + e_t$, where R_t is sukuk return, R_f is treasury bill rate, R_m is industry based sukuk market return and $HLIA$ is high minus low information asymmetric portfolios.

Sukuk categories	Average Intercept(a)	Sukuk market risk (b_1)			Information asymmetry risk (b_2)			R^2	F-Stat.	DW
		Avg.	Min	Max	Avg.	Min	Max			
All sukuks	0.005 (*0.412*)	0.445 (*0.012*)	0.059 (*0.00*)	0.968 (*0.53*)	0.226 (*0.031*)	-0.217 (*0.00*)	0.499 (*0.274*)	0.125	26.35 (*0.00*)	2.11
Ijarah	0.004 (*0.3725*)	0.503 (*0.00*)	0.140 (*0.00*)	0.941 (*0.15*)	0.222 (*0.027*)	-0.113 (*0.00*)	0.429 (*0.192*)	0.153	35.95 (*0.00*)	2.16
Murabaha	0.005 (*0.414*)	0.444 (*0.011*)	0.143 (*0.00*)	0.895 (*0.017*)	0.2357 (*0.025*)	-0.213 (*0.00*)	0.487 (*0.252*)	0.121	28.17 (*0.00*)	2.08
Mudarabah	0.004 (*0.487*)	0.3563 (*0.018*)	0.176 (*0.00*)	0.6078 (*0.017*)	0.219 (*0.033*)	-0.204 (*0.00*)	0.445 (*0.167*)	0.095	11.03 (*0.00*)	2.18
Musharaka	0.005 (*0.436*)	0.422 (*0.0133*)	0.136 (*0.00*)	0.968 (*0.172*)	0.232 (*0.032*)	-0.217 (*0.00*)	0.499 (*0.189*)	0.115	21.08 (*0.00*)	2.12
Government	0.004 (*0.421*)	0.421 (*0.010*)	0.143 (*0.00*)	0.942 (*0.177*)	0.217 (*0.031*)	-0.213 (*0.00*)	0.454 (*0.274*)	0.117	23.24 (*0.00*)	2.10
Corporate	0.005 (*0.413*)	0.4325 (*0.012*)	0.058 (*0.00*)	0.968 (*0.531*)	0.222 (*0.032*)	-0.217 (*0.00*)	0.488 (*0.252*)	0.114	24.87 (*0.00*)	2.14

Panel B: Statistics of the model parameters for 627 sukuk-by-sukuk time-series regressions

Parameters	At less than one percent	At less than five percent	At less than 10 percent	Insignificant	Total
Intercept	62 (9.88%)	106 (16.90%)	145 (23.13%)	482 (76.87%)	627
b_1	492 (78.47%)	558 (89%)	584 (93.14%)	43(6.86%)	627
b_2	366 (58.37%)	474 (75.60%)	537 (85.65%)	90 (14.35%)	627

Table 4 provides the significance of average factor loading (time series model coefficients) for the sukuk market risk (b_1) and information asymmetry risk (b_2) associated with sukuk investment. The coefficient *p-values* are reported in the parentheses. The results reported here are based on the weekly data. We compare the weekly results with those based on the daily and monthly data, but they are almost similar. Since time series returns are usually serially correlated, so, we apply Cochrane–Orcutt to correct auto correlation problem in time series data and generate unbiased coefficient estimates. Panel B provides the detail statistics of the model parameters for all sukuk-by-sukuk time series regression.

Table 5: Time series regressions of sukuk excess return on (i) market excess return and (ii) excess return of the highest information asymmetric portfolio (with the lowest average beta) over that of lowest information asymmetric portfolio (with the highest average beta) across the (i) all sukuks and (ii) industry areas. The time series model is specified as: $R_t - R_f = a + b_1[R_m - R_f] + b_2 HLIA + e_t$, where R_t is sukuk return, R_f is treasury bill rate, R_m is industry based sukuk market return and $HLIA$ is high minus low information asymmetric portfolios.

