Co-integration of Sukuk and Bond Yields - Evidence from Globally Placed Sukuk

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Abstract: *The study addresses the question "How do the financial markets perceive and price internationally issued Islamic bonds?" It is examined by empirically testing for the evidence of co-integration of sukuk yields with the US Treasury yields using Vector Error Correction (VEC) models. Our results indicate that the sukuk yields are highly co-integrated with the US Treasury yields in long-term relationships. The short-term dynamics of the sukuk yields with the interest rate series is, however, complex showing bi-directional influences. We infer that the international financial markets are viewing and pricing sukuk in a manner similar to that for the conventional bonds.*

Keywords: Islamic finance, sukuk, Islamic bonds.

Introduction

The Islamic Banking and Finance (IBF) industry by promising "interest free" products in conformity with the Islamic injunctions, has grown remarkably over the last four decades and is approaching $2 trillion in total assets. It is expected to grow by an average of 19.7% a year to $3.4 trillion by 2018. An estimate by AL-Hersh (2014), using time series forecasting methods, predicts the future growth for the IBF industry to be at a compounded average rate of 20% over the period 2013-2020 and its size to reach US$3 trillion by 2020.

The IBF's recent growth has been led by sukuk securities, alternatively known as 'Islamic bonds' or 'Islamic investment certificates', which have become the dominant instrument in Islamic finance (Ariff, Iqbal, & Mohamad, 2012). Outside the domestic markets of the Muslim countries, Sukuk have been placed globally in more than 12 international markets across the world as marketable securities, besides private placements. Ariff, Safari, and Mohamad (2013) estimate the total market size, both domestic and international, to be about US$ 840 billion. The sukuk securities market has also generated considerable interest in the West. European regulators have started to provide legal recognition to sukuk issues, and a number of entities, sovereign, financial and corporate, have started to issue sukuk to source funds from the GCC and other Muslim countries for their funding requirements (Economist, 2014). The United Kingdom became the first Muslim country

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besides the non-Muslim countries to issue a £200 million sukuk in 2014, which was 11.5 times oversubscribed and was competitively priced with the UK government bonds. Hong Kong has issued two sovereign sukuk; its first $1 billion issue was in 2014 and the second also for $1 billion was in 2015. The total value of internationally placed sukuk is about $50 billion as per our sample of all 92 sukuk issues for which information was available as of August 2014 on the Data Stream International (Thomas Reuters) database.

The issuance of sukuk securities with the local domestic markets has become an established mode of financing in many Muslim countries, with Malaysia taking the lead. However, the global placement of "Islamic bonds" in the financial markets of the US and Europe by entities from Islamic countries is a recent practice. With it the price information on a consistent basis has recently become available and offers opportunities for conducting academic and applied studies. Our study looks at the issue of whether the international financial markets price sukuk differently than the conventional bonds by examining how far yields to maturity on sukuk are integrated with the yields on the US Treasuries. There are a few studies on this aspect of sukuk using domestic data from the Muslim countries in which religiously motivated participants may be playing a dominant role, and financial regulations are religiously influenced. Our study is one of the pioneer studies in examining internationally price data which may shed light on how international investors perceive sukuk, bulk of which may not be religiously so motivated.

The following section provides a brief summary of the related theoretical issues and literature review of the extant studies. The next section provides an overview of the features of the globally issued sukuk in the sample. Following it, an econometric exercise examines the extent and nature of co-integration of the sukuk yields with the Treasury yields. The final section summarizes the work and offers a conclusion.

Theoretical Issues and Literature Review

The introduction of sukuk in the international markets has rekindled the debate as to what extent Islamic finance products are indeed riba (interest) free, and in what ways the sukuk differ in substance from the conventional bonds. After all acceptance of Islamic products by the international finance markets is not a proof of its legitimacy, since, as Al-Amine (2008); Shaikh, Sharif, and Arif (2016) point out, the focus of the Islamic capital market shall not be only on how to raise the funds and be acceptable to international financial institutions but to be sharia-compliant first and foremost. El-Gamal (2003) finds it paradoxical that "Islamic finance quickly turned to mimicking the (interest-based) conventional finance it set out to replace." Rethel (2011) asserts that Islamic finance is "overly focused on its epistemic legitimation as normal financial activity" and tends "to emulate, and, therefore, largely reproduce, the existing global financial order." Afshar (2013) on the other hand, contends that "here are fundamental risk/return differences between the two..." but concedes that "the fundamental difference in their structure has great religious difference but virtually no financial differences." Other issues relate to the cost of issuance of sukuk vs bonds, Hayat, Den Butter, and Kock (2013), accounting Saad and Hanif (2014); Hanefah, Noguchi, and Muda (2013), while El-Gamal (2009) raises a more basic issue of equity vs efficiency. Since

it is hard to resolve such issues theoretically, empirical studies may shed light on the economic substance of Islamic securities as to the extent to which these retain elements of interest.

