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FINANCIAL ECONOMICS | RESEARCH ARTICLE

New Islamic equity style indices: Constructing and testing the efficacy of information transmission

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Abstract: The non-existence of commercially available Islamic Equity Style Indices from index providers such as MSCI especially on small value and small growth stocks motivates us to construct our new indices. Firstly, various index construction methods are compared. Secondly, this paper describes in detail the process of index construction and finally, the new indices are tested using out-of-sample forecast and trading strategies. Notably, our results show Large Growth (LG) and Large Value (LV) indices have more efficacy compared to Small Growth (SG) and Small Value (SV) stocks. From the perspective of Islamic financial market, the creation of Islamic equity style index enables new strategies which focus on size, value, and smart beta. In addition, the out-of-sample VAR forecast indicates that LG and LV indices are the best candidates for creating a new benchmark for portfolio diversification. Furthermore, by applying simple trading strategies and selecting Islamic value and small market capitalization stocks, our evidence shows that Islamic equity style indices have benefits for investors and fund managers. To the best of authors' knowledge, this paper is the first attempt to create non-commercially available Islamic equity style indices.

Subjects: Econometrics; Economic Forecasting; Investment & Securities

Keywords: Islamic capital markets; stock market index; equity style index; information transmission; vector autoregression

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PUBLIC INTEREST STATEMENT

This paper focuses on the creation of Islamic equity style indices based on Islamic stocks from an emerging economy. Only stocks which are approved by the Shariah Advisory Council of the Securities Commission are included in the sample. The newly developed Islamic equity style indices are also useful to investors as they can be relied upon for the purpose of portfolio construction. To increase the robustness, newly developed indices are tested on their ability of information transmission with respect to macroeconomic variables as well as for purpose of verifying their validity when applied to asset pricing models. Furthermore, investors and analysts will be able to understand the idiosyncratic nature of the rapidly growing Islamic capital markets and how it is related to other regional and international markets.

1. Introduction

The equity style indices proposed by Fama and French (1992) has become an important area of study for researchers in the area of finance. Nevertheless, despite the benefits of adopting the model proposed by Fama and French, a benchmark index has yet to be constructed to analyze the Malaysian Islamic share market index. The benefits of constructing such an index would open up various areas of research on the Malaysian FTSE EMAS *Shariah* index. The FTSE EMAS *Shariah* index in Malaysia has been growing in significance over the last decade signifying the growth of the Malaysian capital markets as one of the largest Islamic capital markets in the world with total market capitalization of over MYR1.5 trillion as at the end of 2014.

An equity style index serves the purpose of a benchmark index which can help fund managers to design portfolios in order to generate returns above the returns provided by the broad-based benchmark index. This finding was at the center of Sharpe (1992) and Fama and French's (1992) analysis which argued that value shares outperform growth shares based on a cross section of companies selected from the US share exchange. Consequently, fund managers and index providers such as Russell and Morningstar as well as FTSE and MSCI followed these findings by developing equity style indices in various share exchanges.

Nonetheless, there has yet to be an equity style index which is created based on Islamic stocks. This paper will attempt to address this void by creating Malaysian equity style indices by using the **Russell Co. methodology** and focusing on companies which are listed on the FTSE EMAS *Shariah* index. The paper will be organized as follows, Section 2 will explain the relevant literature as it relates to Islamic equity style indices. This is followed by Section 3 which will explain the index construction methodology and data collection. Section 4 will present descriptive statistics followed by Section 5 which will provide results of forecasting evaluation based on the newly developed indices. The Islamic indices are then evaluated based on simple trading strategies in Section 6. The newly created indices will then be presented in Section 7. Finally, section 8 concludes and discusses implications of the paper together with suggestions for further research.

2. Islamic equity style indices

The development of equity style indices has been growing since the 1970s as investors found that there are differences in terms of classification between different types of shares. Shares classified based on different "style's" showed similar characteristics. The classification of shares based on different styles was further highlighted by Sharpe (1992) who argued that shares can be classified based on growth or value style shares.

However, at present, there is a gap in terms of commercially available Islamic equity style indices. This gap can be further explained as illustrated in Table A of Appendix A. The evidence from international index providers indicates that even though there are Islamic indices which have been developed, these indices are not comprehensive to include all equity style factors such as growth, value, and size.

Investors and fund managers have a distinct interest in the area of equity style investment based on the basic principle of selecting shares that outperform the market (Reilly & Brown, 2009). Both active and passive fund managers would rely on conventional finance theories with the aid of equity style benchmarks in order to aid them in constructing a portfolio of shares which can deliver returns above that provided by the market. Bernstein (1995) argued that by utilizing a style index, good fund managers can develop a "contrarian" strategy which does not only provide liquidity to the share market but also provides opportunities to gain abnormal returns.

The recent literature relating to equity style indices seem to indicate various advantages to utilizing equity style indices. A study by Lucas, van Dijk, and Kloek (2002) found that by utilizing equity style share market indices, fund managers can develop investment strategies which generate excess returns by applying a style rotation strategy.

Furthermore, Siegel (2003) asserted that an equity style index should not only serve as a benchmark to understand individual shares and to describe a fund manager's approach to managing a portfolio but also should be used to evaluate a fund manager's performance. Style investing has been credited for the success that it has made in identifying size and value characteristics. For this purpose, Fama and French (1992) in fact successfully argued that value shares outperform growth shares.

Nonetheless, Fama and French's value premium which has historically been explained in terms of two competing explanations which can be explained as rational market risk (where value stocks are argued to be riskier than growth stocks) and market overreaction hypothesis (where agents overstate returns for growth stocks) has been subject to much criticism. For instance, Wu, Liu, and Chen (2016) provided evidence to show that investors show preferences and gain higher returns for growth over value stocks during periods of extreme pessimism or optimism. Yen, Sun, and Yan (2004) on the other hand provided evidence that the value premium only exists in the short term but disappears in subsequent periods. As the debate on the value premium continues, a study on the existence of the value premium in Islamic markets would be of relevance to researchers and investors.

