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Constructing Fama–French Factors from Style Indices: Evidence from the Islamic Equity Market

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ABSTRACT: This study has contributed to the analysis of the Fama–French three-factor model by proving the validity of model using the newly constructed Fama–French factors from Malaysian Islamic stock market. With generalized method of moments and robustness tests, our results compliment earlier studies by comparing the results over two sub-periods, before and after the financial crises and the fall of Lehman Bros. The results of the analysis suggest that the reversal of size effects exists after periods of financial crisis. This is the first attempt to create FF factors and test the model from Islamic equity style indices.

KEY WORDS: equity style index, Fama–French three-factor model, generalized method of moments, Islamic equity market, Islamic finance

The introduction of the Fama–French (FF) three-factor model in the early 1990s has been greeted with both acceptance and scepticism by researchers in the area of asset pricing. Nonetheless, the seminal work has been widely accepted as an improvement to the capital asset pricing model (CAPM) by Sharpe (1964) and Lintner (1965). However, studies emanating from this work were mainly conducted in the US market.

Over the years, there has been growing acceptance for the asset pricing theory developed by Fama–French throughout the world. Studies performed by Faff (2003) and Long Pham (2007), respectively, support the validity of the three-factor model in Australia and Japan using national stock market data. Both studies in fact substantiated the robustness of the Fama–French factor betas with the use of simple “off-the-shelf proxies” based on FF size and book-to-market factors with certain exceptions when it comes to results which are in contradiction to findings by Fama–French (1992).

This study performs similar tests identified by Faff (2003, 2004) and Long Pham (2007). However, the study focuses on the Islamic capital markets in Malaysia and the Shariah index which are currently under researched. The importance of conducting tests on this Islamic stock market index cannot be overlooked due to the significance and growth of the Islamic stock market index in Malaysia. In this study, the FF factors created from Malaysian Islamic stock market indices are newly constructed and in and of itself contributes a new body of knowledge to the area of asset pricing which is related to Islamic stock market data.

Based on the newly developed FF factors from Islamic stocks, this article attempts to address some of the issues pertaining to the validity of the FF model as well as certain areas which warrant further research. Our findings indicate that there is a reversal of size effects relating to post-crisis periods, similar to finding by Faff (2003). The three-factor model also appears to be empirically superior to the CAPM model in explaining stock prices. To further prove the existence of the FF model in the Malaysian Islamic stock market, several tests based on the generalized method of moment (GMM) methodology are carried out to prove the validity of the newly created FF factors.

Based on the empirical tests, the GMM results indicate that the FF three-factor model in fact supports previous studies. It would also suggest that the three-factor model can be used for purposes of

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devising an asset portfolio. Furthermore, there are certain issues and problems relating to the three-factor model which is subject to much debate. Issues regarding reversal of size effects and negative risk premia require further closer analysis as the findings may not necessarily support existing theory. Nonetheless, the results of this study have meaningfully contributed by way of verifying the use of the Islamic Equity style indices as a benchmark index. We also believe that the index can be used in this case for assessing the performance of the Malaysian sectoral indices. These findings will prove useful both for investors who are trying to improve their asset allocation decision-making and for policy-makers who are concerned with developing the Islamic financial markets. Another compelling reason might be the fact that the Malaysian government has an interest in ensuring that the success in growth of the Islamic capital markets can be sustained with a better understanding of the nature of market. A reliable set of Islamic equity style indices may not help to ameliorate all the possible problems pertaining to managing the Islamic capital markets, but might aid in further understanding it.

The remainder of the article is organized as follows. First we review the related literature and present the empirical methodology used to analyze the Islamic stock market data. Then we describe the data and variables employed, and discuss the findings and how they are related to the objectives of this study. Finally, we provide conclusions and suggestions for future research.

**Fama–French Three-Factor Model and Islamic Stock Markets**

The three-factor model by Fama–French, as described by many finance scholars from their seminal article in 1992, represents one of the most influential articles in the last two decades (Faff 2003). Their study proves that beta has no ability to explain cross-sectional variations in equity returns. Instead, other more fundamental factors, more notably size, and book-to-market value of equity in fact better explain the cross-sectional returns of stocks. They evaluate the joint effects of market beta, size, earnings to price (E/P) ratio, leverage and the book value (BV)/market value(MV) on a cross section of average returns (Reilly and Brown 2009). While size and average returns are significantly negatively related, BV/MV ratio and average return are found to be positively related. Both size and BV/MV are significant when included together (Fama and French 1992). Similar findings are reported in Grinold (1993), Davis (1994) and He and Ng (1994).