Sukuk categories	Average Intercept(a)	Sukuk market risk (b_1)			Information asymmetry risk (b_2)			R^2	F-Stat.	DW
		Avg.	Min	Max	Avg.	Min	Max			
All sukuks	0.005 (*0.412*)	0.445 (*0.012*)	0.059 (*0.00*)	0.968 (*0.53*)	0.226 (*0.031*)	-0.217 (*0.00*)	0.499 (*0.274*)	0.125	26.35 (*0.00*)	2.11
Property	0.004 (*0.365*)	0.497 (*0.006*)	0.141 (*0.00*)	.941 (*0.159*)	0.227 (*0.025*)	0.087 (*0.00*)	0.429 (*0.18*)	0.148	34.58 (*0.00*)	2.16
Industrial product	0.006 (*0.365*)	0.506 (*0.007*)	0.144 (*0.00*)	0.878 (*0.151*)	0.214 (*0.029*)	-0.114 (*0.00*)	0.428 (*0.192*)	0.153	35.75 (*0.00*)	2.18
Consumer product	-0.005 (*0.456*)	0.586 (*0.00*)	0.525 (*0.00*)	0.662 (*0.00*)	0.293 (*0.00*)	0.224 (*0.00*)	0.381 (*0.00*)	0.206	48.84 (*0.00*)	2.11
Finance	0.006 (*0.473*)	0.355 (*0.019*)	0.176 (*0.00*)	0.619 (*0.170*)	0.241 (*0.032*)	-0.213 (*0.00*)	0.488 (*0.173*)	0.056	16.75 (*0.00*)	2.12
Technology	0.004 (*0.362*)	0.489 (*0.007*)	0.167 (*0.00*)	0.859 (*0.089*)	0.2561 (*0.006*)	0.117 (*0.00*)	0.429 (*0.041*)	0.155	36.09 (*0.00*)	2.05
Plantation	0.006 (*0.409*)	0.486 (*0.001*)	0.251 (*0.00*)	0.874 (*0.013*)	0.2184 (*0.01*)	0.137 (*0.00*)	0.327 (*0.06*)	0.132	29.48 (*0.00*)	2.17
Mining	0.004 (*0.391*)	0.5027 (*0.006*)	0.158 (*0.00*)	0.902 (*0.103*)	0.215 (*0.032*)	0.0625 (*0.00*)	0.410 (*0.252*)	0.145	33.62 (*0.00*)	2.16
Construction	0.006 (*0.464*)	0.357 (*0.017*)	0.200 (*0.00*)	0.620 (*0.161*)	0.243 (*0.031*)	-0.217 (*0.00*)	0.499 (*0.164*)	0.055	10.95 (*0.00*)	2.04
Trade-Service	0.005 (*0.389*)	0.483 (*0.011*)	0.058 (*0.00*)	0.968 (*0.531*)	0.208 (*0.040*)	-0.191 (*0.00*)	0.434 (*0.274*)	0.135	31.01 (*0.00*)	2.16

Table provides the significance of average factor loading (time series model coefficients) for the sukuk market risk (b_1) and information asymmetry risk (b_2) associated with the sukuk investment. The coefficient *p-values* are reported in the parentheses. The results reported in this table are based on the weekly data. We compare the weekly results with those based on the daily and monthly data, but they are almost similar. Since time series returns are usually serially correlated, so, we apply Cochrane–Orcutt approach to generate unbiased coefficient estimates.

Table 6: Cross sectional regressions of sukuk return on two risk factor loadings: (i) sukuk market risk $\widehat{b}_1$ and (ii) information asymmetry risk $\widehat{b}_2$ across (i) all sukuks, (ii) contract types and (iii) issuer categories. The cross-sectional regression model is specified as: $R_{it} = \Upsilon_{0t} + \Upsilon_{1t}\widehat{b}_{1i} + \Upsilon_{2t}\widehat{b}_{2i} + \eta_{it}$ where R_{it} is sukuk return, Υ_1 and Υ_2 are estimated coefficients determining the sukuk risk premia for two risk factors.

