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Borsa İstanbul Review

Borsa İstanbul Review 22-5 (2022) 1033–1038

http://www.elsevier.com/journals/borsa-istanbul-review/2214-8450

Full Length Article

Sukuk versus bonds: New evidence from the primary market

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Received 29 March 2022; revised 21 June 2022; accepted 21 June 2022
Available online 28 June 2022

Abstract

We use a propensity score matching procedure to compare the returns of sukuk and conventional bond issuances in the primary market in the period 2000–2021. The results of our analysis show that sukuk are issued at lower overall coupon levels than conventional bonds. We find that the difference is between −11 and −28 basis points, depending on the matching technique used. Our analysis also shows that the difference is larger in corporate issuances than noncorporate issuances. We believe that these findings can be explained by the higher demand for sukuk issuances due to the limited investment universe available to Islamic investors.

JEL classification: E43; G12; G21

Keywords: Conventional bonds; Islamic debt; Primary market; Propensity score; Return spreads; Sukuk

1. Introduction

The introduction of sukuk, the Islamic equivalent of conventional bonds, is one of the most important innovations in the field of Islamic finance, as it gives firms and sovereigns a sharia-compliant access to public debt markets. In recent years, the issuance of sukuk has skyrocketed, with $174 billion in sukuk issued in 2020 alone (Refinitiv, 2021). Although sukuk and conventional bonds both give issuers access to liquidity through the public debt market, empirical findings suggest that the two instruments are priced and treated differently by market participants (Alam et al., 2013; Safari et al., 2013).

The literature has contradictory findings on the difference in returns between sukuk and bonds. On the one hand, Ayturk et al. (2017) find that primary market spreads of both sukuk and bonds are determined by a similar set of factors, suggesting similar treatment of the two instruments by market participants. Hossain et al. (2021) also find no significant differences between the returns of sukuk and bonds but document the presence of higher overall risk for sukuk, for which investors are not fully compensated. On the other hand, Balli et al. (2021) document the presence of meaningful differences in the way in which yields of sukuk and bonds are determined and show that bonds are significantly more sensitive than sukuk to movements in global markets (see also Saad et al., 2020; Safari et al., 2013). Moreover, Naifar and Hammoudeh (2016) find no relationship between uncertainty in conventional bond markets and returns on the Middle Eastern sukuk studied. Furthermore, Asmuni and Tan (2021) confirm the presence of significant differences in yields between government-issued sukuk and bonds on the Malaysian market and attribute these differences to liquidity considerations. Similarly, Fathurahman and Fitriati (2013) compare the yields on sukuk and conventional bonds listed on the Indonesia Stock Exchange and find that sukuk provide higher returns than conventional bonds.

The disagreement in the literature on whether returns on sukuk and conventional bonds are different might be caused largely by the methodologies employed in many of these studies. First, most of the prior studies analyze the returns on conventional bonds and sukuk either by comparing the returns on sukuk and bonds issued by same issuer or by comparing the returns on matched sukuk and bonds grouped based on the

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Peer review under responsibility of Borsa İstanbul Anonim Şirketi.

https://doi.org/10.1016/j.bir.2022.06.005

characteristics of the issuers of these securities. The first approach results in a final sample that is small, with a fairly limited number of issuers, which affects the reliability of the final results. The second approach is likely to result in a larger sample, but this matching technique does not account for some of the most important determinants of sukuk and bond returns that are unique to each issuance (e.g., issuance size, type, or year). Second, some of these studies use returns data from the secondary market to compare differences in returns between the two securities. However, given the illiquidity of the sukuk market and many regional bond markets, using secondary market data to analyze returns might lead to erroneous or misleading conclusions (Alam et al., 2013; Safari et al., 2013). Lastly, some of these studies focus on examining domestic markets or limited regional markets, therefore limiting the relevance and applicability of such results because of the limited number of issuers and participants in these markets as well as the relatively limited links with international markets in comparison to international issuances. This paper addresses these gaps by focusing on international sukuk and bond issuances and by using primary market data and propensity score matching (PSM) techniques to match and compare the different issuances.