The multifactor approach to determining risk factors which influence asset allocation decisions as proposed by Fama and French (1992, 1993, 2003) has grown and developed in the recent past. For instance, Wagner and Winter (2013) have proposed stylized factors to include risk factors such as liquidity and momentum. This approach can also be used to develop Islamic indices.

Another advantage of an equity style index is that it can be used as a macroeconomic variable for purposes of comparison and analysis against other contemporaneous economic variables. As an example, López (2015) used the volatility index to test whether it relates to other international volatility indices.

There are various different methods which have been proposed when it comes to constructing an equity style index. The different methods applied by index providers has caused confusion among users of the style indices. As an example is a trade-off between simplicity and the explanatory power of the constructed index (Siegel, 2003). The single common variable which is used is, in fact, the P/B ratio (or the inverse, B/P ratio) by index providers. However, what is more, important is that the index meets guidelines of representativeness and captures style characteristics.

The completeness versus purity of the created style indices was also a concern as style indices would often be developed by classifying shares according to size and value, however, the size and value shares were not "pure" in its classification. Shares classified as value shares would not have in its entirety value share characteristics. This has spurred the growth of the development and classification of "neutral" or core shares (as an example the Russell Company core value and core growth shares)

There is a scarcity in terms of literature relating to style indices in Islamic share markets. Nevertheless, the few studies which involve classifying Islamic shares based on different styles have been performed by researchers who had an interest in investor asset allocation decisions. For instance, Walkshäusl and Lobe (2012) found that investors in Islamic indices seem to invest mainly in growth and positive momentum shares. Dewandaru, Masih, Bacha, and Masih (2015) on the other hand tested the merits of introducing a style-based approach to Islamic shares by using an Islamic portfolio using a multi-rotation strategy derived from three prominent styles notably momentum, value, and quality investing.

The current literature is divided when it comes to the link between Islamic and conventional indices. For instance, Ajmi, Hammoudeh, Nguyen, and Sarafrazi (2014) managed to prove that Islamic share market indices seem to have a link with conventional indices. In this study, the authors

suggested that the idea that both indices Islamic and conventional indices are decoupled is not true. Krasicka and Nowak (2012) agreed with Ajmi et al. (2014) by presenting evidence to claim that the Malaysian Islamic Sukuk market and the conventional market have common factors. They further argued that the gap in terms of financial practices between Islamic and conventional finance is diminishing. However, Jawadi, Jawadi, and Louhichi (2014) presented evidence to show that Islamic and conventional indices performed differently. In their analysis, they identified a benefit of using the Islamic index during the financial crisis as Islamic shares outperformed conventional shares.

The literature so far has indicated that despite the idiosyncratic nature of equity style shares in emerging countries, investors and fund managers would benefit from the development of the equity style indices. However, research in the area of asset pricing for purposes of portfolio construction and asset allocation decisions have advanced lately especially when it comes to identifying risk factors which may influence investment decisions. For this purpose, fund managers and investors have recently found benefits in developing “smart” factor indices which can be used as an investable proxy for stock selection purposes (Amenc, Goltz, Lodh, & Martellini, 2014).¹

3. Index construction methodology and data collection

3.1. Index construction methodology

3.1.1. Selection of Islamic equity style growth and value shares

The first step in developing the Islamic Equity style indices in Malaysia is to sort companies on the FTSE EMAS Shariah index according to growth, value, and blend shares. The shares are selected based on companies listed on the *Shariah Index* by the *Shariah Advisory Council of the Securities Commission of Malaysia* (SC), and Securities Commission Malaysia (2015). The list of *Shariah* compliant companies on the KLSE is revised semi-annually and is reported twice a year. The list is then compiled and matched with the list of companies on the FTSE EMAS *Shariah* index. The companies which are selected are then divided based on the top 30 companies (large companies), companies between the range of 31 to 100 (mid-sized companies), and 101 and remaining companies (small companies) based on their market capitalization.²

Once the list of *Shariah* compliant companies has been collected, the methodology for sorting shares according to growth and value shares is achieved by the following steps. The method which is employed is similar in part to the method which was proposed by Fabozzi (1998) and has been used by index providers such as the Russell Co. and Morningstar in order to develop the equity style indices (refer to Appendix C).

The Russell Co. methodology is used in this study in order to develop growth and value stock market indices. As argued earlier in the literature review section, investors have a keen interest in ensuring that the equity style indices which are created have been constructed with a focus on “purity,” representativeness, and efficiency. The Russell Co. method of developing style indices was one of the earliest commercially available indices which were created and uses the principle of parsimony to make certain that the style indices are met investors high standards of representativeness. In comparison, other index providers including S&P, MSCI, and Morningstar have developed their own methods of creating style indices using a variety of variables in order to develop the indices.

The Russell Co. method is the simplest in terms of a number of growth and value factors which are used for purposes of index construction, it has the benefit of parsimony as well being the earliest available style index. The Morningstar style indices in comparison use a larger number of variables (which includes both historical and projected earnings and sale growth information in order to determine the growth factor). However, for commercial reasons, each index provider has a claim to make in terms of the superiority of their commercial index as compared to those developed by competing index providers.

The sequence of steps which were followed in order to sort shares based on growth, value, and blend shares is explained as below:

Begins with matching growth and value factor

(i) Determine and match growth and value factor variables related to the *Shariah* compliant companies including market capitalization, Return on Equity (ROE), Revenue Growth Rate, Book-to-Price (B/P) ratio. This is achieved by matching the companies from the *Shariah* index with the variables which are downloaded from Reuters Datastream. The missing data relating to these companies will result in these companies not being chosen as a constituent of the index.

