DO SHARIAH STOCK MARKET INDICES PERFORM BETTER THAN NON-SHARIAH STOCK MARKET INDICES? A CASE STUDY OF BANGLADESH AND PAKISTAN STOCK MARKETS

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Abstract

This paper is based on the empirical evidence of comparative study of Shariah and non-Shariah stock market indices of Bangladesh and Pakistan stock exchanges. The primary objective of the research is to investigate which index performs better in terms of risk and returns trade off. For Bangladesh stock market, DSES and DSEX represent Shariah and non-Shariah stock market indices respectively. Similarly, for Pakistan stock market, KMI-30 and KSE-30 are the symbol of Shariah and non-Shariah indices. Panel data analysis is used by obtaining secondary source of data from the period January, 2015 to June, 2021 with weekly frequency for both of the markets. The POLS, REM and FEM models are applied. Findings have proved that non-Shariah index performs better than Shariah index in DSE, whereas as per PSX data, Shariah index outperforms than non-Shariah index. Besides, results proved that most of the investors move from unrestricted market to restricted market in PSX, but,

however, it is not witnessed in DSE. The implication of this research assists investors to make their rational decisions and make portfolios in order to get maximum returns with least amount of risk.

***Keywords**: Conventional index, Market capitalization, Returns, Uncertainty, Volatility.*

1. Introduction

The financial performance of a Shariah stock market index compared to a non-Shariah stock market index is a key question not only for researchers and financial analysts, but also for investors in the last two decades. Some researchers believe that Shariah indices perform better (Eka, 2020; Saiti, Bacha & Masih, 2014); while others advocate non-Shariah indices (Rana & Akhter, 2015). Having said that, investors have their own cognitive views when choosing stocks that can actually give the superficial returns from their chosen stock market investments, creating a portfolio and holding those securities with the least level of risk (Bakar & Ali, 2014). Shariah compliance means strict adherence to the Shariah code of conduct, or Islamic laws and practices for investors to invest in the stock market; but for those who simply choose non-Sharia index options, there are no restrictions other than a country's rulebook and instructions from statutory regulators (Abdullah, Baharuddin, Shamsuddin, Mahmoud & Shahuddin, 2011). Similarly, Guyot (2011) examines Shariah and non-Shariah indices and concludes that Shariah investors have limited options compared to non-Shariah investors.

Various arguments have been made for the performance of the Shariah and non-Shariah indices, but opinions are widely divided on the two dichotomies of the indices (Rejeb and Arfaoui, 2017). Conversely, there is currently no consensus that, two different indices are two sides of the same picture. Therefore, the success of the stock market depends on the performance of the index and the degree to which investors make rational decisions about their portfolios. However, the roles of the two different schools of thought, Shariah and non-Shariah indices, are quite different and have been confirmed by a large number of researchers and sholars in their research articles.

The Shariah stock market index is based on the principles of the Quran and Hadith. Therefore, transactions in goods and services prohibited by Sharia law are not considered. Some of the prohibited businesses, such as, alcoholism, pornography, interest-based financing (riba), ammunition, nightclubs, gambling (maysir), insecurity (gharar), tobacco businesses, insurance companies, etc. are not permissiable as per Shariah code of conduct (Al-Khazali, Leduc & Alsayed, 2016; Merdad, Hassan & Alhenawi, 2010; Sukmana & Kolid, 2012; Tahir & Ibrahim, 2020). Likewise, failure to delve into short selling, margin financing, futures, T2 and T3 trading, day

trading, etc. limits faith-based investors (Shaikh, Shafiai, Ismail & Ismail, 2016). In addition, Sharia law also prohibits commercial transactions that omit the physical delivery function in goods and services, and wrongful transactions that violate the relationship between supply and demand.

There is an authenticated argument for Shariah-compliant firms which have to abide by Shariah practices including low cash and cash equivalent balance, low accounts receivable balance and low leverage that adversely affect the financial performance against their counterparts. Likewise, Shariah Advisory Board (SAB) requires to scrutinize every company in terms of nature of the business. In addition, SAB considers those companies which simply follow the Shariah code of conduct and Islamic practices. Then, a specific Shariah screening company is to be a part of the Shariah index; but non-Shariah compliant companies do not have any range bound of financial characteristics; rather they simply abide by the rules and regulations of regulatory bodies that promulgate on that country.

Non-Shariah index is also called the conventional index which does not require any Shariah binding for the investors. The conventional index is almost available in every stock market and it has its own pros and cons. At large, the investors freely trade for any stock market in any country without any Shariah prohibition. They do short selling, future contracts, options, margin financing, interest-bearing securities without knowing a Shariah based lawful or unlawful line of discrimination. Non-Shariah index and its experts believe that the stock market follows the random walk so investors make their portfolios as per the situation of the market. In short, tycoons of the stock markets have the consensus for investors that they, majority of the investors, trade on stock market on sentimental basis rather than fundamental basis.

Emerging stock markets particularly for South Asian countries including Bangladesh and Pakistan are so much volatile; and the market is so much unpredictable and generates yields by means of heavy gains and losses. In addition, the elements of risk and returns in the emerging South Asian stock market are comparatively greater than the developed stock markets that ultimately affect the investors' behavior. Likewise, the asymmetric information is prevailed on the South Asian emerging stock market countries, and the investors are broadly categorized into two ways, i.e., informed and uninformed investors. Hence, due to asymmetric information may cause losses for both local and international investors for the South Asian emerging stock market countries since the volatility is out of control like 1996 stock market scam in Dhaka Stock Exchange (DSE).