The Fama–French three-factor model in fact improved on the capital asset pricing model by introducing two additional factors, namely size and book-to-market ratio. The addition of these factors improved how investors approached asset pricing models by accounting for the size and value effect on firm’s returns. Consequently, fund managers utilized this new model for purposes of improving the way their investment portfolios are constructed.

The research performed by Faff (2003) lends credence to the three-factor model as proposed by Fama–French by successfully proving that Frank Russell Co. style portfolios can be used to create Fama–French factors. As a proxy to mimic the portfolio suggested by Fama–French (1992), the Russell-based style indices do not reject the Fama–French model after having being tested based on a multivariate asset-pricing analysis (Faff 2003). Instead, these “off-the-shelf” style indices possess very useful information which can be translated into an active investment management system.

Faff (2003), in his article, also proves that there is a high proportion of SMB and HML betas which take on a positive sign. Walid and Lau (2009) on the other hand followed up on the research by Faff while constructing a Russell/Nomura style index and supported the claims made by prior research. The results from the study were derived from the generalized method of moments (GMM) technique. In doing so, the analysis managed to prove that the Fama–French model is more reflective of the Japanese stock market. There was also evidence that the Fama–French index can be used as a benchmark to be linked to a financial distress indicator. The authors also suggested that investors would require compensation for additional risk as a result of holding small size stocks of high BM ratio and would prefer to accept a discount for larger size stocks. (Walid and Lau 2009)

Long Pham (2007) also contributed toward the debate surrounding the empirical performance of the CAPM and the Fama–French model. Similar to Faff (2003), he attempted to overcome the problems in
constructing market proxies for the Fama–French factors by using Daiwa Style indices as stylized factors to be compared to Daiwa sectoral indices. This article further improved on Fař’s article in 2003 by testing the significance of the newly constructed index against the Tokyo stock exchange, however, found results to be mixed when it came to proving whether the Fama–French model is more superior as compared to the CAPM model and other asset pricing models.

Fař (2004), however, sought to address some findings that he described as variables in the Fama–French model which are not be as robust as suggested in prior literature. The research seems to indicate that when the estimated risk premia are taken into account, the support for the Fama–French model is less persuasive. This article also uncovered a negative size premium and together these findings would suggest that similar to what was postulated by Dimson and Marsh (1999), the reversal of the size effect proposition is less persuasive in proving that small companies tend to outperform larger companies (Fař 2004). Instead, it was argued in this case that small firms have peculiar characteristics which makes them perform differently.

Further conflicting evidence can be seen from the work by Kothari et al. (1995) who argued that book-to-market results are affected by a selection bias. The cross section of expected returns reveals statistically significant compensation for beta risk for an equally weighted index. However, the relation between book-to-market equity returns is weaker and less consistent as compared to Fama–French. (Kothari et al. 1995)

A recent study by Jame and Tong (2013) based on work by Barberis and Shleifer (2003), however, has broken ground on a new area of study utilizing style factors developed by Fama–French. In this study, industry-wide decisions of retail investors are scrutinized and it was found that the retail industry demand is highly correlated and related to past industry returns. Over and above that, industries heavily bought by retail investors over the past year underperform industries overly sold over the same period of time. Therefore, industry-wide categorization influences investment decisions of retail investors and has an impact on asset prices. In recent work by Lau and Lee (2015), it is further shown that equity style index is better than stock market index in transmitting information to selected macroeconomic variables. Equity style indices like growth style or value style possess economic content, and hence, they are suitable candidate to be used as leading economic indicator.

**Theoretical Framework**

In describing the three-factor model, Fama–French (1993) ascertained a theoretical model to explain the stylized effects of two additional factors, namely SMB and HML factors which serves as an addition to the existing CAPM model. The three-factor model is described in equation (1) based on Long Pham (2007):

$$E(R_i) - R_f = b_i[E(R_M) - R_f] + s_iE(R_{SMBt}) + h_iE(R_{HMLt}) \tag{1}$$

where $E(R_i) - R_f$, $E(R_M - R_f)$, $E(R_{SMB})$, $(R_{HML})$ represent the expected excess return on asset $i$, the expected excess return on market portfolio, the expected return on proxy portfolio for the “small-minus-big” size factor, and the expected return on proxy portfolio for “high-minus-low” book-to-market factor, respectively.

