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THE LEVEL OF CONVERGENCE TO SHARI'AH PRINCIPLES AND CORPORATE PROFITABILITY

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ABSTRACT

This study constructs a Shari'ah convergence index for 1,362 companies operating in 10 different Islamic countries between 2017 and 2021 and assesses its relation to corporate profitability. Shari'ah screening variables are based on existing Shari'ah screening literature and applications, and variable weights are assigned using the Integrated Determination of Objective Ccriteria Weights (IDOCRIW) technique, a widely used, multi-criteria decision-making method. The results suggest that 4% of the sample is completely non-compliant as they engage in non-permissible business activities, 82% has a non-compliant activity level below 30% and the remaining 14% has a non-compliant activity level between 41 and 99%. Our panel data regression analysis shows that, while the Shari'ah convergence index does not affect operating profitability, it does have a statistically positive effect on total corporate profitability. These findings are attributable to two factors, interest burden and debt level. It seems that, for Islamic companies, The high cost of debt service may offset the advantage of high leverage on profitability.

Keywords: Shari'ah convergence, Shari'ah screening, Multi-criteria decision-making, Return on assets, Return on equity.
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I. INTRODUCTION

In recent years, with the progress of financial technologies, many new financial investment tools have become available to investors, in addition to conventional financial assets. However, investors influenced by Islamic economic principles only include in their investment portfolios assets which comply with Shari'ah, and given the return potential, investment in stocks remains one of the most preferred investment options for Muslim community. The Shari'ah principles permit investments only in stocks of issuers that comply with Islamic rules with respect to their main activities, financing criteria, and investment decisions. Given that conventional and Islamic financial systems are practiced simultaneously in many of the countries where more than 90 percent of the population are Muslim, Shari'ah screening is required to determine which stocks are acceptable to investors with Islamic concerns.

Many global financial institutions that offer Shari-ah compliant financial assets apply screening criteria which they develop based on Shari'ah principles. In addition, stock exchanges and other organizations offer methodologies for Shari'ah screening. In general, Shari'ah screening is applied as a two-step process, where in the first step, the companies with main business activities that are non-permissible by Islamic principles are identified, and at the second step, the companies are checked according to their indebtedness, liquidity, interest income, and non-permissible income levels. However, there are considerable differences among screening methodologies in terms of debt, liquidity, interest, and non-permissible income measures employed, and in the thresholds applied.

In the literature, there are studies comparing Shari'ah screening criteria of various practitioners. Khatkhatay & Nisar (2007) compare the Shari'ah screening processes of Dow Jones, Malaysian Securities Commission, and Meezan Pakistan indices, while Pok (2012) compares those of Malaysian Securities Commission, Dow Jones, Financial Times, and Standard & Poor's indices. Derigs & Marzban (2008) cover Dow Jones, Financial Times, Standard & Poor's, Morgan & Stanley, HSBC, Amiri, Dubai İslamic Bank and Azzad & Meezan indices, whereas Bin Mahfouz & Ahmed (2014) analyze Dow Jones, Financial Times, Standard & Poor's, Morgan & Stanley and Malaysian Securities Commission's Shari'ah screening principles.

Still, the most detailed study on the subject is by Ho (2015). In the study, 34 Islamic finance indices are compared with respect to their screening criteria and the similarities and differences among them. The comparison shows that in qualitative screening, several conservative institutions classify companies that involve in non-permissible activities as Shari'ah non-compliant, while more liberal institutions accept companies engaging in non-permissible activities as compliant, if the ratio of non-permissible income to total revenue, is below 5%. For the debt screening, either total liabilities or interest-bearing liabilities are employed as the numerator, whereas in the liquidity screening, either accounts receivable, or accounts receivable plus cash, is employed as the numerator. Interest screening, on the other hand, is measured either with interest income or cash plus interest bearing securities. While some indices prefer to use average market capitalization as the denominator of all ratios, others use either total assets or market value of

equity. By taking into consideration all screening criteria, Ho (2015) classifies Dow Jones, Azzad and BM Hijrah as the most conservative indices.

This classification fully confirms the findings of the four studies listed in the first paragraph of this section. Kafou & Chakir (2017) reach the same findings as Ho (2015) by analyzing Moroccan All Shares Index with Dow Jones, Financial Times, Standard & Poor's, Morgan Stanley and STOXX indices, and conclude that for quantitative screening, the STOXX committee is the most liberal and Dow Jones the most conservative. Meanwhile, Hanif (2019) compare the Accounting and Auditing Organization for Islamic Financial Institutions, and Dow Jones, Bursa Malaysia, Financial Times, Standard & Poor's, Morgan Stanley, Thompson Reuters, STOXX, and ISRA Bloomberg indices, and draw the same conclusions as the previous studies and explain the reason of the differences amongst the financial institutions with the following remarks:

- *"Modern finance and investment is a new phenomenon and hence, the current practice is based on ijtihad of contemporary scholars who have different Shariah opinions."*
- *"There is no higher Islamic authority that is responsible for religious rulings to be followed by all Muslims."*

The ranking of companies with respect to their Shari'ah convergence levels is investigated by Hanif (2019) and Orhan & Işıker (2021). Hanif after reviewing the existing screening methodologies concludes that in terms of Shari'ah compliance, the screening of non-permissible income should have the highest weight, and liquidity should have the lowest whereas indebtedness and interest should have similar weights which falls between permissible income and liquidity. Consequently, he proposes the weights of 20% for liquidity, 25% for debt, 25% for interest, and 30% for non-permissible income screening. The author however, does not make any empirical research to test the proposed weights. On the other hand, Orhan & Işıker (2021) after a detailed analysis of the existing literature and applications conclude that Shari'ah scholars do not accept any differences among quantitative criteria, and so they propose an equal weight for each screen. The authors apply their methodology to a small dataset consisting of 20 Turkish firms for three consecutive years between 2017 and 2019, and they do not include liquidity screening in their empirical methodology since Turkish indices omit that criterion.

The aim of all Shari'ah screening methodologies is to determine whether a stock is Shari'ah compliant or not, but they do not give any information about the level of compliance of the issuing company. As such, the first purpose of this study is to determine the level of compliance of issuers to Islamic principles by developing a Shari'ah convergence ranking methodology. On this purpose a dataset consisting of 1,362 companies from 10 different countries over a five-year period between 2017 and 2021 is employed. Given the significant differences in the Shari'ah screening methodologies of financial institutions, in the context of this study, the variables used in the ranking are determined with a review of existing screening criteria applications, and the weights of variables are calculated objectively by applying the Integrated Determination of Objective Criteria Weights (IDOCRIW) method which is a well-known multi-criteria-decision making technique.

The debt level, liquidity level and non-permissible income level are the principal determinants of Shari'ah convergence, and all these factors have

important implications on corporate profitability. Islamic principles favor lower cash and receivables level and prefer that returns be gained to a high extent from illiquid assets such as inventory and fixed assets. While the amount of liquid assets shows the capacity of a company in meeting its short-term liabilites, the effect on profitability is negative as liquid assets consist of low return investments which do not result in an increase in production or sales (Durrah et al., 2016). Based on Baranek (1966), the level of liquidity represents a tradeoff between the lower profitability of current assets and the financial flexibility it offers. Islamic principles favor higher equity levels and accept equity as the main source of financing the corporate investments. The amount of debt level that formulates the capital structure decision of the corporations is studied by different theories. Myers & Majluf, (1984), in their pecking order theory suggest that leverage and profitability are negatively related, whereas Jensen (1986) in his free cash flow theory suggests that debt reduces the agency cost of free cash flow and so leverage, and profitability are positively related. Finally, the trade-off theory states that the optimal capital structure is attained at the point where the gains from the tax advantage of interest equals the cost of financial distress. Finally, the formula developed by DuPont de Nemours, Inc., commonly shortened to DuPont formula shows that to maximize return on equity firms must borrow up to the point where the cost of debt equals to the return on investment.