We posit that the differences in the returns between similar sukuk and bond issuances might be largely related to the types of investors in each instrument. Although conventional bonds attract all types of investors and traders in the bond market, sukuk tend to be held predominately by investors who are restricted to investing in sharia-compliant instruments for personal or institutional reasons. We believe that the restrictions faced by the majority of "natural" investors in sukuk and the smaller size of the market in comparison to the conventional bonds market are the main reasons for the observed yield differences. These two factors reduce the size of the investment universe available to these investors and are likely to lead to excessive demand on sukuk issuances because of the limited investment opportunities available elsewhere for this group of investors (see Djelassi & Boukhatem, 2020; Godlewski et al., 2013). This is also likely to lead to longer holding periods and less liquidity or trading in the secondary market, which in return lead to less volatility and correlation with other asset classes. This is confirmed by previous empirical findings, which show that the "buy-and-hold" strategy followed by most sukuk investors has led to oversubscription in primary issuances, less trading and price discovery, lower correlation with major markets, and less overall volatility than is the case with conventional bonds (Balli et al., 2021; Harvey & Cosgrave, 2012; Najeeb et al., 2017; Saeed et al., 2021). Therefore, we should expect sukuk issuances with characteristics similar to those of bond issuances to have lower returns because of the higher demand for these issuances by this group of investors. Although it is reasonable to expect sukuk investors to be compensated for the illiquidity of sukuk issuances in the form of an illiquidity premium, we believe that the concept of an illiquidity premium is not properly reflected in the pricing of such issuances in primary and secondary markets.

We test our hypothesis using PSM techniques to match conventional bond issuances to sukuk issuances using shared characteristics to enable a more accurate comparison of the returns of the two groups in the primary market. The results of our analysis show that sukuk are issued at lower overall coupon levels than conventional bonds. We find that the difference is between −11 and −28 basis points (bps), depending on the matching technique used in our analysis. Furthermore, the results show that although the coupon is smaller for sukuk than conventional bonds for both corporate and noncorporate issuers, the difference is larger for corporate issuers. The results of the ordinary least squares (OLS) regression analysis provide further confirmation of these findings. We believe that these findings could be related to the higher demand for sukuk issuances due to the limited investment universe available to Islamic investors and the lack of liquidity in the secondary market, which creates higher demand on the primary market.

The paper makes several contributions to the literature and has market and policy implications. First, the paper offers new evidence on the return differential between sukuk and bonds using PSM techniques, which provides a more accurate and robust comparison between the two groups than techniques used in earlier studies. Second, the findings give further support to the argument that the limited investment opportunities, in addition to the "buy-and-hold" strategy followed by many sukuk investors, can lead to persistent mispricing of sukuk. This suggests that sukuk investors are systemically undercompensated for the risks that they assume (Hossain et al., 2021). For investors and traders, this implies that holding sukuk incurs a higher cost than investing in bonds with similar qualities. This also suggests that issuers can benefit from this mispricing by issuing more sukuk, instead of conventional bonds, in order to benefit from the lower requirement for returns on the former. Last but not least, the findings in this paper suggest a need for regulators and industry participants to institute changes that improve the liquidity conditions and the price discovery process in order to enable the sukuk market to continue its growth and eliminate known inefficiencies and risk mispricing. This also calls for the development of more sharia-compliant liquidity management products to reduce pressure on sukuk as the main instrument for Islamic institutions to soak up their excess liquidity.

2. Data and methodology

2.1. Data

We extract the data on all new USD-denominated international sukuk and bond issuances between 2000 and 2021 from the Eikon/Datastream database.[1] We start our analysis in 2000 because of the very limited sukuk issuance activities before that year. In order to avoid potential issues with our analysis due to

[1] We exclude issuances by US-based firms because they are considered domestic issuances, which are likely to have different dynamics than international issuances.

Table 1
Descriptive statistics.

Panel 1: full sample								
Variable	Sukuk (335 obs.)				Conventional bonds (10,092 obs.)			
	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Issuance size (USD mill.)	792.64	580.03	110.00	4500.00	302.60	704.76	50.00	8000.00
Tenor (years)	6.60	4.17	0.30	30.00	4.24	5.43	0.10	43.70
Coupon (basis points)	387.25	181.54	38.00	1075.00	293.55	274.52	2.06	3300.00
Panel 2: corporate issuers								
Variable	Sukuk (176 obs.)				Conventional bonds (6712 obs.)			
	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Issuance size (USD mill.)	618.47	449.06	110.00	3520.00	126.89	264.05	50.00	4000.00
Tenor (years)	5.70	2.12	1.50	11.00	3.10	4.52	0.10	43.70
Coupon (basis points)	408.23	191.72	73.68	1075.00	304.67	295.29	3.00	3300.00
Panel 3: noncorporate issuers								
Variable	Sukuk (159 obs.)				Conventional bonds (3380 obs.)			
	Mean	Std. dev.	Min	Max	Mean	Std. dev.	Min	Max
Issuance size (USD mill.)	985.43	645.48	150.00	4500.00	651.52	1077.84	50.00	8000.00
Tenor (years)	7.60	5.47	0.30	30.00	6.51	6.30	0.20	31.00
Coupon (basis points)	364.04	167.12	38.00	987.50	271.46	226.13	2.06	2294.40