(ii) The B/P ratio is used to compare a share market's value to its book value, where

$$B/P \text{ Ratio} = \frac{\text{Total assets} - \text{Intangible Assets and liabilities}}{\text{Share Price}} \quad (1)$$

In order to determine growth factors, return on equity, and revenue growth rate is chosen as the variables to be used to identify a share' style. Return on equity (ROE) measures how well the management is making use of assets of the company in generating returns to shareholders. The ROE can be described as:

$$ROE = \frac{\text{Net Income}}{\text{Shareholder's Equity}} \quad (2)$$

where net income is determined for the whole fiscal year (excluding dividends paid to common shareholders and after taking into account distribution of dividends to preferred shareholders). Shareholder's equity is calculated based on a firm's total assets minus total liabilities. Revenue growth, on the other hand, is calculated based on the trailing revenue growth rate (as applied by the Dow Jones method) change in revenue from this year to the previous semi-annual period ($R_t - R_{t-1}$) divided by revenue from the previous year (R_{t-1}).

(iii) The list of companies together with the mentioned variables is then arranged in a spreadsheet. The growth and value shares are selected based on a composite value score. This score is determined by firstly determining the probability score of each variable, ROE, GR, and BP. This is achieved by using the linear probability algorithm which was proposed by Russell Co. This algorithm is explained as below:

$$\text{Probability}_{\text{value}} = \frac{1}{1 + \exp \left[\frac{5(X_M - X)}{X_M - X_L} \right]} \quad (3)$$

$$\text{Probability}_{\text{value}} = \frac{1}{1 + \exp \left[\frac{5(X - X_U)}{X_U - X_M} \right]} \quad (4)$$

(iv) The companies are arranged vertically in a spreadsheet and variables related to determining the composite variable score is arranged horizontally. These variables include market capitalization, ROE, Revenue Growth rate, and BP ratio.

(v) The Composite Value Score (CVS) is then determined by firstly establishing the probability value for ROE, revenue growth rate, BP ratio, and the market capitalization ratio. This is determined by using the STATA software to determine the upper (X_m), median (X), and lower (X_l) percentiles which will be substituted into the Russell algorithm above to establish the probability value for

each variable. The lower limit is based on the 10th percentile, the median limit is at the 50th percentile, and the upper limit is at the 90th percentile.

(vi) For purposes of calculating the probability value, the exponential value for the 10th and 90th percentile is then determined for each share and then the IF function on MS Excel is applied and is used to decide on the probability value for each variable based on its market capitalization (where the $X(\text{median})$ value of market capitalization based on the 50th percentile is used). The IF function formula basically argues that if the market capitalization of the company is less than its median (as determined by using the STATA software), therefore the probability value for the variable is based on the value derived from the 10th percentile. Alternatively, the value from the 90th percentile is used.

Once the probability values have been established for each variable, the CVS is determined by using the composite probability for each share based on the formula below:

$$\text{Composite probability} = ((1 - \text{probability value ROE}) + (1 - \text{probability value Revenue Growth})) \times 0.5 + \left(\text{probability value } \frac{B}{P} \times 0.5 \right) \quad (5)$$

(vii) The algorithm above which is used to determine probability value is once again applied where the X_m is at the 75th percentile, X is at the 50th percentile, and the X_l is at the 25th percentile for both the composite probability value above against market capitalization. Similar to the above, the exponential value is firstly determined for the 25th and 75th percentile. This is followed by determining the CVS where if the market capitalization for the share is less than the market capitalization at the 50th percentile, therefore, the probability value at the 25th percentile is chosen. Alternatively, if the market capitalization is more the value at the market capitalization at the 50th percentile than the probability value at the 75th percentile is chosen.

(viii) The CVS has now been determined. The shares will then be differentiated between growth, value, and core (between growth and value) based on the following:

Probability value between 0–40% = Value shares

Probability growth between 41–59% = Core shares

Probability value between 60–100% = Growth shares

(ix) This process is repeated for the large, medium and small groups of companies in order to determine a collection of companies which can be categorized as large growth (LG), large value (LV), large core (LC), medium growth (MG), medium value (MV), medium core (MC), small growth (SG), small value (SV) and small core (SC) groups of companies.

3.1.2. Creation of the share market index

The share market index is created for each style index by firstly matching the companies against its share price and a number of shares. The list of companies based on the groups of companies which have been chosen are matched against the list of share price and a number of shares as downloaded from Reuters Datastream and the companies which have missing data are excluded from the list of companies used to construct the index.

The data for a number of shares and share prices are daily data and they are arranged vertically according to date in a spreadsheet. The companies are then listed horizontally and the total market capitalization of each company is determined daily by multiplying the two variables. As the index begins from May 2006, the index value for May 2006 is calculated as 100. However, subsequent to that date, the index value is determined based on the following formula (Kok & Goh, 1995):

$$\text{Index Value} = \frac{\text{Total market value of all companies}(t + 1)}{\text{Total market value of all companies}(t)} \times 100 \quad (6)$$

The *Shariah* index is revised semi-annually and when the following list of *Shariah*-compliant securities is released, the index would need to be rebalanced. Rebalancing of the index is done based on a method which is mentioned below:

(a) The list of companies from the new period is compared against the list of companies from the previous period. The companies are then matched to see which companies remain on the index belonging to the current period. Companies which are new and should be included in the new index, as well as companies which should be excluded from the index, is then determined. This is followed by calculating the market capitalization of companies which should be included and companies which should be excluded.

(b) Once this is done, the following formula is applied to determine the adjusted base Aggregate Market Value (AMV):

$$\text{Old Base AMV} \times \frac{\text{Old current AMV} + \text{Market value of Included Stocks}}{\text{Old Current AMV}} \quad (7)$$

and adjusted base AMV for delisted component shares is formulated as:

$$\text{Old Base AMV} \times \frac{\text{Old current AMV} + \text{Market value of Excluded Shares}}{\text{Old Current AMV}} \quad (8)$$

where the Old current AMV is determined by the sum market capitalization for all companies as at the last date of the previous period and the Old base AMV is the total market capitalization as at 30 May 2006 (i.e. the first date chosen for construction of the index).

(c) The index value after the rebalancing is done for the first day of the new semi-annual period is calculated as follows:

$$\text{Index value(First day after rebalancing)} = \left(\frac{\text{Adjusted base AMV}}{\text{Total market value for all companies (At first day)}} \right) \times 100 \quad (9)$$

The index value following the first day of rebalancing:

$$\text{Index value} = \left(\frac{\text{Toal market capitalization}(t + 1)}{\text{Adjusted base AMV}} \right) \times 100 \quad (10)$$

(d) This process is repeated for all the groups of equity style shares and six new Islamic equity style indices have now been created.