The relationship between Shari'ah compliance and profitability is analyzed in several studies. Pepis & de Jong (2019) analyze the mentioned relationship on 664 firms for the period between 1990-2018 and conclude that Shariah-compliance positively affects long term profitability measured with return on assets and return on sales. Saba et al. (2021) by analyzing 941 Malaysian firms for the period between 2000-2013 show that Shari'ah compliant firms have higher ROA, ROE and growth rate compared to non-Shari'ah-compliant firms. Farroq & Alahkam (2016) in their study on the Middle East and North African region show that when performance is measured with market-adjusted returns, non-Shari'ah-compliant firms perform better compared to Shari'ah-compliant firms.

The studies that investigate the relationship between Shari'ah compliance and corporate profitability disclose conflicting results. The aim of this study is to investigate the relationship between not Shari'ah compliance but Shari'ah convergence level and corporate profitability, which to our knowledge has not been tested before in the previous literature. The large dataset consisting of 1,362 companies, is an important strength of the study.

The remaining of the paper is structured as follows. The next section presents variables, data and methods used in the analysis. Section 3 presents and discussed the results. Finally, section 4 concludes the paper.

II. VARIABLES, METHODOLOGY AND DATA

2.1. Variables

This paper aims to construct a Shari'ah convergence index for non-financial corporations and to investigate the relationship between the degree of convergence to Islamic rules and corporate profitability. For this purpose, a set of variables to

measure convergence to Shari'ah principles and another set to measure profitability are required.

Many financial institutions apply Shari'ah screening processes to determine the stocks to be included either in the Islamic indices or in Shari'ah compliant mutual funds. The widely used screening methodologies are developed by Dow Jones (DJIMI), Financial Times (FTSE), Morgan & Stanley Capital International (MSCI), Standard & Poor's' (S&P), Hong-Kong and Shanghai Bank (HSBC), and Thomson Reuters (T&R). In addition, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI), an institution responsible for the development and issuance of standards for the global Islamic finance sector, has also developed its own metrics for Shari'ah screening. These institutions apply a qualitative and quantitative two-step process. First in qualitative screening, companies with non-permissible business activities by Shari'ah rules are identified and categorized as Shari'ah non-compliant. The business activities that are classified as non-compliant by the above-listed institutions are presented in Table 1.

Table 1.
Non-compliant Business Activities

	DJIMI	FTSE	MSCI	S&P	HSBC	T&R	AAOIFI
Alcohol	X	X	X	X	X	X	X
Broadcasting & entertainment	X	X	X	X	X	X	X
Media (except newspapers)	X			X	X	X	X
Conventional finance	X	X	X	X	X	X	X
Gambling	X	X	X	X	X	X	X
Hotels, restaurants & bars	X	X	X	X	X	X	X
Pork related products	X	X	X	X	X	X	X
Tobacco	X	X	X	X	X	X	X
Weapons and defense	X	X	X		X	X	X
Biotechnology					X		
Silver and gold (trading)				X	X	X	X

The biotechnology industry is classified as non-Shari'ah compliant only by HSBC, whereas all other industries are classified as non-compliant by at least four out of seven institutions. Hence, in the context of this study all companies which engage in business activities listed in Table 2, excluding the biotechnology industry, are classified as Shari'ah non-compliant.

The second step in the Shari'ah screening process is quantitative and involves the calculation of a set of ratios to assess convergence to Islamic rules. Quantitative screening consists of four categories which are debt, liquidity, interest, and non-permissible income. The metrics employed for each of these categories by seven previously-mentioned institutions are presented in Table 2 while differences in the denominator of the ratios applied is summarized in Table 3.

Table 2.
Quantitative Screening

	DEBT SCREEN	LIQUIDITY SCREEN	INTEREST SCREEN	NON-PERMISSIBLE INCOME SCREEN
DJIMI	total debt / average market capitalization <33%	account receivables / average market capitalization <33%	(cash + marketable securities with interest) / average market capitalization <33%	N/A
FTSE	total debt / total assets <33%	(cash + account receivables) / total assets <50%	(cash + marketable securities with interest) / total assets <30% interest income / total revenue<5%	impermissible income / total revenue<5%
MSCI	total debt / total assets <33.33%	account receivables / total assets <33.33%	(cash + marketable securities with interest) / total assets <33.33%	impermissible income / total revenue<5%
S&P	total debt / market value of equity<33%	account receivables / market value of equity <49%	(cash + marketable securities with interest) / market value of equity <33%	impermissible income / total revenue<5%
HSBC	total debt / average market capitalization <33%	account receivables / average market capitalization <33%	(cash + marketable securities with interest) / average market capitalization <33%	N/A
T&R	interest-bearing debt / average market capitalization <30%	(cash + account receivables)/ total assets <67%	(cash + marketable securities with interest) /average market capitalization <30%	N/A
AAOIFI	interest-bearing debt / average market capitalization <30%	(cash + account receivables) / average market capitalization <70%	(cash + marketable securities with interest) / average market capitalization <30%	N/A

Table 3.
Denominator Difference

INSTITUTION	DENOMINATOR
DIJIMI, HSBC, AAOIFI	Average market capitalization
FTSE and MSCI	Total assets
S&P	Market value of equity
T&R	Average market capitalization. for debt & interest screens Total assets for income screen

As can be noticed at Table 2, there are important differences across institutions, not only in the formula of the calculated metrics, but also in the thresholds applied. From Table 3, average market capitalization and market value of equity are the two market driven variables employed in the denominator by DIJIMI, HSBC, AAOIFI and S&P. The use of market value data for the computation of the ratios has two important shortcomings. First, even if the market value is supposed to provide the real value of the company it is very frequently pronounced and empirically showed that all markets in general, and emerging markets especially, are not always efficient and driven by irrational investors which creates an inconsistency problem. And second, according to Islamic principles, only factors that are entirely under the control of the company should be considered (Derig & Marzban, 2008; Hanif, 2019). As market-based data is not under full control of the firm, it cannot be treated as endogenous. Given these issues, in the context of this study, total assets are used in the computation of all ratios.

For the numerator of debt screening ratios, the two variables employed are interest bearing debt and total debt. Islam strictly prohibits interest-bearing debt, but at the same time favors equity in financing of investments. As such, to pass Shari'ah screening, companies need to keep both financial and non-financial debt that they use to finance their assets within the accepted limits (Derig & Marzban, 2008). So, given that both interest-bearing and total debt are expected to not exceed certain limits, two ratios are used in this study for debt screening. These are the ratio of total debt to total assets (DS1) and the ratio of interest-bearing debt to total assets (DS2).

For the numerator of liquidity screening ratios, the two variables employed are account receivables and account receivables plus cash. According to the Shari'ah, returns should be earned from illiquid investments and consequently for a Shari'ah compliant company the share of inventory and fixed assets in total assets should be large. (Hanif, 2019). Given that cash and account receivables are the most liquid assets, liquidity screen (LS) is measured using cash plus account receivables as a ratio of total assets.

