Does the choice of stock selection criteria affect the performance of Shariah-compliant equity portfolios?

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Abstract:

Shariah-compliant equity investments make implicit bets and do not invest in firms with non-compliant core operations. The negative screens are implemented in two steps, qualitative screens and quantitative screens. There exist significant discrepancies among the existing Shariah screening guidelines. When an investment universe is reduced with these restrictions it results in heterogeneous size and sector allocation and thus yields in different financial performance. The main purpose of this study is to highlight the effect of alternative choice of stock selection on the portfolio level outcomes of Shariah-compliant equity portfolios. This study constructs seven Shariah-compliant equity portfolios with monthly rebalancing based on seven different screening guidelines from a reference investment universe (S&P 500 active constituents). The portfolios are evaluated for the period 1984-2017. In addition to raw performance, style analysis is performed to attribute the difference in financial performance to different risk factors. The resulting restricted portfolios vary significantly in terms of size and sector allocation. The heterogeneous sectoral bets lead to difference in financial performance. This study also shows that the choice of stock selection matters for a Shariah-compliant investor. Market capitalization based screens result in superior financial performance as compare to assets based screens. Finally, investors should consider seriously the relatively higher turnover associated with such restricted portfolio.

Keywords: Shariah screening guidelines, Islamic finance, Shariah-compliant portfolios, Performance evaluation

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1. Introduction

The social responsible investments incorporate non-financial criteria in the construction of financial portfolios. Their investment decisions can be categorized into primary and secondary objectives. The primary objective is to invest in firms that have positive impact on social, ethical, and environment values Adam and Bakar (2014). The profit maximization on the other hand is secondary objective of these investors. A special case of social responsible investor is the Shariah-compliant investor (SCI). These investors follow Shariah law which governs all aspects of life of Muslims. These investors are more demanding because they implement additional constrains on the investment universe. These constrains stem from Shariah investment principles. These principles prohibit investment in non-compliant activities i.e., interest (Riba), gambling (Maisir), excessive risk under uncertainty (Gharar).\(^1\)

The complex nature of financial markets makes it very difficult for firms to keep their operations free from the effect of non-compliant operations, such as interest revenue. Therefore, in its ideal form, the SCI will always be left with none or very few investment opportunities. This confronts SCI to more demanding situation to choose stocks among the assets universe that provide attractive economic benefits and adherence to their social, religious or ethical beliefs. Following the needs of SCI and the complexities in financial markets the Shariah scholars have relaxed the ideal form of Shariah-compliant investments. They formulated a relatively more balance investment criteria which is known as Shariah-compliant equity investment guidelines (Derigs and Marzban, 2008).

The objective of these guidelines is to ensure that the SCI always invest in a portfolio which is consistent with the Shariah rulings (Arslan-Ayaydin et al., 2018). This is achieved with the help of a two steps negative screening process, qualitative (sectoral) and quantitative (financial) screens. The former investigates the core operations of firms while the later evaluate the level of financial leverage, liquidity and interest income in a firm's financial statements. These screens are not explicitly stated in the religious scriptures but are the result of analogical reasoning of Shariah scholars (Nisar and Khatkhatey, 2007). The liberty in analogical approaches and the absence of single decision making authority in Islam leads Shariah scholars to formulate diverse investment guidelines. For example, world leading index providers i.e., S&P, Dow Jones Islamic Market

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\(^1\) Non-compliant activities are production or selling of alcohol, tobacco, weapons, pornography, media (except news), interest based activities, gambling, excessive risk under uncertainty and speculative trading.
Index (DJIM), FTSE and financial institutions i.e., HSBC Amanah, Amiri, Dubai Islamic Bank and Azzad Investment have formulated their own screening guidelines for equity investments.

The diversity in Shariah screening guidelines extends the choices of selection for SCI. In practice the SCI is always confronted to numerous issues. First, the diversity in screening criteria itself is a problem and SCI always has to opt for specific criteria with an opportunity cost. Second, there is lack of mutual agreement on the use of proxies and threshold level. For example, DJIM follows a threshold level of 33% for liquidity screen while MSCI is more liberal and considers threshold level of 70% for the same screen. Third, the different interpretations of firm's value results in different divisors in the financial ratios which then affects the overall screening process (Obaidullah, 2005; Derigs and Marzban, 2009).

The heterogeneity in Shariah screens is a serious issue for SCI because the differences in existing screening guidelines affect the diversification opportunities and leads to different sector allocation. The difference in sectoral bets results in different representation of each sector and effects the performance of the Shariah-compliant equity portfolios (SCEPs). The effect of Shariah restrictions on the performance of conventional portfolios has been addressed by numerous studies (see for example: Derigs and Marzban (2008); Derigs and Marzban (2009); Ashraf and Mohammad (2014); Ashraf (2016); Boudt et al. (2019)). This study differentiates itself from previous efforts in number of ways. First, most of the previous studies are based on a single screening criteria or fund level data and focus is given to performance comparison with conventional portfolios. This study does not compare SCEPs with conventional portfolios but answers an important question, that is, whether the choice of selection methodology (different screening guidelines) matters for Shariah-compliant investors?

In order to answer the above question it is important to restrict a unified investment universe with different Shariah screens and create different SCEPs. The SCEPs are created from seven different Shariah screens with monthly rebalancing. All the SCEPs are fully invested and are not allowed for short selling. The selection bias is addressed by adopting more advance portfolio construction methodology. All the seven SCEPs are constructed with stock level data extracted from the active constituents of a unified investment universe (all stocks listed on S&P 500) for extended time period (1884-2017).
Another important aspect that is ignored by most of the performance evaluation centered studies is the effect of transaction cost on the overall performance of SCEP's. In practice the SCEP's result in higher turnover as compare to conventional portfolios (Boudt et al., 2019). This is because in addition to routine rebalancing of weights, a SCI has to monitor the SCEPs frequently and exclude all firms immediately if their interest income exceeds the maximum allowed threshold. This study also addresses the question that whether SCEP's are able to compensate the additional transaction cost?

The empirical findings of this study show that the discrepancies in the selection guidelines have serious consequences for SCI in terms of diversification opportunities and sector allocation. The performance of SCEP's depends on the choice of stock selection and the intensity of screens. A switch from a more liberal strategy to more strict guidelines has negative effect on diversification but such a tilt positively affects the financial performance. It is also interesting to note that SCEP's show strong exposure to information technology stocks and energy sector and these sectoral bets shape the performance of SCEPs in market turmoil’s. Future studies are required to further highlight the effect of stock selection guidelines in Shariah with different asset universe from different geographical locations.

