



# Islamic vs. Conventional Equity Indices and Investor Sentiments

Ume Habibah




Suresh Kumar Oad Rajput

Muhammad Shahid Iqbal


**Abstract: Purpose:** This paper aims to empirically investigate the equity-sentiment relationship along with making a comparison between the Islamic equity indices with conventional ones. **Methodology:** To achieve the research objects, different models are applied including Ordinal Least square, Granger-Causality test, Johansen cointegration, and Autoregressive-distributed-lag (ADRL) model. **Findings:** Results show that investor sentiments explain both Islamic and conventional equity indices. Further, it could also be concluded from the results that Islamic-equity-indices don't behave differently as compared to conventional-equity-indices. **Originality:** This study adds in literature, based on the empirical findings, that on the Islamic and conventional equity-sentiment relationship, Sharia screening criteria don't play any significant role.


**Keywords:** Investor Sentiments, Islamic-equity-indices, Conventional-equity-indices, Johansen Co-integration, and Autoregressive-distributed-lag (ADRL) model

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@ Lecturer, Air University Multan, umehabibah.92@gmail.com,  0000-0003-0341-1510  
Asst.Prof, Sukkur IBA University, Sukkur, suresh\_kumar@iba-suk.edu.pk,  0000-0003-4443-0750  
Lecturer, University of Sargodha, Sargodha, Pakistan, shahidjam55@gmail.com,  0000-0001-6164-6559

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## Introduction

Great interest has been generated in Islamic finance since the 80s. Finance literature is majorly interested in comparing the performance of Islamic indices with conventional indices. The question of whether Islamic indices are more/less profitable than conventional ones has remained a question of finance literature for many years (Hakim & Rashidian, 2002; Hussein, 2004). The main interest area is to see the risk-return difference in Islamic and conventional indices (Abdullah, Hassan, & Mohamad, 2007; Basher, Nechi, & Zhu, 2014; Dewandaru, Bacha, Masih, & Masih, 2015; Hayat & Kraeusl, 2011; Milly & Sultan, 2012). The interest developed in Islamic finance is because of the Islamic finance industry's fast growth. The global financial crisis further boost up the Islamic financial system development which is also called a sharia-complaint financial system and the assets of the sharia-compliant financial system as considered as ethics-filtered assets. Some studies have noted that investing in Islamic indices lose the diversification benefits (Girard & Hassan, 2008; Kok, Giorgioni, & Laws, 2009) while many studies find the contrary results and have highlighted the diversification benefits (Guyot, 2011; Hakim & Rashidian, 2002) if an investment is done in Islamic financial system.

Further in the conventional-financial-system, more specifically in the United States, conventional indices have been investigated within the relation of sentiments (see, among others, Brown & Cliff, 2004; Habibah, Rajput, & Sadhwani, 2017; Lux, 2011; Sadhwani, Rajput & Habibah, 2018; Verma & Soydemir, 2009). In emerging financial systems, the relation of equity indices with the investor sentiments in terms of information arrival is being reviewed by Brzeszczyński, Gajdka, and Kutan (2015). They highlight the importance of investor sentiments and depict that this area needs more attention. Some other studies investigate the investor sentiment co-movements with Islamic and conventional indices (Aloui, Hkiri, Lau, & Yarovaya, 2016) depicting that Sharia rules do not influence the relationship between sentiments and equity returns. On the other side, (Narayan & Bannigidamath, 2015) investigate the predictability of Islamic and conventional returns by employing financial news and results prove that financial news better predicts the Islamic returns as compared to conventional ones.

Contrary evidence from prior studies motivates us to further investigate the connectedness of the equity-sentiment relationship. Thus this paper analyzes the role of Sharia rules in the equity-sentiment relationship dividing the equity into Islamic and conventional equity indices and adds contribution to already established knowledge by answering the question of either sharia rules make difference in equity-sentiment relation or not. This study incorporates a comprehensive set of sen-