Sukuk categories	Average intercept (Υ_0)	Average sukuk market risk premia (Υ_1)			Average information asymmetry risk premia (Υ_2)			Average R^2	Average F-Stat.
		Avg.	Min	Max	Avg.	Min	Max		
All sukuks	0.032	0.0192	-0.083	0.124	0.0139	-0.348	0.253	0.041	12.52
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.993*)	(*0.01*)	(*0.00*)	(*0.965*)		
Ijarah	0.0196	0.0324	-0.1187	0.1959	0.0235	-0.327	0.334	0.067	3.45
	(*0.02*)	(*0.00*)	(*0.00*)	(*0.997*)	(*0.00*)	(*0.00*)	(*0.996*)		
Murabaha	0.0256	0.0232	-0.079	0.148	0.0247	-0.323	0.324	0.045	6.56
	(*0.00*)	(*0.03*)	(*0.00*)	(*0.998*)	(*0.00*)	(*0.00*)	(*0.997*)		
Mudarabah	0.0445	0.0127	-0.147	0.207	-0.006	-0.728	0.292	0.141	3.25
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.995*)	(*0.022*)	(*0.00*)	(*0.997*)		
Musharaka	0.0270	0.0218	-0.0909	0.147	0.0256	-0.345	0.3122	0.048	4.78
	(*0.04*)	(*0.00*)	(*0.00*)	(*0.989*)	(*0.00*)	(*0.00*)	(*0.990*)		
Government	0.026	0.0233	-0.080	0.149	0.0221	-0.359	0.321	0.045	5.25
	(*0.02*)	(*0.00*)	(*0.00*)	(*0.998*)	(*0.00*)	(*0.00*)	(*0.989*)		
Corporate	0.031	0.0195	-0.087	0.132	0.0145	-0.347	0.279	0.038	12.24
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.984*)	(*0.02*)	(*0.00*)	(*0.939*)		

Panel B: Statistics of the cross-sectional model parameters for 377 weekly regressions

Parameters	Significant at one percent	Significant at five percent	Significant at 10 percent	Insignificant	Total
Intercept	267 (70.82%)	295 (78.24%)	301 (79.84%)	76 (20.16%)	377
Υ_{1t}	188 (49.87%)	237 (62.86%)	287 (76.12%)	90 (23.88%)	377
Υ_{2t}	205 (54.38%)	260 (68.97%)	285 (75.60%)	92 (24.40%)	377

Table 6 provides the significance of average sukuk risk premia (cross series model coefficients) for sukuk market risk and Information asymmetry risk associated with the sukuk investment. The coefficient *p-values* are reported in the parentheses. The results reported here are based on the weekly data. We compare the weekly results with those based on daily and monthly data, but the findings are almost similar. We check the robust *p-values* for all cross-sectional regressions; they are mostly significant at one percent level though the level of significance drops to five or ten percent levels in some cases. Panel B provides the detail statistics of the cross sectional model parameters for 377 weekly regressions.

Table 7: Cross sectional regressions of sukuk return on two risk factor loadings: (i) sukuk market risk $\widehat{b}_1$ and (ii) information asymmetry risk $\widehat{b}_2$ across (i) all sukuks, and (ii) industry types. The cross-sectional regression model is specified as: $R_{it} = \Upsilon_{0t} + \Upsilon_{1t}\widehat{b}_{1i} + \Upsilon_{2t}\widehat{b}_{2i} + \eta_{it}$ where R_{it} is sukuk return, Υ_1 and Υ_2 are estimated coefficients determining the sukuk risk premia for two risk factors.