We obtain the factor loadings $b_i$, $s_i$, and $h_i$ from the slopes of the empirical counterpart in equation (2):

$$\tilde{R}_{it} - R_f = \alpha_i + b_i(\tilde{R}_{Mt} - R_f) + s_i\tilde{R}_{SMBt} + h_iR_{HMLt} + \tilde{\epsilon}_{it} \tag{2}$$

where $R_{it}$—$R_f$, $R_{Mt}$—$R_f$, $R_{SMBt}$, $R_{HMLt}$ denote the realized excess return on asset $i$, the realized excess return on market portfolio, the realized return on proxy portfolio for size factor, and the realized return on proxy portfolio for the book-to-market factor at time $t$, respectively. The beta coefficients, $b_i$, $s_i$, and $h_i$, represent the sensitivity of the excess return on asset $i$ to changes in returns on common risk
factors. Following from this, by taking the expectation of equation (2) and comparing it to equation (1), the intercept $\alpha$ is expected to be zero for all $i$.

Using Faff’s (2003, 2004) methodology of introducing GMM to test the Fama–French model, we develop the following system of equations:-

$$\tilde{R}_i - R_f = b_i(\tilde{R}_{Mt} - R_f) + s_i \tilde{R}_{SMB} + h_i \tilde{R}_{HML} + \tilde{\epsilon}_i$$  \hspace{1cm} (3)

$$\tilde{R}_{Mt} - R_f = \mu_M + \tilde{\xi}_i$$  \hspace{1cm} (4)

$$\tilde{R}_{SMB} = \mu_{SMB} + \tilde{\psi}_i$$  \hspace{1cm} (5)

$$\tilde{R}_{HML} = \mu_{HML} + \tilde{\omega}_i$$  \hspace{1cm} (6)

$i = 1, 2, \ldots, N$

where $\mu_M, \mu_{SMB}, \mu_{HML}$ are the estimated market premium, SMB premium, and HML premium, respectively. Correspondingly, there are seven sample moments in this system of equations namely:-

$$\left(1/T \sum_{t=1}^{T} \tilde{\epsilon}_i, 1/T \sum_{t=1}^{T} \tilde{\epsilon}_i(\tilde{R}_{Mt} - R_f), 1/T \sum_{t=1}^{T} \tilde{\epsilon}_i \tilde{R}_{SMB}, 1/T \sum_{t=1}^{T} \tilde{\epsilon}_i \tilde{R}_{HML}, 1/T \sum_{t=1}^{T} \tilde{\xi}_i, 1/T \sum_{t=1}^{T} \tilde{\psi}_i, 1/T \sum_{t=1}^{T} \tilde{\omega}_i \right)$$

Also, there are six parameters ($b_i, s_i, h_i, \mu_M, \mu_{SMB}, \mu_{HML}$) to be estimated for each asset. Since the system is over identified (i.e., having more known than unknown variables), the test for assessing identification is conducted to verify whether moment restrictions are valid or not. Under the null hypothesis, the moment restrictions are found to be valid, implying the choice of FF model is appropriate.

**Data and Variables**

**Data**

The data are taken from various Malaysian regulatory bodies including Bank Negara Malaysia (Central Bank of Malaysia), Securities Commission of Malaysia (SC), Department of Statistics of Malaysia, and from Reuters Datastream. We use monthly data covering the period May 30 2006 until May 25 2011. The cubic spline method is employed to determine monthly data points for economic data which was reported on a quarterly basis. The sample period is chosen to coincide with the Shariah Listing of Shariah compliant securities from the Securities Commission of Malaysia. The cubic spline method is used for purposes of interpolating quarterly economic data to produce monthly data which are relevant to this analysis. This method also enables the development of a smooth curve which interpolates values of monthly data. The application of the cubic spline method in capital markets through the mathematical application of a piecewise polynomial function is explained by Granville (2005).

Shariah compliant securities are stocks listed on the Kuala Lumpur Stock Exchange (KLSE) which are approved by the Shariah Advisory Council (SAC) of the Securities Commission of Malaysia (SC) and listed on the website of SC. These stocks are classified as Shariah compliant based on the SAC’s methodology in screening companies to be included in their list of Islamic Shariah compliant securities. The list of Shariah compliant securities is produced twice a year.

