

Is the Performance of Conventional and Shariah-Compliant Portfolios Two Sides of the Same Coin? Evidence from Bursa Malaysia

Hani Nuri Rohuma (Ph.D)¹

¹ Faculty of Economics, University of Benghazi, Benghazi, Libya

Correspondence: Hani Nuri Rohuma, Faculty of Economics, University of Benghazi, Benghazi, Libya. E-mail: hani.rohuma@gmail.com

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Abstract

This study arises from the rapid global growth of the Shariah-compliant financial services industry and the evident paucity of research on the direct comparison between a conventional portfolio and a Shariah-compliant portfolio. Therefore, this study undertakes to investigate the differences in the performance between a hypothetical conventional portfolio and a hypothetical Shariah-compliant portfolio on Bursa Malaysia over the 1 December 2005-28 February 2018 examination period. The examination period is divided into: (1) the overall period (1 December 2005-28 February 2018); (2) the bullish 1 period (1 December 2005-30 June 2007); (3) the crisis period (1 July 2007-28 February 2009); (4) the bullish 2 period (1 March 2009-30 June 2014); and (5) the consolidation period (1 July 2014-28 February 2018). The risk and return characteristics, the risk-adjusted return measures, the return correlation measure, and the sample paired *t*-test are the performance evaluations employed in this research. The results revealed that the performance of the conventional and Shariah-compliant portfolios was broadly similar in different economic regimes.

Keywords: Shariah, Shariah-compliant portfolio, conventional portfolio, Bursa Malaysia

JEL Classification: G11, G15, G41

1. Introduction

In recent decades, many investors have emerged who invest in socially responsible investments (SRIs), which are also known as ethical investments in the UK and sustainable or green investments in Europe. An SRI is an investment that takes into account financial, social, and environmental elements (Auliyah & Basuki, 2021). Some SRI investors avoid investing in companies that trade in tobacco, pornography, fast food, or any investment that is harmful to the environment. As indicated by the Global Sustainable Investment Alliance report issued in 2021, the SRI assets in the USA, Canada, Europe, New Zealand, and Australia reached \$35,301 billion in 2020, compared to \$30,683 billion in 2018, which is an increase of 15% over two years (GSIA, 2021). SRI arose as a result of investors' desire to avoid investing in companies whose activities did not align with their values or beliefs. For example, many investors in principle do not invest in companies involved in the arms or gambling industries; Jewish investors may not want to invest in the pork industry, and Muslim investors may not want to invest in industries that contradict Islamic principles. However, ethical investors are unable to determine the investment components of conventional investments and may find themselves in an awkward situation, having to either invest in ways contrary to their beliefs or not at all.

According to Abd-Karim (2010) and Mansor (2012), Shariah-compliant investment is one of the fastest-growing SRI types and differs from conventional investment in that it is subject to Shariah, the Islamic code of law. Whether the investors are Muslims or not, Shariah-compliant investments are not permitted to be in businesses that deal in or produce alcohol, pork products, pornography, gambling (Maisir), financial products like bonds, preferred stocks, or options with fixed interest (Riba), or any other activity that is regarded as immoral (El-Gamal, 2000). Ernst and Young (2019) state that the Shariah-compliant financial services industry is one of the fastest-growing global financial services industries. Alam et al. (2020) indicate that the Islamic financial services sector has grown by 10-12% each year over the past 20 years. Likewise, according to the S&P Global Rating report issued in 2022, the global Islamic finance sector will grow by 10% to 12% in 2021-2022. Aside from that, Islamic finance had fast growth in 2020, with total assets rising 10.6% despite the COVID-19 pandemic and falling oil prices (Damak, 2022).

The Islamic Financial Services Board estimates that the value of the Islamic financial services industry is \$3,06 trillion by the end of 2021 (IFSB, 2022). Yet, the size of the Shariah-compliant financial services industry remains negligible when compared to the global financial services industry, as it only represents around 1% of the global financial market (Montgomery & Masson, 2016). For example, the total value of the Shariah-compliant financial services industry in 2021 was less than the total worth of the assets of one of the largest banks in the world, JP Morgan Chase & Co., which the S&P global market intelligence estimated at \$3.743 billion in December 2021 (Yamaguchi, Terris & Ahmad, 2022). However, despite its small size in the global financial services industry, the high growth of the Shariah-compliant financial services industry shows there is considerable potential for this industry to grow globally. Especially given the rapidly growing Muslim population, which is expected to reach around 2 billion by 2022 (World Population Review, 2022), accounting for roughly 25% of the global population. This has led many national banks and well-known international banks, such as Standard Chartered, HSBC, Citibank and BNP Paribas, to either open separate branches or separate windows within conventional branches to operate Shariah-compliant financial services.

Many researchers conclude that conventional mutual funds outperform Shariah-compliant mutual funds (Mansor & Bhatti, 2011; Jabeen & Dars, 2014). The lesser performance of Shariah-compliant mutual funds may have suffered from poor diversification, as their managers may face a challenge with stock allocation, which by definition has to be Shariah-compliant. Therefore, Shariah-compliant mutual funds do not operate under the same favourable conditions as conventional mutual funds. Besides the disadvantages of smaller size and restricted investment choices, Shariah-compliant mutual funds have unique additional operational costs since they must appoint Shariah scholars to monitor and ensure that their investments are in line with Shariah. Interestingly, Wilson (1997, cited in Abd-Karim, 2010) observes the possibility of Shariah-compliant mutual fund managers suffering from a moral hazard problem, according to which the mutual fund managers may hide their managerial incompetence concerning Shariah-compliant mutual funds on the basis that they could not diversify the mutual funds well enough because of Shariah restrictions. Thus, Shariah may have an adverse effect on mutual funds' performance.