Risk and returns are an integral part for each stock market and the investors are very keen to know mean returns and variation of returns. In addition, uncertainty in stock market is a major concern for the investors as the risk is directly proportional to volatility which directly impacts on stock returns. Investors try to safeguard their portfolios against risky shares and maintain the strategy of low risk and high returns. Apart from this, Shariah index, however, covers very low percentage of risk than conventional index. Generally, the return rate is comparatively low for Shariah index than non-Shariah index. Nevertheless, investors are comparatively more secured in Shariah index than its benchmarked index as per the literature support; and it has been witnessed during the Asian financial crisis as well. It is, therefore, key characteristic of Shariah stock index for having stability and resilient to shocks than its counterparts from the past historical data.

The aim of this study is based on empirical findings for Bangladesh and Pakistan stock markets where the panel data analysis is applied. This data analysis contains cross sectional data for Bangladesh and Pakistan including the time series data as a time factor. The results are regressed, since, it has the feature of quantitative and qualitative aspect of the data. Above all, the frequency of the data is weekly and this study is known to be balanced panel data. The selected countries for this study are Bangladesh and Pakistan which are briefly stated under the following heading of index selection criteria:

1.1. Index Selection Criteria for Bangladesh

1.1.1. DSEX Shariah Index (DSES)

DSES is a Shariah based index launched in Bangladesh on 20th January 2014, and it is the part of DSEX which is the parental or broad index of Dhaka Stock Exchange (DSE). The above DSES is, indeed, a subset of broad-based index and it requires Shariah screening process, and has an index committee to maintain Shariah-compliant practices. Initially, the service is provided by S&P Dow Jones Indices. DSES is considered to be included for Bangladesh capital market, as it is the only index representation for Shariah based in the country.

1.1.2. Dhaka Stock Exchange Broad Index (DSEX)

DSEX was launched on 28th January 2013. DSEX is the benchmark index of DSE because it displays the listed companies share price movement; and represents 97% of the market capitalization. According to a monthly report of capital market development in Bangladesh (June-

2021) that market capitalization of DSE is 5142.82 billion in Bangladesh Taka (BDT). Presently, DSE has 22 sectors that cover 609 listed companies.

1.1.3. Index Selection Criteria for Pakistan

1.1.3.1. KMI-30 Index

KSE-Meezan Index (KMI)-30 was launched in September 2008 with the mutual collaboration of Karachi Stock Exchange (KSE) and Al-Meezan investment fund. This index selects 30 companies that are screened out from Shariah standards criteria. This index is based on free float market capitalization and the upgrading of the index, in terms of addition or deletion of the company, takes place on a semi-annual basis.

1.1.3.2. KSE-30 Index

KSE-30 Index began its commercial operations on 1st September 2006. This is also a free float market capitalization index and considers the impact of cash dividend and bonus shares on its adjustment of index. Furthermore, right shares issuance to existing shareholders are also taken into account under this index which ultimately leads to the true scenario of KSE-30 index. This index is based on 30 companies which are selected for six months; and the selected company continues to be for the proceeding period, if it does not violate the assumptions of regulatory bodies and benchmark criteria.

1.2. Problem Statement

Emerging stock market embeds the problem of sustainability and credibility as the risk and returns are highly correlated. Related to South Asian stock markets which are highly volatiles that eventually impact the investors and their returns on equity (Bekaert & Harvey, 2003). Generally, the foreign investors not only lose the confidence from the stock markets due to high movement of the index but local investors also face the same problem for abrupt behavior of the market. It is pre-supposition that market follows sentiment analysis but not on fundamental grounds and, hence, there is no proper check and balance to protect the investors' money which ultimately shatter confidence of the investors in the long-term in the South Asian countries, such as, Bangladesh and Pakistan stock markets. Emerging stock market data generally has the tendency of non-stationarity over time and creates biasness of the data. This situation leads to inefficient emerging stock market

where unexpected changes in variances are observed as a common factor within short span of time (Lingaraja, Selvam & Vasanth, 2014).

1.3. Purpose of the Study

The purpose of this study is to investigate the financial performance of Shariah and non-Shariah stock market indices of Bangladesh and Pakistan for the last six and half years. Moreover, stock market index of every country plays a pivotal role for local and international investors, financial analysts and market regulators. However, the established theories describe that stock markets follow Efficient Market Hypothesis (EMH), and there is no autocorrelation among the data because the market moves upward or downward direction in an intraday session. On the contrary, emerging stock market has the tendency of abnormality of the data and above all risk-return trade-off is a common phenomenon in Bangladesh and Pakistan stock markets. When investors make their portfolios in the emerging stock markets; they are well aware about abrupt volatility in the stock market indices that should ultimately lead to high risk by means of unexpected gains and losses.