Note that all financial institutions employ the sum of cash and marketable securities with interest for the numerator of interest screening ratios. FTSE however, adds a second ratio to measure interest, which is the ratio of interest income to total revenue. Consequently, in this study two measures were employed to measure interest screen. These are:

Interest Screen (IS1) = (Cash + Marketable securities (with interest)) / Total Assets
Interest Screen (IS2) = Interest Income / Total revenue

In some instances, the corporations engage in Shari'ah permissible main business activities and non-permissible secondary business activities. If this is the case, some financial institutions classify all firms which engage in Shari-ah non-permissible primary or secondary activities as non-compliant whereas others examine the amount of revenue from non-permissible activities by dividing the income from non-compliant activities to total revenue and classify the corporation as non-compliant if the mentioned ratio exceeds 5 percent. In the context of this study in line with DIJMI, HSBC, T&R, and AAOIFI, all firms which engage in non-permissible primary or secondary business activities are classified as non-compliant.

For all ratios, the seven institutions differ in the thresholds they apply. However, as the first aim of this study is to categorize the firms according to their convergence to Shari'ah principles and not Shari'ah screening, the benchmarks and thresholds are insignificant.

To measure profitability, the frequently used measures within the literature are return on equity (ROE) and return on assets (ROA). ROE shows the return on capital invested by company owners and is defined as the ratio of net income to total equity. To compute total equity, either year-end values or average values are employed (Monteiro, 2006; Rappaport, 1986). ROA on the other hand, shows profit generating potential of company's assets. There are two different approaches for computing ROA, either as the ratio of net income to total assets or the ratio of earnings before interest and taxes (EBIT) to total assets. The first measure is frequently criticized, as the numerator (i.e., net income) is the return attributed to equity holders, and the denominator (i.e. total assets) is the investments of both equity and debtholders (Jewell & Mankin, 2011). Similar to ROE, total assets are computed with either year-end values or average values (Tissen & Sneidere, 2019). As a result, in this study, ROE and ROA are measured respectively as the ratio of net income to average total equity and the ratio of EBIT to average total assets. Aerage total equity for ROE and average total assets for ROA are computed by taking arithmetic means of the present and prior year data.

The control variable of the study is size. As a general approach, size is added to the studies by taking the natural logarithm of either total sales revenue or total assets. However, as the dataset of the present study consists of companies from 10 different countries which disclose financial results in their local currencies, rather than using absolute values, size is measured as a ratio by dividing sales revenue by gross domestic product (GDP) of the relevant country and relevant year. Three other dummy variables of country, industry and covid 19 are added to the regression equation. The variables of the study are summarized in Table 4.

Table 4.
The Variables

ABBREVIATION	NAME	DEFINITION
ROE	Return on Equity	Net Income / Average Total Equity
ROA	Return on Assets	EBIT /Average Total Assets
SIZESAL	Size 2	Sales Revenue / GDP
COUNT	Country	Country code
IND	Industry	Industry code
COVID	Covid 19	0 for years 2017,2018,2018; 1 for years 2020,2021

2.2. Methodology

The first purpose of this study is to develop a Shari'ah convergence ranking methodology for non-financial firms. In developing the ranking methodology, the critical issue is to determine the weights to be given to each of five Shari'ah compliance ratios. On this purpose, multi-criteria-decision making techniques aim to rank the variables when multiple criteria need to be considered together. Among different techniques the IDOCRIW technique being a combination of ENTROPY and the Criterion Impact Loss (CILOS) techniques enables strengths of one method to offset the weaknesses of the other. Consequently, the IDOCRIW technique is employed in this study to assign weights to the variables defined in the earlier sections.

The ENTROPY technique, first introduced by Claude Shannon as a measure of uncertainty, is applied in six steps (Zhang et al., 2011; Karami & Johansson, 2014). These steps are:

1. The decision matrix is prepared.
2. The decision matrix is normalized.
3. The shares in total are computed and results are organized in a matrix.
4. Using the ENTROPY coefficient of the normalized values, the ENTROPY values are calculated
5. The Degree of Differentiation of the Information which indicates the distance from the ideal value is calculated
6. The criterion weights (wj) are calculated.

Introduced by Mirkin in 1974, the Criterion Impact Loss (CILOS) technique takes the largest or smallest optimal value of one criterion and calculates the loss of importance (effect) of the other criteria. It is also applied in six steps. (Zavadskas, 1987; Cereska et al., 2016).

1. The decision matrix is transformed into a benefit-oriented matrix. All criteria in the decision matrix are anticipated to be benefit-oriented, if there are cost-oriented criteria, they are converted to benefit-oriented by dividing the alternative with the minimum value in the criterion by the values in the column.
2. The decision matrix is normalized
3. "Square Matrix R" is prepared by sorting the rows to each column from maximum to minimum according to values in the rows. The data in the diagonals of the matrix R shows the best values for all criteria.

4. "Square Matrix P" is prepared. The matrix P shows the loss of each criterion relative to the most important criterion
5. The square matrix F is prepared. In the matrix the criterion significance degrees (qj) are calculated, and the computed values indicate the criterion importance degrees due to normalization.
6. CILOS weights are calculated by solving the F matrix.

The IDOCRIW technique is applied by combining the weights calculated with ENTROPY and CILOS techniques. In this method, the aggregate weights are calculated with equation 1.

$$\mathrm{w}j = \frac{\mathrm{qj} * \mathrm{wej}}{\sum_{j=1}^{n} \mathrm{qj} * \mathrm{wej}} \tag{1}$$

where (qj) represents the weights assigned by CILOS while (wej) represents those assigned by ENTROPY. The variability of the criterion in the ENTROPY method and the loss of criterion effect in CILOS are balancing factors in the IDOCRIW technique. (Zavadskas & Podvezko, 2016).

The second purpose of the present paper is to examine the relationship between profitability and the degree of convergence to Shari'ah rules. For this purpose, an unbalanced panel data regression analysis is applied. In the context of this study, in order to control for time-invariant, firm-specific effects, and unbalanced structure, fixed effect model is used as it is consistent in the literature. (Baltagi, 2001; Wooldridge, 2010; Yalama, 2013; Ullah et al., 2018).[1]

In the analysis, the following panel regressions are used:

$$ROE_{i,t} = \alpha + \delta\, IDOCRIW_{i,t} + \rho SIZESAL_{i,t} + \gamma IND_i + \theta COUNT_i + \mu COVID_i + u_{i,t} \tag{2}$$

$$ROA_{i,t} = \alpha + \delta\, IDOCRIW_{i,t} + \rho SIZESAL_{i,t} + \gamma IND_i + \theta COUNT_i + \mu COVID_i + u_{i,t} \tag{3}$$

where $ROE_{i,t}$ is the return on equity of stock i at period t, $ROA_{i,t}$ is the return on asset of stock i at period t, $IDOCRIW_{i,t}$ Shari'ah convergence ranking criteria for stock i at time period t, $SIZESAL_{i,t}$ is the size ratio of stock i at period t, $COUNT_i$ is country dummy, IND*i* is industry dummy, COVID is dummy for covid 19, and $u_{i,t}$ is the error term.

2.3. Data

The dataset used in this study consists of manufacturing, service and technology companies established in Islamic countries. Presently, there are about 30 countries

1. If the panel has a short T, a fixed effects model could be more suitable. Dynamic models generally need a greater number of time periods (T) compared to the number of cross-sectional units (N) to yield reliable estimates. (Wooldridge, 2010)

across the globe in which more than 90% of the population are Muslim. Of these 30 countries, only 12 utilizing international financial reporting standards in accounting applications are included in this current study to ensure the consistency of the data, which are gathered from the financial statements of the companies. As the data are obtained from national stock exchange websites, the two countries of Azerbaijan and Nigeria are omitted as they have very few non-financial industry firms listed in their stock exchanges. The final list consisted of 10 countries, which are Bahrain, Bangladesh, Jordan, Kuwait, Malaysia, Oman, Pakistan, Qatar, Türkiye, and the United Arab Emirates. Only non-financial companies which are listed on national stock exchanges for all five years between 2017 and 2021 are included to the analysis. The final sample consists of 6,810 observations of the 1,362 firms over a five-year period (www.nationsonline.org; www.ifrs.org).