timents and equity indices (Islamic and Conventional). Sentiments include the VIX (volatility index), GSVI (Google search volume indices), AAI' spread<sup>1</sup> (American Association of Individual investors), BW (Baker and Wurgler's) index and another sentiment index (developed by the University of Michigan). VIX is considered as *the world's premier barometer of investor sentiment* by the Chicago Board Options Exchange (CBOE), also named as investor fear gauge. It is used as a sentiment proxy by Durand, Lim, and Zumwalt, (2011), Habibah et al. (2017) and, Whaley (2000). BW index is a composite sentiment index based on the first principal component of five (standardized) sentiment proxies; pdnd<sup>2</sup>, ripo<sup>3</sup>, nipo<sup>4</sup>, cefd<sup>5</sup> and s<sup>6</sup>. AAI asks respondents to classify themselves as bullish, bearish, or neutral. GSVI is used to track investor positive and negative market attention, used by Klemola, Nikkinen, and Peltomäki (2016) and Habibah et al. (2017) as sentiment proxy. This study investigates the reaction of equity indices to investor sentiments keeping in view the effect of sharia-compliant rules. The findings of this study provide new insights into the role of investor sentiments in the financial system by drawing a line of sharia rules between Islamic and conventional equity indices. The incorporation of a comprehensive set of sentiment indices is to give a detailed view of sentiment connectedness with the equity returns.

The further comprehensive set of equity indices includes DJ (Dow Jones) Islamic US index, DJ Islamic large-capitalization index, DJ Islamic middle-Capitalization index, DJ Islamic small-capitalization index, FTSE Sharia USA \$ index, S&P 500 Sharia \$ index, MSCI AC America Islamic Standard index, DJ (Dow Jones) US index, DJ-Large -cap index, DJ-Mid-Cap index, DJ-Small-cap index, FTSE USA \$ index, S&P 500 \$ index and MSCI AC America Standard index. The former seven are Islamic indices and the later seven are conventional indices. This study provides another building block employing a comprehensive analysis of the connectedness between investor sentiments and US equity indices (Islamic and conventional).

In addition, this study provides insights on how investor sentiments differ any impact on Islamic equity. This objective is similar to Aloui et al. (2016) who conclude that Sharia rules do not influence the connectedness between sentiment and Dow Jones Islamic US equity returns. This study differs in the way that it provides a list

- 1 Difference between Bullish and Bearish investor sentiments
- 2 Value-weighted dividend premium
- 3 First-day returns on IPOs
- 4 IPO volume
- 5 Closed-end fund discount
- 6 Equity share in new issues

of US equity indices including Dow Jones, MSCI, FTSE, and S&P equity returns. This study is also designed to answer do sentiments predict the Islamic equity returns.

Results show that investor sentiments are related to both Islamic and conventional equity indices. The relationship is more prominent in the case of investor fear gauge (VIX) and Market bear index. Further, the Islamic indices behave in accordance with conventional equity indices. So, the Sharia rules do not play a significant role in the sentiment-equity relationship.

## Literature Review

The current state of research in the Islamic financial system can be best described by the given studies. Hassan (2002) examines the market efficiency of DJIM for the time period 1996 to 2000 by applying the Dickey-Fuller test, Variance Ratio test, and serial correlation test. Results show that DJIM returns are efficient and normally distributed. Further, the pieces of evidence of the positive relationship between DJIM returns and conditional volatility are also results by applying the GARCH model. Further, the relationship of DJIM with the risk-free rate and Wilshire 5000 Index is tested by Hakim and Rashidian (2002) with the conclusion that the risk-free rate and Wilshire 5000 Index do not cause the changes in DJIM. In addition, the capital asset pricing model (CAPM) is applied by Hakim and Rashidian (2004) to check the correlation of the sharia-compliant index with Dow Jones Sustainability World Index (DJS) and Dow Jones World Index (DJW). They find that performance of DJIM is better than DJW and less than DJS.

Another comprehensive study is done by Hussein and Omran (2005) to capture the performance of Islamic equity indices taking size effect, industry effect, and economic conditions into consideration. Results conclude that Islamic equity indices outperform in the bullish time, and underperform in the bearish time. Islamic equity indices are found to provide abnormal returns due to investing in consumer cyclical, telecommunication, industrial, basic material, and small firms.

The performance of the FTSE Islamic index in relation to FTSE all world conventional index is examined by using the CAPM, Treynor, Sharpe, and Jensen as performance measures by Hussein (2004). The results conclude that Islamic and conventional indices perform in the same manner in the overall period but Islamic indices outperform in bullish periods and underperform in the bearish periods.

In the case of mutual funds, the same behavior is also witnessed by Islamic and conventional mutual funds (Elfakhani, Hassan, & Sidani, 2005). While on the other side, A. Hassan, Antoniou, and Paudyal (2005) find that sharia rules put a

significant impact on portfolio performance in the DJIM index. Khatkhatay and Nisar (2007) also review and compare the Sharia screening rules of Meezan Bank of Pakistan, Securities and Exchange Commission (SEC) of Malaysia, and Dow Jones Islamic Indices of USA and conclude the Malaysian SEC as the most liberal and DJIM as the most conservative Sharia compliance organization.