Section 2 presents the discrepancies in current Shariah screenings. Section 3 summarizes few studies on SCEPs. Sector 4 discusses data composition, sector allocation and methodology used for performance evaluation. The major empirical results are displayed in section 5. The difference in performance of SCEPs is attributed to different risk factors in Section 6. The robustness analysis based on choice of sample period is presented in Section 7 while Section 8 summarizes the whole study.

2. The need for Shariah screens
Shariah in its ideal form does not allow investing in a firm with even a minor portion of income from non-compliant sources Nisar and Khatkhatay (2007). In practice the nature of operations in the financial markets and the presence of complex financially engineered products make it almost impossible for firms to operate at zero level of interest. Following the ideal structure, initially Shariah scholars always opted to rule out investment in equities. However, in order to represent the Shariah-compliant investors and to provide them an investment opportunity in stock market
the Shariah scholars associated with world leading index providers such as, S&P Shariah indices (S&P), Dow Jones Islamic Market Indices (DJIM), Financial Times Stock Exchange (FTSE) Shariah indices, Morgan Stanley Capital International (MSCI) Shariah indices and financial institutions such as Hongkong and Shanghai Banking Corporation (HSBC), Dubai Islamic bank (DIB), Meezan Bank Pakistan (Meezan) and Amiri capital (Amiri) have formulated Shariah guidelines for equity investments. Under these guidelines the Shariah-compliant investor is allowed to invest if the equity issuing firm passes series of qualitative and quantitative screens. The qualitative guidelines focus on sectoral screens and exclude all those firms whose core operations are non-compliant. Although there are minor differences but Shariah scholars mostly agree on the general theme of qualitative screens. For example, S&P 500 Shariah index and DJIM are stricter and exclude a firms even if minor portion of its revenue is generated from non-compliant operations. On the other hand more liberal guidelines such as FTSE is only concerned with major operations of firms and tolerate non-compliant revenue from minor operations Derigs and Marzban (2008).

Fluctuations in working capital i.e., draining of liquidity, short term trade cost, and the ready availability of short term finances are key factors for a firm’s dependence on banks and other financial institutions. Thus there is always a possibility that the revenues of Shariah-compliant firm are affected by interest. The concerns related to participation in non-permissible activities and the maximum allowable tolerance level is key motivation for designing quantitative screens. However, the absence of single decision making authority and the leniency in the approach of analogical reasoning results in diverse quantitative guidelines. The remarkable differences in the quantitative screens as shown in Table 1 are the key motivation for this study.

Table 1: The discrepancies in quantitative screening guidelines of world leading index providers and financial institutions.

|            | S&P | DJIM | FTSE | MSCI | HSBC | Amiri | Azzad | DIB | Mezan |
|------------|-----|------|------|------|------|-------|-------|-----|-------|
| Panel A: Interest Screens |     |      |      |      |      |       |       |     |       |
| TI/TR      |     |      | 5%   |      | 5%   |       |       |     | 5%    |
| CSI/MC     | 33% | 33%  |      |      |      |       |       |     |       |
| CSI/TA     | 33% | 33%  | 33%  |      |      |       |       |     | 33%   |
Panel B: Liquidity Screens

| (AR+CSI)/TA | 50% | 80% |
| (AR+C)/TA | 50% | 50% |
| AR/TA | 70% |
| AR/MC | 49% | 33% | 45% |

Panel C: Leverage Screens

| TD/TA | 33% | 33% | 30% | 33% | 30% | 40% |
| TD/MC | 33% | 33% | 33% | 30% |

Shariah screens use both balance sheet and income statement information. TI and TR refers to total interest income and total revenue respectively. While C, CSI, AR, TD, TA are balance sheet items and represents cash, cash and short term investments, account receivables, total debt and total assets. MC stands for market capitalization.

2.1. Discrepancies in quantitative Screens

The quantitative screens assess the level of a firm’s interest income, liquid assets and financial leverage relative to the firm size and compare it to a pre-specified threshold level. Though the Shariah boards associated with financial institutions agreed to use three types of financial screens, however disagreement exists in the use of proxies to measure financial leverage, liquid assets, interest revenues and divisor in the financial ratio. Shariah screens also show variation in the maximum allowable threshold level.

The issue of interest (Riba) is always a priority concern for Shariah-compliant investors. In Islamic economic system money is considered as a medium of exchange rather than a commodity and the unjust incremental gains associated with the use of money either in the form of loans or on spot trading is strictly prohibited. Even in the presence of very strict parameters in Quran and Hadith regarding interest, the Shariah scholars show disagreement on a mutually agreed measure of interest. It can be observed in the first panel of Table 1 that FTSE and HSBC are using the ratio of total interest to revenue of a firm with maximum tolerance level up to 5%. On the contrary, DJIM and S&P Shariah index considers a firm as Shariah-compliant if its interest revenue is less than 33% of its market capitalization. Another noticeable discrepancy is that instead of emphasizing directly on interest, DJIM and S&P Shariah index focus on the potential sources of interest and use cash and short term investments (CSI) as proxy to measure interest revenues.

The strict rules for interest extend the circle of restrictions from pure use of interest to all potential sources that can generate interest revenue or interest liabilities, i.e., financial leverage and current assets. Therefore, in addition to interest screens, Shariah scholars use two more
The liquidity screen is used to monitor interest income generated from current assets and financial leverage screens is used to keep an eye on interest payments. Apart from potential source of interest, Shariah preference for fixed assets as source of income generation is key motivation for liquidity screens. In terms of proxies the financial leverage screen shows consistency, however our observations regarding variation in the proxies and threshold level hold true for liquidity screens.

Another major discrepancy is the use of divisor in the financial ratios. The existing Shariah screens measure the replacement value of a firm in two ways. Table 1 shows that DJIM, S&P Shariah and AZZAD use market capitalization as divisor in quantitative screens. In this study portfolios constructed with these screening guidelines are referred as market capitalization based SCEPs. On the other hand FTSE, HSBC, MSCI and Amiri prefer to use total assets as the true measure of firm replacement value. This study refers to the portfolios construed with these screening guidelines as total assets based SCEPs. Such an intergroup classification is also considered by Derigs and Marzban (2009).