Note: The table presents the descriptive statistics for the full sample including all observations included in our study using various matching techniques.

missing data for some observations, we include only observations that include the characteristics covered by our PSM procedure. We explain these characteristics in Appendix 1 and the methodology Section 2.2. Our final sample includes a total of 335 sukuk issuances during the period studied and 10,092 conventional bond issuances. We provide the main descriptive statistics in Table 1.[2] The full sample descriptive statistics, in Panel 1 of Table 1, show that sukuk issuances on average have higher coupon rates (387.25 bps) than conventional bonds (293.55 bps), longer tenors (6.60 years) than conventional bonds (4.24 years) and larger issuance sizes (USD 792.64 million versus USD 302.60 million). The results for the two subsamples (corporate and noncorporate issuers) show similar trends.

2.2. Methodology

To perform our analysis, we use PSM techniques to compare the returns on similar sukuk and bond issuances. Following Wamser (2014) and Gianfrate and Peri (2019), we use a two-step procedure to estimate the average treatment effect on the treated (ATET) using PSM.[3] We consider structuring a public debt issuance as sukuk as the treatment effect and thus define sukuk issuances as the treated group, while defining conventional bonds as the control group. In this approach, the treatment effect is measured as the difference in the rate of return due to using a sukuk structure.

The first step of our estimation procedure involves using a probit function to estimate the probability, or propensity score, that the issued instrument is a sukuk.[4] We use the following issuance characteristics in the calculation of our propensity scores: year of issuance; tenor (in years); rating (by any of the major rating agencies); region; industry based on the global industry classification standard (GICS); maturity type (e.g., bullet, callable, perpetual); and issuance size. The final model used is:

$$sukuk\ probability_{i,t} = \beta_0 + \beta_1\ tenor_{i,t} + \beta_2\ issuance\ size_{i,t} + maturity\ type\ dummies + region\ dummies + rating\ group\ dummies + year\ of\ issuance\ dummies + industry\ dummies + \varepsilon_i \quad (1)$$

The different variables and the construction of the various dummy indicators are explained in Appendix 1.

The second step in the procedure involves using the estimated propensity scores to match the treated observations (sukuk) and the control observations (bonds) to estimate the treatment effect. As mentioned earlier, the treatment effect corresponds to the difference in the returns between the two matched groups. We use a few matching techniques in the second step: nearest-neighbor (NN) matching with three, five, or eight matches; radius matching (RM) with a 0.05 percent or 0.1 percent radius; and kernel matching (KM). In NN matching, we allow the control observations to be matched more than once to reduce bias and improve the quality of the matching process. Following Gianfrate and Peri (2019), we perform our analysis initially using the full sample and then rerun it after splitting the sample into two groups: corporate issuers and noncorporate issuers, with the latter group including issuers

[2] Our sukuk sample does not include any covered issues, hence we exclude all covered bonds from our sample.

[3] Gianfrate and Peri (2019) provide a detailed discussion of this approach.

[4] We find that using a probit instead of a logit function provides more robust results.

such as governments and supranational entities. This allows us to account for any potential differences in our conclusions due to the different dynamics in each market (see Asmuni & Tan, 2021).

Lastly, to confirm the results of our analysis, we also perform a series of OLS regressions with the coupon rate as the dependent variable and the same variables used to estimate the propensity scores as independent variables. We also add a dummy variable, *sukuk*, which takes a value of 1 if the issuance is a sukuk and 0 otherwise. The OLS model is:

$$Coupon_{i,t} = \beta_0 + \beta_1\ sukuk_{i,t} + \beta_2\ tenor_{i,t} + \beta_3\ issuance\ size_{i,t} + maturity\ type\ dummies + region\ dummies + rating\ group\ dummies + year\ of\ issuance\ dummies + industry\ dummies + \varepsilon_i \quad (2)$$

All the variables are defined in Appendix 1. The coefficient of *sukuk* (i.e. β_1) captures the difference in the coupon rate (the dependent variable) from issuing a sukuk, instead of a bond.