Sukuk categories	Average intercept (Υ_0)	Average sukuk market risk premia (Υ_1)			Average information asymmetry risk premia (Υ_2)			Average R^2	Average F-Stat.
		Avg.	Min	Max	Avg.	Min	Max		
All sukuks	0.032	0.0192	-0.083	0.124	0.0139	-0.348	0.253	0.041	12.52
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.993*)	(*0.01*)	(*0.00*)	(*0.965*)		
Property	0.046	0.0099	-0.097	0.1197	-0.0098	-0.655	0.293	0.076	3.07
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.993*)	(*0.09*)	(*0.00*)	(*0.998*)		
Industrial pro.	0.0273	0.0128	-0.289	0.303	0.0302	-0.363	0.310	0.113	2.58
	(*0.00*)	(*0.015*)	(*0.00*)	(*0.99*)	(*0.00*)	(*0.00*)	(*0.991*)		
Finance	0.021	0.0227	-0.124	0.198	0.0367	-0.368	0.378	0.061	3.46
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.998*)	(*0.00*)	(*0.00*)	(*0.995*)		
Technology	0.0157	0.0362	-0.306	0.425	0.0335	-0.533	0.362	0.133	2.60
	(*0.03*)	(*0.00*)	(*0.00*)	(*0.99*)	(*0.00*)	(*0.00*)	(*0.984*)		
Plantation	0.051	0.0203	-0.505	0.4303	0.0327	-0.51	0.762	0.245	2.22
	(*0.00*)	(*0.005*)	(*0.00*)	(1.00)	(*0.001*)	(*0.00*)	(*0.996*)		
Mining	0.0324	0.01	-0.340	0.250	0.0262	-0.353	0.316	0.085	2.58
	(*0.00*)	(*0.025*)	(*0.00*)	(*0.994*)	(*0.00*)	(*0.00*)	(*0.984*)		
Construction	0.0199	0.0215	-0.121	0.208	0.0363	-0.362	0.365	0.059	3.41
	(*0.02*)	(*0.00*)	(*0.00*)	(*0.997*)	(*0.00*)	(*0.00*)	(*0.986*)		
Trade-Service	0.0270	0.0234	-0.087	0.150	0.0230	-0.353	0.328	0.046	4.42
	(*0.00*)	(*0.00*)	(*0.00*)	(*0.99*)	(*0.03*)	(*0.00*)	(*0.977*)		

Table provides the significance of average sukuk risk premia (cross series model coefficients) for sukuk market risk and Information asymmetry risk associated with the sukuk investment. The coefficient *p-values* are reported in the parentheses. The results reported in this table are based on the weekly data. We compare the weekly results with those based on the daily and monthly data, but the findings are almost similar. We check the robust *p-values* for all cross-sectional regressions; they are mostly significant at one percent level though the level of significance drops to five or ten percent levels in some cases. TT