The motivation for choosing Bursa Malaysia in this study is that it comprises conventional and Shariah-compliant capital markets working in parallel and is a well-regulated market that offers a wide range of financial and investment facilities with data availability. Moreover, choosing one country to conduct the analyses helps to reduce the bias that derives from the variety of national characteristics present if the study used different countries (Hoepner, Rammal & Rezec, 2011). Bursa Malaysia is a well-known market for Shariah-compliant investments, and it has an excellent reputation among investors who prefer to invest according to Shariah since the majority of stocks listed on it are Shariah-compliant. As indicated by the Shariah-compliant stock list issued by the Shariah Advisory Council (SAC) of the Securities Commission of Malaysia (SC), there are 751 Shariah-compliant stocks out of a total of 953 stocks listed on Bursa Malaysia, representing around 79% of the total number of securities as at May 2022 (SC, 2022a). The total market value of the Islamic capital market is RM2,200.29 billion (Malaysian Ringgit) which represents more than 63% of the Malaysian capital market as at the end of September 2022 (SC, 2022b). Several other factors favoured the choice of Bursa Malaysia, including the fact that 65% of the world's Shariah-compliant financial assets are located in Malaysia, Iran and Saudi Arabia (Hassan, Rabbani & Ali, 2020).

1.1 Research Problem

Asset management companies generally construct a portfolio depending on the investor's investment objectives and constraints outlined in the investment policy statement. Generally speaking, a portfolio consists of different asset classes, such as fixed-income securities, real assets, stocks and derivatives. Because of the significant development of the Shariah-compliant financial services industry, a new type of portfolio known as the Shariah-compliant portfolio (SCP) emerged. The asset allocation of the conventional portfolio (CP) is mainly decided according to the risk and return factors. While the asset allocation of the SCP is mainly decided on Shariah principles, however risk and return remain important factors. The Shariah constraints on the use of specific financial tools may have a negative effect on the degree of diversification that could be achieved by the SCP. Many studies have emerged on the comparison of the differences in performance between conventional mutual funds and Shariah-compliant mutual funds. According to the researcher, the performance of mutual funds might not be directly comparable for three reasons: (1) fund managers may not pursue the same investment style; (2) fund managers' concentration on the number of constituents in the respective funds may be drastically different; and (3) fund managers may follow different weighting methods in asset allocation. Therefore, to investigate whether Shariah restrictions in Bursa Malaysia have negative effects on the performance of the SCP, this research undertakes to compare the performance of the CP and its Shariah-compliant counterpart on Bursa

Malaysia during the 1 December 2005-28 February 2018 examination period. Thus, the main question for this research is:

How is the CP different from the SCP in terms of their performance on Bursa Malaysia?

1.2 Research Secondary Questions

From the main question, the research's secondary questions are as follows:

1. Are there significant differences in the risk and return characteristics between the CP and SCP in Bursa Malaysia under different economic regimes?
2. Are there significant differences in the risk-adjusted return between the CP and SCP in Bursa Malaysia under different economic regimes?
3. Are there significant differences in the return movements between the CP and SCP in Bursa Malaysia under different economic regimes?
4. Are there significant differences in the mean return between the CP and SCP in Bursa Malaysia under different economic regimes?

1.3 Research Objectives

The main objectives of this research are as follows:

1. To construct a hypothetical CP and a hypothetical SCP and compare their risk and return characteristics in Bursa Malaysia under different economic regimes.
2. To compare the risk-adjusted return of the CP and SCP in Bursa Malaysia under different economic regimes.
3. To examine the relationship between the return movements of the CP and SCP in Bursa Malaysia under different economic regimes.
4. To investigate whether the mean difference return between the CP and SCP in Bursa Malaysia is statistically significant under different economic regimes.

2. Literature Review

There has been a debate among researchers on the performance of CPs compared to SCPs since their emergence. Jabeen and Dars (2014) and Anwar Shah, Gull & Parvez. (2017) argue that because SCPs cannot invest in activities that are prohibited in Shariah, they face a problem of poor diversification, which contributes to CPs performing better. However, according to modern portfolio theory, the principle of diversification is based on the return correlation of stocks rather than the number of stocks in a portfolio. Thus, a good portfolio performance depends on choosing the right assets. According to the literature, CPs do not always outperform SCPs; for instance, Omri et al. (2019) and Al-Yahyaee et al. (2020) conclude in their studies that SCPs outperform CPs. Other researchers found no difference in the performance between CPs and SCPs (Setiawan & Oktariza, 2013; Trabelsi, Bahloul & Mathlouthi, 2020). On the other hand, many researchers demonstrated that SCPs outperform CPs in a bearish period, while CPs outperform SCPs in a bullish period (Merdad, Hassan & Alhenawi, 2010; Norman, Almsafir & Smadi, 2013).

Mansor and Bhatti (2011) compared the performance of 350 conventional mutual funds and 127 Shariah-compliant mutual funds in Bursa Malaysia from January 1996 to April 2009. The authors used the descriptive analysis as well as the *t*-test approach to examine risk and return performance. The study concluded that the return of each type of portfolio was higher compared to the return of the market benchmark. However, the return of the conventional mutual funds was not significantly higher than the return of the Shariah-compliant mutual funds, while the risk performance was significantly better for conventional mutual funds compared to Shariah-compliant mutual funds. Contrary to the above results, Shah et al. (2012) compared the performance of 94 conventional mutual funds and 31 Shariah-compliant mutual funds on the Pakistan stock exchange. The study used the daily net asset values from the time of creating mutual funds to November 2011. The performance evaluations include risk, return, risk-adjusted return, selectivity and market timing. The findings indicated that the Shariah-compliant mutual funds were generally better diversified, less risky and achieved higher returns compared to the conventional mutual funds.

Along similar lines, Karim, Datip & Shukri (2014) examined the performance of the FTSE Bursa Malaysia Index against the Malaysia Dow Jones Islamic Index (DJIM) over the examination period from January 2000 to October 2011. The study separated the examination period into four sub-periods - the overall period, before the subprime crisis, during the subprime crisis, and after the subprime crisis. The authors employed traditional risk-adjusted return measurements, such as the Sharpe ratio, the modified Sharpe ratio, the Treynor measure and the adjusted Jensen's alpha index. The findings indicated that, during all sample periods, the risk-adjusted return

of the Shariah-compliant index was higher than the return of the conventional index.