The market index being used is the Islamic Equity style indices as derived from the Malaysian Shariah stock market, which is then used to construct the Fama–French “SMB” and “HML” factors which are produced by using the Russell Company method. These indices are identified as large
growth (LG), large value (LV), core growth (MG), core value (MV), small growth (SG), and small value (SV). The risk-free rate is based on the Malaysian Treasury Bill (Band 10) rate.

For purposes of clarity, the Islamic growth stocks (LG and LV) are taken from the top 30 largest Shariah compliant companies listed on the Kuala Lumpur Stock Exchange. The core value (MV) and core growth (MG) stocks represent the following 70 largest stocks. The SV and SG stocks represent the remaining 98% of stocks in the universe of Islamic stocks.

Creation of Malaysian Islamic Equity Style Indices to Develop Fama–French Factors

The large and small growth and value Malaysian Islamic Fama–French factors are developed by using data from the list of Shariah compliant shares traded on the KLSE. Malaysian Islamic Equity style LG, LV, SG, and SV indices are then derived from the KLSE Shariah index using the Frank Russell Company Method in creating sub-indices. The KLSE Sectoral Indices which shall be used for purposes of this study are in fact derived from the KLSE Index. For further explanation regarding the relationship between the indices, refer to Figure 1 below:

Once the Islamic Equity style indices of growth and value factors have been created, they are then utilized to determine the returns of small-minus-big “SMB” and high-minus-low “HML” book-to-market factor. These factors can be described as follows:-

\[
SMB_t = \left( \frac{RSV_t + RSG_t}{2} \right) - \left( \frac{RLV_t + RLG_t}{2} \right)
\]

\[
HML_t = \left( \frac{RLV_t + RSV_t}{2} \right) - \left( \frac{RLG_t + RSG_t}{2} \right)
\]

where RSG_t is the return on the SG index in the period t, RLV_t is the return on the LV index in period t, and the LG is the return on the LG index in period t.

In creating the Malaysian Islamic Equity style indices for purposes of deriving the FF factors, there were certain limitations from the point of view of availability of data which needs to be used for the purpose of constructing the indices. We have dealt with this issue by carefully selecting companies

![Figure 1. Relationship between KLSE Shariah equity style indices and KLSE sectoral indices.](image-url)
which are listed on the Shariah compliant list of companies and also have data available from Reuters Datastream. However, certain companies have been deliberately excluded from the indices due to unavailable data.

**Descriptive statistics.** Panel A below provides basic descriptive statistics of the newly created Islamic FF factors. An important observation from the statistics is that the average SMB and HML premiums are positive for the period tested. This finding is similar to that of Fama–French (1993) which argues for a positive FF premium. Also, the market factor produces the highest average return and the highest standard deviation. This is not consistent with Fama–French’s study which states that the average return of the market is lower than the FF factors; however, results are similar when it comes to the standard deviation of the market returns.

Panel B from Table 1 indicates that the FF factors are weakly correlated with one another. The strongest degree of correlation is between SMB factor and the market factor (0.29). The lowest degree of correlations is between the HML factor when compared against the SMB factor (0.12). Similar findings were found by Fama–French (1993)

### Table 1. Descriptive statistics and correlations between FF factors.

<table>
<thead>
<tr>
<th></th>
<th>$\hat{R}_{mt} - R_f(%)$</th>
<th>$\hat{R}_{SMB}%$</th>
<th>$\hat{R}_{HML}%$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PANEL A: Basic descriptive statistics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.9644</td>
<td>0.1412</td>
<td>0.1696</td>
</tr>
<tr>
<td>Median</td>
<td>1.2773</td>
<td>0.2188</td>
<td>-0.2451</td>
</tr>
<tr>
<td>Maximum</td>
<td>13.5454</td>
<td>11.6461</td>
<td>9.4306</td>
</tr>
<tr>
<td>Minimum</td>
<td>-15.2226</td>
<td>-8.8989</td>
<td>-5.0792</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>4.6485</td>
<td>4.3173</td>
<td>2.5108</td>
</tr>
<tr>
<td><strong>PANEL B: Correlations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\hat{R}_{mt} - R_f(%)$</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\hat{R}_{SMB}%$</td>
<td>0.29</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>$\hat{R}_{HML}%$</td>
<td>0.22</td>
<td>0.12</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Empirical Test Results

With this newly constructed Islamic Equity style indices, we conduct empirical tests on the performance of the indices against Malaysian sectoral indices. By using these indices, we intend to prove the veracity of the Fama–French (1992) three-factor model by utilizing the factors which have been created in the Islamic Equity style indices. The validity of the three-factor model will be tested based on the generalized method of moments method.

