Full text document (pdf)

Citation for published version

Abadi, R., & **Silva, F.** Do Islamic fundamental weighted indices outperform their conventional counterparts? An empirical investigation during the crises in the MENA region. *Eurasian Economic Review* (2020). <https://doi.org/10.1007/s40822-020-00158-x>

DOI

<https://doi.org/10.1007/s40822-020-00158-x>

Link to record in RepositóriUM

<https://repositorium.sdum.uminho.pt>

Document Version

Author's Accepted Manuscript

Universidade do Minho
Escola de Economia e Gestão

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Do Islamic fundamental weighted indices outperform their conventional counterparts? An empirical investigation during the crises in the MENA region.

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Acknowledgement

This work was carried out within the funding with COMPETE reference no POCI-01-0145-FEDER006683, with the FCT/MEC's (Fundação para a Ciência e a Tecnologia, I.P.) financial support through national funding and by the ERDF through the Operational Programme on "Competitiveness and Internationalization COMPETE 2020 under the PT2020 Partnership Agreement".

Do Islamic Fundamental Weighted Indices Outperform their Conventional Counterparts? An Empirical Investigation During during Crises in the MENA Region

Abstract

This paper investigates the performance of Islamic fundamental weighted (FW) portfolios compared to that of non-Islamic counterparts, to examine whether Shari'ah-compliant stocks can protect investors during crises in the Middle East and North Africa (MENA) region. Portfolios' performance is assessed using several risk-adjusted performance measures including more robust measures in the context of recently developed multi-factor models.

The study's findings suggest that the performance of Islamic and non-Islamic FW portfolios depends on the performance measures used and on the periods under analysis. Both Islamic and non-Islamic FW portfolios underperform against the cap-weighted (CW) benchmark. Furthermore, the Islamic portfolios underperform compared to their non-Islamic counterparts during the period of the global financial crisis, while they perform similarly to their non-Islamic counterparts during the Arab Spring period.

Based on these results, we conclude that Islamic FW portfolios do not seem to protect investors from losses during crises.

Keywords: *Islamic fundamental weighted portfolios, Arab Spring, global financial crisis, MENA markets.*

JEL Classification: F65, G01, G11, G12

1. Introduction

Market stability is one of the main standards that encourages investors to allocate their money primarily in emerging market assets. In the last few years, many countries in the MENA region suffered from geopolitical conflicts that affected the economies of all countries in the region. In late 2010, revolutions in Tunisia, Egypt, Yemen, and Libya had begun. These revolutions, which also spread to Syria, Iraq, and many other countries, became known as the Arab Spring. Because of these conflicts, the Tunisian stock exchange was closed for more than two weeks and the Egyptian stock exchange was closed for two months. Moreover, some economies in the MENA region also suffered from the conflicts in neighboring countries. The continued fighting in Syria and Egypt affected the stability of Lebanon and Jordan. Before the Arab Spring, the region also suffered from the global financial crisis of 2007–2009, which had a detrimental effect on the real estate sector in many Gulf countries, including the United Arab Emirates and Kuwait (Martin, Osorio, Battista, Hanouz, Geiger, & Galvan, 2014). The global financial crisis led to the failure of many large financial institutions and to a sharp decline in oil prices due to weak global demand. In 2014, this region faced another oil price slump, as oil prices plummeted by around 60% in the fourth quarter of that year. These events had severe consequences on the national economies of the MENA region as a whole, particularly, on investment decisions and financial asset prices.

The MENA region is dominated by the financial sector, which is one of the most affected sectors by market instability. Rejichi, Aloui, and Nguyen (2014) find that the banking sector plays an important role in ensuring market efficiency in the MENA region. Furthermore, in the MENA region, there are Islamic institutions, which operate based on Islamic law, and non-Islamic institutions whose operations are based on conventional banking laws. During the last decade, the Islamic finance industry has seen a huge expansion in global capital markets. The demand for Islamic-compliant financial assets is expanding, mainly, in Islamic emerging markets, where many investors prefer to invest in stocks and portfolios that follow Islamic laws. Among the MENA countries, Bahrain, Qatar, Kuwait, Oman, United Arab Emirates, and Saudi Arabia have the most developed Islamic sectors and provide the largest chunk of the total value of Islamic investments worldwide.

The Islamic-compliant financial institutions operate differently from their conventional peers since they follow the principles of Shari'ah law (i.e., Islamic law). Shari'ah principles prohibit the charging of interest and use risk sharing instead. This makes the general conceptual framework for Islamic institutions' financial statements different from that of conventional financial institutions. The two sides of the balance sheet, liabilities, and assets, will be affected by Islamic law. The funds

on the liabilities side are collected through investment deposits and demand deposits. The assets side is affected because Islamic institutions use interest-free financing instruments since the Shari'ah prohibits charging an interest rate (Hassan, Farhat, & Al-Zubi, 2003). Revenues and expenses are also affected since the type of loans (Murabaha, Mudarabah, & Musharaka) on which Islamic banks rely to generate their income are different from those of conventional banks. In addition, an argument in the Islamic finance literature contends that Islamic banks generate higher income from their assets (Viverita, 2011). Based on the financial characteristics of Islamic institutions (i.e., low leverage, low account receivables, and low cash), the cash flows of these institutions could be affected. Moreover, the capital structure of Islamic banks depends more on shareholders' capital, while that of conventional banks depends more on loans, which may affect dividend payments. Along with the previously mentioned characteristics, Islamic investing is also based on the asset-backing principle (financing is based on illiquid assets) and the profit-loss sharing principle (contracting parties share not only the profits but also the losses). In this manner, we expect the Islamic financial institutions' fundamentals such as revenues, dividend payments, and equity book value to be higher than those of their conventional counterparts. Furthermore, we expect the impact of Islamic laws on these firm fundamentals to be also shown in their stock values.

The different characteristics of Islamic and non-Islamic financial institutions make it valuable to evaluate the performance of FW portfolios that are constructed based on accounting data, as proposed by Arnott, Hsu, and Moore (2005).

Despite the significant expansion in Islamic finance and in FW indexation strategies, there are very few studies that examine the performance of Islamic FW portfolios. Boudt, Raza, and Wauters (2019) select Shari'ah-compliant S&P 500 stocks over the period 1986–2014 to study the effect of the weighting method on the financial performance of Shari'ah-compliant portfolios. Their results suggest that the choice of weighting method matters for Shari'ah-compliant equity investors in terms of optimizing the financial performance of their portfolios. However, portfolio performance evaluation for countries affected by political and financial crises is still rare in general, particularly, in the MENA region. The absence of such studies motivated us to investigate whether accounting-based portfolios of Islamic stocks could outperform those of non-Islamic stocks during periods of crisis in the MENA region, since the literature argues that Islamic financial institutions are more stable during financial crises and do not face solvency challenges or losses, unlike their non-Islamic peers¹. Thus, this study aims to investigate whether Islamic portfolios that are constructed based on firm fundamentals are able to outperform their conventional counterparts and to analyze the impact of the global financial crisis and the Arab Spring on the performance of those portfolios.

The contributions of this research are twofold. First, this is the first study that investigates the performance of Islamic FW portfolios in comparison with non-Islamic FW portfolios in the MENA region, a region where Islamic investing is a very important issue. In this context, the current study contributes to the Islamic finance literature and to the investing decisions made in Islamic portfolios. Moreover, it provides additional empirical evidence to the fundamental indexation literature by examining the performance of financial institutions that operate differently. Second, this research extends the methods applied in prior literature. In particular, more robust performance measures based on the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model that includes momentum and illiquidity factors are used along with the more traditional risk-adjusted measures to check the robustness of our results.