3.2. Data collection procedure

3.2.1. Company and share series information

The primary aim of this paper is to construct an equity style share market index based on the Malaysian Islamic universe of shares. For this purpose, we have selected companies from May 2006 to August 2011. These dates are chosen based on the Securities Commission of Malaysia's *Shariah* Advisory Council (SAC) list of companies that selected by the SAC. This list is determined twice a year and will be used to determine the universe of companies which form part of the universe of Islamic companies which constitutes the FTSE EMAS *Shariah* index. The source of data is taken from the Reuters Datastream database.

In order to generate the list of *Shariah*-compliant shares, we firstly need to match the companies listed on the SAC list with the companies listed on the FTSE EMAS *Shariah* index. This process involves checking to ensure that the companies which are not on the SAC list are eliminated from the list of companies to make up the index.

In order to develop the equity style indices, the growth and value factors are chosen based on variables which include the Book-Price ratio, revenue growth rate, earnings per share, share price, and a number of outstanding shares. These ratios will then be selected in order to form part of the factors which decides the different forms of companies, whether they are in fact growth or value shares.

Based on the list of companies which have been chosen, companies with missing data would be eliminated from the number of companies selected for purposes of index construction. For instance, the 30 June 2006 list of 871 companies, only 333 companies were selected for purposes of constructing the base index due to companies which were missing from the list or unavailable data based on the other data-sets which were used.

3.2.2. *Liquidity requirement*

The liquidity screen is a method used to ensure that companies listed on an index have been checked to ensure that those that are not heavily traded are excluded from the index. This is to ensure that they index is more representative of the performance of companies. For the purpose of the Islamic equity style indices, once the companies have been categorized into SG, MG, LG as well as SV, LV, and LG shares, and before the indices are created, the liquidity test is conducted to eliminate companies which do not meet the liquidity requirements.

The liquidity test that is applied is based on the Russell Co. global indices method of screening for liquidity. Under this method, the securities with inadequate liquidity are eliminated from the index. This is done by evaluating the average daily dollar trading volume (ADDTV) and the active trading ratio (ATR). The ADDTV is applied for purposes of smoothing abnormal trading volumes over short periods of time and measures the actual transactions taking place in the share market. On the other hand, the ATR further refines the evaluation by looking at the possibility that a few transactions across the year could distort the ADDTV of individual shares. This two-step liquidity screen provides an accurate assessment of the market and its liquidity. The formula for calculating both ADDTV and ATR are as below:

$$\text{ADDTV} = \frac{\text{Annual accumulated trading volume in USD}}{\text{Number of available trading days (open for trading)}} \quad (11)$$

$$\text{ATR} = \frac{\text{Number of active trading days (minimum 1 share traded)}}{\text{Number of available trading days}} \quad (12)$$

All securities in investable countries with eligible share types are ranked by ADDTV. The list of companies which are eligible for inclusion in the Islamic indices upon rebalancing is based on securities with an above-median ADDTV and greater than 90% ATR. These companies usually correspond to the threshold of the bottom 5% cumulative total market capitalization universe, in descending order of ADDTV. Furthermore, as part of the requirement of the liquidity test, the companies in the bottom 2% of the equity style indices were eliminated. This process was performed in order to match the requirement of capturing 98% of the eligible universe of shares for each particular index.

The Russell Co. method also presupposes that companies that qualify for the index have met the liquidity test. The liquidity test requires that companies that are inactive for periods of 30 days or more during the financial year should be eliminated from the index. This process was performed by initially ensuring that the list of companies for each semi-annual period has been determined through the process of matching and elimination. Once this has been performed, a spreadsheet is designed to sort companies which meet these index selection criteria.

The final list of companies list that has been created is constructed as a result of conducting the liquidity test. The test was repeated over again for the nine remaining semi-annual periods.

3.3. Index maintenance and corporate actions

The Islamic share market indices are further maintained in order to ensure that daily changes to the share market and its impact on companies which constitutes the Islamic equity style indices have been taken into account. The indices are in fact evaluated during business (i.e. trading days) and exclude all public holidays and uses closing share prices. The daily maintenance of the index is also done based on the companies which have been chosen and have met the liquidity screen. These alterations to the index involve changes as a result of delisting and relisting shares, stock splits, and mergers and acquisitions.

In the event of a spin-off, the companies which have come into existence from the parent company are now in existence. There are no changes that are required to the indices due to the companies spinning off assets and equity from the parent company. These newly established companies, however, needs to meet the index eligibility requirement such as the size and liquidity requirement in order to form the index. Companies which have stopped trading (halted securities) will be kept on the indices based on its most recent closing price or until trading is resumed or officially delisted. A company is removed from the Islamic equity style index as soon as the announcement is made that the company is to be delisted. However, no changes are made to the indices if the company decides to list in another share exchange other than its primary share exchange.

In the event of a share split, the increase in a number of shares and the decrease in a number of shares would not necessitate any changes to be made to the index. The share split in fact is done in order to reduce the share price in order to have more investors to invest and this does not have any significant effects on an index. Conversely, in the event of a reverse split, based on the Russell method, the decrease in a number of shares and increase in share price is adjusted accordingly, However, no other changes need to be made to the index.

When it comes to the reclassification of share classes into other classes, the method which is used is to make changes to indices once the reclassification has been finalized. The acquiring companies unified share price is used as the total market capitalization of the company. As the total number of shares rises proportionately the following reclassification, the combined market capitalization remains unchanged for the company as a whole. This would mean that there are no changes which need to be made to the indices when such an event occurs. Finally, if the share exchange temporarily closes, the last closing price will be used when the share market reopens.