The company list and company-specific data have been collected from the official websites of national stock exchanges, with each classifying industries differently. However, given that Malaysian firms have the largest share of the sample, all firms in the sample were categorized according to Bursa Malaysia's industry classification. Due to limited number of observations, Bahrain, Jordan, Kuwait, Oman, Qatar, and the United Arab Emirates are grouped in one single category named the Middle East. The final sample consists of companies from five different geographical regions, which are Bangladesh, Malaysia, the Middle East, Pakistan, and Türkiye. The country and industry classification of the dataset is presented in Table 5.

Table 5.
The Sample

CODE	INDUSTRY	BANGLADESH	MALAYSIA	MIDDLE EAST	PAKISTAN	TÜRKİYE	TOTAL
100	food and beverage	10	89	27	22	21	169
101	textile and leather	28	21	2	53	19	123
102	automotive, automotive parts and ship building	2	22	2	18	15	59
103	building materials and glass	17	28	29	22	20	116
104	chemical, personal care, pharmaceuticals	16	26	13	35	10	100
105	wood and furniture	0	33	0	0	3	36
106	paper and packaging	2	17	4	7	10	40
107	home appliances and equipment	4	9	2	6	6	27
108	industrial equipment and cables	7	47	6	1	8	69
109	energy infrastructure, equipment and services	0	23	5	9	13	50

Table 5.
The Sample (Continued)

CODE	INDUSTRY	BANGLADESH	MALAYSIA	MIDDLE EAST	PAKISTAN	TÜRKİYE	TOTAL
110	oil and gas producers	3	3	9	8	3	26
111	electronic, technology and telecommunication equipment	0	37	1	0	1	39
112	metal	3	36	8	7	6	60
114	tobacco	1	0	1	2	0	4
200	construction	0	62	8	6	6	82
201	retailers	3	13	14	0	15	45
202	tourism	1	24	21	2	6	54
203	consumer and industrial services	2	58	23	1	1	85
204	transportation and logistics	2	25	17	2	3	49
205	digital services, software and telecom	6	48	12	6	16	88
206	media	0	7	0	1	2	10
207	electricity, gas, water and multiutilities	6	11	7	0	0	24
208	education	0	0	7	0	0	7
TOTAL		113	639	218	208	184	1362

The data for all variables have been gathered from financial statements and the foot notes disclosed by companies which were obtained either from the database of national stock exchanges and/or company websites.

III. ANALYSIS AND FINDINGS

3.1. Convergence to Shari'ah Principles

To construct a Shari'ah compliance index, qualitative screening is first performed. All companies with non-permissible business activities are automatically classified as Shari'ah non-compliant. Out of the 1,362 included firms, 56 are identified as non-compliant in the qualitative screen. All quantitative screening ratios are then computed for the remaining 1,306 firms which engage in Shari'ah-permissible business activities. The descriptive statistics for Shari'ah indexing variables are presented in Table 6.

Table 6.
Descriptive Statistics for Shari'ah Convergence Variables

GEOGRAPHY	YEAR		DS1	DS2	LS	IS1	IS2
BANGLADESH	2017	Mean	36.64%	17.99%	24.90%	4.91%	1.63%
		Min.	1.93%	0.00%	2.14%	0.00%	0.00%
		Max.	93.58%	70.30%	85.34%	46.87%	58.94%
		St. dev.	21.07%	18.13%	16.02%	10.00%	6.97%
	2018	Mean	37.51%	18.88%	23.55%	4.80%	2.65%
		Min.	1.76%	0.00%	2.16%	0.00%	0.00%
		Max.	92.45%	81.51%	93.05%	41.16%	99.93%
		St. dev.	21.26%	18.16%	15.76%	9.52%	12.11%
	2019	Mean	36.48%	18.34%	23.87%	4.83%	2.23%
		Min.	1.60%	0.00%	2.14%	0.00%	0.00%
		Max.	91.33%	85.89%	78.46%	45.78%	59.48%
		St. dev.	21.33%	18.39%	15.28%	9.96%	8.72%
	2020	Mean	36.57%	18.83%	22.89%	4.70%	2.47%
		Min.	1.12%	0.00%	1.19%	0.00%	0.00%
		Max.	97.69%	94.44%	67.12%	55.86%	59.13%
		St. dev.	21.69%	19.29%	15.72%	10.10%	9.19%
	2021	Mean	37.09%	19.01%	24.06%	5.96%	2.28%
		Min.	1.49%	0.00%	1.11%	0.00%	0.00%
		Max.	97.99%	93.27%	72.57%	68.50%	58.41%
		St. dev.	21.56%	19.40%	17.27%	11.80%	8.84%
MALAYSIA	2017	Mean	26.45%	8.32%	34.07%	8.89%	1.32%
		Min.	0.23%	0.00%	0.74%	0.00%	0.00%
		Max.	251.34%	125.01%	119.28%	64.77%	25.81%
		St. dev.	19.77%	10.89%	19.02%	11.59%	2.07%
	2018	Mean	26.44%	8.85%	33.00%	9.36%	0.93%
		Min.	0.34%	0.00%	0.46%	0.00%	0.00%
		Max.	268.13%	126.26%	124.74%	77.01%	20.69%
		St. dev.	20.61%	11.52%	19.05%	12.44%	2.25%
	2019	Mean	26.61%	8.95%	31.97%	9.31%	0.98%
		Min.	0.41%	0.00%	0.32%	0.00%	0.00%
		Max.	182.37%	134.44%	119.69%	71.25%	22.00%
		St. dev.	19.35%	12.18%	18.30%	12.05%	2.17%
	2020	Mean	26.91%	9.02%	32.72%	9.96%	0.91%
		Min.	0.33%	0.00%	1.07%	0.00%	0.00%
		Max.	273.24%	124.41%	118.94%	67.04%	38.51%
		St. dev.	23.19%	13.92%	19.36%	12.30%	2.38%
	2021	Mean	26.47%	7.52%	33.32%	9.57%	0.83%
		Min.	0.38%	0.00%	0.51%	0.00%	0.00%
		Max.	667.32%	99.67%	117.47%	72.49%	65.13%
		St. dev.	33.85%	10.53%	18.95%	12.16%	3.50%

Table 6.
Descriptive Statistics for Shari'ah Convergence Variables (Continued)