The remainder of this paper is structured as follows. Section 2 reviews the relevant literature on the performance of Islamic portfolios and the effect of financial and political crises on their performance as well as reviews the literature on the performance of FW portfolios. Section 3 describes portfolio construction methods and the risk-adjusted performance measures used. Section 4 describes the dataset and variables definition. Empirical results are presented and discussed in Section 5. Finally, Section 6 presents the main conclusions.

2. Literature Review

Substantial growth in the Islamic finance industry has led to multiple studies that analyze the performance of Islamic equity indices. In the light of existing literature, the empirical findings show mixed results regarding the performance and risk of Islamic equity indices and Islamic equity portfolios in comparison with their conventional counterparts, mainly during crisis periods. In this section we review the main studies that investigate the performance of Islamic portfolios and the effects of political and financial instability on the performance of Islamic portfolios and FW portfolios.

2.1. Performance of Islamic Portfolios during Crisis Periods

Many researchers have analyzed the performance of Islamic equity portfolios, as an ethical investment in many countries throughout the world during different periods. Using the FTSE Global Islamic Index, Hussein (2004) finds that the Islamic index outperformed the conventional unscreened index for the overall period 1996–2003 and the subperiod 1996–2000 based on the Sharpe ratio, Jensen's alpha, and Treynor ratio. However, it underperformed compared to the conventional index

over the period 2000–2003. Based on the same performance measures, Hussein and Omran (2005) found similar results using the Dow Jones Islamic index. Jawadi, Jawadi, and Louhichi (2014) use different performance ratios and estimated a CAPM-GARCH model to evaluate the financial performance of Islamic and conventional indices for Europe, the US, and the World, over the period 2000–2011. They find that the performance of the Islamic indices compared with the conventional indices depends on the region under consideration and the performance criterion. However, their results suggest that Islamic indices outperformed conventional indices during the financial crisis, while conventional indices outperformed Islamic indices before the financial crisis and during non-crisis periods. Therefore, they argue that investors can expect some investment opportunities from Islamic finance products, since the financial crisis has a less significant impact on the Islamic indices. Lobe, Roble, and Walkshausl (2012) investigated the performance of 155 Islamic indices around the world, using the Sharpe ratio and the Jensen alpha in the context of the CAPM and the Carhart (1997) four-factor model. They find that Islamic indices perform similarly to conventional indices and have a growth and positive momentum bias. Furthermore, they investigate the performance of these indices in bull and bear markets, and find that the Islamic indices outperform in bear markets. Based on these results, Lobe *et al.* (2012) argue that the performance of Islamic indices is conditional on the economic cycle. Al-Khazali, Lean, and Samet (2014) use a stochastic dominance analysis to compare the performance of Islamic and non-Islamic indices in the US, Canada, UK, Japan, Europe, and Asia Pacific region, in developed markets, emerging markets, and global markets. They find that emerging markets conventional indices dominate their Islamic counterparts during the period 2007–2012, which shows that during and after the financial crisis, the conventional indices stochastically outdid their Islamic peers. During the same period, in developed markets such as in Europe and the US, Islamic indices dominated their conventional peers. Similarly, Alam, Arshad, and Rizvi (2016) explore 10 sectoral global Islamic indices and their conventional peers over 18 years to study the Islamic sectoral efficiency. They find that Islamic indices and conventional peers tend to present similar efficiency patterns in the short run. Conversely, they find that across the last decade, the Islamic sectoral indices generally show a higher efficiency regime. They conclude that the Islamic indices seem to have stayed attractive and resilient because the stocks in these indices have low leverage. Ho, Rahman, Yusuf, and Zamzamin (2014) compare the risk-adjusted performance of global stock indices from Islamic and conventional markets over the period 2000–2011 and over four subperiods to capture the effects of the dot.com crisis and the financial crisis. They conclude that during crisis periods, Islamic indices outperform conventional indices since they are less affected by the crisis. They argue that the conservative nature of Islamic investments could explain why they outpaced conventional indices. Ashraf and Mohammad (2014) apply a logistic smooth transition

autoregressive model to examine whether the performance of global and regional Islamic equity indices differs from conventional indices during a “down market.” They find strong evidence that Islamic equity indices show lower volatility and perform better in comparison with the conventional benchmark index during the sample period. Therefore, they argue that during a downturn, Islamic equity indices provide hedging opportunities for investors and fund managers. Furthermore, they argue that the higher performance of Islamic indices is generated from the systematic risk in comparison with conventional benchmarks. In the MENA region, Bousalam and Hamzaoui (2016) find that the four Islamic float-weighted indices in the Moroccan market outperform their conventional peers.

Bitar, Madies, and Taramasco (2017) analyze the financial characteristics that distinguish Islamic banks from conventional banks in 124 developed and developing countries over the period 2006–2012. They find that Islamic banks are more capitalized than conventional banks, which makes the returns of the Islamic banks more volatile. They also find that the Islamic banks are more profitable and more liquid. Furthermore, in markets where the two types of banks operate, the liquidity and earnings volatility of the Islamic and the conventional banks tend to be similar. Using the dynamic generalized method of moments and quantile regression approaches, Hosen and Masih (2017) analyze stock returns of 141 Islamic and non-Islamic firms in Malaysia. Their findings indicate that there is no difference in the average stock returns between the Islamic and non-Islamic firms. Therefore, Muslim investors can invest their capital in stocks that follow their religious beliefs without sacrificing financial performance. On the contrary, Tareen and Siddiqui (2019) find that returns on Shari’ah compliant stocks in the Pakistan stock exchange are significantly higher than non-compliant stocks, because the Shari’ah compliant companies have lower levels of debt. Similarly, Dharani, Hassan, and Paltrinieri (2019) also find that Shari’ah stocks offer higher returns than non-Shari’ah stocks in the Indian market during the period 2001–2017. Furthermore, Shari’ah portfolios exhibit a lower level of risk and lower volatility during the crisis period.

In general, most of the literature that documents outperformance of Islamic portfolios, argue that this outperformance may be due to the Shari’ah screening criteria that mainly prohibits investment in stocks of firms that are excessively leveraged, and, or engaged in lending activities.

2.2. Performance of FW Portfolios during Crisis Periods

Arnott (2006) studies both CW and FW indices in depth and investigates the effect of bubbles on the performance of those indices. He finds that the CW was not the best weighting method during the late 1990's technology bubble. He notices that stock prices increase based on investors' expectations

rather than on stock fundamentals. He also documents that FW indices are not riskier than CW indices, but they exhibit a positive Jensen's alpha. These results are consistent with those of Siegel (2003), which show that investors would be protected against the impact of speculative bubbles when they invest in fundamental indices. Based on large established firms in the global equity market, Finnerman and Kirchmann (2015) also provide evidence that FW portfolios outperformed CW portfolios in terms of return and risk-adjusted attributes over the periods that included the dot.com bubble crisis in 2001 and the 2008 financial crisis. Amenc, Goltz, and Sourd (2009) show that the performance of FW indices depends on market conditions and these indices tend to underperform compared to the S&P 500 for long periods.

Amenc, Goltz, and Ye (2012) analyze FW indices over the period 1987–2011 and find that the performance of these indices decreases during the global financial crisis and the European sovereign debt crisis. They explain this decrease in performance by showing that FW strategies overweight financial stocks that are most affected by the crises. Therefore, they concluded that FW indices fail to protect investors from being exposed to financial crises, which have severely affected the banking sector. Bolognesi and Pivodori (2016) confirm these results in European markets. Likewise, Chen, Dempsey, and Lajbcygier (2015) find that FW indices underperform during the global financial crisis. The researchers argue that the underperformance of FW indices during the global financial crisis is due to the overweighting of value stocks whose share prices have fallen sharply.