Market capitalization reflects the market value of a firm. However, this proxy is highly exposed to volatility caused by mispriced securities, market cycles and speculations (Boudt et al., 2019). In practice the short term variations in market capitalization is smoothened by using 24-36 months trailing average. On the contrary the second group argues that the total assets of firm is trusted accounting figure and is independent of market volatilities. However, this proxy also has shortcomings as it depends on the accounting practices (for example, LIFO or FIFO) (Derigs and Marzban, 2008). Furthermore, the consideration of goodwill as assets in a balance sheet is also a debatable issue in Shariah but such issues are out of scope of this study.

The threshold level used in financial screens is also debatable as it varies between 5% to 70%. The one-third rule 33% followed in most of the cases is based on Hadith and Fiqhi rules (Levy and Hennessy, 2007). However, this measure is arbitrary and subject to criticism i.e., it's out of context use (Obaidullah, 2005). On the contrary, the 5% threshold is based on the opinion of Shariah boards and no such arguments can be found in Quran and Hadith. The discussion concludes that the use of threshold levels is arbitrary and can be alter in the light of Maslaha (for betterment of mankind) and Maqasad al Shariah (objective of Shariah law) but of course with the consensus of Shariah scholars.
The lack of mutual consensus on single selection criteria and the apparent discrepancies in Shariah guidelines makes it very difficult to choose an equally acceptable alternative. It is important to mention that the acceptability stated is reflected purely from the perspective of faith. The extent of individual acceptability in terms of portfolio outcomes may vary significantly depending on the risk and returns preferences.

3. Review of literature on Shariah compliant equity investments

Although the Islamic mutual fund industry is relatively new, there is tremendous growth in the size of market share of Islamic investment vehicles. Despite rapid growth, the literature on Shariah-compliant equity investment is scarce (Raza et al., 2019). Right from the time when first Islamic index “Dow Jones Islamic Index (DJIM)” was introduced by Dow Jones in February 1999, numerous studies have highlighted two major aspects of Shariah-compliant equity investments.

The first group of studies discusses the differences in current screening guidelines and provides analogical reasoning behind the derivation of these screens (see, e.g., Obaidullah, 2005; Nisar and Khatkhatay, 2007; Derigs and Marzban, 2008). The sole purpose of these studies is to highlight the theoretical justification of Shariah-compliant investment guidelines and ignore the effect of such discrepancies on the financial performance of SCEPs. On the other hand number of studies address this limitation and focus on the performance evaluation of SCEPs with its conventional counterparts.

In terms of difference in performance, evidence is provided either from mutual funds industry or broad market indices structured by world leading index providers i.e., S&P, DJIM, MSCI and FTSE. For comparison of Shariah-compliant mutual funds and conventional mutual funds (see, e.g., Abdullah et al., 2007; Hayat and Kraeussl, 2011; Hoepner et al., 2011; Rubio et al., 2012; Ashraf, 2013; Makni et al., 2015; Nainggolan et al., 2015; El-Masry et al., 2016; Makni et al., 2016; Boo et al., 2017; Hammamia and Oueslati, 2017). For comparison based on Shariah-compliant indices and conventional indices (see, e.g., Hussain and Omran, 2005; Kok et al., 2009; Alam and Rajjaque, 2010; Walkshausl and Lobe, 2012; Bacha et al., 2013; Al-Khazali et al., 2014; Ho et al., 2014; Clarke, 2015; Alam et al., 2016; Umar, 2017). The findings of performance evaluation studies lead to mix conclusions where some studies suggest that Shariah
restrictions improve overall portfolio performance while other argue that such restrictions have negative effect on diversification opportunities and effects the performance negatively.

The studies mentioned here suffer from few serious shortcomings. First, in case of mutual funds the constituents are unknown therefore the difference in performance, if any, cannot be attributed to different sectors or equity factors. On the other hand stock indices are not investable. Second, findings of some of these studies cannot be generalized because of relatively small sample period, survivorship bias and look ahead bias. Third, the performance evaluation is carried out in absence of transaction cost. Fourth, the Shariah-compliant portfolios are evaluated against a broader index (conventional benchmark). Such a comparison shows the effect of Shariah restriction on the performance of unrestricted portfolios but fails to provide enough evidence to conclude that difference in Shariah investment guidelines matters for Shariah-compliant equity investors.

Recent studies by Raza and Ashraf (2019), Raza et al., (2019) and Boudt et al. (2019) address the issue of look ahead bias and limited time span and present empirical evidence for extended time period. However, their studies highlight the effect of weighting method and not the effect of stock selection criteria in Shariah.

4. Data and methodology

We restrict the investment universe to the month end constituents of S&P 500. In order to implement the Shariah screens on the investment universe we use the fundamental data for cash, account receivables, short term securities, total assets, total debt, number of common shares outstanding. The time period of analysis ranges from January 1984 to December 2017.

In order to assess the different dimensions of Shariah-compliant portfolio I use seven different screening guidelines formulated by S&P, DJIM, Azzad, FTSE, HSBC, MSCI and Amiri. This study implements the qualitative screen by following Global Industrial Classification Standards (GICS). It is important to note that this study uses the 24 months trailing average of market capitalization in the financial screens.

Each Shariah-compliant equity portfolio is rebalanced at times $t = 1, \ldots, T$. To construct the portfolios with seven different Shariah screening guidelines, This study starts from a reference investment universe of S&P 500 stocks. This study denote $I_{i,t}$ as the dummy variable indicating whether stock $i$ belongs to the reference investment universe at time $t$ and $i = 1, \ldots, N$, with $N$ the number of stocks in the investment universe. In a second step, I determine whether the stock is
Shariah compliant. Therefore, I denote $S_{i,t}$ as the dummy variable which is one if stock $i$ at time $t$ is Shariah-compliant. This process is repeated for each set of Shariah investment guidelines. This study thus constructs seven Shariah-compliant equity portfolios. This study assumes that the portfolio is fully invested and do not allow for short selling since this is prohibited by Shariah. The US market is composed of ten major sectors. In order to test the hypothesis related to sector allocation I introduce sectoral dummies to each Shariah portfolio. The average sector allocation is then estimated for the time period 1984-2017.