GEOGRAPHY	YEAR		DS1	DS2	LS	IS1	IS2
MIDDLE EAST	2017	Mean	27.30%	8.81%	33.12%	3.88%	0.55%
		Min.	1.48%	0.00%	0.94%	0.00%	0.00%
		Max.	118.90%	74.47%	92.70%	56.68%	17.14%
		St. dev.	19.45%	11.56%	21.52%	9.55%	1.88%
	2018	Mean	28.69%	9.57%	33.48%	4.17%	0.57%
		Min.	1.19%	0.00%	1.04%	0.00%	0.00%
		Max.	155.84%	57.23%	90.94%	51.18%	19.76%
		St. dev.	21.39%	12.11%	22.35%	9.48%	1.91%
	2019	Mean	28.76%	9.70%	32.79%	4.08%	0.70%
		Min.	1.22%	0.00%	1.21%	0.00%	0.00%
		Max.	183.25%	68.86%	94.86%	67.64%	32.60%
		St. dev.	22.05%	13.08%	21.93%	9.42%	2.66%
	2020	Mean	27.68%	8.90%	32.53%	4.11%	0.44%
		Min.	0.97%	0.00%	0.56%	0.00%	0.00%
		Max.	109.67%	60.26%	96.18%	72.72%	11.15%
		St. dev.	19.68%	12.28%	21.66%	9.29%	1.23%
	2021	Mean	29.83%	10.37%	34.42%	4.80%	0.49%
		Min.	0.31%	0.00%	0.36%	0.00%	0.00%
		Max.	316.69%	243.81%	95.77%	65.90%	10.00%
		St. dev.	27.50%	21.00%	21.17%	10.54%	1.53%
PAKISTAN	2017	Mean	39.26%	15.49%	20.90%	5.96%	0.44%
		Min.	2.61%	0.00%	0.26%	0.00%	0.00%
		Max.	156.67%	87.62%	85.88%	70.96%	20.72%
		St. dev.	20.85%	15.95%	18.19%	12.49%	1.62%
	2018	Mean	40.68%	16.38%	21.00%	4.93%	0.34%
		Min.	4.03%	0.00%	0.46%	0.00%	0.00%
		Max.	157.86%	80.14%	86.05%	69.46%	6.35%
		St. dev.	20.46%	15.77%	17.59%	10.97%	0.82%
	2019	Mean	41.94%	18.25%	19.58%	4.13%	0.50%
		Min.	2.62%	0.00%	0.51%	0.00%	0.00%
		Max.	168.20%	151.57%	84.12%	55.15%	10.95%
		St. dev.	21.19%	18.03%	16.81%	9.27%	1.32%
	2020	Mean	39.99%	15.75%	20.61%	5.73%	0.66%
		Min.	2.86%	0.00%	0.16%	0.00%	0.00%
		Max.	182.54%	163.03%	89.75%	52.67%	13.97%
		St. dev.	21.33%	17.38%	17.97%	11.23%	1.57%
	2021	Mean	38.07%	13.31%	22.24%	7.06%	0.49%
		Min.	2.74%	0.00%	0.44%	0.00%	0.00%
		Max.	193.15%	171.68%	75.29%	62.79%	14.08%
		St. dev.	20.85%	16.40%	17.55%	12.62%	1.30%

Table 6.
Descriptive Statistics for Shari'ah Convergence Variables (Continued)

GEOGRAPHY	YEAR		DS1	DS2	LS	IS1	IS2
TÜRKİYE	2017	Mean	39.33%	13.52%	32.58%	6.53%	0.89%
		Min.	0.34%	0.00%	0.05%	0.00%	0.00%
		Max.	251.65%	105.78%	96.05%	57.19%	21.30%
		St. dev.	25.31%	12.39%	20.23%	10.82%	2.20%
	2018	Mean	40.13%	14.99%	32.23%	6.61%	1.26%
		Min.	2.83%	0.00%	0.33%	0.00%	0.00%
		Max.	270.53%	83.20%	99.04%	59.19%	19.83%
		St. dev.	26.60%	13.57%	21.33%	10.64%	3.05%
	2019	Mean	38.95%	14.37%	31.80%	6.98%	1.67%
		Min.	0.42%	0.00%	0.71%	0.00%	0.00%
		Max.	192.60%	100.72%	95.41%	69.10%	42.85%
		St. dev.	23.22%	14.03%	20.66%	11.26%	4.62%
	2020	Mean	38.67%	13.86%	34.33%	9.26%	0.97%
		Min.	0.44%	0.00%	0.24%	0.00%	0.00%
		Max.	99.15%	78.72%	92.63%	71.57%	13.83%
		St. dev.	21.47%	13.16%	21.09%	12.31%	1.81%
	2021	Mean	41.92%	12.99%	34.64%	8.06%	0.90%
		Min.	0.10%	0.00%	0.15%	0.00%	0.00%
		Max.	97.68%	73.46%	96.93%	74.58%	20.31%
		St. dev.	22.56%	13.67%	20.71%	12.12%	2.47%

For the remaining 1,306 non-financial companies, to apply CILOS and ENTROPY techniques a decision matrix is prepared by classifying the companies according to their geographical region for years between 2017-21. The ENTROPY technique is then applied by following the steps mentioned in the methodology section. All the steps are applied and the weights are calculated. Like the Entropy technique, the decision matrix prepared by classifying the companies according to geographical region serves as the starting point for the CILOS technique. The subsequent steps are followed and then weights are calculated. The IDOCRIW technique is a combination of ENTROPY and CILOS techniques. The weights with IDOCRIW technique are computed. The results from these steps are presented in Table 7 to Table 10.

Table 7.
Decision Matrix: Performance of Shari'ah-Compliant Firms in Five Geographies (2017-21)

	DS1	DS2	LS	IS1	IS2
Türkiye	0.398	0.139	0.331	0.075	0.011
Middle East	0.285	0.095	0.333	0.042	0.006
Bangladesh	0.369	0.186	0.239	0.050	0.023
Pakistan	0.400	0.158	0.209	0.056	0.005
Malaysia	0.266	0.085	0.330	0.094	0.009
Max	*0.400*	*0.186*	*0.333*	*0.094*	*0.023*
Min	*0.266*	*0.085*	*0.209*	*0.042*	*0.005*

Table 8.
ENTROPY Technique

Normalized Decision Matrix						
	DS1	**DS2**	**LS**	**IS1**	**IS2**	
	Min	**Min**	**Min**	**Min**	**Min**	
Türkiye	0.67	0.61	0.63	0.56	0.44	
Middle East	0.93	0.90	0.63	1.00	0.88	
Bangladesh	0.72	0.46	0.87	0.84	0.22	
Pakistan	0.66	0.54	1.00	0.76	1.00	
Malaysia	1.00	1.00	0.63	0.45	0.54	
Sum	3.99	3.51	3.76	3.60	3.08	
Share Matrix in the Sum						
	DS1	**DS2**	**LS**	**IS1**	**IS2**	
	Min	**Min**	**Min**	**Min**	**Min**	
Türkiye	0.17	0.17	0.17	0.16	0.14	
Middle East	0.23	0.26	0.17	0.28	0.29	
Bangladesh	0.18	0.13	0.23	0.23	0.07	
Pakistan	0.17	0.15	0.27	0.21	0.32	
Malaysia	0.25	0.28	0.17	0.12	0.18	
Sum	1.00	1.00	1.00	1.00	1.00	
Calculation of Entropy Values						
	DS1	**DS2**	**LS**	**IS1**	**IS2**	
	Min	**Min**	**Min**	**Min**	**Min**	
Türkiye	-0.542	-0.530	-0.543	-0.564	-0.593	
Middle East	-0.441	-0.413	-0.544	-0.389	-0.379	
Bangladesh	-0.519	-0.618	-0.443	-0.443	-0.806	
Pakistan	-0.544	-0.569	-0.402	-0.474	-0.341	
Malaysia	-0.420	-0.381	-0.542	-0.633	-0.527	
Average	-0.4932	-0.5022	-0.4947	-0.5006	-0.5293	Total Dj
dj= (1-ej)	0.5068	0.4978	0.5053	0.4994	0.4707	2.4800
ej= (1-dj)	1.5068	1.4978	1.5053	1.4994	1.4707	
wj	**0.2044**	**0.2007**	**0.2037**	**0.2014**	**0.1898**	**1.0000**
RANK	**1**	**4**	**2**	**3**	**5**	