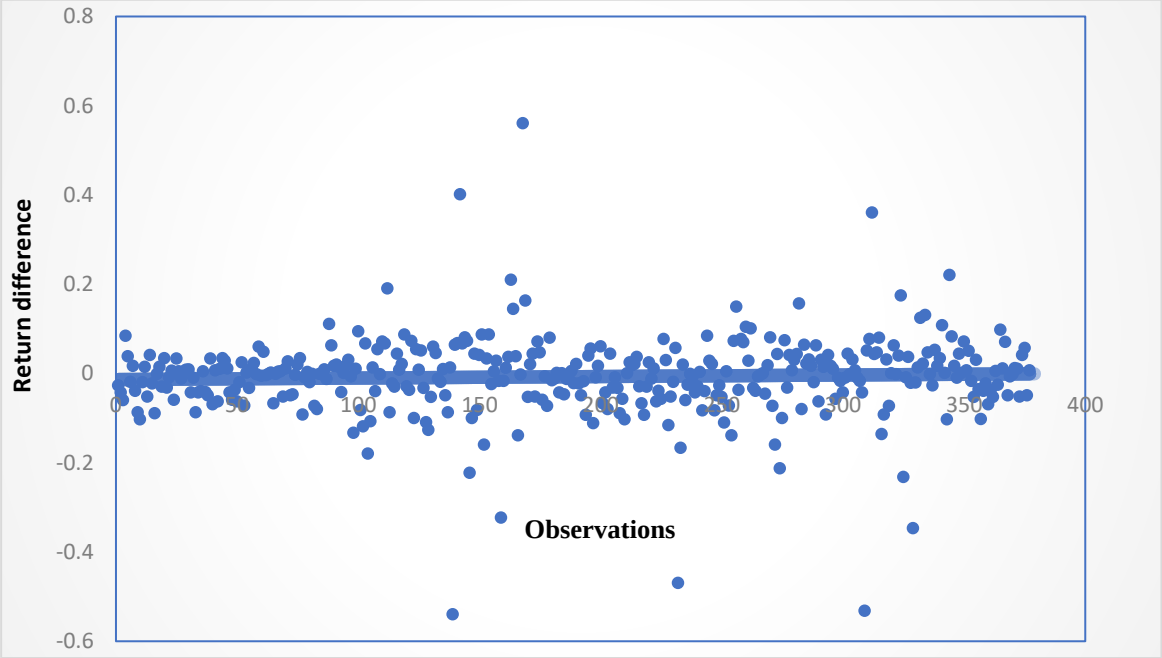
Table 8: Effect of the market performance of bond and equity on the sukuk return in Malaysian market.

We run Auto Regressive Distributed Lag (ARDL) model: $R_t^{Sukuk} = \alpha_0 + \alpha_1 t + \sum_{i=-1}^{-p} \phi_i R_{t-i}^{Sukuk} + \sum_{i=0}^{-r} B_1 R_{t-i}^{Equity} + \sum_{i=0}^{-s} B_2 R_{t-i}^{Bond} + e_t$, in which R_t^{Sukuk} is the average return of all sukuk on trading day *t*, R_{t-i}^{Sukuk} is the lagged average return of sukuk for the trading day *t-i* (*-1* to *-p*), R_{t-i}^{Equity} is the equity market return for the trading day *t-i* (0 to *-r*) based on Kuala Lumpur Composite Index (KLCI), and R_{t-i}^{Bond} is the average bond market return for the trading day *t-i* (0 to *-s*) based on Malaysia all bond index. We include a time variable '*t*' to control the trends in time-series data. In this model, $\sum_{i=1}^{p} \phi_i R_{t-i}^{Sukuk}$ captures the lag effects of sukuk on its current market performance, while $\sum_{i=0}^{r} B_1 R_{t-i}^{Equity}$ and $\sum_{i=0}^{s} B_2 R_{t-i}^{Bond}$ determine the contemporary and lagged effects of the equity and bond markets performance on the current performance of sukuk. We use Akaike information criterion method to select optimal lags of the explanatory variables. We test this model based on a total 627 sukuks listed on Bursa Malaysia over seven years from January 2010 to March 2017. Since the sukuks irrespective of their contract types and issuer categories are designed to replicate a bond equivalent cashflow while constituting an equity-like ownership on the underlying assets, we arrange all sukuks into two homogeneous groups based on their cash flow patterns. The first group includes the fixed cash flow (FCF) sukuks and the other group includes non-fixed cash flow (NFCF) sukuks. Setting the other features aside, FCF sukuks more resemble fixed coupon bonds, while the NFCF sukuks generally have a similar appearance to non-fixed coupon bonds or a common stock because their cash flow is not certain. We report the coefficients of relevant variables only due to space constraint. We particularly focus on the contemporaneous effects of the equity and bond markets performance on the current period sukuk return. The unreported lag coefficients of the equity and bond market movements have insignificant effect on the current period sukuk return.