Further, Islamic and conventional mutual funds' performance is examined by Abdullah et al. (2007) by applying the Timing and selectivity ability, Modigliani measure, Jensen Alpha, adjusted Sharpe index, and Sharpe index measure. They find that Islamic mutual funds perform better in bearish time period, and in bullish time period, conventional mutual funds perform better. In addition, Islamic and conventional indices performance is also compared in some other studies like Abderrezak (2008) and Elfakhani et al. (2005).

Kraussl and Hayat (2008) set IEFs as the benchmarks against Islamic and conventional benchmark of local, global and Malaysian regions and find no significant difference. The applied measures include information ratio, TT measure, Modigliani and Modigliani measure, Sharpe ratio, and Jensen's measure. The Malaysian Islamic and conventional mutual funds' growth and performance comparison is analyzed by Mansor and Bhatti (2009). They perform correlation analysis and find standard deviation and average returns without adjustment of risk. They find that Islamic and conventional mutual funds are strongly correlated with the higher growth rate of Islamic mutual funds. They provide evidence of the importance of Islamic mutual funds. On the other side, they argue that in terms of size, Islamic mutual funds are less than conventional mutual funds.

Some interesting findings are presented by Hoepner, Rammal, and Rezac (2011). They use a huge Islamic equity dataset and apply the Fama and French three-factor model (1993), three-level, and conditional three-level Carhart Model (1997). Results are quite interesting that Islamic equities outperform than its conventional equities in some nations and underperform in some nations. They exhibit the hedging function by Islamic equities.

Further, the copula approach is applied by Hammoudeh et al., (2014) to test the dependence of Islamic equity indices over their conventional equity indices. They find the DJIM has a time-varying dependence with Asian conventional equity indices, European conventional equity indices, US conventional equity indices, global oil prices, volatility index (VIX), and Treasury bond interest rate. They depict that Islamic equity indices are much different from conventional equity indices based on Sharia compliance rules.

Rana and Akhter (2015) investigate the Islamic and conventional stocks' conditional volatilities by applying the Mean-GARCH models related to exchange rate and interest rate. They find the overall significant positive effect of exchange rate and interest rate volatility on emerging Islamic equity. They also find that Islamic equities counter less diversification and small investment that leads to the underperformance of Islamic equities than its conventional counterparts.

While Aloui et al. (2016) do not find any significant impact of sharia rules on the relationship of Islamic and conventional equity indices with the investor sentiments. In addition, Hkiri, Hammoudeh, Aloui, and Yarovaya (2017) find the Islamic indices as a safe haven for investors during the period of the financial crisis. They also find the time-varying significant impact of volatility spillovers for all kinds of stock indices. The short-run and long-run association between Islamic and conventional equity indices are also reported by Jebran, Chen, and Tauni (2017).

So, it could be concluded that no consensus has been developed till now whether sharia rules make a different behavior of Islamic equity indices than its conventional ones or not. This study is an attempt to provide another building block in the equity sentiment relation keeping in view the sharia-compliant equity indices. Further, section 2.1 explains how Islamic equity indices are different from conventional equity indices while section 2.2 explains how investor sentiments are related to equity indices.

## How Islamic Equity Indices Are Different From Conventional Equity Indices?

Islamic scholars have developed the Sharia screening criteria which distinguish the Islamic equity indices from conventional equity indices. As the interest (*Riba*) is considered as unlawful (Haram) in Sharia screening criteria, so Sharia rules are also developed by Islamic scholars for dividend payments. Islamic investors who want to enjoy the halal (lawful) monetary rewards, can invest their potential investments in Islamic equity indices. Such investment also gives peace of mind to Islamic investors having religious and ethical beliefs. On the other side, traditional finance theories consider Islamic indices riskier than conventional ones because keeping in view the modern finance theories, Islamic equity indices lack diversification (Albaity & Ahmad, 2008). On the other side, Atta (2000) and Hussein and Omran (2005) depict that these sharia-based indices can earn more profit than their conventional ones as if the included companies fulfill the financial and extra-financial filter criteria. In addition to these opposite views, some other studies (see e.g., Aloui et al., 2016) conclude that both indices perform in the same way either they are Islamic or conventional.