For considering the perspective of capital investments, this study which empirically tests stock markets of Shariah indices with non-Shariah indices for Bangladesh and Pakistan stock exchanges in terms of their risk and returns. Furthermore, researcher investigates that whether investors are more secured in Shariah indices than its counterparts or the situation is vice versa. Apart from this, the aim of this study is to investigate whether Shariah indices change the sentiment of faith investors to move from non-Shariah indices to Shariah indices and invest in *Halal* (permissible) stocks and get the lawful returns as per the Islamic Shariah practice and Islamic laws.

1.4. Limitation of the Study

This study has some limitations regarding two selected Asian emerging stock markets that simply follow the Shariah and non-Shariah index as a standalone index. The countries which are opted for this study are Bangladesh and Pakistan. This study deals with a comparative study for the financial performance between Shariah and non-Shariah stock market indices for Bangladesh and Pakistan. The researcher cracks to explore the risks and returns on Shariah and non-Shariah indices on the stated countries with the help of panel data analysis. Lastly, the study examines results and findings of the secondary data; and collection of data starts from January 01, 2015 to June 30, 2021 covers the period of six and half years with weekly frequency.

2. Literature Review

Literature review is the most important element in research work since it indicates how much work has been done by the existing researchers for the specified area. It also creates new rooms and avenues for research and assists in research gap for the potential researchers about their research work in the foreseeable future.

The focus of this study is an emerging Sout Asian stock markets and restricts Bangladesh and Pakistan stock exchanges, whereby, Shariah and non-Shariah indices are to be taken into account as a standalone index, i.e., country's own index. Interestingly, literature review describes that Shariah practice companies have limited opportunities for ethical investors by means of portfolio diversification (Guyot, 2011). On the contrary, researchers, who are in favor of non-Shariah practices, have written several articles and given the high weightage to unscreened conventional indices; because of risk and returns and even no benchmark for ethical consideration (Rana & Akhter 2015). This section presents a comprehensive overview of the literature, and it is elaborated into different segments which are stated here as under:

Shariah based investments follow the concept of assets based and assets driven strategy whilst non-Shariah based investments simply apply the concept of interest based and debt driven strategy. Moreover, Shariah and non-Shariah stocks have some limitations and constraint factors that apply to both of these stocks. Shariah stock means to abide by the Islamic laws and practices whereas non-Shariah stock acts upon one country's laws and regulatory bodies by laws. The main difference can be examined under the following points:

a. **Leverage:** Shariah-compliant stock companies should maintain low leverage (Farooq, Omer & Alahkam, 2016). There is a faith that a high leverage company ultimately leads to liquidation because of bankruptcy (Madyan, Salim & Muslich Anshori, 2013); and the company has to pay much more on borrowing cost. The financial institutions lend the money on fixed cost i.e., interest (Riba) as per the conventional approach. However, the practice of Riba is strictly prohibited as per the Shariah laws (Dewi, Sulaiman & Ferdian, 2010; Saba, Ariff & Rasid, 2020). On the contrary, non-Shariah stock company's managers believe that a high leverage company does not face the agency problem and the company expands its business without any liquidity issues as per the economic theory

(Fosu, Danso, Ahmad & Coffie 2016 and Jensen, 1986). There is a valid justification about Shariah index that has low leverage which ultimately leads to underperform than non-Shariah compliant index. Hence, Shariah-Compliant companies are low leverage that eventually leads to agency problem than its counterparts. On the contrary, non-Shariah companies are relatively having higher leverage includes several financial instruments like coupon bonds, financial derivatives, interest bearing borrowings from commercial banks and so on (Saiti et al., 2014).

b. **Cash and Accounts Receivables:** Shariah stock firms prefer less amount of cash and accounts receivable balance and it should be 1/3 of total assets. If Shariah stock companies exceed this threshold limit, then it will be out of Shariah selection criteria (Zaidi, Shah, Ashraf, Ghauri & Hassan, 2015). When cash and accounts receivables availability are so much limited then the Shariah stock companies have limited opportunities to grow. On the contrary, higher amount of accounts receivable builds the relations with customers in the long run.

Likewise, large cash and cash equivalent companies are having surplus reserves and it is a positive sign to invest in capital expenditures; and Research and Development (R&D) projects with greater chance of growth in assets (Harford, Mikkelson & Partch, 2003). On the other hand, non-Shariah stock companies would rather prefer to sell the goods on a credit basis which enhances not only their sales revenue but it ultimately has trickles down effect of profitability of the non-Shariah stock.

c. **Trading of Shariah Share Price on Net Liquid Assets:** Shariah stock trading price value should be greater than the net liquid assets, i.e., (Total Assets- Total Liabilities- Non-Liquid Assets) divided by the total number of outstanding shares, for instance, as per the example of KMI-30 index (Saiti et al., 2014; Shaikh, 2010). However, there is no limiting factor for non-Shariah practice firms and no legal binding for the trading share price over the stock market.

d. **Threshold of Business Activity:** Shariah stock company does not deal in any product or service which is against the doctrine of Islamic practices (Asutay, Wang & Avdukic, 2021); but no criteria are prescribed for non-Shariah compliant stock companies. Similarly, Shariah stock restricts any business which earns 5 percent or more of its income

from that source of business is considered to be Haram (unlawful as per Islamic practices), such as, tobacco, conventional financial institutions, liquor, night clubs, pork products, etc. Non-Shariah stock companies simply follow the statutory laws being implemented by the regulatory bodies of that country that should be undoubtedly unopposed to the public policies and interests.

e. **Traditional Market Microstructure Theory:** This theory deals with informed traders and un-informed traders where the asymmetric information is there for un-informed investors. As per the Shariah practice, it clearly suggests that every trader must have access on that particular stock information and it requires full disclosure about the given stock; and the manipulation and fraudulent activities are strictly prohibited, i.e., *tadlis.* However, asymmetric information is witnessed in non-Shariah stock market where informed traders are exploiting the inside information, and un-informed traders are easily trapped just because of lacking information. Hence, non-Shariah stock traders can easily generate abnormal profit for having secret information (Madyan et al., 2013).