This study evaluates the raw performance by using the annualized average return (measured with mean). I evaluate risk as the volatility (calculated as standard deviation in returns on monthly basis and then annualized with the square root of time rule. I also report the risk of monthly losses at 95% through value at risk (VaR), computed as the 5% quantile of monthly returns. The Shariah portfolios are also investigated for maximum loss in the given time period by reporting the value of maximum drawdown, measured as the percentage loss from peak to trough. In order to provide better insight on the effect of risk factors I also reported the risk adjusted performance of these portfolios. For this purpose this study reports the Sharpe ratio and the Jensen's alpha. This study also uses the Carhart (1997) four factor model and report the intercept (alpha) and exposure to risk factors.

Both Shariah-compliant and the unrestricted portfolios are constructed with monthly rebalancing. The initial Shariah screens and the constant monitoring always result in higher number of transactions for a Shariah-compliant portfolio resulting in higher turnover. The above mentioned statistics are based on raw performance. However, trading is not free and additional transactions affect the raw performance of Shariah-compliant portfolio. Therefore it is important to measure the turnover of all portfolios. This study estimates the turnover as,

$$Turnover_{t+1} = \sum_{i=1}^{N} (|W_{i,t+1} - W_{i,t}|),$$

where $W_{i,t+1}$ is the new weight of security $i$ at rebalancing time $t + 1$ and $W_{i,t}$ is the actual weight of security $i$ before rebalancing at $t + 1$.

5. Results

This study starts the analysis by presenting the effect of stock selection criteria on the cardinality of Shariah-compliant portfolios. In order to guide the readers this study classifies all Shariah-
compliant equity portfolios in to two groups. The Shariah screening guidelines of S&P 500 Shariah, DJIM and Azzad use market capitalization as divisor in the financial screens therefore this study refers to them as market capitalization based guidelines. The FTSE, MSCI, HSBC and Amiri use total assets as divisor therefore this study refers to them as total asset based guidelines.

Figure 1: The effect of Shariah-compliant equity screening on the cardinality of the S&P 500 investment universe

Note: This figure shows, in terms of the number of remaining S&P 500 stocks, the effect of reducing the investment opportunity set when applying the Shariah screening guidelines provided by S&P 500 Shariah index (represented by the gray area), DJIM (represented by bars), AZZAD (represented by white area with dots), FTSE, MSCI, HSBC Amana and AMIRI (all represented by dotted and dashed lines) for the period 1984 to 2017. Here I report the number of compliant assets after qualitative and quantitative analysis.

5.1. The effect of screening differences on the cardinality and sector allocation of Shariah-compliant portfolios.

Results in Figure 1 shows that Shariah screens have negative effect on diversification opportunities and it significantly reduce the S&P 500 asset universe. The results show two major findings. The diversity in stock selection criteria effects the size of compliant asset universe. For example, the total asset based screens (FTSE, HSBC, MSCI and Amiri) show less variation and result on average 236, 234, 227,237 Shariah compliant companies respectively. While the market capitalization based screens (DJIM, S&P and Amiri) are more volatile across time and result on average 205, 239, 219 Shariah compliant companies respectively.
The variation in the size of compliant asset universe is interesting and we can notice that the market capitalization based strategies were more restrictive at the beginning of our analysis period i.e. around the black Monday. In comparison to total asset based strategies the market capitalization based strategies developed from conservative to liberalize and improve diversification opportunities over the time period 1984-2017.²

The difference in screening guidelines results in heterogeneous weight allocation to different sectors. It can be notice in Table 2 that the choice of selection criteria in Shariah-compliant equity investment effects the sector allocation of Shariah-compliant equity portfolios. The total asset based screens are more titled toward value sector (materials industry and telecommunication sector) while the market capitalization based strategies invest more in growth sectors (for example, energy and information technology stocks). A very important finding is that Shariah-compliant screens exclude almost all the stocks that belongs to finance sector from the investment universe.

5.2. Performance evaluation
Shariah restrictions restrict the investment universe and results in different sectoral bets. This heterogeneity in sectoral bets result in different factor loading and thus shape the performance of restricted portfolio. In this section I first test the effect of Shariah restrictions on the performance of unrestricted portfolio. Then I address the main question that whether the choice of selection criteria matters for Shariah investors?

5.3. The effect of Shariah restrictions on the performance of unrestricted market portfolio
The effect of Shariah restriction on the performance of unconstrained market portfolio remains the central focus of many studies. The results in Table 3 are not redundant as the comparison is made with different Shariah restricted portfolio. The out-of-sample performance shows that the unrestricted market portfolio (S&P 500 all stocks) over the period 1984-2017 has a annualized

² One of the possible reason for this behavior is the growth in all the fundamental variables that are used in financial screens. The growth rate estimation shows that all the fundamental variables have positive growth in the last three decade however average market capitalization of US equities experience more growth as compare to total assets. Such a high growth in market capitalization is intuitive and could better be explained in relation to the Tobin's Q explanation of market equilibrium. As expected, the intensity in screens of market capitalization group shows negative relationship with Tobin's Q and get relaxed as the Q ratio approach its peak level in tech bubble.
mean return of 8.27%. It is interesting to see that in comparison to unrestricted portfolio the choice of Shariah-compliant stock selection criteria is of secondary importance. This argument is based on the fact that Shariah investment restrictions not only improve the returns but also improve the stability in portfolio returns by reducing the overall portfolio risk. These results are consistent with Derigs and Marzban (2009); Ashraf (2013); Walkshausl and Lobe (2012); Ashraf (2016); Boudt et al. (2019).