The reasons for developing Islamic equity indices as an alternative to their conventional ones include the fact that conventional equity indices don't follow the Islamic standards (Uusmani & Taqī 'Uṣmānī, 2002). As the Islamic investors holding ethical and moral beliefs want the investment which should be ethically and morally purified. As the Muslims' faith is profit should be as a result of some efforts or some work which don't happen in investment in interest dominated indices. Further, purification prohibits interest and interest-dominated investments too. Such companies and businesses that don't follow the Islamic filter criteria are eliminated from the Islamic index portfolio. Sharia advisory board is managed to ensure that indices named Islamic indices are actually following the Sharia rules (Hassan, 2001).

Same as interest, Sharia rules also prohibit gambling and such kind of games that are based on chance, and the sale of such things which amount, size, or type is not accurately stated at the time of transaction. While Sharia rules encourage partnership businesses (El-Gamal, 2000). Further, some Islamic scholars also encourage the purification of income by giving a portion as charity. Otherwise, income is considered contaminated. For example, if an investment earns the 8% interest on it, then income could be purified by giving away the amount of 8% as a charity. But the purification of capital gain through this way is still debatable. Some Islamic scholars argue that capital gain doesn't show the interest earned (Uusmani & Taqī 'Uṣmānī, 2002). If such purification does happen, then usually the fund managers do so. Fund managers deduct the amount of charity before distributing the amount to the investors. And sometimes, this purification process lies in the hand of investors by disclosing the ratio of purification to the investor (Valpey, 2001).

Zakat is a kind of charity. It is paid on the idle wealth of one year. The amount of idle wealth must exceed the *nisab*, which is the standard minimum amount. The rate of zakat is usually 2.5% of the personal idle wealth (Al-Qaradawi, 1999). But the calculation of zakat on the profit earned from the investment has controversy (DeLorenzo, 2000). Further, the timing of dividends received and the timing of capital gain make this calculation more complicated. Further, to promote ethical and moral business practices, some other pillars are also being presented by Valpey (2001). The first one is the involvement of equity holders to favorably affect corporate behavior which is named shareholder advocacy. As the equity holders are concerned with their role as owners and are less concerned with the high returns on their income as per the Islamic perspective. In addition, time to time check and balance, and reporting on time are also considered compulsory tools to ensure that Islamic standards are being properly followed.



## Investor Sentiments and Equity Indices

Behavioral finance has established the point that asset prices get influenced by investor sentiments (Baker & Wurgler, 2006). In prior literature, the effect of investor sentiments has been extensively studied on security prices (Baker & Wurgler, 2006; Brown & Cliff, 2004, 2005; French, 2017; Habibah et al., 2017; C. Lee, Shleifer, & Thaler, 1991; Lee, Jiang, & Indro, 2002; Nasserri & Mansoor, 2016; Taffler, Agarwal, & Wang, 2017). Some researchers have also seen the impact of investor sentiments on asset pricing with geographical comparison, companies' size comparison, and sector division comparison (Brown & Cliff, 2004; Nor, Ibrahim, & Rashid, 2013). These studies report strong evidence of connectedness between investor sentiments and securities. Generally, high sentiments lead to shifting the securities prices up and low sentiments lead to shifting the securities prices down. Some studies directly measure the investor sentiment and some indirectly measure investor sentiment. Furthermore, investor sentiments are also classified into two behavioral extremes, optimistic sentiments, and pessimistic sentiments. Investors' positive attitude or perception about the market is called optimistic sentiments and investors' negative attitude or perception about the market is called pessimistic sentiments. When investors majorly rely on noise, rather than facts, then sentiments are investor sentiments are high (strong).

The double-digit growth rate of the Islamic finance industry has grabbed the attention of researchers to make compare the Islamic and conventional equity indices. Islamic finance industry prohibits the trading of such things that do not possess physical existence (Chapra, 1985). This industry prohibits everything that oppresses basic human rights. It prohibits the business of interest (*Riba*), the use of alcohol and alcoholic products, even it also prohibits the production of alcohol and alcoholic products (Hassan & Rashid, 2010). It also prohibits the involvement of gambling and uncertainty (Chapra, 1985). Islam prefers equity and discourages the use of debt. It supports the production by hard work and earning through integrity. It favors entrepreneurship (Farooq, 2007). So Islamic economic system is symbolized by brotherhood, mutual solidarity, and partnership.