4. Descriptive statistics

The six Islamic equity style indices for each semi-annual period between May 2006 and April 2011 according to the index construction methodology mentioned above. By utilizing the Securities Commission's *Shariah* Advisory Council's (SAC) list, shares which are either excluded, included or continue to remain as a constituent on the indices. Furthermore, the Russell Co. index construction, screening, and index maintenance methodology was also applied.

Consequently, as a result of decomposing the Islamic shares based on different styles, the number of *Shariah* compliant companies which becomes a constituent of each style classification that combines both value and growth as well as market capitalization characteristics is presented in Table B of Appendix B. Based on this table, Islamic equity style indices can be grouped based on large growth (LG), LV, core growth, core value, small growth, and small value shares.³

Table B indicates that's there are a larger number of growth shares as compared to value shares for all categories of market capitalization. For instance, in May 2006, 70% of large market capitalization shares are growth shares as compared to 27% value shares. Similarly, in October 2006, 70% of large market capitalization shares are growth shares as compared to a relatively small decrease of

23% value shares. Similar observations were found for other categories of market capitalization where it appears that there are more than two-thirds of a majority of Islamic growth shares as compared to value shares.

Furthermore, shares which are classified as “blend,” or a mix between growth and value shares based on the Russell Co. methodology represents the fewest number of shares for all large, core, and small market capitalization shares across all sub-periods.

Certain inferences can be made based on these findings. Firstly, the results of the analysis based on the Islamic share market shows that investors favor growth shares over value shares. This observation agrees Waulkhausl and Loeb’s (2012) analysis of growth shares in Islamic share markets. Furthermore, Bernstein (1995) also argued that investors have an inherent preference for growth shares based on conventional markets. This analysis would provide further evidence that investors, both in conventional as well as Islamic share markets have similar preferences for growth shares.

Secondly, investors have a preference for “pure” shares, which are either “growth” or “value” shares. The low number of “blend” shares which according to the definition based on the Russell Co. methodology, consist of shares with both growth and value features, would indicate that investors do not perceive there to be any value in investing in shares with “blend” features. Amenc, Faff and Martellini (2003) argued that “pure” indices are more valuable than “overlapping” or “blend” indices and would outperform the blend indices. The findings from this study would further suggest that completeness and purity of shares are important to investors who have preferences for “pure” growth and value shares.

The results above seem to indicate that investors have similar preferences when it comes to growth shares and purity. Preferences for growth shares during periods of economic recession (during the Global Financial Crisis) would be another area of interest which could be a subject for further studies.

Table B also seems to indicate that growth shares constitute a larger percentage of total shares (with an average of 74%) which make up the Islamic equity style indices over the ten semi-annual periods. This is followed by the value shares (with an average of 29%) and finally the blend of large and small shares (with an average of about 10%) which constitutes the smallest percentage of the total shares selected. This finding, in fact, corresponds with findings by Bernstein (1995) who argued that there is a preference for investors to invest in LG style shares in conventional US equities.

5. Forecasting evaluation

A useful method that can be applied in order to test the robustness of an index is the Vector Auto Regression (VAR) forecasting evaluation method. The forecasting method which is used is the one-step ahead and the multi-step ahead forecasting method. The forecasting algorithm VAR forecasting method is based on a VAR (p) equation where

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + \varepsilon_t \tag{13}$$

where y_t is defined as $(y_{1,t}, y_{2,t}, \dots, y_{k,t})^T$, of $k \times 1$ vector, where each c is a $k \times 1$ vector of constant (intercept), each A_i is a $k \times k$ coefficient matrix, and ε_i is $k \times 1$ error terms vector. By assuming parameter A of the VAR(1) is known, the traditional 1 step ahead forecast based on time t is:

$$y_{t=1|t} = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p+1} \tag{14}$$

The h steps ahead forecast error is therefore expressed as:

$$y_{t+h} - y_{t+h|t} = \sum_{s=0}^{h-1} \psi_s \varepsilon_{t+h-s} \tag{15}$$

where the matrices Ψ_s are recursive substitution:

$$\Psi_s = \sum_{j=1}^{p-1} \Psi_{s-j} A_j \tag{16}$$

and $A_j = 0$ if $j > p$.

The test of a forecasting model is, in fact, the out of sample forecast performance. In computing the out-of-sample VAR forecast, the mean absolute percentage error (MAPE) and the root mean square percentage error (RMSPE) is used. For h steps ahead forecasted results, the MAPE can be calculated based on:

$$\text{MAPE}(h) = \left(\frac{1}{h} \sum_{t=1}^h \left| \frac{e_h}{y_h} \right| \right) 100\% \tag{17}$$

The RMSPE, on the other hand, can be determined based on:

$$\text{RMSPE}(h) = \sqrt{\frac{1}{n} \sum_{t=1}^h \left(\frac{e_h}{y_h} \right)^2} \times 100\% \tag{18}$$

where

$$e_h = y_t - \hat{y}_t(h), \hat{y}_t \text{ is forecast value for } y_t \tag{19}$$

The simulated (pseudo) based forecasting applied in this study applies both stochastic and deterministic simulation as both of these simulations are unbiased predictors of linear models. Forecasting remains primarily deterministic because application of the deterministic method is more straightforward as compared to the stochastic method (Essi, Olaomi, & Nwabueze, 2006).

In order to perform the forecast, three systems of variables are developed. The first system of variables (Table 1) consists of LV and LG shares together with macroeconomic variables including GDP, IPI, KLCI, and LEI. The second system of variables (Table 2) on the other hand is made up of MV and MG shares together with macroeconomic variables and the third system (Table 3) is made up of SG and SV shares as well as macroeconomic variables. The forecasting evaluation seems to indicate that LG and large value (LV) indices seem to provide the best forecasting estimates based on the chosen system of variables. This can be seen from Table 1 where the RMSPE and MAPE are lower as compared to the other two systems.

The stochastically simulated forecast is preferred because it provides a lower RMSPE and MAPE. In summary, this would infer that it would be better to use the LG and LV indices for purposes of estimation.