In the emerging markets context, Hsieh (2013) considers the components of the S&P Emerging Markets Large Mid Cap Index to investigate whether FW indices consistently outperform their CW counterparts during the dot.com bubble and the global financial crisis. He finds that during both crises, FW indices' performance experiences a sharp decline. Therefore, he suggests that FW indices may have significant exposure to risk factors in emerging markets during unstable times. Ferreira and Krige (2011) compare the CW indices and FW indices performance in the South African stock market. They report that the FW composite index outperforms the CW index in 10 out of 14 years. The underperforming years were 1997, 1998, 2005, and 2007, capturing mainly the Asia financial crisis in 1997 and the global financial crisis in 2007.

Studies that focus on the effect of political crises on market indices' performance are still limited. For example, Perotti and Oijen (2001) find that stock returns are negatively affected by political shocks in emerging markets. Mahmood, Irfan, Iqbal, Kamran, and Ijaz (2014) study the extent to which political events in Pakistan impact the returns of the Karachi Stock Market index (KSE-100). They select 50 major political events from 1998 to 2013. Their results show evidence of abnormal negative returns a few days before and a few days after an event. In the MENA markets, Abdelbaki

(2013) finds that at the beginning of the Egyptian revolution, the Egyptian stock indices have declined substantially. The main index (EGX30) fell about 16%, while the EGX70 and EGX100 indices fell about 24% and 22%, respectively. Chau, Deesomsak, and Wang (2014) examine the effect of the Arab Spring on the volatility of stock indices in the MENA region. They find that the Arab Spring increased the volatility of MENA stock markets indices, and particularly Islamic indices.

The empirical findings of the aforementioned studies seem to suggest that the performance of CW Islamic indices in comparison to that of their conventional counterparts depends on the dataset under consideration, period of the study, and measures used. On the other hand, when comparing the performance of FW portfolios to CW portfolios in crisis and non-crisis periods, the empirical evidence is also mixed and very scarce for the MENA region. This study aims to bridge these gaps in prior research.

3. Methods

3.1. Portfolios Construction Methods

In this research, we focus on the performance of Islamic FW portfolios in relation to their CW benchmark and the conventional FW portfolios over the period 2005–2015 and over two subperiods, 2007–2009 and 2011–2015. FW portfolios are constructed following the method used by Arnott *et al.* (2005). As fundamental metrics, we use equity book value (BV), cash flows (CF), dividend payments (DIV), sales, and also a composite of these four metrics (COMP). We construct the benchmark Islamic (non-Islamic) CW portfolio including the Islamic (non-Islamic) stocks. We use the same CW portfolios' constituents and reweight them based on the fundamental variables. The FW portfolios are constructed independently for Islamic and non-Islamic institutions.

The weight of a stock i in a market CW portfolio is the market value of the firm divided by the market value of all companies in the portfolio and is denoted by:

$$X_{i,t}^{MV} = MV_{i,t} / \sum_{j=1}^{Np} MV_{j,t}, \quad (1)$$

where $MV_{i,t}$ is the market value of company i at time t , $j=1$ and Np is the number of stocks in the portfolio.

The weight of each stock for each fundamental metric is defined as:

$$X_{i,t}^{FW} = F_{i,t-1} / \sum_{j=1}^N F_{j,t-1}, \quad (2)$$

where $F_{i,t-1}$ is the fundamental metric (for example, sales) of company i at fiscal year-end $t - 1$ closest to t ($t - 1 < t$). Note that $F_{i,t-1}$ is the fundamental value of the total company and not the value on a per-share basis.

The weight considering the composite of fundamental metrics is calculated as:

$$X_{i,t}^{COMP} = 1/4 \times (X_{i,t}^{BV} + X_{i,t}^{CF} + X_{i,t}^{DIV} + X_{i,t}^{Sales}) \quad (3)$$

This composite metric is expected to result in weights that reflect the true value of a company better than each single metric, as possible valuation errors of a single metric should (partly) cancel out.

Finally, returns on the portfolios are calculated as follows:

$$R_{t+1}^{Index} = \sum_{i=1}^N X_{i,t} \times R_{i,t+1}, \quad (4)$$

where $R_{j,t+1}$ is the stock's return in $t+1$.

The portfolios are rebalanced annually at the end of December. The month of December has been chosen because of the simplicity of comparing companies at the end of the year.

3.2. Risk-Adjusted Performance Measures

This section presents the risk-adjusted measures that are used to analyze the performance of the constructed portfolios. Portfolio performance is assessed using traditional risk-adjusted measures, the Sortino ratio, which is a downside risk-adjusted measure, and a set of more robust risk-adjusted performance measures. The traditional risk-adjusted measures include the Jensen's alpha, the Treynor ratio, the Sharpe ratio, and the information ratio. The more robust risk-adjusted performance measures are based on the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the seven-factor model proposed by Abadi and Silva (2019) that adds momentum and illiquidity factors.

Jensen's (1968) alpha (the regression intercept a_p) is estimated using the CAPM times-series regression, as expressed in the following equation:

$$R_{p,t} - R_{ft} = a_p + b(R_{M,t} - R_{ft}) + \varepsilon_t, \quad (5)$$

where $R_{p,t}$ is the return on the portfolio p in month t , R_{ft} is the risk-free rate, b is portfolio p 's beta coefficient, $R_{M,t}$ is the return of the market CW portfolio in month t and ε_t is the regression residual in month t .

The beta coefficient (b) for the portfolio p is used to compute the Treynor (1965) ratio as follows:

$$Treynor\ ratio_p = (R_p - R_f) / b_p, \quad (6)$$

where R_p is portfolio p 's average returns during the estimation period and R_f is the average of the risk-free rate during the estimation period.

The Sharpe (1966) ratio of portfolio p is calculated as follows:

$$\text{Sharpe ratio}_p = (R_p - R_f) / \sigma_p, \quad (7)$$

where σ_p is the standard deviation of the returns on portfolio p during the estimation period.

The Sortino and Price (1994) measure, which is usually known as the Sortino ratio, is computed as follows:

$$\text{Sortino ratio}_p = (R_p - R_f) / \sigma_{s-d,p}, \quad (8)$$

where $\sigma_{s-d,p}$ is the semi-deviation of portfolio p 's returns that is computed using only the negative returns².

The information ratio of portfolio p is calculated as in Goodwin (1998):

$$\text{Information ratio}_p = E(R_{p,t} - R_{M,t}) / \sigma(R_{p,t} - R_{M,t}), \quad (9)$$

where $E(R_{p,t} - R_{M,t})$ is the average excess return of the portfolio p over the market CW portfolio and $\sigma(R_{p,t} - R_{M,t})$ is the standard deviation of the excess return.

To analyze the impact of crises on the performance of the portfolios, besides considering the analysis for the different periods, in the case of risk-adjusted measures in the context of factor models, we consider a dummy variable (Crisis) that takes the value of one for the global financial crisis (Arab Spring crisis) and zero otherwise. An interaction term between the risk factors and the crisis dummy is added, allowing for risk factor changes between the different periods.