Likewise, Shariah based screening is the most cardinal element for selection of Shariah base company for Shariah index purposes. According to Hassan and Girard (2011) described that faith conscious investment screening began by Dow Jones Islamic stock market index in 1995. Similarly, Haider, Ashraf and Ramzan (2012) mentioned that Shariah based screening means considering those companies that do meet the standard criteria as per the Islamic code of conduct and Shariah laws. Likewise, Ashraf (2016) expressed Shariah based screening requires several steps to pass on for particular security that consists of the nature of business, revenue source, financial position and dividend payment purification. In addition, FTSE Shariah screening is done by Yasaar Limited which is a leading consultancy for having religious scholars who approve the securities for FTSE under the Shariah index. Moreover, there are several standalone (national) indices which have their own Shariah screening criteria like FTSE Bursa Malaysia EMAS Shariah Index, Jakarta Islamic Index, Nifty 50 Shariah Index, DSEX Shariah Index, KSE-Meezan index (KMI)-30 and many more.

Studies are very limited in numbers for panel data particularly for Shariah and non-Shariah stock market indices especially for selected South Asian emerging market countries. Most of the researchers have the issue of access to stock market data when the stand-alone stock market indices are as concerned. Another study was taken place in Pakistan Stock Exchange (PSX), formerly known as Karachi Stock Exchange (KSE), where the researchers applied the panel data analysis

and investigated through POLS, FEM and REM. Data collection period for secondary source was 2007-2017 where 115 non-financial companies had been selected. The results were empirically tested through different financial ratios including leverage ratio, debt ratio, market to book ratio and profitability ratio. The results proved that fundamental analysis was the core predictors for future stock returns on PSX (Muhammad & Ali, 2018).

Rehman et al. (2018) investigated Asian stock markets and found that random walk theory exists in South Asian countries, named as India, Bangladesh and Pakistan. They have applied different econometric models including runs test and State Space Model (SSM) in order to capture random walk model assumption. The results were evaluated on S&P BSE-500 index, CSE-All Share Index and KSE-100 index and found absence of random walk model for the above stated countries. Hence, it completely missed out the assumption of EMH of the stock markets for the stated South Asian countries.

Irfan, Saleem and Irfan (2011) studied the performance of KSE with the help of non-parametric test approach. This study dealt with the empirical results and findings; and covered the period from 01-01-1999 to 31-08-2009 for the weekly opening and closing index value of KSE-100. They used different tests, such as, Anderson Darling test, Kolmogorov-Smirnov test, Philips Perron test, Runs test and Ryan-Joiner test for this market. Their results showed that weak form efficiency did not prevail in KSE-100 index as the data showed the biasness, and no randomness was witnessed while applying the above tests. Thus, the EMH-weak form efficiency has not been observed for the above stated time period.

Zaman (2019) studied on Bangladesh stock markets of Chittagong and Dhaka. He investigated weak form efficiency validity for this market. For this purpose, he opted to have a secondary data from the period of 27th January 2013 to 31st August 2017. Parametric and non-parametric tests have been applied for this study. The empirical results have shown that Chittagong stock exchange and Dhaka Stock exchange were not witnessed for weak form efficiency for the above stated period. Pertaining to panel data analysis, Saba et el. (2020) studied on Malaysian stock exchange where they applied the panel data analysis for which 634 firms have been opted as Shariah compliant firms and 307 non-Shariah compliant firms. Initially, the panel data is unbalanced and collection of secondary data starts from 2000 to 2013. Lastly, the findings prove that Shariah compliance firms perform better and adds the entity's value within the ambit of Shariah compliance rules and regulations.

3- Data and Methodology

The methodology of this study is to investigate the comparative performance of Shariah and non-Shariah stock markets indices of Bangladesh and Pakistan.

3.1 Data Collection Period

The constraint factor is lying with the data set of DSES which began its commercial operation from January 20, 2014 (Aarif, Rafiq & Wahid, 2020). The following table presents the selection criteria of DSE and PSX stock market indices on weekly frequency with respect to data collection time frame.