Despite the expansion in the sukuk market, the academic research on these securities, particularly on internationally-placed sukuk, has been rather limited. (Zulkhibri, 2015) notes that, "the literature on sukuk is largely qualitative rather than quantitative research, with the bulk of academic research in the form of conference and seminar papers." For example, Cakir and Raei (2007) discusses some legal challenges in adaptation of sukuk for international placement and the impact of the Global Financial Crisis. Academic research is "still in relatively short supply" mainly due to, among others, a lack of historical, reliable, and consistent data. A few studies have examined the risk-return in sukuk securities. Cakir and Raei (2007) assess the impact of sukuk on the cost and risk structure of investment portfolios by using the Value-at-Risk (VaR) framework. The paper analyzes whether secondary market behavior of Eurobonds and sukuk internationally issued by the same issuer are significantly different to provide gains from diversification. Their analysis implies that such gains are present and in certain cases very significant. However, their time period is short, and ends before the onset of the Global Financial Crisis (2007-2009) which has had a large impact on the sukuk market; see (Wedderburn-Day, 2010). Rauf (2016) attempts to identify the different types of risk embedded in the sukuk structure of Nasdaq HSBC Amanah sukuk and Nasdaq Dubai listed sukuk. The study's results confirm that market risk, credit risk, operational risk and liquidity risk significantly influence the sukuk returns. Godlewski, Turk, and Weill (2011) using Malaysian sukuk data, empirically examine whether investors react differently to the announcements of sukuk and conventional bond issues. They conclude that "the stock market is neutral to announcements of conventional bond issues, but reacts negatively to the announcements of sukuk issues." Their explanation of the difference in stock market reactions is that it is a reflection of the adverse selection problem whereby sukuk issuance by lower-quality debtor companies is favored.

A strand of inquiry related to the present study focuses on the question, "Should the new debt instrument sukuk be considered as equivalent to the conventional bonds so that the sukuk certificates are properly described as Islamic bonds?" In Ariff et al. (2012) and a follow up study, Ariff et al. (2013), it is contended that because of the fundamental differences in the structuring of sukuk and conventional bonds, the conventional pricing models are not appropriate for pricing of sukuk. The two studies compare yield-to-maturity of paired samples of sukuk and conventional bonds matched by their term, issuing entities and the credit rating which traded in Kuala Lumpur from 2005 to 2011. The two studies also conduct Granger causality tests to detect whether yields of one type of security appear to affect the yields of the other type. The authors report significant differences in the yields of the matched pairs, while the Granger causality tests fail to detect causality in either direction. From their analysis the authors conclude: "Evidence does not appear to support the market description that the sukuk are Islamic bonds." And, the authors suggest that the sukuk securities should not be priced the same way as the conventional bonds and there is a need to develop fresh valuation models for these securities. However, it is here suggested that the conclusion reached by the two studies needs to be revisited. Firstly,

due to marked difference in the structuring, placement, collateral, issuance costs, liquidity and bankruptcy cost of sukuk and the conventional bonds it should not be a surprise to find significant differences in the risk level and hence in the yields to maturity of the two. Secondly, the Granger causality tests also have weaker power in efficient bond markets, since one would not expect to find much cross-serial correlations especially when monthly data is used, as in Ariff and Safari (2012) and Ariff et al. (2013). Thirdly, the particular institutional characteristics of the Malaysian market may have influence the findings in the two studies.

Uppal (2015) examines the issue of whether the financial markets perceive internationally-issued sukuk differently than the conventional bonds by testing for co-integration of sukuk returns with the US Treasury yields. From the quoted price data daily returns to the sukuk holders are calculated after adjusting for accrued interest and coupon payments. The study finds that the sukuk returns are highly co-integrated with the US Treasury yields in long-term relationships. It is inferred that the international investors are viewing and pricing the sukuk in a manner similar to that for conventional bonds. The study may, however, be open to criticism on its methodology, since it compares rates of return on sukuk with Treasury yield to maturity series, which may not be a strictly valid comparison. Therefore, the present study seeks to reexamine this issue while using yield to maturity data for both variables.