Prior to conducting this study, the SMB (small-minus-big) and HML (high-minus-low) factors have been chosen from the Islamic Indices which were created. The factors are then regressed against Malaysian sectoral indices and then divided into two sub-periods on a monthly basis between June 2006 to August 2008 and September 2008 to April 2011, respectively. The segmentation of the analysis into two sub-periods is done on purpose to coincide with the events before and after the collapse of Lehman Bros upon declaring bankruptcy on September 15 2008. By doing so, the research attempts to empirically evaluate the performance of Islamic equity style indices in Malaysia having isolated any spillover effects as a consequence of the ill-fated downfall of Lehman Bros. and the global financial crisis. Also, the attempt to separate the indices based on two sub-periods will also test the robustness of the Fama–French three-factor model based on normal assumptions.
The choice of using GMM as an alternative to ordinary least squared (OLS) test is because the GMM method of estimation has several advantages in this case as compared to OLS. Among others, GMM modeling provides a general estimator which encompasses standard econometric estimators including OLS, instrumental variables (IV), and maximum likelihood. Also, GMM is valid under weaker assumptions about the normality of data distribution. Finally, GMM provides a consistent variance estimation that gains in efficiency and helps to avoid biasness in calculating test statistics (Long Pham 2007).

Tables 2 and 3 below present the GMM test results based on the Pre-Lehman Brothers collapse sub-period. Based on these tables, it can be proven that market betas are positive and significant. Furthermore, four out of ten size factor (si) betas are positive and significant at the 1% significance level. Also, three out of ten value factors (hi) are positive and significant for this sub-period. The GMM test statistic seems to indicate that the FF model cannot be rejected at the 10% significance level but for the case of the Technology Index subsector.

Tables 4 and 5 below, however, present the GMM test results based on the Post-Lehman Brothers sub-period. It can be shown that market betas are also positive and significant, and three out of ten size factor (si) are positive and significant at the 1% significance level. Also, five out of ten value factors (hi) are positive and significant for this sub-period. However, in comparison with the Post-Lehman Brothers sub-period, three out of ten GMM test statistics are below the 10% significance level, most notably the Consumer Product Index subsector which has a GMM test statistic below 5%.

The single rejection of an industry subsector is similar to a scenario identified by Faff (2004) where the Resources sector industries rejected the FF model over the full sample period (from May 1996 to April 1999).\(^1\) In fact, the findings by Faff (2004) seem to suggest that the FF model is not

### Table 2. GMM test results for Malaysian sectoral indices when regressed against Malaysian Islamic FF factors for the pre-Lehman Brothers sub-period.

<table>
<thead>
<tr>
<th>KLSE subsector index</th>
<th>Bi</th>
<th>si</th>
<th>hi</th>
<th>GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance index</td>
<td>0.888 (9.23***)</td>
<td>0.168 (2.36***)</td>
<td>0.067 (0.43)</td>
<td>0.48 [0.827]</td>
</tr>
<tr>
<td>Construction index</td>
<td>1.413 (10.38***)</td>
<td>−0.144 (−0.02)</td>
<td>−0.378 (2.08**)</td>
<td>0.62 [0.803]</td>
</tr>
<tr>
<td>Consumer product index</td>
<td>0.582 (6.95***)</td>
<td>0.176 (3.35***)</td>
<td>0.078 (0.53)</td>
<td>1.80 [0.179]</td>
</tr>
<tr>
<td>Industrial products index</td>
<td>0.992 (17.30***)</td>
<td>0.353 (6.72***)</td>
<td>−0.089 (−0.71)</td>
<td>0.37 [0.952]</td>
</tr>
<tr>
<td>Trade and services index</td>
<td>0.948 (26.01***)</td>
<td>−0.024 (−0.58)</td>
<td>−0.046 (−0.66)</td>
<td>1.08 [0.300]</td>
</tr>
<tr>
<td>Technology index</td>
<td>0.504 (3.79***)</td>
<td>−0.027 (−0.14)</td>
<td>−0.231 (−1.00)</td>
<td>5.79 [0.016]</td>
</tr>
<tr>
<td>Properties index</td>
<td>1.153 (7.63***)</td>
<td>0.678 (9.91***)</td>
<td>0.345 (1.26)</td>
<td>0.24 [0.627]</td>
</tr>
<tr>
<td>Plantation index</td>
<td>1.504 (6.22***)</td>
<td>0.063 (0.46)</td>
<td>−0.145 (−0.50)</td>
<td>1.68 [0.195]</td>
</tr>
<tr>
<td>Mining index</td>
<td>1.059 (2.95***)</td>
<td>0.366 (0.69)</td>
<td>1.276 (2.27**)</td>
<td>2.43 [0.119]</td>
</tr>
<tr>
<td>Industrial index</td>
<td>0.894 (15.52***)</td>
<td>−0.152 (1.71)</td>
<td>−0.109 (−1.04)</td>
<td>0.32 [0.858]</td>
</tr>
</tbody>
</table>