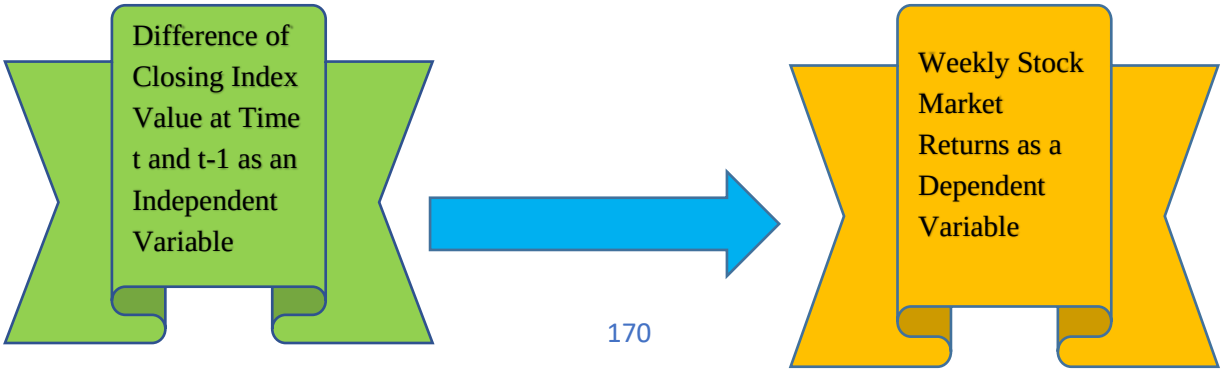
Table 01: Shariah and non-Shariah indices

Index Family	Shariah Indices	Non-Shariah Indices	Data From	Data Up To
DSE	DSEX Shariah Index (DSES)	Dhaka Stock Exchange Broad Index (DSEX)	01/01/15	06/30/2021
PSX	KSE-Meezan Index (KMI)-30	KSE-30 Index	01/01/15	06/30/2021

Source: Author's work

3.2 Selection of Variables

The selection of variables is closing index value for each country, and the flow of frequency for the stock market data is weekly. Primarily, the emerging South Asian stock markets for this study are Bangladesh and Pakistan, where Shariah index and non-Shariah index are adopted for these countries as a standalone index. However, dependent and independent variable are stated by the following pictorial presentation.



3.3 Descriptive Statistics

This test describes the general sample statistic summary report for panel series data for Shariah and non-Shariah indices from the period of July 01, 2015 to June 30, 2021. In addition to that, descriptive statistics tests will cover up from measure of central tendency to measure of dispersion. However, it will depict the overall performance of Shariah and non-Shariah indices for Bangladesh and Pakistan stock exchanges.

3.4 Variable Returns Selection

For this study, weekly returns are calculated by the difference of closing index value of the current week (at time period t) and the closing index value for prior week (at time period t-1). However, dividend adjustment is not to be considered as dividend declaration represents about the returns announced by the specific company whereas the benchmark index, stock market index, maintains those companies which follow certain criteria to be within the index; if it does not rely on those stated standards then that company is out of that index. Therefore, returns are calculated for the emerging selected South Asian stock markets countries by the following formula for Shariah and non-Shariah indices:

$$\boldsymbol{R_{i,t=l_n}\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \approx l_n\,(P_{i,t}) - l_n\,(P_{i,t-1})} \qquad (3.4)$$

Where

$\boldsymbol{R_{i,t}}$ = It is the weekly return for Bangladesh and Pakistan stock markets indices for Shariah and non-Shariah compliance at time period t.

$\boldsymbol{l_n}$ = Natural log

$\boldsymbol{P_{i,t-1}}$ = It shows weekly closing index value of Bangladesh and Pakistan stock market indices before a week of time period t.

3.5 Panel Data

This study covers panel data for Shariah and non-Shariah stock market indices for Bangladesh and Pakistan stock exchanges. Gujarati (2012) expressed that panel data may better judge the empirical analysis results than time series data. With regard to this research, observations contain 6.5 years data approximately with weekly frequency of two countries, closing index value on weekly basis, should have stock market indices as a standalone benchmark being considered to be a part and parcel of this research study.

3.5.1 Linear Model for Panel Data

The formulation of this panel data set contains Shariah and non-Shariah stock market indices for Bangladesh and Pakistan at different time intervals. Equation of panel linear model data can simply be formulated as under:

$$\text{Shariah}_{i,t} = \alpha + \beta_1 \text{Non\_Shariah}_{i,t} + \varepsilon_{i,t} \quad (3.5.1)$$

Where

$Shariah_{i,t}$ = It is the current weekly closing index value of Bangladesh and Pakistan stock market indices at time t for Shariah index.

α = Unknown intercept for each Shariah and non-Shariah index entity

β_1 = Slope coefficient

$Non\_Shariah_{i,t}$ = It is the current weekly closing index value of Bangladesh and Pakistan stock market indices at time period t for non-Shariah index.

$\varepsilon_{i,t}$ = It is the random error term on the closing index value or stochastic shock.

It is presumed that the stock market follows random walk theory and EMH assumption, so current weekly index value of Shariah index is regressed on non-Shariah index at the same period of time t. Generally, simple panel linear model can be further elaborated into three different ways, such as, (a) Pooled OLS model; (b) random effects model and (c) fixed effect model.

3.5.1.1 Pooled OLS Model

This model presumes that all entities (Shariah and non-Shariah stock market indices) follow the same regression model having the same intercept or constant and the same slope intercept for each entity. Conversely, Pooled Ordinary Least Square (POLS) simply follows the rule of homoscedasticity as a standard, and very thin margin line for heteroscedasticity. According to Muhammad & Ali (2018) raised their consensus for this model as the intercept remains constant for cross-sectional data over longitudinal time series information. Furthermore, observations are not cross correlated with one another over time. The following equation is the model of POLS for this study:

$$\text{Shariah}_{i,t} = \alpha + \beta_1 \text{Non\_Shariah}_{i,t} + \varepsilon_{i,t} \quad (3.5.1.1)$$

Where

α = Constant intercept remains the same for each entity.