The abnormal return change between the global financial crisis period (Arab Spring) and non-global financial (non-Arab Spring) crisis period comes from the regressions:

$$R_{p,t} - R_{ft} = a_1 + a_2 \text{Crisis} + b_1(R_{M,t} - R_{ft}) + b_2 \text{Crisis} \times (R_{M,t} - R_{ft}) + \varepsilon_t \quad (10)$$

$$R_{p,t} - R_{ft} = a_1 + a_2 \text{Crisis} + b_1(R_{M,t} - R_{ft}) + b_2 \text{Crisis} \times (R_{M,t} - R_{ft}) + s_1(\text{SMB}_t) + s_2 \text{Crisis} \times \text{SMB}_t + h_1(\text{HML}_t) + h_2 \text{Crisis} \times \text{HML}_t + \varepsilon_t \quad (11)$$

$$R_{p,t} - R_{ft} = a_1 + a_2 \text{Crisis} + b_1(R_{M,t} - R_{ft}) + b_2 \text{Crisis} \times (R_{M,t} - R_{ft}) + s_1(\text{SMB}_t) + s_2 \text{Crisis} \times \text{SMB}_t + h_1(\text{HML}_t) + h_2 \text{Crisis} \times \text{HML}_t + r_1(\text{RMW}_t) + r_2 \text{Crisis} \times \text{RMW}_t + c_1(\text{CMA}_t) + c_2 \text{Crisis} \times \text{CMA}_t + \varepsilon_t \quad (12)$$

$$R_{p,t} - R_{ft} = a_1 + a_2 \text{Crisis} + b_1(R_{M,t} - R_{ft}) + b_2 \text{Crisis} \times (R_{M,t} - R_{ft}) + s_1(\text{SMB}_t) + s_2 \text{Crisis} \times \text{SMB}_t + h_1(\text{HML}_t) + h_2 \text{Crisis} \times \text{HML}_t + r_1(\text{RMW}_t) + r_2 \text{Crisis} \times \text{RMW}_t + c_1(\text{CMA}_t) + c_2 \text{Crisis} \times \text{CMA}_t + i_1(\text{ILML}_t)$$

$$+il_2Crisis \times ILML_t + m_1(WML_t) + m_2Crisis \times WML_t + \varepsilon_t \quad (13)$$

The intercept of these regressions (a_1) is the abnormal return for the non-global financial (non-Arab Spring) crisis period. Crisis is a dummy variable equal to one for the global financial crisis (Arab Spring). The coefficient of the Crisis (a_2) measures the abnormal return change from non-global financial (non-Arab Spring) crisis period to global financial (Arab Spring) crisis for each portfolio. $R_{M,t}$ is the return of the market CW portfolio in month t . SMB_t , HML_t , RMW_t , CMA_t , WML_t , and $ILML_t$ are the size (that captures the excess return of small stocks over big stocks), value (that captures the excess return of value stocks over growth stocks), profitability (that captures the excess return of high profitability stocks over low profitability stocks), investment (that captures the excess return of conservative stocks over aggressive stocks), momentum (that captures the excess return of prior year winner stocks over loser stocks), and illiquidity (that captures the excess return of illiquid stocks over liquid stocks) factors, respectively³.

Furthermore, to analyze the difference in the performance of the portfolios during the global financial crisis period, Arab Spring crisis period and non-crisis period, two dummy variables are used. The first dummy is the global financial crisis (GFCrisis) that takes the value of one for the global financial crisis period (2007–2009) and zero otherwise. The second dummy is the Arab Spring crisis (ASCrisis) that takes the value of one for the Arab Spring crisis period (2011–2015) and zero otherwise. The abnormal return changes between the three periods (non-crisis period, global financial crisis period, and Arab Spring crisis period) are estimated using the following regressions:

$$R_{p,t} - R_{ft} = a_1 + a_2 GFCrisis + a_3 ASCrisis + b_1 (R_{M,t} - R_{ft}) + b_2 GFCrisis \times (R_{M,t} - R_{ft}) + b_3 ASCrisis \times (R_{M,t} - R_{ft}) + \varepsilon_t \quad (14)$$

$$R_{p,t} - R_{ft} = a_1 + a_2 GFCrisis + a_3 ASCrisis + b_1 (R_{M,t} - R_{ft}) + b_2 GFCrisis \times (R_{M,t} - R_{ft}) + b_3 ASCrisis \times (R_{M,t} - R_{ft}) + s_1 (SMB_t) + s_2 GFCrisis \times SMB_t + s_3 ASCrisis \times SMB_t + h_1 (HML_t) + h_2 GFCrisis \times HML_t + h_3 ASCrisis \times HML_t + \varepsilon_t \quad (15)$$

$$R_{p,t} - R_{ft} = a_1 + a_2 GFCrisis + a_3 ASCrisis + b_1 (R_{M,t} - R_{ft}) + b_2 GFCrisis \times (R_{M,t} - R_{ft}) + b_3 ASCrisis \times (R_{M,t} - R_{ft}) + s_1 (SMB_t) + s_2 GFCrisis \times SMB_t + s_3 ASCrisis \times SMB_t + h_1 (HML_t) + h_2 GFCrisis \times HML_t + h_3 ASCrisis \times HML_t + c_1 (CMA_t) + c_2 GFCrisis \times CMA_t + c_3 ASCrisis \times CMA_t + r_1 (RMW_t) + r_2 GFCrisis \times RMW_t + r_3 ASCrisis \times RMW_t + \varepsilon_t \quad (16)$$

$$R_{p,t} - R_{ft} = a_1 + a_2 GFCrisis + a_3 ASCrisis + b_1 (R_{M,t} - R_{ft}) + b_2 GFCrisis \times (R_{M,t} - R_{ft}) + b_3 ASCrisis \times (R_{M,t} - R_{ft}) + s_1 (SMB_t) + s_2 GFCrisis \times SMB_t + s_3 ASCrisis \times SMB_t + h_1 (HML_t) + h_2 GFCrisis \times HML_t + h_3 ASCrisis \times HML_t + c_1 (CMA_t) +$$

$$\begin{aligned}
& c_2 GFCrisis \times CMA_t + c_3 ASCrisis \times CMA_t + r_1(RMW_t) + r_2 GFCrisis \times RMW_t + \\
& r_3 ASCrisis \times RMW_t + il_1(ILML_t) + il_2 GFCrisis \times ILML_t + il_3 ASCrisis \times ILML_t + \\
& m_1(WML_t) + m_2 GFCrisis \times WML_t + m_3 ASCrisis \times WML_t + \varepsilon_t
\end{aligned} \tag{17}$$

The intercept (a_1) of these regressions is the abnormal return in the non-crisis period (the reference category). The coefficient of the GFCrisis (a_2) corresponds to the abnormal return difference between the global financial crisis period and the non-crisis period, while the coefficient of the ASCrisis (a_3) measures the abnormal return difference between the Arab Spring crisis period and the non-crisis period for each portfolio. However, the difference between the global financial crisis period and the Arab Spring period must be statistically tested as well. We use the same regressions but we change the reference category to be the Arab Spring period instead of the non-crisis period.

4. Dataset and Variables Definition

4.1. Dataset

Using the Thomson Reuters DataStream database, we obtain the monthly total return and other required data for all financial firms listed on stock exchanges of 13 countries in the MENA region. These countries are Bahrain, Egypt, Israel, Jordan, Kuwait, Lebanon, Morocco, Palestine, Oman, Qatar, Saudi Arabia, Tunisia, and the United Arab Emirates. Hand-collected data from company financial reports were also obtained to minimize missing data.

The classification of Islamic versus non-Islamic is done by reading the notes of each firm in the financial sector that is listed on the DataStream database. On average, there are 92 Islamic stocks and 344 non-Islamic stocks on the database. The data are collected for the period December 2004 through December 2015. The period was chosen since it includes several market cycles, specifically, the financial crisis in 2007 as well as the Arab Spring in 2011. This 132-month period enables us to investigate the changes in performance of the alternative constructed portfolios being evaluated in the different political and financial phases experienced in the MENA equity markets during this period. Since we cover companies from different countries with different currencies, all the data was collected in US dollars.

4.2. Variables Definition

For the fundamental variables, we follow Arnott *et al.* (2005), except that we use a three-year average for sales, cash flows, and dividends rather than five-year due to our relatively short period.

Sales is measured by the three-year average sales for a company, which aims to capture business profitability. CF is the three-year average of operating cash flows. CF could enable us to understand how well the company is being managed. DIV is measured by the three-year average of dividends paid over the past three years. DIV may reflect how a company uses its cash. Finally, the BV is the single year value of the company that is calculated using the most recent financial statement rather than the average to give specific insight of any changes in firm size as a result of mergers and acquisitions. BV is equal to shareholders' equity plus deferred taxes less preferred stock⁴. Market Capitalization (MC) is the closing stock price multiplied by the number of outstanding shares at the end of each year.