Muslims are prohibited to rely on noise and rumors from Quran and Hadith. As Allah (SWT) is saying in Surah Hujuraat (Quran 49:6), "O you who have believed, if there comes to you a disobedient one with information, investigate, lest you harm a people out of ignorance and become, over what you have done, regretful". Prophet Muhammad (PBUH) also says "It is enough sin for a man to speak of everything that he hears". Further, in the Kitab al-Buyu, the book of transaction, (Book 10 of Sahih Muslim), explains that Islam prohibits any sort of speculation for individual gain at the cost of information disequilibrium or asymmetric information in business.



So, a Muslim as an investor must avoid the rumor. He first verifies the news he gets then he has to decide whether rely on the news or not. This shows the propensity of sentiments in Islamic investors (Barberis, Shleifer, & Vishny, 1998). So investor sentiments could be defined as speculation propensity. Every type of speculation is prohibited in Islam. In addition, as investor sentiments are relying on noise rather than fundamentals (Baker, Wurgler, & Yuan, 2012) and Islamic principles do not allow to rely on noise, so investor sentiments do not play any role in valuation in Islamic finance. So it could be assumed here that sharia-based indices do not have any theoretical relationship with sentiments as it is established above that Islamic finance follows the fundamentals rather than noise or sentiments. However, if a significant relationship is found between sharia-based indices and investor sentiments then it would be concluded as there is no difference between Islamic and conventional indices. This conclusion may close the doors for Islamic finance or we may imply that sharia filtering criteria are flawed.

In literature, investor sentiments are found to have a significant relation with equity indices and sharia rules do not found to effect on this relationship (Aloui et al., 2016). Further Albaity and Ahmad (2008) have found the same direction of Islamic and conventional indices. Albaity (2011) has found the monetary policy and inflation rates as the important determinants of stock prices in Malaysia which is an Islamic country.

Studies on investor sentiment and Islamic indices have appeared recently (Al-Hajjeh, Redhead, & Rodgers, 2011; Aloui et al., 2016; Nor et al., 2013; Perez-Liston, Huerta, & Haq, 2016). Some studies construct the investor sentiment index using a combination of survey and market-data-based proxies. Some researchers used a mix of survey and secondary data for investor sentiments. This study adopts different proxies for investor sentiments. These proxies are used by many prior studies as VIX is used by Bandopadhyaya and Jones (2008), Chen, Lee, & Hsu (2017); Dash & Moran (2005), Durand, Lim, & Zumwalt (2011), Kurov (2010), Smales (2014), Whaley (2000) and Wu, Liu, & Chen (2016); GSVI is used by (Klemola et al., 2016); AAI' spread is applied by Klemola et al., (2016), (Fisher & Statman, 2000); BW index is applied by Baker & Wurgler (2012); Baker et al., (2012); Habibah, Bhayo & Iqbal (2021) and Stambaugh, Yu, & Yuan (2012); and UM index is used by Fisher and Statman (2003).

## Data Description and Methodology

This study incorporates the monthly data with different observations. Data for the Islamic and conventional equity indices are obtained from Bloomberg, data for VIX

is obtained from the CBOE website<sup>7</sup>. Data for the BW index is obtained from the website of Professor Jeffrey Wurgler<sup>8</sup>, data for the AAI index is obtained from the website of the American Association of Individual Investors<sup>9</sup>, data for sentiments by the University of Michigan is obtained from the FRED<sup>10</sup> and data for GSVI is taken from Google trend Volume<sup>11</sup>. For GSVI, two different terms are used; Market Crash and Bear Market. Data ranges from February 2004 to September 2015 for all variables except MSCI, which ranges from September 2009 to September 2015.

Table 1 reports the descriptive statistics of the data. To further analyze the relationship among change in investor sentiments and equity indices (Islamic and conventional), we have applied the ordinary least square method, Granger-Causality, Johansen co-integration, and autoregressive-distributed-lag-model (ARDL). A brief discussion on these methods is given below;

## Ordinary Least Square

To test the possible relationship between changes in investor sentiments and equity returns, the following ordinary least square models are used;

$$(1) \quad (\Delta Returns_t) = \beta_0 + \beta_1(\Delta Sent._t) + \varepsilon_t$$

$$(2) \quad (\Delta Returns_t) = \beta_0 + \beta_1(\Delta Sent._{t-1}) + \varepsilon_t$$

Here  $\Delta Returns_t$  defines the weekly logarithmic change in Islamic, and conventional equity returns,  $\Delta Sent._t$  defines the weekly first difference of investor sentiments and  $(\Delta Sent._{t-1})$  defines the weekly first difference of investor sentiments with the lag of one week.