β_1= Slope intercept is almost the same for each entity.

3.5.1.2 Random Effect Model

This model is an alternative method for fixed effect model where it pre-supposes the selection of some samples out of total population. Error term is divided into two parts, i.e., random error and the error term due to not considering the other entities of the same country which may show the trend and biasness of the data. Hence, Random Effect Model (REM) equation can be described under the following model:

$$\text{Shariah}_{i,t} = \alpha + \beta_1 \text{Non\_Shariah}_{i,t} + \varepsilon_{i,t} \quad (3.5.1.2.1)$$

Where

α = Intercept shows the mean intercept of Bangladesh and Pakistan

$\varepsilon_{i,t}$ = Random error plus error term due to not considering other entities

Again, error term is divided into two segments such as:

$$\varepsilon_{i,t} = \delta_{i,t} + \mu_{i,t} \quad (3.5.1.2.2)$$

$\delta_{i,t}$= Showing the individual intercept with the help of alpha

$\mu_{i,t}$= Error term showing due to randomness

After considering the above error terms, the equation looks like as follows:

$$\text{Shariah}_{i,t} = \alpha + \beta_1 \text{Non\_Shariah}_{i,t} + \boldsymbol{\delta_{i,t}} + \mu_{\boldsymbol{i,t}} \quad (3.5.1.2.3)$$

3.5.1.3 Hausman Test

This empirical test is exclusively used for selecting either a FEM or REM. Under panel data information, FEM is consistent even correlation among the estimators is due to individual effect. However, REM is suitable where the individual effects are inconsistent and results are insignificant. Hausman (1978) is the benchmark for selecting either a FEM or REM. The hypothesis of Hausman test is as follows:

H_O= REM is suitable for panel data if p-value is >0.05

H_A = FEM is suitable for panel data if p-value is <0.05

3.5.1.4 Fixed Effect Model

This model is the third approach for panel data, and it is used exclusively when the results are not up to the marks under POLS. However, this research restricts to Least Square Dummy Variable (LSDM) method for Fixed Effect Model (FEM). Unlike POLS, it is assumed that constant intercept varies for each entity; and there may be a chance that slope intercept also varies for each entity. In addition, FEM also assumes that error term does not have a correlation with a constant term but if the relationship is found between error term and a constant term then random effect model is to be selected for considering this issue. Moreover, this model has the feature of containing large number of dummy variables and N degrees of freedom. The problem of large number of dummy variables can be offset by using mean deviation from mean and try to remove dummy variables for so many parameters. Hence, equation of FEM can simply be stated here as under:

$$\text{Shariah}_{i,t} = \alpha + \beta_1 \text{Non\_Shariah}_{i,t} + \text{DV}_{\text{Bangladesh}} + \varepsilon_{i,t} \quad (3.5.1.4)$$

Where

$\text{DV}_{\text{Bangladesh}}$ = Dummy variable for Bangladesh

4. Results and Interpretation

The results have been drawn while applying the several tests. As this study checks the financial performance of Shariah and non-Shariah stock market indices of Bangladesh and Pakistan. The subheadings for this purpose have been drawn as under:

4.1 Summary Statistics of Weekly Closing Indices Returns of Bangladesh and Pakistan Stock Markets

Descriptive statistics indicate about the overall picture of measure of central tendency and measure of dispersion where it shows the average return (mean) and overall risk (standard deviation) for the selected Shariah and non-Shariah stock market indices for Bangladesh and Pakistan. Hence, this study helps investors for making rational decisions on the basis of risk-return trade off. Empirical findings are stated in table 02.

Table 02: Returns for individual standalone index on weekly frequency

Statistic Results	DSES Returns	DSEX Returns	KMI-30 Returns	KSE-30 Returns
Mean	0.000306	0.00062	0.001186	-0.000306
Median	0	0	0.001587	0.0001
Maximum	0.096442	0.084094	0.143974	0.128867

Minimum	-0.064974	-0.06053	-0.163812	-0.168199
Std. Dev.	0.017242	0.01789	0.030839	0.029699
Skewness	0.510572	0.314223	-0.240612	-0.426944
Kurtosis	6.805189	5.384021	6.803842	7.082228
Jarque-Bera	218.6043	85.60555	207.0362	244.9614
Probability	0.0000	0.0000	0.0000	0.0000
Sum	0.103369	0.209442	0.401006	-0.103302
Sum Sq. Dev.	0.100181	0.107856	0.320506	0.297254
Observations	338	338	338	338

Source: *Author's Estimation*

Table 02 is representation of the weekly returns where the mean returns of DSES is 0.0306% whereas DSEX, symbol of non-Shariah returns, generates 0.0620% which is quite better than DSES. Similarly, volatility of DSES is comparatively low, i.e., 1.72% as per the source of data information whilst DSEX volatility is high as being noticed in the table- 1.79%; so DSEX index intimates the philosophy of higher risk leads to higher returns. With regard to PSX market, mean returns of KMI-30 shows the positive figure, i.e., 0.1186% as compared to KSE-30 index which has the negative returns on the selected time, and the figure is quoted as -0.0306%. Similarly, volatility for KMI-30 index is comparatively greater than KSE-30 index. KMI-30 index volatility is witnessed by 3.08% from the mean data but for KSE-30 index, the volatility is just 2.97% which is more consistent with the normal data than its rival counterpart. Hence, it shows the relationship of risk and returns for PSX market where higher returns require the higher risk, for instance, KMI-30 index; and lower returns yields low risk like KSE-30 index.