Table 1 reports the mean of the annual returns and the annual volatility of the Islamic and non-Islamic portfolios. In addition, it reports the mean of the MC and the accounting variables that we used to construct the Islamic and non-Islamic portfolios. Panel A and Panel B of Table 1 show that the Islamic portfolios generate lower annual returns and higher annual volatility than the non-Islamic portfolios. Panel C presents the means for the accounting variables and the MC over the entire study period from 2005–2015. We observe that the Islamic financial institutions have higher values for all the accounting variables and higher market capitalizations than the non-Islamic institutions. This indicates that the Islamic institutions are on average bigger than their conventional counterparts. Conversely, in the period preceding the global financial crisis (2005–2006), the non-Islamic institutions present higher sales and higher BVs than the Islamic institutions. Furthermore, the accounting variables of both the Islamic and non-Islamic institutions increased during the global financial crisis, while the MC decreased for both in comparison with the pre-global financial crisis period. Although the Islamic institutions had higher increases in the accounting variables and larger decreases in MC than their conventional counterparts, they still show higher values for both the accounting variables and the MC. While the size of the non-Islamic institutions decreased by 26%, the size of the Islamic institutions decreased by 37%. This indicates that Islamic institutions were the most affected by the global financial crisis.

Table 1 *Mean of the annual return, annual volatility, market capitalization, and the accounting variables for the Islamic and non-Islamic financial firms*

This table reports the mean of the annual return, annual volatility, market capitalization, and the accounting variables for the Islamic and non-Islamic financial firms during the entire study period (2005–2015). Furthermore, it reports the mean of the market capitalization and the accounting variables for the Islamic and non-Islamic financial firms for the period preceding the global financial crisis (2005–2006), the period during the global financial crisis (2007–2009), and the period after the global financial crisis (2010–2015). CF refers to operating cash flows, DIV to dividends, BV to book value, and MC to the market capitalization. The annual return is the annualized return; the annual volatility is the annualized standard deviation.

	Islamic	Non-Islamic	
Panel A: Mean of the Annual Return (%) of Islamic and Non-Islamic Portfolios (2005–2015)			
Sales	10.94	12.74	
CF	11.38	13.40	
BV	11.39	12.12	
DIV	10.07	11.86	
MC	10.94	12.53	
Panel B: Mean of the Annual Volatility (%) of Islamic and Non-Islamic Portfolios (2005–2015)			
Sales	20.16	19.33	
CF	21.51	17.61	
BV	20.41	17.40	
DIV	20.49	17.76	
MC	20.55	17.58	
Panel C: Mean (\$) of the Accounting Variables of Islamic and Non-Islamic Firms (2005–2015)			
Sales	355575.4	345703.3	
CF	219727.5	133087.4	
BV	757613.3	519661.2	
DIV	88333.57	40653.75	
MC	1916830	881938.3	
Panel D: Mean of the Accounting Variables of Islamic Firms Pre, During, and Post Global Financial Crisis			
	2005–2006	2007–2009	2010–2015
Sales	227480.1	343307.4	392424.3
CF	141457.8	189428	254957.2
BV	334866.1	586146.4	992536.8
DIV	62224.69	75392.63	102065.1
MC	2885219	1810351	1763093
Panel E: Mean of the Accounting Variables of Non-Islamic Firms Pre, During, and Post Global Financial Crisis			
Sales	275153.8	305574.4	376949.9
CF	104811.7	125870.4	141567.3
BV	369917.8	476762.6	567827.2
DIV	30934.56	38796.97	43812.49
MC	1238336	906074.9	804934.3

5. Empirical Results and Analysis

5.1. Analysis of Islamic FW and CW and Non-Islamic Portfolios' Performance

The financial sector is one of the biggest sectors in the MENA region. This sector includes two types of institutions that operate differently: Islamic institutions that operate based on Islamic law and conventional institutions that operate based on conventional banking laws. Therefore, we focus on this sector to examine whether the Islamic (non-Islamic) FW portfolios exhibit different performance from that of the Islamic (non-Islamic) CW portfolios. Islamic and non-Islamic FW portfolios are constructed using the accounting metrics (sales, CF, DIV, and BV). The results are reported in Table 2.

Table 2, Panel A reports the performance of Islamic portfolios. We compare the performance of Islamic FW portfolios with the Islamic CW benchmark that includes only the Islamic stocks. For all the FW portfolios, except the CF portfolio, the Sharpe ratio and Sortino ratio are significantly lower than the CW portfolio ratio. Moreover, all the FW portfolios generate lower Treynor ratios, negative information ratios, statistically significant negative Jensen's alphas, and statistically significant negative multi-factor models' alphas. Therefore, the CW portfolio is the best performing portfolio using all the risk-adjusted measures. Likewise, in Panel B, which reports the performance of non-Islamic portfolios, the sales and the CW portfolios are the best performing portfolios using all the performance measures. In Panels C and D, we also notice that while the size factor explains the Islamic portfolio returns, the investment and momentum factors explain the non-Islamic portfolio returns. This indicates that Islamic portfolios seem to be more exposed to big stocks, while conventional portfolios tend to be more exposed to stocks with positive momentum and those firms with aggressive investment strategies.

Table 2 Risk-adjusted performance measures of Islamic FW portfolios versus Islamic CW portfolios and non-Islamic FW portfolios versus non-Islamic CW portfolios over the period 2005–2015

This table reports performance measures for Islamic (non-Islamic) FW portfolios versus Islamic (non-Islamic) CW portfolios. The Islamic (non-Islamic) FW portfolios include all Islamic (non-Islamic) stocks. The Islamic CW portfolios include all Islamic stocks, and the non-Islamic CW portfolios include all non-Islamic stocks. CF refers to operating cash flows, DIV to the dividend, BV to book value, COMP to the average of the four metrics. The Sharpe ratio is the average excess return divided by the standard deviation of excess returns; the Sortino ratio is the average excess return divided by the semi-standard deviation of negative returns. The Treynor ratio is excess return divided by the beta coefficient for the portfolio. The information ratio is $E(R_{p,t}-R_{m,t})/\sigma(R_{p,t}-R_{m,t})$. Jensen's alpha is obtained using the CAPM. Alphas in the context of Fama and French (1993) three-factor model, Fama and French (2015) five-factor model, and Abadi and Silva (2019) seven-factor model that includes the momentum and illiquidity factors are also reported. The coefficients of the seven-factor model are also presented. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