Table 2: Sector Allocation Major Shariah Indices.

|               | MKT.Port | DJIM  | S&P   | AZZAD | FTSE  | HSBC  | MSCI  | AMIRI |
|---------------|----------|-------|-------|-------|-------|-------|-------|-------|
| Energy        | 10.22    | 14.26 | 14.11 | 14.45 | 9.83  | 9.49  | 16.04 | 13.77 |
| Material      | 5.49     | 5.40  | 6.06  | 5.23  | 7.50  | 7.00  | 6.68  | 6.04  |
| Industry      | 11.77    | 9.00  | 9.21  | 9.16  | 10.28 | 9.72  | 9.90  | 11.94 |
| Cons.Disc     | 13.63    | 10.94 | 10.58 | 11.88 | 12.50 | 11.82 | 12.65 | 12.16 |
| Cons.Stap     | 11.64    | 16.45 | 15.78 | 16.02 | 14.02 | 13.37 | 13.30 | 12.13 |
| Health.Cr     | 11.60    | 19.78 | 18.22 | 19.88 | 20.85 | 20.71 | 18.67 | 13.03 |
| Financial     | 13.97    | 0.25  | 0.57  | 0.25  | 0.35  | 0.26  | 0.31  | 0.84  |
| Info.Tec      | 11.90    | 19.44 | 17.86 | 18.91 | 14.21 | 19.60 | 13.27 | 16.55 |
| Tele          | 5.35     | 4.27  | 6.80  | 3.97  | 8.13  | 6.65  | 7.10  | 8.35  |
| Uti           | 4.43     | 0.22  | 0.82  | 0.26  | 2.33  | 1.38  | 2.08  | 5.21  |

Note: The first asset universe is not restricted and is labeled as “Market portfolio” which represents all stocks of S&P 500. The remaining asset universes are restricted with Shariah screening guidelines of DJIM, S&P, AZZAD, FTSE, HSBC, MSCI and AMIRI. The weights are calculated with monthly rebalancing for the period (1984-2017). We adopt the Global Industrial Classification Standards System (GICS) for sector and sub-sector classification, where each company issuing equity has a unique sector code. In the above table Cons Disc, Cons Stap, Health Cr, Info Tech, tele and Uti represents consumer discretionary, consumer staples, health care, information technology, telecommunication and utilities sectors. to unrestricted portfolio the choice of Shariah-compliant stock selection

5.4. Is the choice of Shariah stock selection criteria matters?

The discussion in Section 5.3 shows that Shariah restrictions improve the performance of unrestricted market portfolio. But we can see that there are seven Shariah-compliant equity portfolios. A Shariah-compliant investor primary objective (adherence to faith) is satisfied if she restricts the investment universe with any of the seven selection criteria. However, as shown in Section 5.1 the choice of selection criteria affects the cardinality and results in heterogeneous sectoral bets. This effect further the performance of SCEP’s. But we are still not able to conclude that whether the choice of stock selection criteria matters in terms of risk and return trade-off? Therefore, I compare here the performance of SCEP’s constructed with different screening guidelines with each other. For this purpose this study reports in Table 3 the annualized mean, annualized volatility and Sharpe ratio of the seven SCEP’s, together with measures of downside risk (value-at-risk 5% quantile).
It can be seen that the risk and returns characteristics of a SCEP portfolio depends on the choice of selection criteria such that all SCEP's result in different annualized returns and volatility. The highest annualized returns are achieved by SCEP constructed with the screening guidelines of DJIM and the lowest risk in terms of volatility is achieved by SCEP constructed with screening guidelines of MSCI. To grasp a more generalized view of performance difference between different SCEPs let us also compare the raw performance of market capitalization based SCEP's with total asset based SCEP's.

It is interesting to see that all the market capitalization based SCEP's (S&P, DJIM and Azzad) result in higher annualized returns and outperform the best performing total asset based SCEP (HSBC) by 222, 158 and 60 bases points respectively. The market capitalization based SCEP's also show lower volatility and value at risk as compare to the total asset based SCEP's. This favorable risk and return trade-off of market capitalization SCEP's can better be reflected in terms of risk per unit of reward (Sharpe ratio). The Shariah guidelines of DJIM, S&P and AZZAD increased the Sharpe ratio of HSBC from 0.57 to 0.77, 0.74 and 0.65 respectively. It is also interesting to observe that all the SCEP's tends to display different values for skewness and excess kurtosis.

Table 2 also reports the downside risk of all SCEP's. A higher value of drawdown indicates a higher probability of fund redemption. Among all SCEP's, the worst drawdown is experienced by SCEP constructed with the screening guidelines of HSBC while the lowest drawdown is achieved by SCEP constructed with the screening guidelines of S&P 500 Shariah.

5.5. Turnover analysis

The performance evaluation in above sections is carried out in the absence of transaction cost. SCEP's by design result in higher turnover as compare to an unrestricted portfolio. The portfolio manager has to monitor the investment vehicle on regular basis for Shariah-compliance. Thus she has to liquidate stocks which have crossed the maximum allowed threshold level and buy new stocks to rebalance the portfolio. In practice transactions are not without cost. Thus it is very important to revisit the superior performance hypothesis of Shariah-compliant equity portfolios because higher turnover leads to performance drag. In order to see the effect of transaction cost it is important to compare the average turnover of Shariah restricted portfolio and an unrestricted portfolio. All portfolios are constructed with monthly rebalancing.
The results of turnover are presented in the second last column of Table 3. The first major finding is that the unrestricted market portfolio has the advantage of lower turnover as compared to all SCEP's. The increase in turnover is due to the additional transactions that a Shariah-compliant investor has to perform for the supervision of Shariah-compliance of the SCEP.

Table 3: The impact of Shariah restrictions on performance of Shariah-compliant portfolios created from S&P 500 all stocks

| Panel A: Unrestricted Portfolio | Mean (%) | Vol (%) | SR | MDD (%) | VaR % | Skew | Kurt | TO% | BETC |
|--------------------------------|----------|---------|----|---------|-------|------|------|-----|------|
| Mkt Port                       | 8.27     | 15.06   | 0.55 | 52.50   | 7.10  | -0.74| 5.50 | 2.70| NA   |

| Panel B: Shariah Restricted Portfolio | Mean (%) | Vol (%) | SR | MDD (%) | VaR % | Skew | Kurt | TO% | BETC |
|--------------------------------------|----------|---------|----|---------|-------|------|------|-----|------|
| DJIM                                 | 11.37    | 14.86   | 0.77 | 47.00   | 6.60  | -0.60| 5.18 | 4.28| 13.40|
| S&P                                 | 10.73    | 14.61   | 0.74 | 46.10   | 6.30  | -0.61| 5.17 | 3.85| 14.98|
| AZZAD                               | 9.75     | 14.99   | 0.65 | 46.80   | 6.70  | -0.66| 5.40 | 3.97| 9.77 |
| FTSE                                | 8.34     | 14.95   | 0.56 | 53.10   | 6.80  | -0.72| 5.41 | 4.11| 1.53 |
| HSBC                                | 9.15     | 15.75   | 0.58 | 57.30   | 7.00  | -0.67| 4.97 | 4.34| 3.16 |
| MSCI                                | 8.81     | 14.49   | 0.61 | 47.30   | 6.60  | -0.72| 5.57 | 3.81| 5.87 |
| AMIRI                               | 8.65     | 14.84   | 0.58 | 52.50   | 6.80  | -0.68| 5.39 | 4.88| 2.25 |

Note: This table reports the annualized mean (Mean (%)), annualized volatility (Vol (%)), Sharpe ratio (SR), drawdown (MDD (%)), VaR (95% confidence interval), skewness (Skew), kurtosis (Kurt), Turnover (TO) and break-even transaction costs (BETC, in cents per dollar traded) for Shariah restricted portfolios and S&P 500 all stocks. For the Sharpe ratio, the Table also shows the results of significance tests, where *, **, and *** indicates that the Sharpe ratio differ significantly from the Sharpe ratio of the market capitalization portfolio on all S&P 500 stocks and the Sharpe ratio of SCEP constructed with DJIM screening guidelines respectively, at the 10%, 5%, and 1% levels based on the t-test with HAC standard errors.