Hoepner et al. (2011) examined the investment style and financial performance of 265 Shariah-compliant mutual funds from 20 Muslim and non-Muslim countries from September 1990 to April 2009. The results differed depending on whether the country had an Islamic majority or not. The Shariah-compliant mutual funds significantly outperformed or equalled their benchmark in the six biggest Islamic countries (Malaysia and the GCC countries). By contrast, the Shariah-compliant mutual funds significantly underperformed their benchmark in Western countries. This might be due to the biases that exist due to a variety of national characteristics in different countries. Setiawan and Oktariza (2013) compared the performance of conventional and Shariah-compliant stocks of public companies listed on the Indonesia Stock Exchange over the 2009-2011 examination period. The authors examined the risk and return performance by applying the independent sample *t*-test, the Mann Whitney U-test, as well as the traditional risk-adjusted performance measures, namely, the Sharpe ratio, the Treynor ratio and Jensen's alpha to 30 Shariah-compliant stocks and 30 conventional stocks. The study concluded that there were no significant differences in the risk, return and risk-adjusted performance measures between conventional and Shariah-compliant stocks.

In terms of the global financial crisis (GFC), Dewi and Ferdian (2009) and Ahmed (2009) claimed that Shariah-compliant finance could deal with the financial crisis more effectively than its conventional counterpart. During the GFC, the Islamic banks were more stable than the conventional banks (Zehri, Abdelbaki & Bouabdellah, 2012). Indeed, Askari, Iqbal, Krichenne and Mirakhor (2010) observe that no major Islamic bank has gone bankrupt in the last three decades. This stability may have motivated investors to focus more on Shariah-compliant investments as the majority of some Islamic institutions' clients were non-Muslim (PricewaterhouseCoopers Malaysia, 2008, cited in Krasicka & Nowak, 2012:4). On the other hand, Hayat and Kraeussl (2011) concluded that the Shariah-compliant mutual funds underperformed their Shariah-compliant and conventional benchmarks during the global financial crisis. Also, Al-Khazali, Leduc and Alsayed (2016) concluded that during the GFC, Shariah-compliant indices and their conventional counterparts showed a similar level of efficiency. Besides, the reaction to major volatility shocks in the Shariah-compliant stocks was comparable to the reaction of the conventional stocks (Hkiri et al., 2017).

Abdullah et al. (2007) compared the performance of 14 Shariah-compliant mutual funds to 51 conventional mutual funds in Bursa Malaysia from January 1992 to December 2001. The authors separated the examination period into three sub-periods (1) before the Asian financial crisis (1992-1996); (2) during the Asian financial crisis (1997-1998); and (3) after the Asian financial crisis (1999-2001). By applying various standard methods, such as the Sharpe ratio and adjusted Sharpe ratio as well as Jensen's alpha, the study found strong evidence that the Shariah-compliant mutual funds outperformed the conventional mutual funds in the bearish period, and vice versa in the bullish period. Another study conducted by Alwi et al. (2019) compared the risk and return characteristics and the risk-adjusted performance of 100 Shariah-compliant mutual funds with 100 conventional mutual funds in Malaysia over the period from 2007 to 2015. The authors separated the examination period into the crisis period from 2007 to 2008 and the overall period from 2007 to 2015. The results indicated that both kinds of mutual funds outperformed their respective market benchmarks, but the Shariah-compliant mutual funds relatively outperformed the conventional mutual funds in both periods.

Trabelsi, Bahloul and Mathlouthi (2020) compared the performance of conventional, Shariah-compliant, and mixed (Shariah-compliant and conventional) optimal international portfolios in both stable and volatile regimes. The dataset includes closing MSCI prices for conventional and Shariah-compliant indices in the US and 15 emerging countries across three continents from June 2002 to February 2017. The Ledoit and Wolf (2008) Sharpe ratio difference test and the Markov regime-switching model serve as the basis for the methodology. In general, the results indicated that conventional, Shariah-compliant and mixed portfolios perform differently, however, this difference is not statistically significant. As a result, selecting Shariah-compliant indices over conventional ones will not disadvantage investors. In Al-Yahyaee et al.'s (2020) study, they evaluated the performance of 22 Islamic and conventional Dow Jones stock market indices across the global financial crisis and the European sovereign debt crisis. The author used various performance measures, including the Sharpe ratio, Treynor measure, Jensen's alpha and other measures. The findings indicated that Shariah-compliant stock returns outperformed conventional stock returns during the global financial crisis and the European sovereign debt crisis, and the post-crisis periods.

In a recent review of the literature on this topic conducted by Mirza et al. (2022), the authors examined how Shariah-compliant and conventional mutual funds performed under risk-adjusted performance during the COVID-19 pandemic. They demonstrated that, when compared to their conventional counterparts, Shariah-compliant funds showed differences in risk-adjusted performance, investment approaches, and volatility

timing. Results specifically showed that Shariah-compliant stock funds are more resistant to COVID-19 shock as they outperformed conventional peers throughout the pandemic's peak months. These findings support the Shariah-compliant stock funds' status as safe havens, which is beneficial for investors trying to reduce their exposure to pandemic risk. By comparing the financial ratios and using the CAPM-EGARCH model, Asutay, Wang and Avdukic (2022) provide a thorough performance comparison between Islamic and conventional indices for the four primary markets: the worldwide, the US, Europe, and the Asia-Pacific between the period from 2007 to 2017. The results demonstrated that throughout the 2007-2009 global financial crisis and the subsequent post-crisis period 2013-2017, Shariah-compliant indices outperformed conventional indices. The comparison is uncertain for the 2009-2013 period since Shariah-compliant indices perform better in the European and Asia-Pacific markets while conventional indices perform better in other regions.

As a result of the previous studies, there is disagreement among researchers regarding whether CPs or SCPs perform better. The differences in the findings might be because of the differences in the methodologies employed in the research and/or the differences in the examination period and/or the market circumstances that differed when the research was conducted. Yet, there is some evidence that SCPs outperform CPs in bearish periods and vice versa in bullish periods. This research differs from the majority of previous studies in that it constructs hypothetical portfolios instead of taking samples of mutual funds from the market. Also, this research is considered a more in-depth study, as it has assembled hypothetical conventional and Shariah-compliant portfolios over an extensive examination period of 147 months, covering both bullish and bearish periods.