Table 9.
CILOS Technique

Benefit-Oriented Decision Matrix					
	DS1	**DS2**	**LS**	**IS1**	**IS2**
	Min	**Min**	**Min**	**Min**	**Min**
Türkiye	0.67	0.61	0.63	0.56	0.44
Middle East	0.93	0.90	0.63	1.00	0.88
Bangladesh	0.72	0.46	0.87	0.84	0.22
Pakistan	0.66	0.54	1.00	0.76	1.00
Malaysia	1.00	1.00	0.63	0.45	0.54
SUM	3.99	3.51	3.76	3.60	1.00
Normalized Decision Matrix					
	DS1	**DS2**	**LS**	**IS1**	**IS2**
	Min	**Min**	**Min**	**Min**	**Min**
Türkiye	0.17	0.17	0.17	0.16	0.44
Middle East	0.23	0.26	0.17	0.28	0.88
Bangladesh	0.18	0.13	0.23	0.23	0.22
Pakistan	0.17	0.15	0.27	0.21	1.00
Malaysia	0.25	0.28	0.17	0.12	0.54
Max	0.25	0.28	0.27	0.28	1.00
Square Matrix R					
	DS1	**DS2**	**LS**	**IS1**	**IS2**
DS1	0.25	0.28	0.17	0.12	0.54
DS2	0.25	0.28	0.17	0.12	0.54
LS	0.17	0.15	0.27	0.21	1.00
IS1	0.23	0.26	0.17	0.28	0.88
IS2	0.17	0.15	0.27	0.21	1.00
Square Matrix P					
	DS1	**DS2**	**LS**	**IS1**	**IS2**
DS1	0.000	0.000	0.368	0.553	0.457
DS2	0.000	0.000	0.368	0.553	0.457
LS	0.335	0.461	0.000	0.243	0.000
IS1	0.067	0.100	0.373	0.000	0.116
IS2	0.335	0.461	0.000	0.243	0.000
Square Matrix F and CILOS Criterion Weights					
	DS1	**DS2**	**LS**	**IS1**	**IS2**
DS1	-0.737	0.000	0.368	0.553	0.457
DS2	0.000	-1.022	0.368	0.553	0.457
LS	0.335	0.461	-1.109	0.243	0.000
IS1	0.067	0.100	0.373	-1.591	0.116
IS2	0.335	0.461	0.000	0.243	-1.030

	DS1	**DS2**	**LS**	**IS1**	**IS2**
qj(w)	0.29381	0.21200	0.19601	0.08702	0.21116
RANK	1	2	4	5	3

Table 10.
IDOCRIW Technique

	DS1	DS2	LS	IS1	IS2	SUM
a-ENTROPY	0.204	0.201	0.204	0.201	0.190	
rank	1	4	2	3	5	
b-CILOS	0.294	0.212	0.196	0.087	0.211	
rank	1	2	4	5	3	
ai*bi	0.0600	0.0426	0.0399	0.0175	0.0401	0.2001
IDOCRIW	0.300	0.213	0.200	0.088	0.200	1.0000
rank	1	2	4	5	3	

The weights calculated by the CILOS and IDOCRIW techniques are very close to each other with both techniques ranking the variables equally. The IDOCRIW technique gives the highest weight to DS1 with 29.4% and the lowest to IS1 with 8.8%. The distance between the highest and lowest weights is 21.2% within the IDOCRIW technique. As IDOCRIW is a combination of the other two techniques, the Shari'ah ranking of 1,306 non-financial companies in the sample is performed with this technique. Using IDOCRIW weights, the degree of Shari'ah convergence (Sc) is calculated with the following equation:

$$Sc = 0.300DS1+0.213DS2+0.200LS+0.088IS1+0.200IS2$$

The Sc value indicates the level on non-compliant activities; therefore, the lower the Sc value, the higher the Shari'ah compliance of the company and vice versa. Given the large sample size consisting of 1,362 companies, the results are presented by dividing the sample to seven groups and is presented in Table 11.

Table 11.
Ranking of the Sample

GEOGRAPHY	YEAR	Level of Non-Compliant Activities														
		0%-10%		11%-20%		21%-30%		31%-40%		41%-50%		51%-99%		100%		
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	TOTAL
BANGLADESH	2017	11	10%	45	40%	39	35%	13	12%	2	2%	2	2%	1	1%	113
	2018	15	13%	39	35%	39	35%	11	10%	5	4%	2	2%	1	1%	112
	2019	14	13%	47	42%	32	29%	11	10%	4	4%	3	3%	1	1%	112
	2020	13	12%	48	42%	34	30%	10	9%	3	3%	4	4%	1	1%	113
	2021	12	11%	41	39%	35	33%	7	7%	5	5%	4	4%	1	1%	105
MALAYSIA	2017	74	12%	278	44%	183	29%	52	8%	11	2%	3	0%	27	4%	628
	2018	82	13%	269	43%	189	30%	53	8%	4	1%	4	1%	27	4%	628
	2019	84	13%	278	44%	178	28%	52	8%	4	1%	5	1%	27	4%	628
	2020	87	14%	265	42%	189	30%	55	9%	7	1%	5	1%	27	4%	635
	2021	82	13%	289	46%	166	26%	50	8%	7	1%	6	1%	27	4%	627

Table 11.
Ranking of the Sample (Continued)

GEOGRAPHY	YEAR	Level of Non-Compliant Activities														
		0%-10%		11%-20%		21%-30%		31%-40%		41%-50%		51%-99%		100%		
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	TOTAL
MIDDLE EAST	2017	36	17%	88	41%	49	23%	20	9%	7	3%	1	0%	16	7%	217
	2018	35	16%	89	41%	50	23%	15	7%	11	5%	2	1%	16	7%	218
	2019	30	14%	93	43%	51	23%	18	8%	8	4%	2	1%	16	7%	218
	2020	34	16%	88	40%	56	26%	15	7%	7	3%	2	1%	16	7%	218
	2021	21	10%	92	44%	55	26%	18	9%	6	3%	2	1%	16	8%	210
PAKISTAN	2017	23	11%	78	38%	73	35%	19	9%	11	5%	2	1%	2	1%	208
	2018	19	9%	78	38%	75	36%	23	11%	10	5%	1	0%	2	1%	208
	2019	20	10%	73	35%	69	33%	36	17%	7	3%	1	0%	2	1%	208
	2020	22	11%	74	36%	75	36%	29	14%	5	2%	1	0%	2	1%	208
	2021	16	8%	86	43%	62	31%	27	14%	6	3%	1	1%	2	1%	200
TÜRKİYE	2017	15	8%	50	27%	74	40%	22	12%	9	5%	4	2%	10	5%	184
	2018	8	4%	57	31%	69	38%	28	15%	9	5%	3	2%	10	5%	184
	2019	13	7%	50	27%	64	35%	35	19%	9	5%	3	2%	10	5%	184
	2020	15	8%	48	26%	61	33%	34	18%	13	7%	3	2%	10	5%	184
	2021	16	9%	39	21%	55	30%	44	24%	15	8%	5	3%	10	5%	184
TOTAL	2017	159	12%	539	40%	418	31%	126	9%	40	3%	12	1%	56	4%	1350
	2018	159	12%	532	39%	422	31%	130	10%	39	3%	12	1%	56	4%	1350
	2019	161	12%	541	40%	394	29%	152	11%	32	2%	14	1%	56	4%	1350
	2020	171	13%	523	39%	415	31%	143	11%	35	3%	15	1%	56	4%	1358
	2021	147	11%	547	41%	373	28%	146	11%	39	3%	18	1%	56	4%	1326
AVERAGE		159	12%	536	40%	404	30%	139	10%	37	3%	14	1%	56	4%	

The level of non-compliant activity is below 10% for 159 companies, 10-20% for 536 companies, and 20-30% for 404 companies. As such, 82% of the sample has a non-compliant activity level below 30%. In addition, 4% of the sample is completely non-compliant as they engage in non-permissible business activities. The non-compliant activity level of the remaining 14% of the sample, is between 41 and 99%. Looking at the percentage distribution of firms to seven groups, the difference between maximum and minimum values is below 3% for all seven groups which implies that the investment and financing policies of the companies is stable across the years. The percentage distribution of the companies within the seven groups is stable across the time period, as the difference between maximum and minimum values does not exceed 3% for all seven groups implying that companies follow consistent and stable investment and financing policies.