### Table 3. This table presents summary of Market, SMB, and HML betas for the pre-Lehman Brothers sub-period.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Max</th>
<th>Min</th>
<th>Sig. Positive</th>
<th>Sig. Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>bi</td>
<td>0.9937</td>
<td>1.504</td>
<td>0.504</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>si</td>
<td>0.1457</td>
<td>0.678</td>
<td>−0.152</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>hi</td>
<td>0.1524</td>
<td>1.276</td>
<td>−0.231</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Notes: This table presents the results of testing the FF model in the system of regressions (3), (4), (5), and (6). The sample is monthly return data extending from January 1984 to December 2004. GMM is Sargan or J test statistic of over-identifying restrictions. Standard errors computed from heteroscedastic-consistent matrix (Robust-White). The associated t-statistic is in parentheses (). The associated p value is in square brackets [ ]. ***, **, * indicate significant at 1% level, 5% level, and 10% level, respectively.
overwhelmingly endorsed due to the fact that the overall GMM test statistic for the sample period proving that the model needs to be rejected at the 10% significance level.

In comparing results from both sub-periods, the plantation subsector beta was the highest Pre-Lehman Bros. at 1.504, while the mining subsector was highest at 1.986 post-Lehman Bros. This would imply that both of these important subsectors are the riskiest by virtue of the high betas which can be seen across sub-periods. The technology subsector on the other hand has recorded a beta of 0.504 pre-Lehman Bros, while the Consumer products subsector recorded the lowest beta of 0.561 in the corresponding sub-period. Both subsectors registered the lowest beta coefficients and implies the riskiest form of investment opportunities across both sub-periods.

Nonetheless, there is proof to suggest that the reversal of the size effect can be identified across the two sub-periods. Notwithstanding negative size and book-to-market premiums, the summary results would support this assertion. This finding is consistent with the results of Gompers and Metrick (1998), Gustafson and Miller (1999) and others.

In testing the validity of the moment restrictions, the GMM statistics seem to indicate that the Fama–French model is supported in most cases for all 10 subsectors against both sub-periods. However, the Technology Index during the Pre-Lehman Bros. period did not produce a satisfactory GMM statistic. In the Post-Lehman Bros. period on the other hand, the Consumer Product Index presents GMM statistics which does seem to suggest that the FF model needs to be rejected at the 5 percent level.

Table 4. GMM test results for Malaysian sectoral indices when regressed against Malaysian Islamic FF variables for the post-Lehman Brothers sub-period.