Features of Globally Issued Sukuk

There were 92 sukuk issued globally with a total face value of US$ 50.7 billion, for which information was available in the DataStream database as of August 2014. Eighty-five percent of these issues have been placed internationally, while the rest have been direct issues in four specific markets, namely United States, Turkey, Malaysia and United Kingdom, with the US market dominating (14%, in terms of total value). Eighty-four percent of the sukuk are listed, mostly on the European exchanges, with Frankfurt and London leading, while the securities markets in the Muslim countries, Turkey, Bahrain, Dubai, and Kuwait play relatively a minor role, as their share in the total value of the issues is only 2.5%

Most of the issues are registered with the US Securities and Exchange Commission under regulations 144A or Regulation S, (73% in value) as debt securities. While this makes the securities less liquid and restricts their trades to qualified buyers, it allows access to the US investors at lower cost and fewer registration and filing requirements. Most of the sukuk issues are by financial institutions (73% in value) followed by sovereign issues (19%). The rest are by corporate entities.

As far as the country of origin of the issuers, UAE tops the list with 41.3% of the number and 46.6% in value of the sukuk issues. It is followed by Saudi Arabia with 18.5% of the number and 25.5% valued of the issued sukuk. In our sample we have one issue each from the US and the UK. The favorite currency of denomination remains the US dollar which is used in 77% of the issues and in 90% by their value. The USD is followed by UAE Dirham and the Turkish Lira.

The earliest sukuk issue in the international markets is dated 6/23/2004 (BMA Interna-

tional Sukuk 2004, Floating Rate Note 06/09 Semi-Annual) while the latest is of 7/2/2014 within the timeframe of our sample. The pace of issuance has saw rapid acceleration over the 2004-07 period, but dropped precipitously during the Global Financial Crisis period, when the market suffering a "drought." The pace of sukuk issuance has, however, been picking up since 2009, with more than $7.8 billion of new issues during the period January to August 2014.

The typical maturity of the sukuk in our sample was five years, in 51.1% of the issues. In all, about 72% of the issues had maturities of five years or less. A small number also had short terms of one or less year of maturity. On the long side 13% of the issues had original maturity of ten years, while in 4.3% of the issues the maturities exceeded 10 years. It is worth noting that there is one perpetual issue. Also, there had been one sukuk which went into default (Saad Group, Golden Belt Manfa'a Sukuk, $650 million, LIBOR+0.85%, Issued in 2007, due in 2012). In addition seven issues were retired earlier for restructuring purposes. Thus, the default rate was about 1% (one out of 92), and the restructuring rate was 7.6% (seven out of 92) which seem to be on the higher side. However, one should note that our sample period includes the Global Financial Crisis, and the sample size is still small to make a meaningful assessment of the default risk. Out of the total of 92 sukuk in the database, 25 sukuk had matured by August 2014, one had defaulted and one has perpetual maturity. That leaves us with 65 sukuk outstanding as of that date.

We find that the basic features of sukuk are very similar to the internationally issued conventional bonds. Quite similar to the conventional bonds, almost 70% of the sukuk are described as "straight" with no embedding options and carrying fixed coupon rate. There is one issue which is convertible and one of the zero coupon variety. We also see two sukuk with coupons paid according to a complex formula, which mixes floating and fixed coupons. The average coupon rate has been 4.70% though there is a wide range in the coupon rates. On the deep discount side, there is one zero coupon sukuk and one with a rate of less than 1%. The bulk of the issues, 57 (62%) have coupon rates ranging from 3% to 6%. There were 23 issues with 7% or higher coupon rate, with a maximum rate of 12.68%.

Co-integration Analysis on Yields

We examine the pricing of sukuk as compared with the conventional bonds by analyzing co-integration of the yields to maturity of sukuk and the yields on the US Treasury Bonds with one year constant maturity. Since most of the sukuk in our sample are sovereign or issues by quasi-sovereign financial institutions are USD denominated, and placed in the US market, it was considered appropriate to relate their yields to the US Treasury yields. A linear model of long-term relationship between the sukuk and the Treasury yields would capture the differences based on risk and maturity premium.

Out of the sample of 92 sukuk, we note that 25 (27%) of sukuk are floating rate securities, with the coupon directly linked with an interest rate index. Dropping the floaters and other sukuk with complex coupons and perpetuity, we are left with a sample of 48 issues which carry fixed rate of coupon and for which price data was available. From

the quoted prices we computed the yield to maturity for the sukuk on a daily bases, which are then used in the co-integration model as follows [1].