Equation (1) is designed to estimate the equity returns by sentiments and equation (2) is designed to predict the near-term returns of the equity market.

## Granger Causality

The idea of co-integration is initially presented by Granger (1981). This study incorporates the different co-integration methods. To check the short-run co-inte-

7 <https://www.cboe.com/>

8 <http://people.stern.nyu.edu/jwurgler/>

9 <http://www.aaii.com/>

10 <https://fred.stlouisfed.org/>

11 <https://www.google.com/trends/>

gration among sentiments and equity indices, Granger Causality is applied, to test the long-run co-integration among sentiments and equity indices, Johansen co-integration is applied. Further, the ARDL model is applied to confirm the results of Granger causality and Johansen co-integration.

Equation 3 and 4 explains the granger causality models in general terms.

$$(3) \quad \Delta y_{1t} = \alpha_0 + \sum_{i=1}^k \alpha_{1i} \Delta y_{1t-i} + \sum_{i=1}^k \alpha_{2i} \Delta y_{2t-i} + \varepsilon_{1t}$$

$$(4) \quad \Delta y_{2t} = \beta_0 + \sum_{i=1}^k \beta_{1i} \Delta y_{1t-i} + \sum_{i=1}^k \beta_{2i} \Delta y_{2t-i} + \varepsilon_{2t}$$

Here  $y_{1t}$  represents the Islamic and conventional equity indices,  $y_{2t}$  represents the investor sentiments. In the granger causality test, null hypothesis  $H_0$  is  $\alpha_{21} = \alpha_{22} = \dots = \alpha_{2k} = 0$  which implies that investor sentiments do Granger-Cause the equity indices. Likewise, null hypothesis  $H_0$  is  $\beta_{11} = \beta_{12} = \dots = \beta_{1k} = 0$  which implies that equity indices do Granger-Cause the investor sentiments.

## Johansen Co-integration

As granger causality incorporates the short-run causality, to investigate the long-run causality among the investor sentiments and equity indices, Johansen co-integration is applied. Johansen Co-integration techniques are used for measuring the number of co-integrated equations. Johansen co-integration techniques have test statistics, which are given below:

$$(5) \quad \text{trace} = -T \sum_{i=r+1}^k \ln(1 - \lambda_i)$$

$$(6) \quad \lambda_{max} = -T \ln(1 - \lambda_{r+1})$$

In trace test,  $H_0$  is designed as the co-integrating vectors are equal or less than  $r$  in numbers and  $H_1$  is designed as the co-integrating vectors are greater than  $r$  in numbers. While in  $\lambda_{max}$  test,  $H_0$  is designed as the co-integrating vectors are equal to  $r$  in numbers and  $H_1$  is designed as the co-integrating vectors are  $+1$ .

This technique is used by several empirical studies to test the long-run relation between their underlying variables (see for example Demian, 2011; Gilmore, Lucey, & McManus, 2008; Gilmore & McManus, 2002; Lucey & Voronkova, 2008; Ullah, Su, & Jan, 2016).

## Autoregressive Distributed Lag Model (ARDL)

To reconfirm the short-run and long-run relationship between investor sentiments and Islamic and conventional equity indices, this study applies the autoregressive

distributed lag model (ARDL) approach that was initially proposed by Pesaran and Shin (1998) and then extended by Pesaran, Shin, and Smith (2001). This technique is considered a more advanced technique as compared to others like Engle and Granger (1987)'s techniques of residual-based and maximum likelihood techniques.

The advantage of applying ARDL techniques over other techniques is that there is no restrictive assumption of all variables to be in the same integration order in the ARDL technique. In other words, it doesn't have any issue if taken variables are integrated of order one or order zero or even fractionally integration exists. Further, the ADRL model applies only a single equation to estimate the long-run relationship among concerned variables while other techniques deal with the set of equations to test the long-run relationship. In addition, unbiased estimates are provided by ARDL technique (Odhiambo, 2008, 2011) and this technique is also suitable than (S. Johansen & Juselius, 1990)'s technique even if the sample size is small. This technique is widely being used in very recent literature (e.g., Ali, Liu, Rehman, & Zheng, 2017; Chen & Lai, 2017; Fromentin, 2017; Mohapatra, Giri, & Sehrawat, 2016; Sek, 2017; Shahbaz, Islam, & Butt, 2016). The ARDL representation of the underlying model of the current study is expressed as follows:

$$\Delta Returns_t = \mu + \rho_{Returns} Returns_{t-1} + \rho_{Sent.} Sent._{t-1} + \sum_{i=1}^{p-1} \alpha_i \Delta Returns_{t-i} + \sum_{i=0}^{q-1} \beta_i \Delta Sent._{t-i} + \varepsilon_t$$