Now let us compare the turnover of SCEPs with each other. Results show that within the SCEP's the market capitalization based SCEP's (DJIM, S&P and AZZAD) have slight advantage over total asset based SCEP's (FTSE, HSBC, MSCI and AMIRI). In addition to the average turnover statistics this study also presents in Figure 2 the historical turnover of market portfolio and the SCEP's at each rebalancing period. In order to estimate the effect of turnover on the net returns it is important to deduct the transaction cost from the gross returns. DeMiguel et al. (2009) note that a realistic value for the proportional transaction cost is around 50 basis points, thus 0.5 cents per dollar traded. Their reference value is based on studies conducted on NYSE stocks in the nineties. Since then, transaction costs have further diminished. Furthermore, when the application is on building Shariah equity portfolios, the replication strategy may be synthetic and thus leading to an even lower implementation cost. Therefore, this study penalizes each transaction with 10 basis point transaction cost. Such analysis enables us to see clearly the effect of rebalancing cost on the net returns. Figure 2 shows both gross returns (blue lines) and the net returns (red lines) of each SCEP and the unrestricted market portfolio on each rebalancing date. We can see that the high cost of rebalancing for SCEP's cause relatively larger drag in the net returns of SCEP's as compare to unrestricted market portfolio.
Now we know that the higher Sharpe ratio Shariah-compliant strategies have higher turnover and this cause relatively larger drag in net returns. In the above Section this study assumes a specific transaction cost. In practice the transaction cost varies. Therefore, I follow Kritzman et al. (2012) and Boudt et al. (2019) and compute the break-even transaction cost in terms of cost per dollar traded. The Break-even transaction cost shows the equilibrium cost per dollar at which the Sharpe ratio of Shariah portfolios is equal to the Sharpe ratio of unrestricted market portfolio. The higher the break-even transaction costs (in cents per dollar traded), the more robust the outperformance is with respect to transaction costs.

Last column of Table 3 shows that the break-even transaction cost is always positive and greater than one cent per dollar traded for all SCEPs. More specifically, we can infer that the profitability of Shariah portfolios is robust to the presence of transaction cost. An alternative inference that we can draw is that the Sharpe ratio of SCEP's will always be positive even if these portfolios are penalized with transaction cost up to 13.4, 14.98 and 9.77 cent per dollar traded. Thus the main conclusion is that the SCEP's as a whole have higher turnover as compare to unrestricted portfolios but the SCEP's has the ability to compensate the additional cost.

The last column of Table 3 shows that the break-even transaction cost of total market capitalization based strategies is less than total asset based strategies. This means that the Shariah-compliant investors should consider the screening discrepancies seriously. This further suggests that there are higher economic benefits associated with market capitalization based screening strategy while the investor has to bear high cost if she screens the investment universe with total asset based screening guidelines.

**Figure 2: Monthly turnover and the effect of transaction cost on commutative performance of SCEP's**
Note: The black bars (secondary axis) shows monthly turnover of each SCEP. The blue line (primary axis) represent the cumulative returns when 1$ is invested in each SCEP in the absence of transaction cost. The red line (primary axis) in each graph represent the effect of transaction cost on the gross return of each SCEP. We penalize each transaction with 10 bases points transaction cost (TXN represents transaction cost). The upper panel of the graph represents market capitalization based Shariah guidelines while the lower part of the graph represents total assets based Shariah guidelines.

6. Performance attribution of Shariah portfolios

The analyses so far show that the market capitalization based SCEP's outperforms not only the unrestricted benchmark but also the total asset based SCEPs. However, we still don't know the reason for such a superior performance. One way to tackle this question is to analyze the cross sectional variation of the overall portfolio returns. In this section, I use the multi-factor model of Fama and French (1992) and Carhart (1997) to examine the cross sectional variation of SCEPs returns. The multifactor model is consistent with a market equilibrium model with four risk factors. At the same time it can be interpreted as a performance attribution model where the regression coefficient and the risk premia of the factor mimicking SCEPs show the proportion of the mean returns to the four widely pursued risk premium i.e.,
market risk premium, size, value/growth and momentum. We run the performance attribution model as follow,

\[ R_{i,t} - R_{ft} = \alpha_i + \beta_1(R_{mt} - R_{ft}) + \beta_2(SMB_t) + \beta_3HML_t + \beta_4MOM_t + \epsilon_{it} \]

where \( SMB_t \) represents the difference in return between a small cap portfolio and a large cap portfolio at time \( t \). \( HML_t \) shows the difference in returns of portfolio consisting of value stocks and portfolio of returns with growth stocks at time \( t \). The fourth factor shows the difference in returns of portfolio of past 12 month winners and a portfolio of past 12 months losers and is represented by \( MOM_t \). \( R_{ft} \) and \( R_t \) represents the risk free rate and market returns respectively.

Results in Table 4 show that the risk adjusted returns (Jensen's Alpha) increase when the unrestricted benchmark is restricted with Shariah guidelines. More specifically, the Shariah restriction of DJIM and S&P result in positive and significant alpha of 0.40 and 0.037.