Table 1. Simulation based out of sample forecast for first system

Forecast error	Simulation based out of sample forecast											
	Types of simulation: deterministic and stochastic											
%	D	S	D	S	D	S	D	S	D	S	D	S
	LG		LV		GDP		IPI		KLCI		LEI	
MAPE	0.8938	0.8340	1.0151	0.9213	0.0445	0.0442	0.5444	0.5470	0.8528	0.8466	0.2015	0.2008
RMSPE	0.0495	0.0462	0.0544	0.0499	0.0066	0.0063	0.0332	0.0332	0.0695	0.0691	0.0107	0.0106

Table 2. Simulation based out of sample forecast for second system

Forecast error	Simulation based out of sample forecast											
%	Types of simulation: deterministic and stochastic											
	D	S	D	S	D	S	D	S	D	S	D	S
	MG		MV		GDP		IPI		KLCI		LEI	
MAPE	2.0569	2.0224	2.2966	2.2503	0.1518	0.1574	0.6455	0.6399	1.0442	1.0523	0.2432	0.2442
RMSPE	0.1097	0.1085	0.1279	0.1273	0.0227	0.0235	0.0366	0.0364	0.0816	0.0823	0.0133	0.0134

Table 3. Simulation based out of sample forecast for third system

Forecast error	Simulation based out of sample forecast											
%	Types of simulation: Deterministic and stochastic											
	D	S	D	S	D	S	D	S	D	S	D	S
	SG		SV		GDP		IPI		KLCI		LEI	
MAPE	1.1642	1.1251	1.0396	1.0170	0.1071	0.1081	0.5897	0.5876	0.8340	0.8175	0.1811	0.1826
RMSPE	0.0631	0.0617	0.0619	0.0608	0.0159	0.0161	0.0334	0.0333	0.0648	0.0637	0.0099	0.0100

6. Trading strategies

We shall now explain the significance of newly developed Islamic equity style indices by undertaking simple trading strategies. The trading strategies which we shall employ can be divided into buying and selling stock portfolios based on SMB (small minus large market capitalization) and HML (high minus low B/P or value minus growth) stocks. These trading strategies will be further divided into three sub-periods to include the full period of the study, pre-crisis period and post-crisis period. The results from these trading strategies are further explained in Table D of Appendix D.

The results from Appendix D suggest that there is a benefit of creating portfolios of Islamic stocks based on Fama and French size and value factors. The value stocks seem to outperform growth stocks with an annualized return of 3.13% for the full period of the study. Highest investment returns could be achieved by buying value and selling growth stocks during the pre-crisis period (annualized return of 5.90%). However, the post-crisis period results seem to indicate that selecting stocks based on size (buying small and selling large cap) stocks yield better returns as compared to selecting stocks based on value and growth characteristics.

7. Newly created Islamic equity style indices

The created indices can be classified as LG, LV, medium growth (MG), medium value (MV), SG, and SV shares. These indices which have been constructed can be seen as below in Figures 1–3 as below:

Figure 1. LG and LV Islamic equity style indices.



Figure 2. MG and MV Islamic equity style indices.



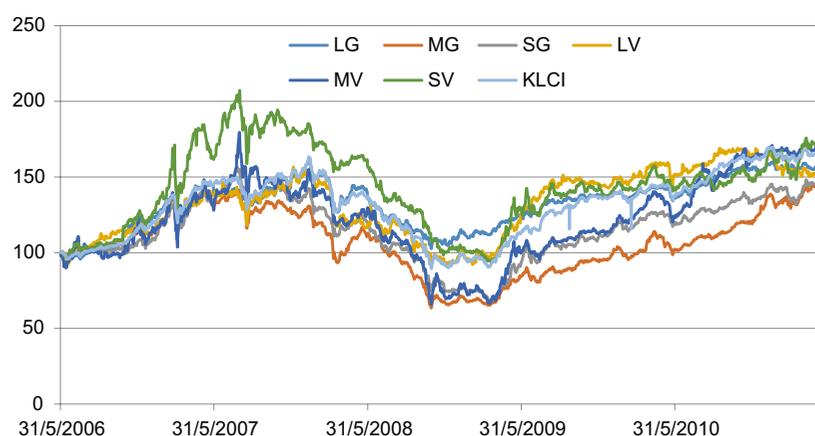
Figure 3. SG and SV Islamic equity style indices.



The newly constructed indices will only be valuable provided it can be proven that it has the application based on existing literature on equity style indices. However, some simple tests can be performed to find for the efficacy of the newly constructed indices. An example of a test that can be conducted is to test the index against the FTSE KLCI to see the degree of correlation of the index. Figure 4 below shows a graphical representation and a correlation between Islamic Equity style indices with the broad-based FTSE KLCI index.

The graph above seems to indicate that the FTSE KLCI broad market index seems to move in tandem with the rest of the newly created Islamic Equity style indices. Furthermore, it is also evident from the graph that Islamic equity style indices and conventional indices are pro-cyclical in the sense that they move downwards during periods of economic crisis and upwards when the economy recovers. The downtrend of the Islamic equity style indices during the Global Financial Crisis in late 2007 and its pro-cyclical nature with the conventional index (KLCI) would be of interest to both investors and regulators.

Figure 4. Islamic equity style indices (LG, LV, MG, MV, SG, SV) and the Kuala Lumpur composite index (May 2006–April 2011).



Intuitively, regulators would be able to infer by looking at the behavior of the Islamic equity style indices that it acts as a bellwether for economic conditions. The strength and reliability of the Islamic equity style indices which is to be used as a forecast for economic conditions, however, has to be tested based on contemporary econometric methods.

Investors, on the other hand, would be able to use the newly constructed indices a useful tool for purposes of making asset allocation decisions. The graphs based on Figure 4 seem to indicate that the Islamic equity style indices would not offer diversification benefits to investors due to the positive correlation between Islamic equity style indices and the conventional index (KLCI). However, benefits of the newly constructed indices for investors have not been tested unless further studies are done based on the predictive properties as well as volatility studies relating to the indices.