3. Methodology

This research is based on secondary data that has been published. The data was examined using the quantitative analytical approach, which is popular for studying financial data. The majority of the data was derived from the Taiwan Economic Journal's (TEJ) database, which required a subscription. The research employs monthly data since daily and weekly data contain a large amount of random white noise (Mun, Vasconcellos & Kish, 2000). It is worth mentioning that white noise is a series of random numbers that cannot be predicted. Furthermore, to avoid the influence of extreme values on the result, this research remedies the outliers according to the Winsorisation approach discussed in Van Rensburg and Robertson (2003), by excluding 0.5% outliers from the top and bottom and replacing these values with 99.5th and 0.5th percentiles, respectively. This study uses the Shariah-compliant securities list report published by the SC to determine if a stock in the database is or is not compliant with Shariah. Any company registered on this list is considered Shariah-compliant, while any company not registered is considered non-Shariah-compliant. The CP investor can invest either in Shariah-compliant stocks or non-Shariah-compliant stocks, or both. During the study period from 1 December 2005 to 28 February 2018, this report was issued at the end of May and November, except for 2006, when it was issued at the end of April and October.

3.1 Examination Periods

As mentioned, the overall examination period of this research is from 1 December 2005 to 28 February 2018. To improve the comparison between CP and SCP in different economic cycles, the examination period is separated into sub-periods. The sub-periods are determined according to the major past turning points of the FTSE Bursa Malaysia EMAS index. These turning points represent the points at which the index experiences upward or downward trends. The main reason for choosing this index to determine the sub-periods is that, as stated in the FTSE Bursa Malaysia index series report published in August 2022, the FTSE Bursa Malaysia EMAS index is comprised of three types of indices: (1) the FTSE Bursa Malaysia small-cap index; (2) the FTSE Bursa Malaysia mid 70 index; and (3) the FTSE Bursa Malaysia KLCI, which represents the blue-chip stocks (FTSE Russell, 2022). Thus, all stocks listed on Bursa Malaysia are represented by the index, regardless of the firm's size. Choosing a large-cap index such as the FTSE Bursa Malaysia KLCI is considered inappropriate to serve as a benchmark for the research, as studies conducted by Luther and Matatko (1994), Sparkes (1995), and Scholtens (2005) indicate that companies complying with ethical investment criteria mostly invest in small-cap companies, and thus, many managers of ethical investment avoid investing in large-cap companies. In addition to the overall period, Figure 1 illustrates the research examination sub-periods, namely, the bullish 1 period, the crisis period, the bullish 2 period and the consolidation period.

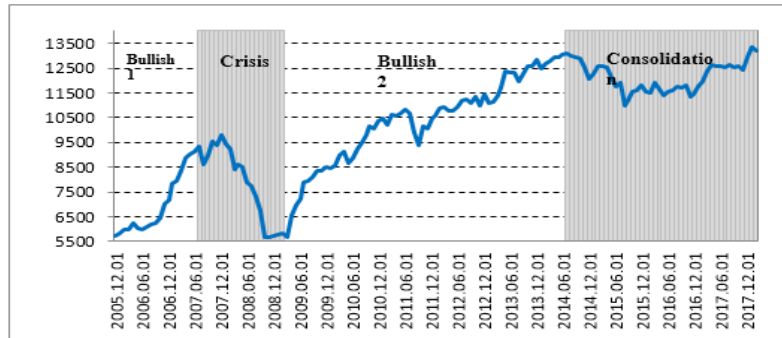


Figure 1. Examination period and sub-periods

As indicated in Figure 1, the four sub-periods of this research are as follows:

1. **Bullish 1 Period (1 December 2005-30 June 2007):** The FTSE Bursa Malaysia EMAS index demonstrated an upward trend in terms of performance. This 19-month period was characterised by a bullish market that continued until the beginning of the GFC.
2. **Crisis Period (1 July 2007-28 February 2009):** After the first bullish period, the index took a downward turn due to the GFC. This 20-month period was characterised by a crisis market. Malaysia, like other countries, was economically damaged by the GFC as a result of the overlapping and interdependence of countries' economies.
3. **Bullish 2 Period (1 March 2009-30 June 2014):** By the end of the GFC, the index had recovered and started an uptrend. This 64-month period was characterised by a strong bullish market.
4. **Consolidation Period (1 July 2014-28 February 2018):** This 44-month period is the last sub-period included in this research, which started when the movement of the index began to consolidate. The index had strong support at a point of 11,500 and rather strong resistance at a point of 13,000.

3.2 Sample Selection

The four main portfolios constructed in this research are as follows:

1. **Conventional Portfolio (CP):** The CP refers to a portfolio that includes all stocks in the research data.
2. **Shariah-compliant Portfolio (SCP):** The SCP is a portfolio that includes all Shariah-compliant stocks identified in the research data.
3. **Non-Shariah-compliant Portfolio (NSCP):** The NSCP refers to a portfolio that consists of all non-Shariah-compliant stocks in the research data. The reason for constructing the NSCP is only for comparison.
4. **Non-finance Portfolio (NFP):** The NFP refers to a portfolio that consists of all stocks in the research data, excluding stocks in the financial sector. Since firms in the financial sector are mostly non-Shariah compliant, the NFP serves as a good benchmark to evaluate SCP performance. Also, constructing the NFP is essential to determining the impact of the financial sector on Bursa Malaysia.

As mentioned earlier, the SC issues the list of Shariah-compliant stocks semi-annually, mostly at the end of May and November over the research examination period. Hence, this research rebalanced the hypothetical portfolios on 1 June and 1 December immediately after the Shariah-compliant lists were released. Table 1 displays the number of stocks in the four portfolios -the CP, the SCP, the NSCP and the NFP- in different economic regimes. The table presents the starting and ending number of stocks in each portfolio over the examination period and sub-periods.