Table 4: Performance attribution of Shariah compliant equity portfolios using the four-factor Carhart model

| Portfolio | Alpha | MKT | SMB | HML | MOM | \( R^2 \) |
|-----------|-------|-----|-----|-----|-----|--------|
| DJIM      | 0.040*** | 0.89*** | -0.20*** | -0.21*** | 0.00 | 0.93 |
| S&P       | 0.037*** | 0.89*** | -0.21*** | -0.18*** | 0.01 | 0.93 |
| AZZAD     | 0.031*** | 0.92*** | -0.20*** | -0.21*** | 0.00 | 0.92 |
| FTSE      | 0.018*** | 0.92*** | -0.20*** | -0.13*** | 0.00 | 0.92 |
| HSBC      | 0.026**  | 0.95*** | -0.17*** | -0.21*** | -0.01 | 0.93 |
| MSCI      | 0.021**  | 0.90*** | -0.21*** | -0.10*** | 0.00 | 0.92 |
| AMIRI     | 0.020*   | 0.92*** | -0.20*** | -0.10*** | -0.01 | 0.93 |

Note: This table reports the results of 4-factor momentum model of Carhart (1997). This study regresses the monthly returns of the considered portfolios (in excess of the risk free rate) on the constant, market excess returns (MKT), Small Minus Big returns (SMB), High Minus Low returns (HML) and Momentum Factor “Winners Minus Losers” (MOM), using monthly returns for the period 1984-2017 with monthly rebalancing. ***, ** and * represent the significance levels at 1%, 5%, and 10% level, respectively, based on the t-test with HAC standard errors.

In terms of risk factor exposure, we see in Table 4 that the (Carhart, 1997) factors explain more than 92% of the return variation for the SCEPs. In terms of risk exposure the SCEPs show strong tilt toward Big stocks. This is intuitive because SCEPs invest in firms that have relatively high market capitalization or high total assets. A major difference is the tilt in Shariah portfolios toward growth stocks. By construction the Shariah portfolio shows almost no exposure to finance sector which shape the factor exposure and provide an explanation for growth tilt. The growth tilt is more prominent in market capitalization based SCEPs as compare to total assets based SCEPs. The growth tilt has two implications for SCEPs.
The absence of finance sector in a SCEP provide hedging benefits and thus the SCEP show resistance to overall market drawdowns caused by financial turmoil’s. Second, the tilt toward growth stocks creates an inertia in Shariah portfolio to grow at a faster rate in bullish market (i.e., tech bubble). However the SCEPs can suffer significant losses when the market rallies end, for example at the burst of dot-com bubble in 2000. The growth tilt in Shariah-compliant portfolio is consistent with Hoepner et al. (2011), Walkshausl and Lobe (2012) and Boudt et al. (2019). It is also interesting to see that total asset based SCEPs are more exposed to market risk premium as compare to total market capitalization based SCEPs.

7. Robustness analysis

The main objective of this study is to highlight the effect of stock selection criteria in Shariah-compliant equity investing on the performance of portfolios that are constructed with diverse Shariah-compliant investment guidelines. I evaluate the performance of total assets based SCEPs and market capitalization based SCEPs with the help of annualized returns and risk assessment for the period 1984-20187. The results so far provide evidence that choice of stock selection affects the portfolio performance and the Shariah-compliant investor can gain more economic benefits if she constructs her portfolio by following market capitalization based stock selection guidelines e.g., the screening guidelines of DJIM, S&P 500 Shariah and AZZAD investments. However, the back-tests carried out are based on 30 years of data and the market structure change significantly within this span of time. Furthermore, we still cannot conclude that whether the performance of market capitalization based SCEP are significantly different from portfolios constructed with total asset based selection criteria? For this purpose I conduct the robustness test to see if the difference in performance is developing across time.

7.1. Development of performance gap through time

The performance of SCEPs can vary with macroeconomic regimes Boudt et al. (2019). Time based trend in cardinality and sectoral bets are key factors that shape the performance of SCEPs in economic turmoil’s. Therefore this section investigates the development of relative performance of SCEPs in different time periods. For this purpose this study classifies the full sample period 1984-2017 into pre crises, crises and post crises period. Since 1984 the US market experience three major crises, Black Monday September (1987 to November 1988), the burst of Dot-Com bubble (September 2000 to September 2002) and the Global Financial Crises (November 2007 to February 2009). The two group of SCEPs (market capitalization based and total assets based portfolios) result in different sectoral bets (see, Table 2) and their constituents are time dependent (see, Figure 1). Recall, SCEPs constructed with market capitalization based screens show high exposure to growth stocks. Therefore, this
group of SCEPs outperforms the total asset based SCEP in market rally in (1988-2000) but then suffers a visible performance drag at the burst of dot-com bubble (2000-2002). In the same time period, total asset based SCEPs suffer relatively less losses. These findings are in contrast with the general perception that SCEPs provide hedging benefits in market crises. This is true only if the crisis is caused by fluctuations in the finance sector. See, for example the results in 6th column of Table 5, the financial performance of all SCEPs in the Global financial crises of 2008-09 is much better than that of market portfolio. The resistance to financial crises is due to the fact that SCEPs do not invest in interest based financial sector. The under-performance in dot-com crises are consistent with the findings of Nainggolan et al. (2015). On the other hand the superior performance in global financial crises is also documented by (Alam and Rajjaque, 2010), (Ashraf and Mohammad, 2014) and Boudt et al. (2019).

Table 5: Performance impact of Shariah restrictions and choice of weighting method when the DJIM Shariah guidelines are used