To check the validity of the classification, the sample is analyzed with FTSE criteria and the results obtained are compared with IDOCRIW classification. FTSE is selected on purpose, as in line with this study, it employs total assets in the denominator of all ratios. The threshold applied by FTSE is 33% for all ratios. The comparison is reported in Table 12.

Table 12.
Comparison

YEAR	IDOCRIW		FTSE		Equal Classification
	0%-33% non-compliant	34%-100% non-compliant	compliant	non-compliant	%
2017	1213	137	1137	213	93%
2018	1211	139	1102	248	90%
2019	1198	152	1126	224	94%
2020	1207	151	1127	231	93%
2021	1183	143	1095	231	92%

As Table 12 implies the level of compliance between FTSE criteria and the categorization used in this study is above 90% for all years in the analysis.

3.2. Degree of Shari'ah Compliance and Profitability

The second purpose of the analysis is to examine the relationship between corporate profitability and the degree of Shari'ah compliance. When both net income and average equity are negative, return on equity, which is computed by taking the ratio of the net income to average equity, shows a "false positive" result. As such, 77 observations with false positive ROE are omitted from the analysis. The descriptive statistics for profitability ratios, which are return on equity and return on assets and the control variable of size, are presented in Table 13.

Table 13.
Descriptive Statistics

GEOGRAPHY	YEAR		ROE	ROA	SIZESAL
BANGLADESH	2017	Mean	10.47%	8.80%	0.03%
		Min.	-53.33%	-14.49%	0.00%
		Max.	87.58%	58.84%	0.53%
		St. dev.	17.78%	10.07%	0.08%
	2018	Mean	10.19%	8.28%	0.03%
		Min.	-53.30%	-7.79%	0.00%
		Max.	106.89%	52.03%	0.53%
		St. dev.	17.58%	8.71%	0.08%
	2019	Mean	6.92%	7.82%	0.03%
		Min.	-184.42%	-39.98%	0.00%
		Max.	144.76%	57.36%	0.48%
		St. dev.	28.93%	10.30%	0.08%
	2020	Mean	4.38%	6.34%	0.03%
		Min.	-191.65%	-17.95%	0.00%
		Max.	196.76%	74.22%	0.54%
		St. dev.	35.75%	10.57%	0.07%

Table 13.
Descriptive Statistics (Continued)

GEOGRAPHY	YEAR		ROE	ROA	SIZESAL
	2021	Mean	6.10%	5.91%	0.03%
		Min.	-122.27%	-52.08%	0.00%
		Max.	205.58%	79.33%	0.50%
		St. dev.	32.22%	13.10%	0.07%
MALAYSIA	2017	Mean	4.43%	4.67%	0.09%
		Min.	-272.51%	-104.45%	0.00%
		Max.	284.51%	72.52%	2.40%
		St. dev.	25.58%	12.08%	0.24%
	2018	Mean	2.10%	3.08%	0.08%
		Min.	-113.02%	-79.50%	0.00%
		Max.	258.59%	58.25%	3.40%
		St. dev.	22.61%	10.90%	0.25%
	2019	Mean	-1.39%	1.99%	0.08%
		Min.	-138.77%	-252.13%	0.00%
		Max.	214.84%	55.05%	3.41%
		St. dev.	20.90%	14.75%	0.25%
	2020	Mean	-0.96%	0.42%	0.08%
		Min.	-327.86%	-210.44%	0.00%
		Max.	288.32%	48.13%	3.22%
		St. dev.	28.07%	16.04%	0.24%
	2021	Mean	3.76%	3.86%	0.08%
		Min.	-168.52%	-183.67%	0.00%
		Max.	187.54%	107.92%	3.38%
		St. dev.	23.34%	15.71%	0.26%
MIDDLE EAST	2017	Mean	0.96%	5.53%	0.41%
		Min.	-12.47%	-15.98%	0.00%
		Max.	58.98%	65.34%	6.42%
		St. dev.	86.26%	7.84%	0.94%
	2018	Mean	3.65%	4.20%	0.41%
		Min.	-167.92%	-18.61%	0.00%
		Max.	43.04%	37.03%	6.39%
		St. dev.	17.77%	7.14%	0.98%
	2019	Mean	2.43%	3.49%	0.42%
		Min.	-63.47%	-21.82%	0.00%
		Max.	38.27%	33.03%	7.65%
		St. dev.	12.79%	7.11%	1.03%
	2020	Mean	-1.25%	1.19%	0.42%
		Min.	-101.11%	-25.24%	0.00%
		Max.	44.42%	15.58%	8.82%
		St. dev.	16.66%	7.61%	1.09%
	2021	Mean	-30.86%	2.34%	0.44%
		Min.	-162.32%	-104.77%	0.00%
		Max.	43.74%	30.16%	10.81%
		St. dev.	22.98%	11.32%	1.19%

Table 13.
Descriptive Statistics (Continued)

GEOGRAPHY	YEAR		ROE	ROA	SIZESAL
PAKISTAN	2017	Mean	13.03%	10.82%	0.07%
		Min.	-541.83%	-13.21%	0.00%
		Max.	217.77%	93.70%	2.34%
		St. dev.	48.54%	12.84%	0.19%
	2018	Mean	14.94%	9.86%	0.06%
		Min.	-61.79%	-29.11%	0.00%
		Max.	165.58%	78.45%	2.12%
		St. dev.	23.56%	11.29%	0.18%
	2019	Mean	8.17%	8.75%	0.07%
		Min.	-154.77%	-48.32%	0.00%
		Max.	116.37%	66.91%	2.32%
		St. dev.	27.39%	11.62%	0.21%
	2020	Mean	13.94%	6.37%	0.07%
		Min.	-153.83%	-21.04%	0.00%
		Max.	201.37%	76.73%	2.30%
		St. dev.	24.52%	11.75%	0.21%
	2021	Mean	19.75%	10.96%	0.06%
		Min.	-106.20%	-88.96%	0.00%
		Max.	266.17%	78.29%	1.95%
		St. dev.	35.58%	13.86%	0.16%
TÜRKİYE	2017	Mean	8.92%	8.64%	0.08%
		Min.	-262.79%	-13.37%	0.00%
		Max.	70.16%	38.65%	1.65%
		St. dev.	31.65%	8.55%	0.20%
	2018	Mean	7.87%	10.25%	0.08%
		Min.	-133.62%	-24.54%	0.00%
		Max.	81.44%	51.00%	2.15%
		St. dev.	30.88%	10.84%	0.23%
	2019	Mean	-4.38%	8.58%	0.09%
		Min.	-157.25%	-30.69%	0.00%
		Max.	68.46%	48.86%	1.98%
		St. dev.	123.50%	10.20%	0.23%
	2020	Mean	9.54%	10.06%	0.08%
		Min.	-208.42%	-16.15%	0.00%
		Max.	213.56%	41.34%	1.18%
		St. dev.	39.63%	9.68%	0.19%
	2021	Mean	21.02%	13.46%	0.06%
		Min.	-349.10%	-24.90%	0.00%
		Max.	220.25%	69.00%	1.39%
		St. dev.	26.58%	13.16%	0.16%

Table 14 presents the results on the relation between degree of Shari'ah compliance and profitability as measured by ROE and ROA. As can be seen from Table 14, IDOCRIW is statistically significant at the 5% confidence level with a negative sign, and the size variable is statistically significant at the 1% confidence level with a positive sign when ROE is used as a measure of profitability. However, when ROA is used, the only statistically significant variable is size.