3. Results and discussion

3.1. Return differential using propensity score matching

We report the ATET results obtained using PSM and the different matching techniques in Table 2. The results for the full sample (Panel 1) confirm the presence of a significant difference in the spreads between sukuk and conventional bonds in the primary market, which is confirmed by all the matching techniques. Interestingly, the results confirm that the difference is negative and ranges between −10.85 bps, using KM, and −28.15 bps, using NN with three matches. All the effects are significant at the 1 percent level, and NN with three matches has the highest standard error (6.97). Overall, these results mean that sukuk issuances are priced at a premium in the primary market compared with similar conventional bonds. This could be explained by the higher demand for such issuances due to the limited investment universe available to sukuk investors compared to conventional bond investors. This could also be explained by the "buy-and-hold" strategy followed by the majority of sukuk investors, which pushes investors to "overbid" for such issuances in the primary market because of the lower probability of obtaining such issuances in the secondary market as a result of the limited trading activities.

Although these results are in line with prior findings in the literature on the presence of significant differences in returns between sukuk and conventional bonds, the sign of the difference is in contrast to the findings in some prior studies, which find that sukuk are priced at a premium compared with conventional bonds (Asmuni & Tan, 2021; Fathurahman & Fitriati, 2013). As highlighted earlier, sukuk are less illiquid and are therefore likely to attract an illiquidity premium, however we believe that this premium is not reflected in the prices of sukuk because of the high demand for such securities, which reduces their average returns to levels below those seen for comparable conventional bonds (Balli et al., 2021; Djelassi & Boukhatem, 2020; Godlewski et al., 2013). This also means that these differences are likely to disappear when the supply of sukuk issuances in the market satisfies demand for them, therefore eliminating any mispricing due to the misalignment of supply and demand.

We perform the same analysis for corporate issuers and noncorporate issuers separately and report the results in Panels 2 and 3 in Table 2, respectively. The results show that although the coupon is lower for sukuk than conventional bonds in both cases, the difference is larger for corporate issuers. This means that corporate issuers can issue sukuk at a larger coupon discount to conventional bonds than noncorporate issuers. The coupon difference is between −11.84 bps and −38.37 bps for corporate issuers and between −6.99 bps

Table 2
Average treatment effect on the treated using various matching techniques.

Matching technique	Nearest neighbor (NN)			Radius matching (RM)		Kernel matching (KM)
	3 Matches	5 Matches	8 Matches	0.05% Radius	0.1% Radius	
Panel 1: full sample						
Avg. treatment (ATET)	−28.15***	−19.54***	−15.19***	−12.06***	−14.55***	−10.85***
Standard error	6.97	5.71	5.05	4.17	5.55	3.32
No. of treated	335	335	335	249	284	335
No. of untreated	670	881	1138	4280	5832	10,086
Panel 2: corporate issuers						
Avg. treatment (ATET)	−38.37***	−26.21***	−23.47***	−16.10**	−18.99**	−11.84***
Standard error	11.03	7.29	7.01	6.16	7.81	4.33
No. of treated	162	162	162	96	104	162
No. of untreated	273	349	458	1459	2228	6276
Panel 3: noncorporate issuers						
Avg. treatment (ATET)	−12.95***	−8.83***	−6.99***	−8.68**	−10.78***	−10.61**
Standard error	3.80	3.25	2.57	4.29	3.00	5.26
No. of treated	156	156	156	104	123	156
No. of untreated	321	414	534	1075	1554	3082

Notes: The table presents the average treatment effect on the treated (ATET) and standard error values (in basis points) calculated using the two-step procedure (see the text for full details) and various matching techniques (in columns). The ATET is measured as the difference in the rate of return between the treated (sukuk) and the untreated (conventional bonds). *Significant at the 10% level. **Significant at the 5% level. ***Significant at the 1% level.

Table 3
Estimating return differential using OLS regressions.