Table 1. Number of stocks in the portfolios

	Number of Stocks in the Portfolios										
	Overall		Bullish 1		Crisis		Bullish 2		Consolidation		
	Dec '05-Feb '18	Dec '05-Jun '07	Jul '07-Feb '09	Mar '09-Jun '14	Jul '14-Feb '18	Start	End	Start	End	Start	End
CP	381	660	381	448	448	485	485	557	557	660	660
SCP	336	498	336	401	401	431	431	430	430	498	498
NSCP	45	162	45	47	47	54	54	127	127	162	162
NFP	377	620	377	438	438	474	474	543	543	620	620

To perform a fair evaluation of portfolios that are formed from the same pool of sample stocks, it is crucial, according to Hsieh and Hodnett (2011), to construct a market proxy from the available sample stocks. Therefore, this research employs the CP as a market proxy for all portfolios constructed from conventional stocks, and the SCP is employed as a market proxy for a portfolio constructed from Shariah-compliant stocks. With regards to choosing the risk-free proxy, this research uses the 3-month Bank Negara Treasury - the central bank of Malaysia- bills rate as the risk-free proxy for the CP. The use of 3-month T-bills is consistent with numerous studies on the performance of funds and portfolios, such as Ong, Teh, Soh, and Yan (2012) and Rohuma (2022). While the 3-month Islamic interbank rates are used as the risk-free proxy for the SCP. In a similar vein, using the 3-month interbank rate as a proxy has been widely used in previous studies, such as Ismaila and Shakranib (2003) and Dharani and Natarajan (2011) and Rohuma (2022).

3.3 Performance Evaluation Measures

The performance evaluation measures employed in this research to assess portfolio performance are: (1) the risk and return measures; (2) the risk-adjusted performance measures; (3) the return correlation measure; and (4) the sample paired *t*-test.

- 1) Return Measures: Of the several parameters that could be used to measure returns, this research adopts the following measures:
 1. Return on Investment (ROI): The return of a stock is estimated by calculating the return on investment. The return on investment for stock *i* in month *t* is obtained directly from the TEJ database.
 2. Monthly arithmetic return: The portfolio’s return is evaluated by calculating the monthly arithmetic return. The monthly arithmetic return for portfolio X over T months is computed as follows in Equation 1:

$$\bar{r}_x = \frac{\sum_{t=1}^T r_{x,t}}{T} \tag{1}$$

Where,

$r_{x,t}$: is the return of portfolio X in month *t*; and

T: is the number of months in the evaluation period.

- 2) Risk Measures: Of the several measures that could be used to measure risks, this research employs the following measures:
 1. Standard Deviation: The portfolio standard deviation measures the dispersion of the upward and downward returns around the average return of the portfolio. The portfolio standard deviation represents the total risk of the portfolio (both systematic and unsystematic). The standard deviation for portfolio X over T months is calculated as follows in Equation 2:

$$\sigma_x = \sqrt{\frac{\sum_{t=1}^T (r_{x,t} - \bar{r}_x)^2}{T-1}} \tag{2}$$

2. Beta Coefficient: The beta coefficient estimates the sensitivity of the portfolio returns to the movement in the market risk premium. The beta coefficient for portfolio X is estimated according to the capital asset pricing model (CAPM), by regressing the time series portfolio excess return on the time series of the market risk premium.
- 3) Risk-Adjusted Performance Measures:

This research employs the traditional risk-adjusted performance measures, namely, the Sharpe ratio, the Treynor measure, and Jensen’s alpha.

1. Sharpe ratio (1966): The Sharpe ratio measures the level of portfolio efficiency and the extent of its ability to achieve an excess return compared to the risk-free rate. The Sharpe ratio measures the excess return that

the portfolio can achieve for each unit of total risk measured by the standard deviation. The Sharpe ratio for portfolio X is computed as follows in Equation 3:

$$SR_x = \frac{\bar{r}_x - \bar{r}_f}{\sigma_x} \quad (3)$$

Where, \bar{r}_f : is the monthly average return of the risk-free rate.

2. Treynor measure (1965): The Treynor measure is similar to the Sharpe ratio. However, it uses a beta coefficient rather than the standard deviation as a measure of risk, since it depends on the ability of diversification to mitigate unsystematic risk. The Treynor measure for portfolio X is computed as follows in Equation 4:

$$TR_x = \frac{\bar{r}_x - \bar{r}_f}{\beta_{x,m}} \quad (4)$$

3. Jensen's alpha (1968): Jensen's alpha measures the actual return of the portfolio in excess of the expected return estimated by the CAPM. Jensen's alpha for portfolio X is computed as follows in Equation 5:

$$\alpha_x = (\bar{r}_x - \bar{r}_f) - \beta_{x,m} \times (\bar{r}_m - \bar{r}_f) \quad (5)$$

This research employs the conventional risk-adjusted performance measures to evaluate the performance of SCP since, unfortunately, there are no evaluation measures that take religious or ethical objectives into account.

4) Return Correlation Measure:

To investigate the relationship between the return movements between different types of portfolios, the research employs the correlation coefficient. The correlation coefficient between the return of portfolio x and the return of portfolio y is computed as follows in Equation 6:

$$\rho_{x,y} = \frac{COV_{x,y}}{\sigma_x \cdot \sigma_y} \quad (6)$$

Where,

$COV_{x,y}$: is the covariance between portfolio x return and portfolio y return;

σ_x : is the standard deviation of portfolio x; and

σ_y : is the standard deviation of portfolio y.

The value of the correlation coefficient is between +1 and -1. If the correlation coefficient is +1, this means there is a strong relationship between two portfolio returns, and thence, the return of the first portfolio moves in the same direction as the return of the other portfolio. If the correlation coefficient is -1, this means there is a strong negative relationship between the two portfolio returns. Thus, the return of the first portfolio moves in the opposite direction of the return of the other portfolio. However, if the correlation coefficient is 0, this means there is no relationship between the returns of the two portfolios. The significance level of this test is at the 5% level.

5) Sample Paired *t*-Test:

This study further employs the sample paired *t*-test to investigate whether the difference in the mean returns between different types of portfolios is statistically significant. The sample paired *t*-test was also used by Abd-Karim (2010), Mansor and Bhatti (2011), and Setiawan and Oktariza (2013). According to Shier (2004), the *t*-statistic of the mean difference return of the two portfolios is computed as follows in Equation 7:

$$t = \frac{\bar{d}}{SE(\bar{d})} \quad (7)$$

Where:

\bar{d} : is the mean difference return between two portfolios; and

$SE(\bar{d})$: is the mean difference standard error, which equals to $\frac{s_d}{\sqrt{T}}$ where, s_d is the standard deviation difference

and T is the number of months.

The significance of the test in this research is at a 5% level. The null hypothesis is H0: the difference in the mean return between the two portfolios is not statistically significant against the alternative hypothesis of H1: the difference in the mean return between the two portfolios is statistically significant.