Table 14.
ROE & ROA

MODEL	**(1)**	**(2)**
VARIABLES	ROE	ROA
IDOCRIW	-0.1130**	-0.0106
	(0.0452)	(0.0157)
SIZESAL	4.3038***	1.9487***
	(1.1156)	(0.579)
Constant	0.1664***	0.1413***
	(0.0249)	(0.0097)
Observations	6,583	6,583
Number of no	1,359	1,359
Country	+	+
Ind	+	+
Covid	+	+

Robust standard errors in parentheses

The results are still robust after controlling the industry and country dummy variables

In all the specifications, the robust standard errors are reported by controlling heteroscedasticity

There is no autocorrelation in the residuals (Wooldridge test Prob > F = 0.0603)

*** p<0.01, ** p<0.05, * p<0.1

We estimate additional regressions by omitting at least one control variables and the results are presented in Table 15. As can be seen form Table 15 the results of all additional six equations conform with our earlier results. Thus, at least, the results that we obtain are robust to the sets of control variables included in the model. They imply that, while the convergence to Islamic principles has no effect on operating profitability, it has significant effect on total profitability. Furthermore, the level of non-compliant activities is statistically significant with a negative sign, implying that as the level of convergence increases, profitability also increases as measured with return on equity. Company size on the other hand, is a statistically significant predictor of profitability both at the operating and total profitability levels.

Table 15.
Robustness

MODEL	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	ROE	ROE	ROE	ROA	ROA	ROA
IDOCRIW	-0.1204***	-0.1300***	-0.1179***	-0.0150	-0.0232	-0.0102
	(0.0449)	(0.0450)	(0.0458)	(0.0158)	(0.0159)	(0.0158)
SIZESAL	4.3337***	4.0094***	4.3199***		1.6282***	1.9480***
	(1.0964)	(1.0904)	(1.1388)		(0.5362)	(0.5862)
Constant	0.0730***	0.1211***	0.1634***	0.0587***	0.0932***	0.1384***
	(0.0094)	(0.0203)	(0.0253)	(0.0040)	(0.0072)	(0.0097)
Observations	6,583	6,583	6,583	6,583	6,583	6,583
Number of no	1,359	1,359	1,359	1,359	1,359	1,359
Country		+	+		+	+
Ind			+			+
Covid						

Robust standard errors in parentheses

The results are still robust after controlling the industry and country dummy variables

In all the specifications, the robust standard errors are reported by controlling heteroscedasticity

There is no autocorrelation in the residuals

*** p<0.01, ** p<0.05, * p<0.1

According to the Dupont formulation, ROE has five components, which are interest burden, tax burden, operating profit margin, asset turnover rate, and equity multiplier. Among these five components, the operating profit margin and asset turnover rate are the two factors that determine ROA when measured with EBIT (Stowe et al., 2002). According to the panel regression analysis results, ROA measured with EBIT is not affected by the level of convergence to Shari'ah principles. The differences in ROE are attributable to the other two factors, namely, interest burden and equity multiplier. When analyzed together, the equity multiplier and interest burden factors imply that the high cost of debt service may offset the advantage of high leverage on profitability, which is the case for Islamic companies. An important determinant of convergence to Shari'ah principles is low debt levels, which in markets where the cost of debt (quoted either directly with interest rates or indirectly with higher prices applied to on account purchases) is high, affect profitability positively.

V. CONCLUSION

This study constructs a Shari'ah ranking methodology for listed companies that operate in Islamic markets and to search for the relationship between corporate profitability and the level of Shari'ah compliance. Many global financial institutions and Islamic organizations propose and apply various Shari'ah screening criteria for stocks and issuers. However, while the aim of the mentioned criteria is to determine whether investment in a particular stock is permissible according to Islamic rules or not, they do not give any information about the level of Shari'ah

convergence of the issuers. Besides, there are important differences between the Shari'ah screening techniques applied by different institutions.

Due to the important differences in the Shari'ah screening methodologies applied by various institutions, the first part of this study determines the variables to be used in the ranking by analyzing existing screening criteria applications. Variables are then weighted using the IDOCRIW technique. The developed ranking methodology is tested on a sample consisting of 1,362 companies that operate in 10 Islamic countries from five different geographic regions over a five-year period from 2017 to 2021. The findings reveal that on average, for 82% of the sample the non-convergence level is below 30%, and between 30 and 40% for 10%. Fifty-six companies (4% of the sample) are fully non-compliant as they engage in non-permissible business activities, whereas companies with non-compliance levels of 40-99% constitute only 4% of the sample.

The findings have some important practical implications. First, Shari'ah screening methodologies of various institutions give information to the investors whether the issuers comply with Shari'ah rules but do not give any information about the level of Shari'ah convergence. As a result, companies that are marginally or fully Shari'ah compliant are treated equally. With this proposed ranking and indexing methodology, more detailed data can be provided to investors with Islamic concerns. Second, with the existence of a ranking methodology, issuers that aim to attract Islamic investors will need to formulate their business strategies more accurately. Therefore, by providing more transparency, the ranking methodology is expected to increase competition in İslamic market.

In the second part of the study, a set of panel models are estimated to identify the relationship between Shari'ah convergence level and corporate profitability. The analysis reveals that Shari'ah compliance level is one of the determinants of return on equity, whereas it has no effect on return on assets measured as the ratio of EBIT to total assets. The results imply that the convergence to Islamic principles has no effect on operating profitability, but it has a significant effect on total profitability. Furthermore, the level of non-compliant activities is statistically significant with a negative sign, implying that as the level of convergence to Shari'ah principles increases, profitability as measured by return on equity increases as well.

ROA consists of two factors, operating profit margin and asset turnover rate. The results imply that the level of convergence to Shari'ah principles does not have any significant effect on both factors, and as such has no impact on profitability at operating level. ROE on the other hand consists of four factors which are ROA, interest burden, tax burden, and equity multiplier. As Shari'ah convergence level has no impact on ROA, its impact on ROE is attributable to two factors, namely interest burden and equity multiplier. Equity multiplier implies that the debt level has a positive effect on profitability. This positive impact however is reversed if the decrease in interest burden factor offsets the increase in the equity multiplier factor. The results of the study imply that in Islamic markets, the high cost of debt service offsets the advantage of leverage on profitability. An important determinant of convergence to Shari'ah principles is low debt levels, which in markets where the cost of debt (quoted either directly with interest rates or indirectly with higher prices applied to on account purchases) is high, affecting the profitability positively.

The study has important implications for practitioners and policy makers. The existing Shari-ah compliance applications determine whether the issuers are Shari-ah compliant or not and do not give any information about the level of compliance. The methodology developed to assess Shari-ah convergence level in this study is supposed to offer a new perspective to both Islamic investors and Islamic fund managers in designing their investment strategies. The findings about the relationship between Shari'ah convergence and profitability imply that in Islamic markets equity financing contributes positively to corporate profitability; as such companies are better off if they rely on capital markets for financing and consequently policy makers contribute to the performance of companies if they promote capital markets.

An important contribution of the present study is that to our knowledge, the relationship between Shari'ah convergence level and corporate profitability has not been analyzed before; as such it fills an important gap in the existing literature. The dataset consisting of 1,362 companies from different geographical regions is another important strength of the present paper. The dataset is available to all researchers that conduct or aim to conduct field studies in the related subject.

Due to data restrictions, the relationship between Shari'ah convergence and performance is analyzed only along the lines of profitability which is an important limitation of the study. The relationship between Shari'ah convergence level and other corporate performance measures with comparisons to other markets is an important research topic for future studies. To check the validity of the calculated Shari'ah screening variable weights with different multi-criteria decision-making techniques is another important research topic for future studies.

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