The co-integration analysis is useful in detecting long-term relationship between time series variables (e.g. many macroeconomic variables) that may be non-stationary (Engle & Granger, 1987). We use the Error Correction Model (ECM) to examine examine the long-term relationship between yields to maturity on the sukuk ($SY_{i,t}$) and the US Treasury one year constant maturity yields ($TY_{i,t}$). A vector error correction (VEC) representation of the model is a restricted VAR that has the co-integration restrictions built into the specifications. Endogenous variables are restricted in the VEC representation so that they converge on their co-integrating relationships in the long run. At the same time, it allows a wide range of short-run deviations from the long-run equilibrium, which are corrected through a series of partial short-run adjustments. Johansen?s method tests restrictions imposed by co-integration on the unrestricted VAR model.

We hypothesize a simple long-term relationship between the sukuk yields and the Treasury yields, with an intercept but without a trend with one co-integrating equation and two lagged difference terms. Since the broad structure of the expected yield is expressed in finance as the risk-free rate plus premiums based on liquidity risk, default risk, maturity risk and specific security features, we assume the long-term relationship between the sukuk yields and the Treasury yields to be linear as explained below. The ECM models are as follows (Engle & Granger, 1987; Johansen, 1991) [2].

$$\Delta SY_{i,t} = \alpha_1 + \gamma_1(\alpha_0 + SY_{i,t-1} - \beta.TY_{i,t-1}) + \delta_1 \Delta SY_{i,t-1} +$$
$$\delta_2 \Delta SY_{i,t-2} + \lambda_1 \Delta TY_{i,t-1} + \lambda_2 \Delta TY_{i,t-2} + \epsilon_{1,t} \quad (1)$$

$$\Delta TY_{i,t} = \alpha_2 + \gamma_2(\alpha_0 + SY_{i,t-1} - \beta.TY_{i,t-1}) + \delta_3 \Delta SY_{i,t-1} +$$
$$\delta_4 \Delta SY_{i,t-2} + \lambda_3 \Delta TY_{i,t-1} + \lambda_4 \Delta TY_{i,t-2} + \epsilon_{2,t} \quad (2)$$

Where $SY_{i,t}$ represent yield to maturity on the ith sukuk and t is the time script. Similarly, $TY_{i,t}$ represents the Treasury yields. The error correction term, γ_i (α_0 + $SY_{i,t-1}$ - $\beta.TY_{i,t-1}$), represents the long-term relationship, and coefficients γ_1 and γ_2 may be considered the speed of adjustment parameters. The co-integrating equation is: $SY_{i,t}$ = - α_0 + $\beta.TY_{i,t}$. The error correction term in a long-run equilibrium is expected to be zero. However, if return on sukuk and the Treasury Yields deviate from the long-run equilibrium in the last period, the error correction term is nonzero and the returns will adjust to partially restore the equilibrium relation.

The detailed results of the co-integration tests are reported in the appendix. The null hypothesis of "no co-integrating equation" CE(s) was found to be rejected for the sample by

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[1]The Excel function used is YIELD(settlement, maturity, rate, price, redemption, frequency, [basis])

[2]The ECM/VEC models (such as equations 1 and 2) are widely used procedures for testing cointegration of several time series. The Johansen test permits more than one cointegrating relationship and is thus more generally applicable than the Engle-Granger test which is based on the test for unit roots in the residuals from a single cointegrating relationship.

the Log Likelihood Ratio test (not reported here) and indicated at least one co-integrating equations at a 5% significance level, implying that the sukuk yields and the US Treasury yields exhibit a long-term relationship.

The long-term relationship in the ECM is "disturbed" by short-term deviations from the equilibrium; the ECM (equations 1 and 2) captures the dynamics of the short-term adjustment process. For the ECM to hold, at least one of the $\gamma_i's$ must be significant. If both the coefficients (γi) are significant, it implies that both series influence each other or that there is a feedback relationship between the two. If only one of the error term coefficients (γ_i) is significant, it implies that one market is driving the other toward long-term equilibrium, but not the other way around. The sign on the error term coefficient (γ_i) should be negative for the previous period's positive (negative) deviation to lead to negative (positive) correction in the current period and drive it toward equilibrium.

The lagged terms of the change in returns, $\Delta SY_{i,t-1}$ and $\Delta TY_{i,t-1}$ included as independent variables, indicate a short-run dynamic (or statistical cause-and-effect) relationship between the two yields. If the lagged coefficient of ΔSY is significant in the regression of ΔTY, or if ΔSY significantly affects ΔTY, it would suggest that Sukuk yields affect the Treasury yields. Similarly, if the lagged coefficient of ΔTY is significant in the regression of ΔSY, we can infer that Treasury yields affect the sukuk yields. If neither lagged coefficient is significant, then no inter-exchange "cause-and-effect" relationship can be inferred.