4. Results: Performance Evaluation for the Portfolios

4.1 Results of the Risk and Return Characteristics and Risk-adjusted Return

The results of the risk and return characteristics and the risk-adjusted performance of the portfolios (CP, SCP, NSCP, NFP) are presented in Table 2. The table is separated into five panels, Panels (a) through (e), demonstrating the results over the examination period and sub-periods, namely, the overall period, the bullish 1 period, the crisis period, the bullish 2 period and the consolidation period, respectively.

Table 2. Results of the risk and return characteristics and risk-adjusted return

Panel (a) The overall period (1 Dec. 2005-28 Feb. 2018)

	CP	SCP	NSCP	NFP
Return	0.817%	0.803%	0.896%	0.767%
Std. Dev.	4.456%	4.436%	4.905%	4.446%
β	1.000	1.000	1.057	0.995
Sharpe Ratio	0.127	0.120	0.133	0.118
Treynor Measure	0.005	0.004	0.005	0.004
Jensen's Alpha	0.000	0.000	0.000	0.000

Panel (b) The bullish 1 period (1 Dec. 2005-30 Jun. 2007)

	CP	SCP	NSCP	NFP
Return	2.878%	2.742%	3.900%	2.849%
Std. Dev.	4.093%	3.957%	5.367%	4.048%
β	1.000	1.000	1.264	0.919
Sharpe Ratio	0.638	0.617	0.675	0.638
Treynor Measure	0.025	0.023	0.030	0.025
Jensen's Alpha	0.000	0.000	0.004	0.000

Panel (c) The crisis period (1 Jul. 2007-28 Feb. 2009)

	CP	SCP	NSCP	NFP
Return	-2.242%	-2.244%	-2.207%	-2.237%
Std. Dev.	5.623%	5.545%	6.344%	5.596%
β	1.000	1.000	0.870	1.006
Sharpe Ratio	-0.448	-0.457	-0.383	-0.450
Treynor Measure	-0.024	-0.024	-0.032	-0.024
Jensen's Alpha	0.000	0.000	-0.002	0.000

Panel (d) The bullish 2 period (1 Mar. 2009-30 Jun. 2014)

	CP	SCP	NSCP	NFP
Return	1.716%	1.729%	1.707%	1.707%
Std. Dev.	4.225%	4.218%	4.570%	4.234%
β	1.000	1.000	0.888	0.999
Sharpe Ratio	0.351	0.350	0.324	0.349
Treynor Measure	0.017	0.017	0.019	0.017
Jensen's Alpha	0.000	0.000	0.001	0.000

Panel (e) The consolidation period (1 Jul. 2014-28 Feb. 2018)

	CP	SCP	NSCP	NFP
Return	-0.025%	-0.030%	-0.216%	-0.190%
Std. Dev.	3.372%	3.453%	3.188%	3.322%
β	1.000	1.000	1.005	0.993
Sharpe Ratio	-0.083	-0.099	-0.150	-0.135
Treynor Measure	-0.002	-0.002	-0.004	-0.003
Jensen's Alpha	0.000	0.000	-0.001	-0.001

4.1.1 Panel (a) The overall period (1 December 2005-28 February 2018):

From the results in the panel, it is noted that over the long term, all portfolios achieved a positive return. This is despite the fact that all portfolios were exposed to high losses during the GFC. It is evident from the panel that the NSCP generates a higher return (0.896%) compared to the returns generated by the CP (0.817%), the SCP (0.803%), and the NFP (0.767%). The higher return of the NSCP is accompanied by a higher standard deviation (4.905%) and beta coefficient (1.057) compared to the other portfolios. Since the NSCP has the highest risk and return, this implies that the NSCP generates higher returns per unit of risk compared to other portfolios. However, when risk is estimated by the standard deviation, the SCP is the safest portfolio to invest in since it has the lowest standard deviation (4.436%), while the lowest beta coefficient exists in the NFP (0.995). In terms of risk-adjusted performance, the NSCP enjoys the highest Sharpe ratio (0.133), while the Treynor measure of the NSCP and the CP is the same (0.005). At the same time, the Treynor measure of the SCP and the NFP is the same (0.004). Also, all portfolios have the same Jensen's alpha (0.000). The risk-adjusted performance of the NFP is almost the same as the risk-adjusted performance of the SCP. This is because the performance of the NFP is similar to the performance of the SCP since both portfolios exclude stocks from the financial sector. On the other hand, the performance of the NSCP is also similar to the performance of the CP in terms of risk-adjusted performance since both portfolios can invest in non-Shariah-compliant stocks.

4.1.2 Panel (b) The bullish 1 period (1 December 2005-30 June 2007):

It is evident from the results in the panel that the NSCP produces a higher return (3.900%) compared to the returns produced by the CP (2.878%), the SCP (2.742%), and the NFP (2.849%). This is because the performance of the NSCP is driven by large companies, such as banks and insurance companies, whose performances are mostly correlated with market conditions. The NSCP is also characterised by a higher standard deviation (5.367%) and beta coefficient (1.264) compared to the NFP, CP, and SCP, and hence the additional risk borne by the NSCP is more than compensated by its returns. The SCP enjoys the lowest standard deviation (3.957%), while the lowest sensitivity to market portfolio fluctuations exists in the NFP since it exhibits the lowest beta coefficient (0.919). Concerning risk-adjusted performance, the NSCP outperforms other portfolios in all three risk-adjusted performance measures. However, the SCP is the worst portfolio in terms of the Sharpe ratio (0.617) and Treynor measure (0.023). Yet, Jensen's alpha is the same (0.000) for the SCP, the CP, and the NFP. The performance of the CP is the same as the performance of the NFP in terms of risk-adjusted performance. This is because the NFP is close to the CP since both portfolios may include some non-Shariah-compliant stocks.