Portfolio	Sharpe Ratio	Sortino Ratio	Treynor Ratio (%)	Inf. Ratio (%)	Jensen's Alpha (%)	Three-Factor Alpha	Five-Factor Alpha	Seven-Factor Alpha
Panel A: Risk-Adjusted Measures for the Islamic Portfolios (2005–2015)								
Sales	0.12***	0.12***	14.18	-0.35	-0.23**	-0.30***	-0.29**	-0.30***
CF	0.13***	0.13***	14.63	-0.29	-0.19*	-0.21**	-0.20*	-0.22*
BV	0.15	0.15	13.62	-0.41	-0.24**	-0.24***	-0.23**	-0.21**
DIV	0.11***	0.11***	12.66	-0.31	-0.28**	-0.27***	-0.26**	-0.26***
COMP	0.13***	0.13***	13.78	-0.44	-0.23**	-0.26***	-0.25***	-0.25***
CW	0.17	0.18	17.12	-	-	-	-	-
Panel B: Risk-Adjusted Measures for the Non-Islamic Portfolios (2005–2015)								
Sales	0.30*	0.30	17.77	-0.19	-0.26	-0.65*	-0.67**	-0.39
CF	0.29***	0.29***	16.03	-0.32	-0.36***	-0.48***	-0.56***	-0.47***
BV	0.30***	0.29***	14.66	-0.49	-0.41***	-0.43***	-0.48***	-0.39***
DIV	0.31***	0.30***	14.34	-0.43	-0.45***	-0.51***	-0.56***	-0.45***
COMP	0.32***	0.31***	15.57	-0.32	-0.37***	-0.52***	-0.57***	-0.42***
CW	0.35	0.34	21.55	-	-	-	-	-
Panel C: Seven-Factor Models' Coefficients for the Islamic Portfolios (2007–2015)								
Portfolio	<i>b</i>	<i>s</i>	<i>h</i>	<i>c</i>	<i>r</i>	<i>m</i>	<i>il</i>	
Sales	0.88***	-0.14**	0.12***	0.01	-0.04	-0.01	-0.01	
CF	0.93***	-0.12*	0.10*	0.00	-0.01	-0.01	0.01	
BV	0.87***	-0.16***	0.05	-0.06	0.04	0.02	0.01	
DIV	1.00***	-0.03	0.01	-0.03	0.04	0.01	0.01	
COMP	0.92***	-0.11***	0.07*	-0.02	0.01	0.01	0.01	
Panel D: Seven-Factor Models' Intercepts and Coefficients for Non-Islamic Portfolios (2007–2015)								
Sales	1.06***	0.29*	0.12	-0.37**	0.03	0.07	-0.12*	
CF	1.08***	0.18**	0.04	-0.17**	-0.13**	0.03	-0.03	
BV	0.98***	0.05	0.04	-0.18**	-0.07**	0.05**	0.00	
DIV	0.99***	0.05	0.07	-0.25**	-0.07	0.04*	-0.02	
COMP	1.03***	0.14*	0.07	-0.24**	-0.06	0.05*	-0.05	

The performance of Islamic FW portfolios in comparison with that of their conventional FW counterparts is reported in Table 3. We use the t-test to find the significant difference between the Islamic portfolios and non-Islamic portfolios' annual returns. In the case of the Sharpe ratio and the Sortino ratio, we use the Jobson and Korkie (1981) test with the Memmel (2003) correction. For the alphas, we compute the difference in the Islamic and non-Islamic portfolios' returns and use that return to run regressions using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model, respectively. While all Islamic portfolios exhibit significantly lower Sharpe and Sortino ratios than non-Islamic portfolios, the difference in the annual returns and the alphas of the portfolios' return difference (in the context of all the multi-factor models that are used) are not statistically significant. These results indicate that Islamic FW portfolios underperform compared to conventional FW portfolios based only on the Sharpe ratio and Sortino ratio over the period 2005–2015. Therefore, there is no compelling evidence that FW Islamic portfolios underperform on a robust basis.

Regarding the investment behavior of Islamic and non-Islamic portfolios, we observe that, while the Islamic portfolios allocate capital in illiquid stocks, the non-Islamic portfolios tend to invest primarily in aggressive investment stocks and firms with less profitability and higher liquidity⁵. This indicates that Islamic stocks are less liquid than non-Islamic stocks, which implies that the Islamic financial institutions is less stable.

Table 3 *Performance difference between Islamic FW and Non-Islamic FW Portfolios over the period 2005–2015*

This table reports performance difference between Islamic FW and non-Islamic FW portfolios. Each Islamic (non-Islamic) FW portfolio includes all Islamic (non-Islamic) stocks. The market benchmark is the CW portfolio that includes all the Islamic and non-Islamic stocks. CF refers to operating cash flows, DIV to the dividend, BV to book value, and COMP to the average of the four metrics. The t-test is used to find the significant difference between the Islamic FW portfolios and non-Islamic FW portfolios' annual returns. In the case of the Sharpe ratio and the Sortino ratio, the Jobson and Korkie (1981) test with the Memmel (2003) correction is used. For the alphas, we compute the difference in the Islamic and non-Islamic portfolios' returns and use that return to run regressions using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

Performance Difference Between the Islamic and Non-Islamic Portfolios					
	Sales	CF	BV	DIV	COMP
Excess Return	-1.80	-2.02	-0.73	-1.79	-1.59
Sharpe Ratio	-0.18***	-0.17***	-0.12***	-0.18***	-0.18***
Sortino Ratio	-0.18***	-0.17***	-0.12***	-0.17***	-0.18***
Jensen's Alpha	-0.29	-0.26	-0.10	-0.11	-0.19
Three-Factor Alpha	0.15	-0.03	0.03	0.10	0.06
Five-Factor Alpha	0.17	0.04	0.12	0.20	0.13
Seven-Factor Alpha	-0.34	-0.34	-0.21	-0.26	-0.29

5.2. Impact of the Global Financial Crisis on the Performance of Islamic FW Portfolios and Non-Islamic FW Portfolios

In line with previous studies, we investigate the effect of the global financial crisis on the performance of Islamic portfolios in comparison with non-Islamic portfolios by analyzing both FW portfolios over crisis and non-crisis periods. The performance differences during the global financial crisis period are presented in Table 4, Panel A, while the performance differences during the non-global financial crisis period are presented in Panel B.

The results in Table 4, Panel A show that the performance difference between the Islamic portfolios and their conventional counterparts is not statistically significant using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model. On the contrary, the Islamic portfolios exhibit statistically significant lower Sharpe and Sortino ratios. This indicates that Islamic FW portfolios underperform when compared to non-Islamic FW portfolios using the Sharpe ratio and the Sortino ratio. This underperformance could be explained by the fact that the biggest financial institutions are Islamic. Therefore, the underperformance of the Islamic FW portfolios means that the biggest Islamic stocks were the most affected by the global financial crisis. Furthermore, the greater increase in cash and cash equivalents, the greater decrease in the market capitalization (Table 1), and the greater decline in the customer deposits growth rate during the financial crisis for the Islamic stocks compared with conventional counterparts (Ali, 2011), may also explain this underperformance. In addition, the poor performance of Islamic stocks during this period could be due to a higher exposure to the construction and real estate sectors than non-Islamic institutions (Ali, 2011). Looking at the risk factors that affect portfolio returns, we find that only the non-Islamic portfolios have exposure to the value and investment factors⁶. This suggests that non-Islamic stocks are growth stocks and follow aggressive investing strategies that enable them to ride out market fluctuations better than Islamic stocks. Thus, these results seem to suggest that the Shari'ah-compliant portfolios were not able to provide attractive investment opportunities during the periods of financial turmoil.

The performance of the constructed portfolios in the non-global financial crisis period is reported in Panel B.

Table 4 *Performance difference between the Islamic and non-Islamic portfolios during the global financial crisis period (2007–2009) and non-global financial crisis period (2005–2006, 2010–2015)*

This table reports the performance difference between the Islamic and non-Islamic portfolios during the global financial crisis period and non-global financial crisis period. CF refers to operating cash flows, DIV to the dividend, BV to book value, and COMP to the average of the four metrics. The t-test is used to find the significant difference between the Islamic portfolios and non-Islamic portfolios' annual returns. In the case of the Sharpe ratio and the Sortino ratio, the Jobson and Korkie (1981) test with the Memmel (2003) correction is used. For the alphas, the difference in the Islamic and non-Islamic portfolios' returns is found and that return is used to run regressions using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model, respectively. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