4.2 POLS Outcomes

Pooled Ordinary Least Square (POLS) is also known as Panel least Square technique. This model is used when it is assumed that constant (intercept) and slope intercept is the same for Bangladesh and Pakistan. POLS model also presumes that market size (capitalization) and listed firms in the stock markets are almost the same. The outcome is elaborated in table 03.

Table 03: **POLS Outcomes (Shariah as dependent Variable)**

Independent Variables	**Coefficient**	**Standard Error**	**t-Statistics**	**Probability Value**	**R-Squared value**	**F-Statistics**
Non_ Shariah	4.154763	0.03315	125.3326	0.0000	0.958741	15708.26

Source: *Author's Estimation*

H_O= POLS is suitable under panel data analysis.

H_A = POLS is not suitable under panel data analysis.

Table 03 indicates the outcomes of POLS where the p-value is significant and presents the value of less than 0.05; so, whether POLS model is feasible or not for the above estimation output being checked through Lagrange Multiplier (LM) test and the benchmark for this study is Bruesch-Pagan (BP) test. Though, R^2 value explains the predicted value at a very high rate and it can be witnessed by F-statistics results which intimates the overall fitness of the model. Furthermore, the Shariah index and non-Shariah index are correlated with one another in Bangladesh and Pakistan stock exchanges. The results indicate that these countries do not follow the random walk model and EMH assumption, and the investors can predict the future outcomes on the basis of previous historical data.

4.2.1 Breusch-Pagan Test Results

Breusch-Pagan Lagrange Multiplier test detects whether POLS method is suitable or go for alternate, i.e., REM. In addition to that, Breusch-Pagan (BP) test result determines whether there is significant difference between both of the entities (Bangladesh and Pakistan) in terms of their market structure or vice versa. However, if the satisfactory result does not generate, then it is a symbol for moving towards either REM or FEM as the case may be. Lastly, BP test result is shown in table 04.

Table 04: ***Bruesch-Pagan Test***

Breusch-Pagan Test Results				
Dependent Variable	**Independent Variables**	**Cross-section One-sided**	**Period One-sided**	**Both**
		112.3529	7.0326	119.3856
Shariah	Non_ Shariah	0.0000	(0.0080)	0.0000

Source: *Author's Estimation*

H_O= POLS is suitable under Bruesch-Pagan test for panel data analysis if the variance between entities are zero.

H_A= POLS is not suitable under Bruesch-Pagan test for panel data analysis if the variance between entities are not zero.

POLS assumes that the intercept and slope coefficients of each entity is almost the same for each country. Table 04 presents the picture of Buresch-Pagan test where all the assumptions of regarding dependent and independent variable(s) meet the criteria of POLS assumption except Shariah and non-Shariah index in the above row which shows the p-value is <0.05. In this case, REM is to be applied to see the results and then confirm from the Hausman test results.

4.3 Random Effect Model

Random Effect Model (REM) is suitable when the intercept of Bangladesh and Pakistan are not the same and the variation in intercept occurs due to randomness of the data; and uncorrelated with exogenous variable (Table-5). It is also believed that REM is suitable when different intercepts for cross sectional entities may influence the endogenous variable.

Table 05: Method: Panel EGLS (Random Effect Model)

Method: Panel EGLS						
Random Effect Model	**Dependent Variable**	**Independent Variables**	**Coefficient**	**Probability Value**	**R-Squared**	**F-statistic**
Cross Section	Shariah	Non_ Shariah	4.154763	0.0000	0.958741	15708.26
Period	Shariah	Non_ Shariah	4.154763	0.0000	0.958741	15708.26

Source: *Author's Estimation*

Table 05 has shown the results of REM-cross section effects and periods effects with the help of econometric model. However, one unit change in non-Shariah index will bring about the change of Shariah index by 4.154763 for both cross section and period effects, and have a positive effect on a dependent variable. In addition, the outcomes of p-value are significant for the above stated variables including R^2 and F-statistics for both Shariah and non-Shariah indices for both cross section and time period random effects. Lastly, the validity of the results can be empirically tested and verified through Hausman test.

4.3.1 Hausman Test

The Hausman Test is used either to accept REM or FEM as the case may be. Hausman test is, generally, used to check if there is a correlation between explanatory variable and error term in the panel data series. Furthermore, this test confirms the validity of selecting either REM or FEM for panel data analysis. Thus, the finding is shown in table 05.