4.1.3 Panel (c) Crisis period (1 July 2007-28 February 2009):

The results of the panel indicate that, while all portfolios made losses due to the GFC, the return performance of the NSCP outperformed the return performance of the other portfolios. Where the NSCP generates a lower loss (-2.207%) compared to the losses generated by the CP (-2.242%), the SCP (-2.244%), and the NFP (-2.237%). The lower loss of the NSCP is accompanied by a higher risk measured by the standard deviation (6.344%) and a lower risk measured by the beta coefficient (0.870), compared to other portfolios. The NSCP has the highest standard deviation because the financial sector is considered one of the most vulnerable sectors to any general decline in market movements. The SCP exhibits the lowest standard deviation (5.545%), while the highest beta coefficient (1.006) exists in the NFP. Concerning risk-adjusted performance, the results show that the NSCP has a better Sharpe ratio (-0.383) than the others, but the Treynor measure and Jensen's alpha for the CP, the SCP and the NFP are the same, and all outperform the Treynor measure and Jensen's alpha of the NSCP.

4.1.4 Panel (d) Bullish 2 period (1 March 2009-30 June 2014):

The results of Panel (d) indicate that all portfolios achieved a positive return after recovering from the losses resulting from the GFC. The SCP has the highest return (1.729%) compared to the returns of the CP (1.716%), the NSCP (1.707%), and the NFP (1.707%). The SCP achieves the highest return with the lowest standard deviation (4.218%), while the NSCP exhibits the highest standard deviation (4.570%). On the other hand, the CP and the SCP are characterised by the highest sensitivity to market movements since their beta coefficients are the highest (1.000). The NSCP, however, enjoys the lowest sensitivity to market movements since its beta coefficient is the lowest (0.888). In respect of the risk-adjusted performance, the results reveal that the CP has the highest Sharpe ratio (0.351), but it is close to the Sharpe ratios of the SCP (0.350) and the NFP (0.349). Nevertheless, the NSCP outperforms other portfolios in terms of the Treynor measure (0.019) and Jensen's alpha (0.001). At the same time, the Treynor measure (0.017) and Jensen's alpha (0.000) for the CP are the same as the Treynor measure and Jensen's alpha for the SCP and the NFP.

4.1.5 Panel (e) Consolidation period (1 July 2014-28 February 2018):

The results of this period show that the CP generates a lower loss (-0.025%) compared to the losses generated by the SCP (-0.030%), the NSCP (-0.216%), and the NFP (-0.190%). However, the NSCP generates the highest loss with the lowest standard deviation (3.188%), but with more sensitivity to market fluctuations since its beta coefficient (1.005) is the highest. The highest standard deviation exists in the SCP (3.453%), while the lowest beta coefficient (0.993) exists in the NFP. In respect of the risk-adjusted performance, the findings show that the CP and the SCP outperform the NSCP and the NFP in the three risk-adjusted performance measures. However, the Sharpe ratio of the CP (-0.083) outperforms the Sharpe ratio of the SCP (-0.099), while the Treynor measure (-0.002) and Jensen's alpha (0.000) for the CP and the SCP are the same. The NFP has a higher Sharpe ratio (-0.135) and Treynor measure (-0.001) compared to the NSCP, while Jensen's alpha (-0.001) for both is the same.

In sum, the results of the table indicate that the SCP had almost the lowest return compared to other portfolios in the overall period, the bullish 1 period and the crisis period, but its return recovered the most in the bullish 2 period and, to some extent, in the consolidation period. By contrast, the NSCP exhibits the highest return in the first three examination periods, while in the last two examination periods its return performance is poor. Generally speaking, the higher the number of Shariah-compliant stocks in a portfolio, the lower the risk measured by the standard deviation. This is evident from the results in the table since, in the first four examination periods, the standard deviation of the SCP is less than the standard deviation of the CP, the NSCP, and the NFP. In the meantime, the standard deviation of the CP and the NFP is less than the standard deviation of the NSCP over the same examination periods. Conversely, the results in the consolidation period are in contrast to this, where the higher number of Shariah-compliant stocks in a portfolio resulted in a higher standard deviation. However, the differences in the standard deviation between all portfolios are not significant. Furthermore, the number of stocks in the financial sector is small, but their performance in the CP is noticeable since, after excluding the financial stocks from the portfolio, as it is in the NFP, the return performance of the NFP becomes poor compared to the CP over the majority of the examination periods.

4.2 Results of the Correlation Test and Sample Paired *t*-Test

As previously stated, this study employs a correlation analysis in different economic regimes to investigate the relationship in return movements between different types of portfolios (CP, SCP, NSCP, and NFP). Besides, this research also employs the sample paired *t*-test to investigate whether the differences in the mean returns between these portfolios are statistically significant in different economic regimes. Over the examination period and sub-periods, Panel (a) in Table 3 presents the results of the correlation test, while Panel (b) over the same examination periods shows the results of the sample paired *t*-test. Any result significant at a 5% level in the sample paired *t*-test table is highlighted in bold.

Table 3. Results of the correlation test and sample paired *t*-test

Panel (a) Correlation test

	Overall Period				Bullish 1 Period				GFC Period				Bullish 2 Period				Consolidation period			
	CP	SCP	NIP	NFP	CP	SCP	NIP	NFP	CP	SCP	NIP	NFP	CP	SCP	NIP	NFP	CP	SCP	NIP	NFP
CP	1.00				1.00				1.00				1.00				1.00			
SCP	1.00	1.00			1.00	1.00			1.00	1.00			1.00	1.00			1.00	1.00		
NIP	0.97	0.95	1.00		0.97	0.95	1.00		0.98	0.97	1.00		0.96	0.92	1.00		0.94	0.92	1.00	
NFP	1.00	0.99	0.97	1.00	1.00	1.00	0.96	1.00	1.00	1.00	0.98	1.00	1.00	1.00	0.94	1.00	0.97	0.96	0.98	1.00

Note. All correlations are significant at 5%.