|                      | Jan 1986-Aug 1987 | Sep 1987-Aug 1988 | Dec 1988-Aug 2000 | Sep 2000-Sept 2002 | Oct 2002-Oct 2007 | Nov 2007-Feb 2009 | March 2009-Dec 2017 |
|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Panel A: Unrestricted Market Portfolio (S&P 500 all stocks) |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 19.30             | -15.80            | 15.20             | -24.80            | 12.20             | -42.30            | 22.50             |
| Ann Vol (%)          | 15.50             | 24.10             | 13.40             | 17.40             | 9.55              | 19.20             | 13.30             |
| SR                   | 1.24              | -0.65             | 1.13              | -1.42             | 1.27              | -2.19             | 1.68              |
| Panel B: Shariah restricted portfolios |                   |                   |                   |                   |                   |                   |                   |
| Shariah-compliant portfolio based on DJIM criteria |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 24.20             | -17.30            | 18.60             | -32.90            | 13.10             | -28.60            | 22.80             |
| Ann Vol (%)          | 15.00             | 24.10             | 13.20             | 29.00             | 10.10             | 16.80             | 11.70             |
| SR                   | 1.61              | -0.72             | 1.42              | -1.13             | 1.30              | -1.70             | 1.95              |
| Shariah-compliant portfolio based on S&P criteria |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 24.00             | -16.40            | 17.40             | -35.20            | 12.80             | -30.50            | 22.30             |
| Ann Vol (%)          | 15.00             | 23.40             | 12.80             | 28.60             | 10.00             | 17.30             | 11.60             |
| SR                   | 1.60              | -0.70             | 1.36              | -1.23             | 1.27              | -1.76             | 1.93              |
| Shariah-compliant portfolio based on AZZAD criteria |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 19.50             | -18.80            | 16.70             | -36.80            | 12.70             | -30.60            | 21.90             |
| Ann Vol (%)          | 16.70             | 24.40             | 13.10             | 26.50             | 10.20             | 17.50             | 11.80             |
| SR                   | 1.17              | -0.77             | 1.28              | -1.38             | 1.25              | -1.74             | 1.86              |
| Shariah-compliant portfolio based on FTSE criteria |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 18.20             | -16.40            | 14.70             | -24.70            | 11.80             | -21.30            | 21.30             |
| Ann Vol (%)          | 16.20             | 23.70             | 13.10             | 18.60             | 9.90              | 18.30             | 11.80             |
| SR                   | 1.12              | -0.69             | 1.12              | -1.32             | 1.19              | -1.16             | 1.81              |
| Shariah-compliant portfolio based on HSBC criteria |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 18.60             | -17.60            | 13.90             | -23.30            | 12.50             | -22.30            | 22.80             |
| Ann Vol (%)          | 16.10             | 24.00             | 13.70             | 20.40             | 10.50             | 18.70             | 12.50             |
| SR                   | 1.15              | -0.74             | 1.03              | -1.14             | 1.19              | -1.19             | 1.82              |
| Shariah-compliant portfolio based on MSCI criteria |                   |                   |                   |                   |                   |                   |                   |
| Ann Mean (%)         | 18.80             | -16.69            | 14.70             | -19.90            | 12.60             | -19.70            | 20.60             |
| Ann Vol (%)          | 15.70             | 24.00             | 12.70             | 17.90             | 9.60              | 17.70             | 11.70             |
| SR                   | 1.2               | -0.69             | 1.16              | -1.11             | 1.32              | -1.11             | 1.77              |
Shariah-compliant portfolio based on AMIRI criteria

|        | Ann Mean (%) | Ann Vol (%) | SR    |
|--------|--------------|-------------|-------|
|        | 17.50        | -15.10      | 1.11  |
|        | -15.10       | 23.60       | -0.64 |
|        | 12.20        | 12.60       | 0.96  |
|        | -18.10       | 16.60       | -1.09 |
|        | 11.50        | 9.80        | 1.17  |
|        | -20.10       | 17.80       | -1.12 |
|        | 21.50        | 11.60       | 1.86  |

Note: This table shows the performance statistics of Shariah portfolios for different choice of sample period. We report all the major crises, the bullish markets, pre crises and post crises. The crises are those periods with the largest drawdown in terms of cumulative loss from the peak to trough. The results are presented in four panels each showing S&P 500 all stocks and Shariah restricted assets universe.

This time variation in the performance statistics can also be seen in a plot reporting the ratio of the cumulative value $1 invested in each Shariah portfolio compared with the cumulative value of $1 invested in benchmark strategy (i.e., the S&P 500). To interpret the time-variation in the relative performance, the slope of the line is important. In periods where the line is upward sloping, the Shariah strategies with alternative weighting outperform the benchmark strategy, and vice versa when it is downward sloping.

Our first observation as shown in Figure 3 is that the relative performance of Shariah indices is relatively stable over time. Though there are few correction periods, the Shariah indices lead to the highest end-value. The Shariah portfolio created with DJIM, S&P and AZZAD criteria show under-performance in dot com crises while these portfolio shows over-performance in global financial crises. In terms of cumulative value for the time period 1984-2014, the Shariah guidelines of DJIM generate additional benefits as compared with the S&P and AZZAD criteria.

Figure 3: Relative cumulative performance of the Shariah-compliant equity portfolios
Note: This figure shows the cumulative performance of SCEPs relatively to the unrestricted market portfolio. The ratio is calculated with cumulative $1 invested in market based SCEP (DJIM and S&P Shariah) and total assets based SCEPs (FTSE and HSBC) compared to cumulative value of $1 invested in unrestricted market portfolio with monthly rebalancing for the period 1984-2017. Shaded areas show the three major financial crises for the period 1984-2017. The crises periods are identified with the help of maximum drawdown analysis.

8. Conclusion

Shariah-compliant equity portfolios avoid investing in non-compliant business activities through a rigorous screening process. The negative screens are implemented in two steps i.e. qualitative (sectoral) screens and quantitative (financial) screens. The Shariah scholars show consensus on the sectoral screens. However, there are number of discrepancies in financial screens. The basic objective of this study is to highlight the screening discrepancies among the existing Shariah investment guidelines and to evaluate the impact of these discrepancies on portfolio outcomes. For this purpose I constructed seven SCEPs from a unified investment universe i.e. S&P 500 all stocks by implementing the screening guidelines of S&P 500 Shariah, DJIM, AZZAD, FTSE Shariah index, HSBC Amanah, AMIRI capital and MSCI Shariah indices. Then I classify all the portfolios in to two groups based on the divisor in the financial screens, market capitalization based portfolio (S&P Shariah, DJIM and AZZAD) and total asset based portfolios (FTSE, HSBC, MSCI and Amiri).
The analyses revealed that both group of portfolios result in different cardinality and sector allocation. All SCEPs by design show almost zero exposure to finance sector. The market capitalization based SCEPs are tilted toward growth stocks while total assets based SCEPs are invested more in value sector. The heterogeneous sectoral bets shape the performance of SCEPs and total market capitalization based SCEPs outperform total assets based SCEPs for the period 1984-2017. The performance of SCEPs in economic turmoil also depends on the choice of stock selection. For example the market capitalization based SCEPs experience relatively larger performance drag as compare to total assets based SCEPs.

We also found that the superior performance of SCEPs comes at relatively higher cost due to high turnover. Though the analyses based on break-even transaction cost show that SCEPs generate enough returns to compensate the high turnover cost, still I recommend that the Shariah-compliant investors should consider the choice of stock selection and the relatively high turnover of SCEPs seriously.
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