<table>
<thead>
<tr>
<th>KLSE subsector index</th>
<th>bi</th>
<th>si</th>
<th>hi</th>
<th>GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance index</td>
<td>1.138 (19.59***)</td>
<td>0.137 (1.59)</td>
<td>0.016 (0.18)</td>
<td>0.71 [0.400]</td>
</tr>
<tr>
<td>Construction index</td>
<td>0.906 (7.36***)</td>
<td>0.288 (1.60)</td>
<td>−0.014* (−0.05)</td>
<td>0.12 [0.726]</td>
</tr>
<tr>
<td>Consumer product index</td>
<td>0.561 (6.46***)</td>
<td>−0.224 (−0.02)</td>
<td>−0.089 (−0.64)</td>
<td>4.68 [0.031]</td>
</tr>
<tr>
<td>Industrial products index</td>
<td>0.810 (9.61***)</td>
<td>0.513 (5.02***)</td>
<td>0.041 (0.69)</td>
<td>0.20 [0.658]</td>
</tr>
<tr>
<td>Trade and services index</td>
<td>0.771 (9.95***)</td>
<td>0.068 (0.79)</td>
<td>0.233 (1.88*)</td>
<td>0.13 [0.061]</td>
</tr>
<tr>
<td>Technology index</td>
<td>0.718 (2.62***)</td>
<td>0.853 (2.92***)</td>
<td>0.918 (2.28*)</td>
<td>0.32 [0.571]</td>
</tr>
<tr>
<td>Properties index</td>
<td>0.914 (8.05***)</td>
<td>0.681 (5.76***)</td>
<td>0.413 (2.07**)</td>
<td>2.84 [0.092]</td>
</tr>
<tr>
<td>Plantation index</td>
<td>1.290 (5.42***)</td>
<td>0.056 (0.22)</td>
<td>−0.623 (−1.73*)</td>
<td>0.23 [0.635]</td>
</tr>
<tr>
<td>Mining index</td>
<td>1.986 (5.46***)</td>
<td>0.288 (0.72)</td>
<td>1.801 (3.62***)</td>
<td>0.25 [0.875]</td>
</tr>
<tr>
<td>Industrial index</td>
<td>0.595 (6.46***)</td>
<td>−0.011 (−0.14)</td>
<td>−0.032 (−0.32)</td>
<td>0.32 [0.858]</td>
</tr>
</tbody>
</table>

Table 5. This table presents summary of Market, SMB, and HML betas for the post-Lehman Brothers sub-period.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Max</th>
<th>Min</th>
<th>Sig. Positive</th>
<th>Sig. Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>bi</td>
<td>0.9689</td>
<td>1.986</td>
<td>0.561</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>si</td>
<td>0.2649</td>
<td>0.853</td>
<td>−0.224</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>hi</td>
<td>0.2661</td>
<td>1.801</td>
<td>−0.623</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

Notes: This table presents the results of testing the FF model in the system of regressions (3), (4), (5), and (6). The sample is monthly return data extending from January 1984 to December 2004. GMM is Sargan or J test statistic of overidentifying restrictions. Standard Errors computed from heteroscedastic-consistent matrix (Robust-White). The associated t-statistic is in parentheses (). The associated p value is in square brackets []. ***, **, * indicate significant at 1% level, 5% level, and 10% level, respectively.
Conclusion

In summary, these findings are supportive of the Fama–French model and in large part verify the results of Faff (2003) and Long Pham (2007). Furthermore, the robustness test of the model seems to provide even more conclusive evidence that the Fama–French model does perform consistently across periods of economic change. What is even more interesting is the fact that the newly developed Islamic Equity style indices, of which the Fama–French factors are derived for purposes of this study have, by and large, survived a test of its validity by supporting claims made by previous research work done in the area.

The findings of the study also would lead us to believe that the fund managers and investors who trade in the Islamic stock markets can use the evidence provided from this study to aid in the construction of asset portfolios. The empirical evidence seems to indicate that the effect of size and value does in fact exist in most cases when it comes to the Shariah stock market index. These findings are consistent with Dimson and Marsh’s (1999) assertions.

An interesting outcome of this study is that the FF factors, which have been derived from Malaysian Islamic stock market data, and the fact that the Shariah compliant universe of stocks concur with the three-factor model would suggest that it is beneficial not only for investors, but also for divisors of policy and regulations. Assuming that the Islamic Equity style indices are used for purposes of benchmarking performance of securities, it is incumbent on the regulators to ensure that the Shariah Advisory Council (SAC) acts efficiently and consistently when it comes to selecting Islamic compliant securities. This is because the selection criteria may have an influence on the Islamic Equity style indices and adversely affect the ability of investors to rely on the validity of the indices.

In conclusion, the results of our findings from this analysis, though supportive of the FF three-factor model, need to be qualified and further analyzed in order to explain results which appear as outliers. Given the limitations of this study, it would be interesting to analyze the results when compared against other international indices relating to Islamic capital markets as this may give researchers and analysts a clearer idea about the risk premia and behavior of the Islamic stocks when measured against the three-factor model.

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Note

1. Refer to Faff (2004).

References