Table 06 Correlated Random Effects - Hausman Test

Random Effect Model	Dependent Variable	Independent Variables	Chi-Square Statistics	Probability Value
Cross Section	Shariah	Non Shariah	529.581318	0.0000
Period	Shariah	Non_ Shariah	126.646064	0.0000

Source: *Author's Estimation*

H_O= REM is suitable for panel data analysis

H_A= REM is not suitable for panel data analysis

Table 06 draws the result of Hausman test where the researcher checks the cross section and time period effects while applying the REM. Since, p-value is significant and it is less than 0.05 so it requires to go for FEM for both cross section and period effects in the model.

4.4 Fixed Effect Model

This model draws the results under FEM where each entity has its own intercept because of size of the market (capitalization), economic conditions, political stability or instability and so on. Considering the perspective of closing index value for both of the indices, i.e., Shariah and non-Shariah as on June 30, 2021 for Bangladesh stock market, which is 1,314.75 index value for DSES (Shariah index), whereas for DSEX (non-Shariah index) is witnessed around 6,150.48 index points. Likewise, closing index value for PSX as on June 30, 2021 for KMI-30 (Shariah index) is touched the level of 76,621.54 and KSE-30 index (non-Shariah index) 18961.9 respectively (Source: psx.com.pk). However, the core reason is market capitalization for both of the markets, such as, 5,142.82 billion in BDT for DSE market as on June 30, 2021 (Source:bb.org.bd), whilst PSX market capitalization stood at PKR 8.29 trillion as on June 30, 2021(Source: dps.psx.com.pk). Albeit, listed companies in DSE is 609, and PSX has 532 listed companies at the end of financial year ended as on June 30, 2021. But even than PSX market performance was quite satisfactory than DSE market. Besides, one set back was witnessed during COVID-19 period in Bangladesh stock market, where it was closed almost two months from the period of March 25, 2020 to May

30. 2020 which eventually lose the confidence of the investors in DSE market. However, PSX remained opened for trading purpose during that pandemic situation.

Besides, the Panel EGLS(Period weights) fixed effect regression model was used to check impact of Non-shariah, and lag of Shariah index on Shariah index. Thus, the finding is shown in table 07.

Table07: Panel EGLS (Period weights) Shariah as dependent Variable

Fixed Effect Model	Variables	Coefficient	Standard Error	T-Statistics	Probability Value	R-Squared	F-statistic	Durbin Watson
Period	Non_ Shariah	0.1655	0.0013	125.8221	0.0000	0.999995	208472.1	1.7632
	Shariah (-1)	0.9509	0.001	929.8933	0.0000			
	DV_Pakistan	773.2986	58.8351	13.1435	0.0000			
	Constant	-783.9586	8.9212	-87.8764	0.0000			

Source: *Author's Estimation*

Table 07 shows the results under Estimated Generalized Least Square (EGLS) technique where it captures the auto-correlation and heteroscedasticity problems in the data. Since, lag of last week Shariah index explains 0.9509 of today's Shariah index which indicates that investors can predict about the future of the Shariah index and earns the superficial profit. Whereas, non-Shariah index coefficient (0.1655) significantly impacts the shariah index. In short, EGLS technique is used for better results and more significance between dependent and independent variables. Under FEM, where the coefficient of DV_Pakistan, shows dummy variable for Pakistan is positive and significant impact on Shariah index which is 773.2986; and the same result is negative for Bangladesh stock market for considering dummy variable for Bangladesh. It is, therefore, concluded that PSX market moves better than Bangladesh stock market from the selected time period. Table 07 also indicates R^2 value of around 0.999995 and F-statistics 208472.1 which shows the overall fitness of the model; and Durbin-Watson denotes the value of 1.7632 which is more than R^2 value and proving to be non-spurious regression results.

5. Conclusion

This study primarily deals in comparative performance analysis of Shariah and non-Shariah indices for Bangladesh and Pakistan stock exchanges. The object of this study was to investigate whether Shariah index performs better than non-Shariah index in terms of risk and returns trade off. The data was collected from the secondary source information, where the data collection

source starts from the period of January 2015 to June 2021, and the flow of frequency is weekly. Additionally, this study is based on panel data analysis where POLS, REM and FEM are applied in order to check the performance and significance of the results.

The above results drew the attention that Bangladesh and Pakistan stock exchanges have the same pattern for Shariah and non-Shariah indices. If non-Shariah index goes downward through market rumor then Shariah index follow the same pattern for both of the exchanges. It is, therefore, concluded that market shocks of last week disturbs the market index in the current week for both Bangladesh and Pakistan stock exchanges. Furthermore, DSES underperforms than DSEX in DSE markets, the core reason should be unfamiliarity with the Shariah index in Bangladesh stock exchanges and it is witnessed through empirical findings. On the contrary, KMI-30 index has a positive and significant returns than KSE-30 index and most of the faith believers, now, switch from unconditional index to conditional index, i.e., KMI-30 Shariah index.

Although panel data analysis, all of the independent variables meet the criteria of POLS assumption which estimates that all the intercepts have the same constant except for Shariah as dependent variable and non-Shariah as an independent variable. Later, the results have been checked under REM where the selected entity does not meet the criteria and shows the significant result, not only in REM but Hausman test for both cross section and period effects. Lastly, FEM is applied with the dummy variables including for both Bangladesh and Pakistan stock exchanges, and shows the positive and significant impact on the overall results. Hence, Shariah index has lower portfolios but even then, it performs better than non-Shariah index in PSX as compared to DSE in Bangladesh Stock exchanges.

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