Panel (b) Sample Paired *t*-test

Sample Paired <i>t</i> -test	Overall Period			Bullish 1 Period			GFC Period			Bullish 2 Period			Consolidation period		
	Mean	<i>t</i>	Sig. (0.05)	Mean	<i>t</i>	Sig. (0.05)	Mean	<i>t</i>	Sig. (0.05)	Mean	<i>t</i>	Sig. (0.05)	Mean	<i>t</i>	Sig. (0.05)
Portfolios CP vs. SCP	0.000	0.670	0.504	0.001	2.299	0.035**	0.000	0.019	0.988	0.000	-0.476	0.636	0.000	0.038	0.971
CP vs. NIP	-0.001	-0.654	0.513	-0.010	-2.295	0.035**	0.000	-0.111	0.910	0.000	0.024	0.981	0.002	1.126	0.263
CP vs. NFP	0.001	1.447	0.151	0.000	1.425	0.173	0.000	-0.300	0.766	0.000	0.521	0.603	0.002	1.338	0.185
SCP vs. NIP	-0.001	-0.666	0.502	-0.011	-2.291	0.033**	0.000	-0.103	0.920	0.000	0.078	0.939	0.002	0.913	0.367
SCP vs. NFP	0.000	0.863	0.381	-0.001	-2.243	0.039**	0.000	-0.173	0.864	0.000	0.727	0.471	0.002	1.117	0.271
NIP vs. NFP	0.001	1.099	0.275	0.010	2.284	0.036**	0.000	0.095	0.923	0.000	-0.001	0.998	0.000	-0.226	0.824

Note. ** Significant at 5%.

4.2.1 Results: Return Correlation Test

It is evident from the results in Panel (a) that the return correlation coefficients between the different kinds of portfolios in different economic regimes are strong and significant at the 5% level. The correlation coefficients are between 0.92 and 1. Although the stocks in the SCP and the NSCP are completely independent, the correlation of their returns is also high. The reason might be because the performance of the NSCP is affected by the performance of the SCP since Shariah-compliant stocks represent a larger percentage of stocks on Bursa Malaysia. Previous studies show that the return correlation between international markets appears to be higher in bearish periods compared to bullish periods (Odier & Solnik, 1993; Longin & Solnik, 1995; Butler & Joaquin, 2002). Despite the high correlation values in the panel, this study discovered that the return correlation appears to be higher during the crisis period, even in the national market, compared to other periods, because the return correlation coefficients between different types of portfolios are higher in the crisis period than in other research periods.

In sum, the results of the panel indicate that the returns of different kinds of portfolios move in the same way as the returns of other portfolios. This gives a strong indication that the portfolios on Bursa Malaysia are not well diversified.

4.2.2 Results: Mean Difference Returns Analysis

The results in Panel (b) show that all *t*-test values are not statistically significant at a level of 5% in the overall period, the crisis period, the bullish 2 period, and the consolidation period. Hence, the null hypothesis cannot be rejected, and the differences in the mean return between the portfolios are not statistically significant. Thus, the differences in the mean return between the CP, the SCP, the NSCP, and the NFP are not statistically significant at a level of 5%. However, in the bullish 1 period, the results demonstrate that the *t*-test value is not statistically significant at a level of 5% between the CP and the NFP. Therefore, the null hypothesis is accepted, and the difference in the mean return between the CP and the NFP is not statistically significant. On the other hand, the mean return of the NSCP is significantly higher than the mean return of the CP, the SCP, and the NFP at a 5% level. At the same time, the mean returns of the CP and the NFP are significantly higher than the mean return of the SCP. As a result, the NSCP mean return outperforms the mean return of all other portfolios significantly at a 5% level, while the SCP mean return underperforms the mean return of all other proxies significantly at a 5% level.

To conclude, the mean difference returns analysis revealed that the CP's average return is only significantly higher than the SCP's average return in the bullish 1 period. Therefore, this research is unable to confirm that the average return of the CP is higher than the average return of the SCP in the bullish periods, since in the bullish 2 period the difference between the average returns of the two portfolios is insignificant.

5. Conclusion

This research compared the performance of the CP and SCP over the 1 December 2005-28 February 2018 examination period. To better understand the movement in the portfolio performance in different economic regimes, the overall examination period was divided into four sub-periods: the bullish 1 period (1 December 2005 to 30 June 2007); the crisis period (1 July 2007 to 28 February 2009); the bullish 2 period (1 March 2009 to 30 June 2014); and the consolidation period (1 July 2014 to 28 February 2018). The portfolio performance

evaluation measures were: (1) the descriptive analysis, which included calculating the average return, the standard deviation, and the beta coefficient; (2) the risk-adjusted performance measures, which included computing the Sharpe ratio, the Treynor measure, and Jensen's alpha; (3) the returns correlation analysis; and (4) the sample paired *t*-test. Since there are no performance measures that take into consideration ethical or religious objectives, this research used the conventional risk and return performance measures to evaluate the SCP. The most important finding described in this research is that the performance of the CP and the performance of the SCP in different economic regimes are comparable.

These results are consistent with other studies (Setiawan & Oktariza, 2013; Alrashidi, 2013; Trabelsi et al., 2020) that concluded that the difference in performance between conventional and Shariah-compliant stocks is generally negligible. Also, the results of this study are in line with the results of Hkiri, Hammoudeh, Aloui & Yarovaya's (2017) study, as the reaction from major volatility shocks in the Shariah-compliant stocks was comparable with the reaction of the conventional stocks. Therefore, contrary to Abdullah et al. (2007), Norman et al. (2013), Karim et al. (2014), Alwi et al. (2019), Tahir and Ibrahim (2020) and Mirza et al. (2022), this study could not find any strong evidence that the SCP outperforms the CP in the bearish period and vice versa in the bullish period. On the whole, the results emphasised that the Shariah screen that is applied in Bursa Malaysia does not adversely affect the performance of the SCP. Thus, the performance of the CP and the performance of the SCP in different economic regimes are two sides of the same coin.

6. Research Limitation

The limitations of this research can be broadly divided into the place of research, the period of research, the portfolio construction, and the performance measures. In terms of research place, this study only compared the performance of CP and SCP on Bursa Malaysia. Therefore, the results obtained might not be generalised to other markets because of their differences in the market environment, national characteristics, regulations, and Shariah standards. Concerning the examination period, this research covered the period from 1 December 2005 to 28 February 2018. It would be desirable to extend the period covered to include more recent data, but this was not available to the researcher at the time of obtaining the data. On the other hand, in constructing the hypothetical portfolios, the research only depended on stocks listed in Bursa Malaysia, hence, the performance of the portfolios only reflects the performance of these stocks. However, if the portfolios were constructed from different assets, such as stocks, fixed-income investments, and real assets, their performance would have been more indicative of portfolios in general, since portfolios should consist of different asset classes that are carefully diversified. Lastly, this research only employed conventional performance measures to evaluate the SCP since there are no existing evaluation measures that take ethical or religious objectives into account.

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