	Sales	CF	BV	DIV	COMP
Panel A: Performance Difference Between the Islamic and Non-Islamic Portfolios During the Global Financial Crisis Period					
Excess Return	-10.47	-9.13	-3.10	-3.95	-6.63
Sharpe Ratio	-0.22***	-0.21***	-0.08***	-0.12***	-0.17***
Sortino Ratio	-0.29***	-0.27***	-0.14***	-0.17***	-0.24***
Jensen's Alpha	-0.85	-0.81	-0.32	-0.36	-0.59
Three-Factor Alpha	-0.48	-0.81	-0.47	-0.39	-0.54
Five-Factor Alpha	-0.73	-0.89	-0.54	-0.58	-0.68
Seven-Factor Alpha	-1.35	-1.59*	-1.03	-1.24	-1.30
Panel B: Performance Difference Between the Islamic and Non-Islamic Portfolios During the Non-Global Financial Crisis Period					
Excess Return	1.66	0.91	0.25	-0.90	0.48
Sharpe Ratio	-0.17**	-0.16**	-0.14**	-0.20**	-0.18**
Sortino Ratio	-0.14**	-0.13**	-0.11**	-0.17**	-0.16**
Jensen's Alpha	-0.27	-0.21	-0.21	-0.26	-0.24
Three-Factor Alpha	0.82	0.62	0.54	0.66	0.66
Five-Factor Alpha	0.54*	0.45*	0.40	0.45*	0.46*
Seven-Factor Alpha	0.36	0.36	0.31	0.41	0.36

The Islamic FW portfolios underperform when compared to the non-Islamic FW portfolios using the Sharpe ratio and the Sortino ratio. However, they outperform non-Islamic FW portfolios at the 10% significant level using the Fama and French (2015) five-factor model, while they perform similarly using the annual excess return, the CAPM, the Fama and French (1993) three-factor model, and the Abadi and Silva (2019) seven-factor model.

5.3. Impact of the Arab Spring Uprisings on the Performance of Islamic FW Portfolios and Non-Islamic FW Portfolios

Since we construct Islamic portfolios using a variety of countries in the MENA region, some of which are directly exposed to the Arab Spring uprisings, we examine the impact of these uprisings on portfolio performance. The objective is to examine whether the Islamic FW portfolios are able to protect investors from exposure to political risk. Table 5 summarizes the performance difference between Islamic FW portfolios and non-Islamic FW portfolios during the Arab Spring period (Panel A) and non-Arab Spring period (Panel B).

The results in Table 5, Panel A show that the performance of Islamic FW portfolios is not statistically significant different from that of the non-Islamic portfolios. These results suggest that Islamic FW portfolios tend to perform similarly to their non-Islamic FW peers over the period of Arab Spring uprisings. Moreover, the non-Islamic portfolios have a positive significant exposure to the size factor, and a negative significant exposure to the illiquidity factor, while the Islamic portfolios have a positive exposure to the illiquidity factor. These results mean that the non-Islamic stocks tend to be smaller and more liquid than the Islamic stocks⁷.

Table 5, Panel B reports the performance difference of the portfolios during the non-Arab Spring period (2005–2010). The Islamic FW portfolios seem to underperform when compared with non-Islamic FW portfolios using the Sharpe ratio and the Sortino ratio. However, the Islamic portfolios tend to perform similarly to non-Islamic portfolios using the annual excess return, the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model. The results of Table 5 indicate that the Islamic FW portfolios tend to perform better in relation to their conventional counterparts in the MENA region during the Arab Spring period in comparison with the non-Arab Spring period that includes the global financial crisis.

Table 5 *Performance difference between the Islamic and non-Islamic portfolios during the Arab Spring period (2011–2015) and non-Arab Spring period (2005–2010)*

This table reports the performance difference between the Islamic and non-Islamic portfolios during the Arab Spring period and non-Arab Spring period. CF refers to operating cash flows, DIV to the dividend, BV to book value, and COMP to the average of the four metrics. The t-test is used to find the significant difference between the Islamic portfolios and non-Islamic portfolios' annual returns. In the case of the Sharpe ratio and the Sortino ratio, the Jobson and Korkie (1981) test with the Memmel (2003) correction is used. For the alphas, the difference in the Islamic and non-Islamic portfolios' returns is found and that return is used to run regressions using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model, respectively. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

	Sales	CF	BV	DIV	COMP
Panel A: Performance Difference Between the Islamic and Non-Islamic Portfolios During the Arab Spring Crisis Period					
Excess Return	5.94	6.17	3.48	5.25	5.22
Sharpe Ratio	0.00	0.00	0.01	-0.02	0.01
Sortino Ratio	0.03	0.03	0.02	0.06	0.03
Jensen's Alpha	0.36	0.21	0.08	0.23	0.22
Three-Factor Alpha	0.50	0.40	0.33	0.41	0.41
Five-Factor Alpha	0.78	0.52	0.43	0.54	0.57
Seven-Factor Alpha	0.39	0.33	0.27	0.35	0.33
Panel B: Performance Difference Between the Islamic and Non-Islamic Portfolios During the Non-Arab Spring Crisis Period					
Excess Return	-8.77	-9.29	-4.41	-7.98	-7.61
Sharpe Ratio	-0.34***	-0.32***	-0.21***	-0.35***	-0.33***
Sortino Ratio	-0.36***	-0.33***	-0.24***	-0.36***	-0.35***
Jensen's Alpha	-0.93	-0.86*	-0.49	-0.71	-0.75
Three-Factor Alpha	-0.36	-0.58	-0.30	-0.31	-0.39
Five-Factor Alpha	-0.55	-0.69	-0.36	-0.40	-0.50
Seven-Factor Alpha	-0.86	-1.12	-0.68	-0.84	-0.87

5.4. FW Islamic and Non-Islamic Portfolios Performance Difference Between the Non-Crisis Period, the Global Financial Crisis Period, and the Arab Spring Uprisings Period

The difference in the performance of FW portfolios between the three periods (non-crisis period, the global financial crisis period, and the Arab Spring crisis period) is also analyzed using two dummy variables in the CAPM and the multi-factor models under consideration. Tables 6 and 7 present the changes in the performance across these periods for Islamic FW portfolios and for non-Islamic FW portfolios, respectively.

In Table 6, the results of the CAPM, the Fama and French (1993) three-factor model, and the Fama and French (2015) five-factor model show that the performance of the Islamic portfolios is similar during the three periods. This is not the case for the Abadi and Silva (2019) seven-factor model, which shows that the performance of the portfolios is statistically significant different from one period to another. This result indicates that using the seven-factor model, the Islamic FW portfolios perform worse during the global financial crisis compared with the non-crisis and Arab Spring crisis periods. Similarly, the portfolios perform worse during the Arab Spring crisis period compared with the non-crisis period, but they perform better during the global financial crisis period. This result could be explained by the observation that the Islamic stocks tend to be more illiquid during the Arab Spring period. Moreover, the Islamic portfolios tend to invest mainly in the largest stocks that have greater previous accounting data. Conversely, the results of Table 7 demonstrate that the performance of non-Islamic portfolios is similar during the three periods since the difference is not statistically significant using either the CAPM or the alternative multi-factor models.

Table 6 *Difference in the Islamic portfolios' performance between the non-crisis period, global financial crisis period, and Arab Spring uprisings period*

This table presents the difference in the Islamic portfolios performance between the non-crisis period, global financial crisis period and Arab Spring uprisings period using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and Abadi and Silva (2019) seven-factor model that includes the momentum and illiquidity factors. a_1 is the abnormal return in the non-crisis period, a_2 measures the change in the abnormal return in the global financial crisis period, and a_3 measures the change in the abnormal return in the Arab Spring crisis period. The period that is considered in this analysis is 2005–2015 for the CAPM and 2007–2015 for the multi-factor models under consideration. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