	Coefficient (β_1)	Std. error	t-value	Regression R^2
Full sample	−28.64***	8.53	−3.36	0.388
Corporate issuers only	−44.40***	14.43	−3.08	0.315
Noncorporate issuers only	−12.80***	4.38	−2.92	0.345

Notes: The table presents the results of Model 2 with the full sample and the two subsamples (corporate and noncorporate issuers). We only report the results for the sukuk dummy variable (β_1). The coefficient of the sukuk dummy variable captures the difference in the coupon (the dependent variable) attributed to issuing a sukuk, instead of a bond. *Significant at the 10% level. **Significant at the 5% level. ***Significant at the 1% level.

and −12.95 bps for noncorporate issuers. All effects are significant at the 1 percent or 5 percent levels. The larger ATET difference in corporate issuances could be caused by the higher demand for these issuances, which is attributed to the lower availability of corporate sukuk issuances, which are smaller and less frequent issuances than sukuk issuances by noncorporate issuers (e.g., sovereigns), which tend to be larger and more frequent (Refinitiv, 2021). This is also related to the fact that on average yields are higher for corporate bonds in our sample than for sovereign ones, and, therefore, the absolute differences between corporate bonds and sukuk are also expected to be higher than those between sovereign sukuk and bonds. To ensure the reliability of our PSM matching, we enforce common support and test the balancing property hypothesis for all matching techniques (unreported results). Our results show that the balancing property is satisfied for all variables included in our model, which confirms the validity of our model.

3.2. Return differential using OLS regressions

To provide further validation of our results, we run OLS regressions using Model 2 with the full sample and the two subsamples (corporate and noncorporate issuers) and report the results for the sukuk dummy variable (i.e., β_1) in Table 3. Once more, the results calculated using the full sample show that sukuk issuances are priced at an average coupon discount of −28.64 bps compared with conventional bonds. Moreover, the average coupon discount calculated is higher using the corporate issuances (−44.40 bps) than using the noncorporate issuances (−12.80 bps). All the results are significant at the 1 percent level. Overall, our results confirm the presence of a significant return differential between sukuk and conventional bond issuances in the primary market, in which sukuk are less costly to issue.

4. Conclusion

Sukuk issuances are in high demand by fixed-income investors who are restricted to investment in sharia-compliant instruments, which significantly limits their investment universe (Djelassi & Boukhatem, 2020; Godlewski et al., 2013). This relatively higher demand for sukuk over conventional bonds is likely to lead to significant price differences between the two instruments in the primary market. This study is the first to use PSM to compare the returns on sukuk and conventional bonds in the primary market. The analysis confirms the presence of a significant coupon discount in the case of sukuk, which is between −11 bps and −28 bps, depending on the matching technique used.

We believe that these differences are a manifestation of the inefficiency of the sukuk market due to the limited issuance activity in the primary market and the lack of sufficient liquidity in the secondary market (Balli et al., 2021; Safari et al., 2013). This suggests that the mispricing is likely to shrink or disappear as the sukuk market grows and as new issuers join the market, which will widen the base of issuers and ensure a regular supply of investment opportunities for sukuk investors. However, these findings also highlight the need to develop new sharia-compliant liquidity management products, which can be used by Islamic institutions to soak up their excess liquidity. This will reduce pressure on sukuk as the main product used by such institutions and will likely enhance returns on these securities as well as improve their liquidity conditions. This will also increase the participation of international traders and investors in the sukuk market, hence, improving liquidity conditions further and enhancing the ability of market participants to properly measure and manage risk and return metrics based on more reliable secondary market activities.

Funding

None.

Declaration of competing interest

No potential conflict of interest to be reported by the author.

Acknowledgment

None.

Appendix 1.

Definitions of the variables

Variable	Definition
Coupon	The coupon rate paid on the issuance in basis points
Tenor	The tenor of the issuance in years
Issuance size	The log of the total size of the issuance in millions of US dollars (USD)
Sukuk	A dummy variable that takes a value of 1 if the issuance is sukuk; 0 otherwise
Maturity type dummies	A dummy variable that takes a value of 1 for each maturity type (bullet or sinkable);[a] 0 otherwise
Region dummies	A dummy variable that takes a value of 1 for each region (Africa, Middle East, Supranational, or Rest of the world);[a] 0 otherwise

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Variable	Definition
Rating group dummies	A dummy variable that takes a value of 1 for each rating group (AAA to AA, AA− to A, A− to BBB, BBB− to BB, BB− to B−, CCC+ to C+, or not rated);[a] 0 otherwise
Year of issuance dummies	A dummy variable that takes a value of 1 for each year of issuance between 2000 and 2021;[a] 0 otherwise
Industry dummies	A dummy variable that takes a value of 1 for each top GICS industry group (consumer discretionary, consumer staples, energy, materials, industrials, healthcare, financials, information technology, real estate, communication services, and utilities) and one for sovereign/quasi-sovereign entities;[a] 0 otherwise

[a] One dummy variable is omitted in each case due to collinearity.

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