8. Conclusion and implications

This study successfully demonstrates that an equity style index for Islamic shares listed on the FTSE EMAS *Shariah* index can be successfully created. The development of the Islamic equity style indices can be summarized as a series of steps beginning with sorting growth, value, and blend stocks using the Russell Co. method into large, small, and core (or mid-cap) stocks. This is followed by using the market capitalization method in order to construct the six Islamic equity style indices including LG, LV, MV, MG, SV, and SG indices. The indices are rebalanced semi-annually to coincide with the release of the *Shariah* compliant list of shares on the FTSE EMAS *Shariah* index and are screened based on index maintenance methods suggested by the Russell method.

The descriptive statistics shows evidence that there is a preference for Islamic growth stocks under all categories of market capitalization. Furthermore, “blend” stocks which have a combination of properties of both growth and value shares are least preferred among investors. This would imply that investors are more convinced about investing in “pure” shares which do not have crossover properties.

The study also suggests that Islamic indices has a correlation with the FTSE KLCI index and can be used for research in areas relating to asset pricing and Islamic capital markets. The out-of-sample VAR forecast, on the other hand, seems to indicate that the LG and LV indices are the best candidates for purposes of benchmarking.

From the perspective of investors and fund managers, the newly created indices have various applications which help from the point of view of benchmarking performance of portfolios. The recent fad with smart beta in the investment community is a new direction which Islamic funds may pursue. Also, the newly created share market indices will have a positive effect on the Islamic capital markets as an information source for managers who are keen on developing Islamic share market portfolios which could outperform conventional indices. The evidence from the simple trading strategies shows further provides evidence that value and small capitalization stocks are beneficial when it comes to creating investor portfolios.

Policy-makers would also benefit from the creation of the Islamic equity style indices for a number of reasons. Firstly, the Islamic equity style indices can be used as a bellwether and a benchmark for economic conditions. Secondly, it is important that the regulators are aware of developments in investing community. Investors are looking for transparency and indices which are reliable, efficient, and representative. The SAC should be aware of the implications of making correct decisions when it comes to the selection of companies which later become constituents of the FTSE EMAS *Shariah* Index. This is to ensure that the equity style indices are correctly developed. Also, further studies would help to uncover types of investors that have preferences for Islamic growth shares. The SC would also be wise to set up measures in order to best protect the interest of existing and potential investors.

However, there are a number of limitations to the current methods used to create this index. The maintenance of the index precludes the effect of mergers and acquisitions, dividend announcements, rights offerings as well as float adjustments had not been performed on the indices. It may be interesting to see the effect to the indices as a result of these adjustments.

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Notes

1. The smart beta methodology is an improvement to the market capitalization weighted method (cap weighted method) of designing investment portfolios. Smart beta portfolios can be formed by using smart beta factors which are derived from factor premia such as value, size, momentum and volatility and not only dependent on size. These smart beta factors are derived by extending asset pricing models such as the Fama and French three-factor model. Consequently, a smart beta index can be formed for purposes of portfolio benchmarking. Smart beta indices have been merited with its low tracking error and abnormal returns for portfolios tracking the index despite the high management cost (Amenc et al., 2014). A diversified multi-beta strategy can also be formed based on a portfolio rotation strategy in order to maximize returns from the smart beta portfolio.
2. The FTSE Russell Bursa Malaysia Index Series method was used in order to group Islamic stocks into large-cap, mid-cap and small-cap stocks.
3. Value and growth, as well as size characteristics, are determined based on the Russell Co. methodology which was applied in the index construction methodology section.

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Appendix A

Table A below present’s international Islamic equity style indices according to index providers. The table further includes information on Islamic index coverage, source as well as the presence of growth, value, and size factors.

Table A. International Islamic equity style index providers

Panel A. Russell Co., FTSE, and MSCI

Index providers	Russell Co.	FTSE	MSCI
Islamic index coverage	Regional indices including: <ul style="list-style-type: none"> • BRIC¹ • Developed Emerging Markets Global • Global + GCC² • US Islamic Large 	Shariah Indices including: <ul style="list-style-type: none"> • FTSE Bursa Malaysia EMAS Shariah Indices and Hijrah Indices • FTSE SET Shariah Indices • FTSE TWSE Taiwan Shariah Index • FTSE/JSE Shariah Indices • FTSE SGX Shariah Index • FTSE Physical Industrial Metals Index 	Regional indices including: <ul style="list-style-type: none"> • Developed economies • Emerging markets • GCC Frontier Markets
Source	Russell ideal ratings Islamic indices	FTSE Shariah global equity index	MSCI global Islamic indices
Growth and value style factors	No	No	No
Size factor	Yes	Yes	Yes

Panel B. S&P Dow Jones, Morningstar, and Thomson Reuters

Index providers	S&P Dow Jones	Morningstar	Thompson Reuters
Islamic index coverage	Country and Regional Islamic Indices including Strategic and Thematic IndicesFor example: <ul style="list-style-type: none"> • DJ Islamic Market International Titans 100 Index • DJ Islamic Malaysia Titans 25 Islamic (USD) • DJ Islamic Sustainability Index 	Classifies funds in Growth and Value factors.For example: <ul style="list-style-type: none"> • Aberdeen Islamic I Equity Class • Public Islamic Asia Tactical Allocation FundHowever, no benchmark index is available 	Regional, country and sectoral indices
Source	S&P Dow Jones Islamic Indices	my.morningstar.com	Thompson Reuters Ideal Ratings Islamic Indices
Growth and value style factors	No	Yes	No
Size factor	Yes	Yes	Yes

¹BRIC refers to Brazil, Russia, India, and China.

²GCC refers to Gulf Cooperation Council which is a political and economic alliance of six Middle Eastern countries including Saudi Arabia, Kuwait, the United Arab Emirates, Qatar, Bahrain, and Oman.

Appendix B

Table B below presents results for cross tabulation of style and market capitalization for large, core, and small stocks according to growth, value, and blend characteristics for 10 sub-periods from May 2006 to April 2011.