Table 1
No of Significant Coefficients in the Estimated VEC Model @ 1% Level

Coefficient	Individual Coefficients			Combinations			Total	One Eq.
	Sukuk Eq.	T-Yield Eq.	BOTH Sig.	Sukuk Eq. Only	T-Yield Eq. Only	NONE Sig.		
β	46	-	-	-	-	02	48	-
α	23	-	-	-	-	25	48	-
γ	12	44	08	04	36	00	48	40
δ_1	36	03	03	33	00	12	48	33
δ_2	17	01	01	16	00	31	48	16
λ_1	07	35	07	00	28	13	48	28
λ_2	07	07	00	07	07	34	48	14

A summary of these results is provided in Table-1, which shows the number of significant coefficients found for each variable in the ECM equations. The coefficients of the co-integration equation (β's) are highly significant (p-values < 0.01) for all sukuk in the sample, except for two with insignificant coefficients. These two sukuk have a very short data history, which may explain the statistical insignificance. We note that none of the speed of adjustment coefficient (γ) is insignificant. Of the 48 sukuk, 12 the coefficients on the error correction term (γ_1) are significant in the Sukuk equation (eq. 1) and 44 (γ_2) in the Treasury yield equations, indicating a bi-directional relationship between the two markets. At the same time in 40 cases at least one of the γ coefficients was insignificant at 1% level of significance. As far as the lagged variables are concerned, the respective coefficients (δ and λ) are remarkably significant particularly at the first lag level, and not so much at the second lag. The lagged variables do not appear to play a significant role in cross-relationship, i.e., lagged sukuk yields don't seem to be affecting T-yields, and lagged T-yields don't appears to be affecting sukuk yield. This result should be quite expected as the market adjusts quite rapidly to changes in the rates.

Overall the results paint a picture where the sukuk yields appear to be well integrated with the Treasury bond yields, although the cross-security influence at lagged intervals seems to be rather weak.

Conclusion

We present an analysis of the globally placed sukuk over the last ten years, using a sample of 92 sukuk for which information was available on the Datastream database as of August 2014. An examination of their basic features, maturities, coupons, etc., depicts a picture of securities which is very similar to the one of internationally issued conventional bonds.

We then examine the time-series behavior of sukuk yields in comparison to the US Treasury bond yields. We note that a large percentage (27%) of our sample of 92 sukuk carry floating rate coupons, and hence are interest based by design. The integration of yields on the 48 sukuk with fixed rate coupons with the Treasury yields is then examined using Vector Error Correction (VEC) models. The results of the VEC estimation indicate the sukuk yields to be highly co-integrated with the Treasury yields in long-term relationships. The short-term dynamics of the two yield series at lagged intervals is rather weak, suggesting that the relations to be rather co-temporaneous

We may infer from our analysis that the international financial markets are viewing and pricing the sukuk in a manner similar to that for conventional bonds, treating these as another type of fixed rate securities. This study confirms the conclusions reached in Uppal (2015) which finds that the rates of return on sukuk are co-integrated with the Treasury yields. Our findings indicate that the sukuk and Treasury yields are dynamically linked. It is contrary to the finding in Ariff et al. (2012, 2013) which are unable to detect statistical causality from their Granger tests.

Nevertheless, as documented in Ariff and Safari (2012) and Ariff et al. (2013) one would expect the yields on sukuk to be different from yields on the conventional bonds due to the institutional and structural differences underlying the placement of sukuk. The perceived risk and, therefore, the required yields on the sukuk should be different from their conventional counter parts. Another factor which could affect sukuk pricing relates to the historical data on their risk and returns which is available for a relatively much shorter period. There are also other uncertainties regarding sukuk, particularly in relation to their default risk and the associated bankruptcy costs. There may also be an associated premium for higher information costs to the extent that the international investor may still be unfamiliar with sukuk.

It is plausible that our co-integration results reflect the practice of benchmarking in the pricing of sukuk on part of the security dealers who may be using Treasury yields or other interest rates as a base for quoting their prices. The use of benchmarking of the Islamic financial products, however, is controversial among scholars, many consider it contrary to the spirit of Islamic finance (Iqbal, 1999; El-Gamal, 2003). It appears that the pricing of sukuk remains interest based in the economic essence. Though the securities are branded as Islamic investment certificates for social and religious legitimacy in the Muslim countries, the global finance industry at the same time perceives sukuk as a fixed income security.

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