(7)

Here  $Returns_t$  represents the returns of Islamic and conventional equity indices at the current level,  $Returns_{t-1}$  represents the returns of Islamic and conventional equity indices at first lag,  $Sent._{t-1}$  represents the sentiments at first lag,  $\mu$  is intercept and  $\varepsilon_t$  is error term of the equation.

## Results and Discussion

To check the data stationarity, Augmented Dickey-Fuller (ADF) test is performed. ADF test is designed with the null hypothesis as: data series has a unit root. ADF statistics and its p-value show that all data series are stationary at level. Moreover, Table 2 reports the regression estimates of the OLS model (equations 1 & 2) taking the stock equity market returns as the dependent variable and investor sentiments as the independent variable. Table 2 comprises 2 panels, panel A contains the Islamic equity market as the dependent variable and panel B contains the conventional equity market as the dependent variable. Results show that change in investor fear gauge  $\Delta VIX$  and  $\Delta Bear$  significantly estimate and predict the equity returns with the negative sign. Results are same for both Islamic and conventional returns except

MSCI Islamic returns.  $\Delta VIX$  and  $\Delta Bear$  have an insignificant positive relationship with MSCI Islamic returns. Somehow same results are found in the case of  $\Delta Crash$ .

$\Delta Spread$  significantly positively estimates the Islamic and conventional equity returns and insignificantly negatively predicts the Islamic and conventional equity returns. The point to be noted here is that the behavior of Islamic and conventional equity indices is the same as  $\Delta Spread$ . Further,  $\Delta UUM$  positively and significantly estimate only the conventional equity returns while the  $\Delta BW$  doesn't estimate and forecast the equity returns.

Based on the results, VIX and Market Bear are found to have the most significant relationship with equity indices as compared to other proxies of investor sentiments. So it could be concluded that pessimistic sentiments (VIX and Market Bear) perform better to explain the equity indices. These results are similar to prior studies (see Durand et al., 2011; Klemola et al., 2016; Lim, Durand, & Yang, 2014; Wu et al., 2016). The negative relation between pessimistic investor sentiments and equity indices shows that investors expect bad returns after good returns. Further, the results are also similar to prior studies that Islamic and conventional equity indices behave in similar ways (see Aloui et al., 2016).

Table 3 explains the Granger causality (GC) results. The Granger Causality test explains, do changes in investor sentiments Granger-Cause the changes in equity returns and vice versa too. Table 3 contains 2 panels; panel A states the GC relationship between investor sentiments and Islamic equity index returns while panel B states the results of GC between conventional equity index returns and investor sentiments. Results suggest that changes in VIX do significantly Granger-Cause the changes in DJ Islamic returns but not vice versa. A significant bidirectional relationship is found between VIX and DJ Islamic mid-cap, DJ Islamic small-cap, FTSE Islamic returns, no significant relationship is found between VIX and DJ Islamic large-cap, S&P 500 Islamic returns.

In the case of  $\Delta Bear$ , significant bidirectional Granger causality is found between all Islamic equity indices (except MSCI Islamic returns) and  $\Delta Bear$  but a significant unidirectional relationship is found with MSCI Islamic returns. A significant unidirectional relationship is also found between  $\Delta Crash$  and Islamic equity returns (except MSCI Islamic returns) that changes in GSVI (Market Crash) do Granger-Cause the Islamic equity returns but not vice versa. No significant relationship is found between MSCI Islamic equity returns and  $\Delta Crash$ . Further, another sentiment proxy; AAI's spread is found to have an insignificant relationship with all Islamic equity returns. In the case of Baker and Wurgler and University of

Michigan investor sentiment proxies, Islamic equity returns (except MSCI) significantly Granger-Cause the sentiments but not vice versa.

The Granger causality in the case of conventional equity indices returns is somehow similar to Islamic equity index returns. The differences are DJ-Mid-cap and DJ-Small-cap equity index returns do Granger-Cause the changes in AAI's spread. Further,  $\Delta VIX$  also Granger-Cause the MSCI conventional equity index returns.