Variables	Panel A: All sukuks	Panel B: Fixed cash flow sukuks	Panel C: Non-fixed cashflow sukuks
Equity (*t=0*)	0.077 (0.11)	0.026 (0.16)	0.021* (0.09)
Bond (*t=0*)	0.025 (0.29)	0.011 (0.18)	0.028 (0.31)
Lag_sukuk (*t=-1*)	0.049** (0.01)	0.011** (0.05)	0.23* (0.08)
Time (*t*)	0.07* (0.1)	0.14 (0.11)	0.43* (0.06)
Constant	0.20** (0.02)	0.27* (0.07)	0.29** (0.03)
F-test	194.27	280.21	139.50
R-squared	0.31	0.39	0.28
Observations	1742	1742	1742

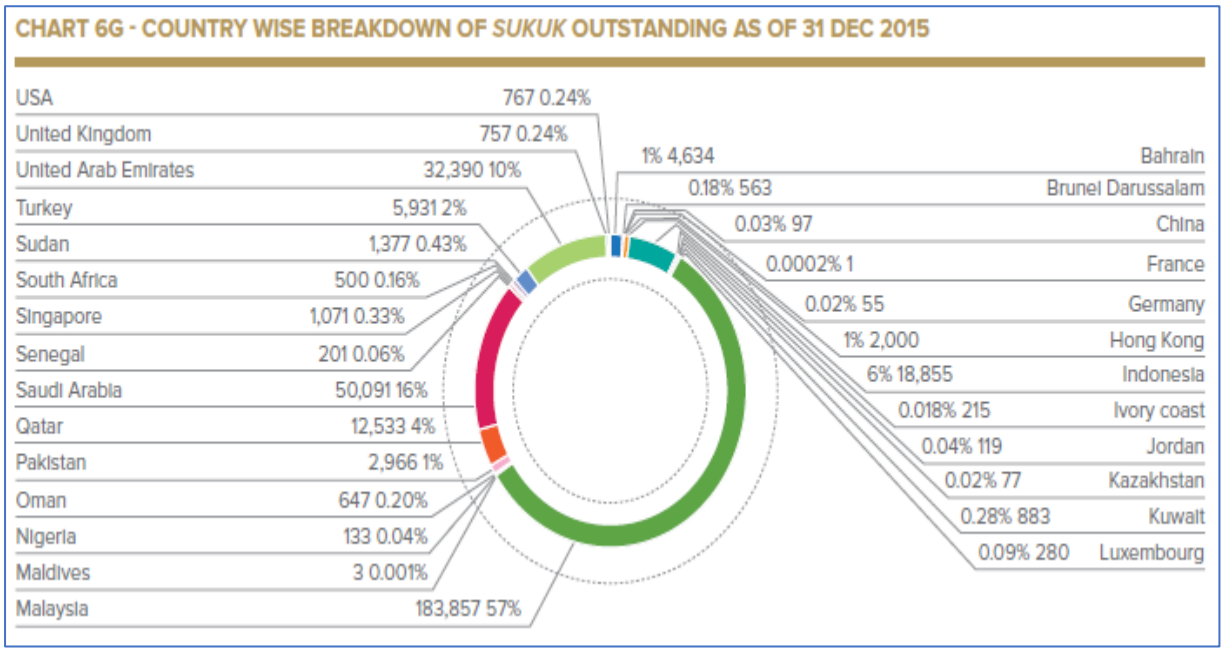
Values in the parenthesis show the *p* values of the coefficients. Asterisks ** and * denote the level of significance at respectively five and ten percent levels.

Figure 2: Scattered plot of return difference between sukuk and bond (SMB)



This figure plots the difference between sukuk and bond returns to check if there is any systematic pattern that might give an arbitrage opportunity to the investors. We track sukuk minus bond returns (SMB) on weekly basis over the sample period from January 2010 through December 2016.

Appendix-A:



Source: IIFM Sukuk Report, 2016; pp. 43