Table B. Cross tabulation of style and market capitalization

May-06		Growth	Value	Blend	Total	Oct-06		Growth	Value	Blend	Total
Large	Count	21	8	1	30	Large	Count	21	7	2	30
	%	70%	27%	3%	100%		%	70%	23%	7%	100%
Core	Count	46	23	1	70	Core	Count	48	20	2	70
	%	66%	33%	1%	100%		%	69%	29%	3%	100%
Small	Count	170	57	3	230	Small	Count	162	49	31	242
	%	74%	25%	1%	100%		%	67%	20%	13%	100%
Total	Count	239	89	5	333	Total	Count	233	77	35	345
	%	72%	27%	2%	100%		%	68%	22%	10%	100%

May-07		Growth	Value	Blend	Total	Nov-07		Growth	Value	Blend	Total
Large	Count	22	7	1	30	Large	Count	21	7	2	30
	%	73%	23%	7%	100%		%	70%	23%	7%	100%
Core	Count	30	37	3	70	Core	Count	12	50	8	70
	%	43%	53%	4%	100%		%	17%	71%	11%	100%
Small	Count	250	86	20	356	Small	Count	432	168	38	638
	%	70%	24%	6%	100%		%	68%	26%	6%	100%
Total	Count	304	131	24	459	Total	Count	466	226	48	740
	%	66%	29%	5%	100%		%	63%	31%	7%	100%

May-08		Growth	Value	Blend	Total	Nov-08		Growth	Value	Blend	Total
Large	Count	22	8	0	30	Large	Count	23	7	0	30
	%	73%	27%	0%	100%		%	77%	23%	0%	100%
Core	Count	44	24	2	70	Core	Count	59	9	2	70
	%	63%	34%	3%	100%		%	84%	13%	3%	100%
Small	Count	361	60	29	450	Small	Count	245	90	2	337
	%	80%	13%	6%	100%		%	73%	27%	1%	100%
Total	Count	429	93	31	553	Total	Count	329	106	4	439
	%	78%	17%	6%	100%		%	75%	24%	1%	100%

May-09		Growth	Value	Blend	Total	Nov-09		Growth	Value	Blend	Total
Large	Count	20	5	5	30	Large	Count	19	6	5	30
	%	67%	17%	17%	100%		%	63%	20%	17%	100%
Core	Count	45	19	6	70	Core	Count	50	18	2	70
	%	64%	27%	9%	100%		%	71%	26%	3%	100%
Small	Count	189	59	13	261	Small	Count	354	165	0	519
	%	72%	23%	5%	100%		%	68%	32%	0%	100%
Total	Count	256	84	24	364	Total	Count	425	190	7	622
	%	70%	23%	7%	100%		%	68%	31%	1%	100%

(Continued)

Table B. (Continued)

May-10		Growth	Value	Blend	Total	Nov-10		Growth	Value	Blend	Total
Large	Count	22	7	1	30	Large	Count	20	8	2	30
	%	73%	23%	3%	100%		%	67%	27%	6%	100%
Core	Count	43	24	3	70	Core	Count	38	29	3	70
	%	61%	34%	4%	100%		%	54%	41%	4%	100%
Small	Count	201	99	0	300	Small	Count	136	75	12	223
	%	67%	33%	0%	100%		%	61%	34%	5%	100%
Total	Count	268	131	4	403	Total	Count	196	113	17	326
	%	67%	32%	1%	100%		%	60%	35%	5%	100%

Appendix C

Style classification and index construction methodology

To classify and construct an index based on value and growth shares, the Price-to-Book (P/B) ratio is employed and the method is described as below (Fabozzi, 1998):

- Step 1: Select a universe of shares
- Step 2: Calculate the total market capitalization of all shares in the universe
- Step 3: Using the variables for classification, develop a score for each share, with the highest score being value
- Step 4: Sort the shares from highest score to lowest score
- Step 5: Calculate the capitalization-weighted median of the scores
- Step 6: Select the shares with a score above the capitalization-weighted median found in Step 5 and classify them as value shares
- Step 7: Classify the remaining shares in the universe as growth shares.

Appendix D

Table D below reports average monthly returns based on trading strategies for portfolios of Islamic stocks which are grouped according to size (large and small capitalization) and valuation (value and growth stocks). The trading strategies are based on buying the small cap and selling large cap stocks as well as buying value and selling growth stocks. These strategies are further sorted based on portfolios of SMB (small minus big capitalization stocks) and HML (high minus low, or value minus growth) stocks for the full period of the study (from May 2006 to April 2011), pre-crisis period (May 2006 to August 2008) and post-crisis period (September 2008 to April 2011) The monthly returns based on trading strategies for the portfolios are calculated as below:

$$\text{Trading strategy SMB} = \left(\frac{RSVt + RSGt}{2} \right) \times \left(\frac{RLVt + RLgt}{2} \right) \tag{A1}$$

$$\text{Trading strategy HML} = \left(\frac{RSVt + RMVt + RLVt}{3} \right) \times \left(\frac{RSGt + RMGt + RLVt}{3} \right) \tag{A2}$$

The returns for both SMB and HML repeated to calculate monthly returns for the full period, pre-crisis period, and post-crisis period.

Table D. Returns from trading strategies

		Mean	SD	T-statistic	Skewness	Kurtosis	AR (1)	ARCH (1)
Full period	SMB	0.1412	4.3173	0.1512	0.1056	0.1476	0.0267 (0.8421)	0.1445 (0.6991)
	HML	0.2612	2.8116	0.2622	1.6321	5.5229	[-0.048] (0.7178)	0.0001 (0.9909)
Pre-crisis period	SMB	0.0245	5.0869	0.0171	0.3669	-0.1343	[-0.010] (0.9632)	0.0327 (0.8506)
	HML	0.4919	2.7099	0.3421	0.8166	1.4184	0.1093 (0.5960)	1.3996 (0.2311)
Post-crisis period	SMB	0.2396	3.6261	0.1932	-0.4125	0.3031	0.0858 (0.6493)	0.8801 (0.3390)
	HML	0.0666	2.9232	0.0477	2.2918	9.4770	[-0.173] (0.3578)	0.1933 (0.6502)



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