Results are similar to prior studies (Durand et al., 2011; Fisher & Statman, 2000; Liew & Budavari, 2017; Lim et al., 2014; Peltomäki, Graham, & Hasselgren, 2017; Wu et al., 2016) that sentiments play a significant role to explain the equity returns. It is possible when all market participants are not prone to these sentiments or they are non-Muslims. These participants are speculative at the same time. This trend would change only in the long-run with the growth of the Islamic finance Industry.

Table 4 explains the results of Johansen Co-integration results. Table 4 contains 2 panels; Panel A and Panel B. Panel A contains the Johansen co-integration coefficients of Islamic equity index returns and investor sentiments and Panel B contains the Johansen co-integration coefficients of conventional equity index returns and investor sentiments. Table contains the results of two tests; Unrestricted Co-integration Trace Rank Test and Unrestricted Co-integration Maximum Eigenvalue Rank Test. The Eigen values, trace statistics, critical values, and p-values of statistics for both are given in the table. Keeping in view the results reported in table 4, it is shown that equity index returns are co-integrated with investor sentiments. The results are similar in both Islamic and conventional cases.

Further, the results of ARDL are reported in tables 5 and 6. Table 5 contains the bound test statistics of ARDL models while table 6 reports the long-run coefficients of ARDL models. The ARDL models are performed to confirm the results of Granger causality and Johansen co-integration results. Table 5 contains the selected model, F-statistics of the bound test, significance of F-statistics for each ARDL model. ARDL models are designed to check the long-run as well as the short-run relationship between investor sentiments and equity (Islamic and conventional) index returns. The bound test F-statistics is greater than the bound values in all cases indicating that there exists a long-run relationship between equity index returns and sentiments. This step leads us to interpret table 6 that is about the long-run coefficients and their significance. Results indicate that long-run coefficients are significant which confirms the results of Johansen co-integration.

Overall, results show that sentiments play a significant role to explain the equity indices returns.

## Conclusion

This study aims to address the question of whether Sharia screening criteria have any significant impact on an investment-equity relationship or not. To achieve the objective a comprehensive data set of equity indices and sentiments is used in the study. Results show that Sharia compliance rules do not put any significant impact on the sentiment-equity relationship as the sentiments are equally affecting the Islamic as well as conventional equity indices. Reference to the literature review section, sentiments are proposed to have no or minimal effect on prediction and estimation of Islamic equity indices but the results are different somehow. These results are following Aloui et al. (2016) that Sharia Compliance rules do not put any potential impact.

The findings of this paper are of interest to the sharia advisory board, public investors, and practitioners who want to align their investment in ethical and religious-based indices. Sharia rules need to be more defined to create a distinctive characteristic than conventional equity indices. Existing Sharia rules are not as strong as to differentiate the Islamic indices from their conventional ones. It is recommended to continuously evaluate the Islamic indices if they are following sharia rules or not. These results are also similar to Hammoudeh et al. (2014). From a diversification point of view, investors cannot enjoy the benefits of diversification if they invest in both indices. They must include only one index in their portfolio to achieve the objective of diversification.

Further, this study is limited only to United States' Islamic equity indices. This could be one possible reason for the same behavior of Islamic and conventional equity indices with respect to investor sentiments. As the US is not a pure Islamic state. The US investors are not only Muslim investors. Even the attitude of Muslim investors in US are also getting influenced by social and environmental effects. Results could be different if the data set is taken from Islamic states like Malaysia, Saudi Arabia, Bahrain, Pakistan, and others. Moreover, this study is only limited to investor sentiments ignoring the other variables that may affect the equity indices. Future researchers may incorporate the economic variables along with investor sentiments to explain the Islamic and conventional equity indices returns.

Another possible reason for the same behavior of Islamic and conventional equity indices with respect to investor sentiments is the selection of sentiments proxies. As the GSVI indices (Market Crash and Bear Market) consists not only of the sentiments of Muslim investor. Rather, it consists of the behavior of both Muslim and non-Muslim investors. Non-Muslim investors do not care for *Riba* (interest) free investment. They have no concern for Sharia rules of selecting securities to make



Islamic equity index. Further, AAI's spread and University of Michigan survey also contains the information regarding investor sentiments without creating a significant difference among Muslim and Non-Muslim investors. In addition, VIX and BW indexes are developed without distinguishing the faith-based and non-faith-based companies. Future researchers must be careful while choosing the sentiment proxy that better reflects the sentiments of Muslim investors. Results could be different if such type of proxy is incorporated.

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