	Sales	CF	BV	DIV	COMP
CAPM a_1	-0.59	-0.65	-0.52	-0.71	-0.62
CAPM a_2	-0.22	-0.32	-0.26	-0.15	-0.24
CAPM a_3	0.47	0.55	0.38	0.57	0.49
Difference in CAPM a_2 and a_3	-0.68	-0.87	-0.63	-0.72	-0.73
Three-Factor a_1	-0.03	-0.21	0.01	-0.03	-0.06
Three-Factor a_2	-0.82	-0.79	-0.83	-0.86	-0.82
Three-Factor a_3	-0.08	0.15	-0.03	-0.03	0.01
Difference in Three-Factor a_2 and a_3	-0.74	-0.94	-0.81	-0.83	-0.83
Five-Factor a_1	0.19	0.04	0.17	0.51	0.23
Five-Factor a_2	-1.07	-1.05	-1.00	-1.43	-1.14
Five-Factor a_3	-0.24	-0.09	-0.15	-0.51	-0.25
Difference in Five-Factor a_2 and a_3	-0.83	-0.96	-0.85*	-0.92	-0.89
Seven-Factor a_1	0.75*	0.54**	0.78**	1.28***	0.84**
Seven-Factor a_2	-2.11***	-1.95***	-1.78***	-2.55***	-2.10***
Seven-Factor a_3	-0.88*	-0.70*	-0.87*	-1.39**	-0.96**
Difference in Seven-Factor a_2 and a_3	-1.22*	-1.25**	-0.91*	-1.16*	-1.14**

Table 7 *Difference in the non-Islamic portfolios' performance between the non-crisis period, global financial crisis period and Arab Spring uprisings period*

This table presents the difference in the non-Islamic portfolios performance between the non-crisis period, global financial crisis period, and Arab Spring uprisings period using the CAPM, the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model that includes the momentum and illiquidity factors. a_1 is the abnormal return in the non-crisis period, a_2 measures the change in the abnormal return in the global financial crisis period, and a_3 measures the change in the abnormal return in the Arab Spring crisis period. The period that is considered in this analysis is 2005–2015 for the CAPM and 2007–2015 for the multi-factor models under consideration. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

	Sales	CF	BV	DIV	COMP
CAPM a_1	0.86	0.33	0.21	0.45	0.46
CAPM a_2	-0.81	-0.48	-0.66	-0.96**	-0.73
CAPM a_3	-1.35**	-0.63**	-0.43	-0.83**	-0.81**
Difference in CAPM a_2 and a_3	0.53	0.15	-0.23	-0.13	0.08
Three-Factor a_1	-0.12	0.14	0.10	-0.17	-0.01
Three-Factor a_2	-0.23	-0.33	-0.46	-0.32	-0.33
Three-Factor a_3	-0.47	-0.59*	-0.44	-0.29	-0.45
Difference in Three-Factor a_2 and a_3	0.24	0.26	-0.01	-0.03	0.12
Five-Factor a_1	-0.08	-0.04	-0.36***	-0.52***	-0.25**
Five-Factor a_2	-0.07	-0.08	0.07	0.19	0.03
Five-Factor a_3	-0.75	-0.53**	-0.05	-0.01	-0.33
Difference in Five-Factor a_2 and a_3	0.68	0.45	0.12	0.20	0.36
Seven-Factor a_1	0.74***	0.05	-0.15	-0.25	0.09
Seven-Factor a_2	-0.74	0.13	0.19	0.22	-0.05
Seven-Factor a_3	-1.25**	-0.53	-0.20	-0.20	-0.55*
Difference in Seven-Factor a_2 and a_3	0.51	0.67	0.39	0.42	0.50

6. Main Conclusions

The uprisings that have taken place in many Arabic countries, mainly, Tunisia, Egypt, Syria, Libya, and Yemen, have not only affected the stock markets of these countries, but also the equity markets of neighboring countries. Furthermore, the MENA countries have also been influenced by the global financial crisis that has affected many international markets. Since the MENA region includes two types of financial institutions that operate differently, it is of interest to investigate whether Islamic FW portfolios constructed based on firm accounting data are able to mitigate investors' losses during crises and are able to beat their CW benchmark portfolio and protect investors from losses. Portfolio performance is assessed using traditional risk-adjusted measures (Sharpe ratio, Treynor ratio, Information ratio, and Jensen's alpha in the context of the CAPM), the Sortino ratio, which is a downside risk-adjusted measure, and a set of more robust risk-adjusted performance measures based on the Fama and French (1993) three-factor model, the Fama and French (2015) five-factor model, and the Abadi and Silva (2019) seven-factor model that includes momentum and illiquidity factors.

The results of this study show that the performance of Islamic and non-Islamic FW portfolios varies based on the period under consideration and the performance measures that are used. On the one hand, we find that the Islamic and the non-Islamic FW portfolios underperform against their CW benchmark. On the other hand, we find that the Islamic FW portfolios underperform compared to their non-Islamic FW counterparts during the whole dataset period and during the global financial crisis period using the Sharpe ratio and the Sortino ratio. Contrarily, the Islamic FW portfolios perform similarly to the non-Islamic FW portfolios in the Arab Spring period. The similar performance may be due to the interdependence between the Islamic and conventional portfolios that operate in the same markets and follow the same central bank regulations, which tend to eliminate the hedging role and the diversification benefit of the investment in Islamic portfolios. In addition, we find evidence that the non-Islamic portfolios have exposure to more risk factors, while Islamic portfolios have positive exposure to the illiquidity factor, whereas the non-Islamic portfolios have negative exposure to the investment, profitability, and illiquidity risk factors.

Given the above, we conclude that Islamic and non-Islamic FW portfolios underperform compared to the CW portfolios. Moreover, the Shari'ah-compliant investing strategy fails to

protect investors from being badly affected by the financial crisis. However, the Islamic FW portfolios tend to show higher performance in the MENA region after the global financial crisis, particularly, during the Arab Spring uprisings. This insight is particularly helpful for investors who track Islamic portfolios as they do not seem to be penalized in terms of financial performance during periods of non-financial crisis.

The results obtained in this study are in line with previous studies in the sense that political and financial uncertainty contributes to portfolio risk and return changes. Our results are consistent with Al-Khazali *et al.* (2014) who find that the emerging conventional Dow Jones indices dominate their Islamic counterparts during the financial crisis.

Overall, we deem our results to be of great interest to the debatable perspectives on the performance of FW portfolios, mainly the Islamic portfolios, during crises. For future research, it would be important to extend the period of analysis to include the most recent years. In fact, the period we analyzed was mainly a crisis period, and so it could be considered a limitation of our study. The use of other downside risk-adjusted performance measures such as value-at-risk and expected shortfall to analyze the performance of FW portfolios, particularly during crisis periods, should also deserve further research attention. In addition, other accounting data could be used to construct alternative FW portfolios, to examine their effect on Islamic portfolios' performance.

Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Footnotes

1. See Hasan and Dridi (2011), Sukmana and Kholid (2012), and Arshad, and Rizvi (2013), among others.
2. To test the statistical significance of the Sharpe ratio and Sortino ratio differences, the Jobson and Korkie (1981) test with the Memmel (2003) correction is used. The Z statistic approximately follows a standard normal distribution, and it is calculated as follows:

$$Z = \frac{SR_1 SR_2}{\sqrt{1/T[2(1-\rho_{1,2}) + 1/2(SR_1^2 SR_2^2 - SR_1 SR_2(1+\rho_{1,2}^2))]}}$$

SR is the portfolio's Sharpe ratio (Sortino ratio), T is the number of observations and $\rho_{1,2}$ is the correlation between portfolios 1 and 2.

3. These factors for the MENA region are computed by the researchers.
4. If a fundamental metric is negative, it is set equal to zero. This approach excludes short positions in stocks. However, it may introduce a potential bias into our data, given that companies with negative metrics are replaced with zero in the dataset. In our dataset, the number of firms with negative fundamentals is rather small. In addition, we consider several fundamentals, as well as a combination of them; therefore, excluding firms with negative fundamentals does not cause a significant problem for our analysis. Moreover, for those companies that do not pay DIV, we exclude this metric and use the average of the three other metrics to calculate the composite fundamental metric of such stocks.
5. The multi-factor models' coefficients for the period 2007-2015 are available upon request.
6. The multi-factor models' coefficients for the global financial crisis period (2007-2009) are available upon request.
7. The multi-factor models' coefficients for the Arab Spring period (2011-2015) are available upon request.

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