Application of Tactical Sector Allocation to Develop Optimal Forward-looking Sector Allocation Strategies for a Conventional Portfolio in Bursa Malaysia

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Abstract

This research examined whether the historical sector compositions could be used to develop the optimal forward-looking sector allocation strategies for a conventional portfolio on Bursa Malaysia over the out-of-sample period from 1 December 2006 to 30 November 2017. The optimal sector allocation strategy was developed to find each sector weight in the portfolio that maximised the Sharpe ratio in the preceding 12-months to estimate the optimal sector allocation for the following month (12-for-1 strategy), as well as for the following three months (12-for-3 strategy). The results indicated the roles of the financial, plantation, and consumer sectors were noteworthy in both kinds of strategies over the majority of the study period. However, during the global crisis period 2007/2008, the plantation sectorwas the safest investment to invest in.The research also found that the historical sector compositions can be used efficiently to develop the optimal forward-looking sector allocation strategies for a conventional portfolioin Bursa Malaysia.

Keywords Sector; Sharpe ratio; Historical sector compositions; Optimal portfolio; Sector allocation;Bursa Malaysia.

1. Introduction

Risk and return are considered as among the most crucial factors that affect investment decisions. Markowitz (1952) introduced the Modern Portfolio Theory (MPT), for which he was awarded the Nobel Prize, in his article ‘Portfolio Selection’. The MPT essentially posits investing in different types of assets and not focusing only on one asset, to reduce the portfolio’s overall risk. This contrasted with the prevailing theory at the time, which claimed that investors should construct a portfolio from all assets that generate the highest return. Markowitz (1952) asserted that the portfolio manager should take into account the correlation coefficient of the assets’ return for a portfolio to be well-diversified. The lower the correlation coefficient between assets’ returns, the higher are the benefits derived from diversification. Thus, by investing in different assets that are less than perfectly correlated, investors can benefit from diversification. Although each asset in the portfolio has unique risk and return characteristics, investors should be concerned with the overall potential risk and return of the portfolio as a whole, and not the risk and return of assets in viewed isolation (Markowitz, 1959).The main assumptions of the MPT are that the market is completely efficient and investors are risk-averse, rational, and always seeking to maximise their expected utility. Investors always look to maximise their expected utility by finding the optimal portfolio which provides the highest expected return for given levels of risk, or the lowest risk for a given level of expected return. Investors seek their optimal portfolio depending on their preferences, means, and expectations

Bursa Malaysia has hundreds of stocks trading within it. Hence, constructing an optimal portfolio from all these stocks is a challenging process. Yet, stocks may be divided into different sectors according to their categories, which makes it possible to construct the optimal sector allocation from these tradable sectors. The optimal sector allocation is the process of selecting the composition of each sector in the portfolio, in a way that makes the portfolio performs better compared to the benchmark. Gupta and Basu (2011) argued that constructing a portfolio from different sectors allows investors to earn a higher risk-adjusted return compared to the benchmark. Beller, Kling and Levinson (1998) asserted that sector returns can be predicted by employing the sector's past return performance.

The main sectors in Bursa Malaysia, according to Pyeman and Ahmad (2017), were (1) the trading and services sector; (2) the industrial sector; (3) the consumer sector; (4) the construction sector; (5) the plantation sector; (6) the financial sector; (7) the technology sector; (8) the mining sector; and (9) the properties sector.However, as clarified in Bursa Malaysia’s annual report in 2018, Bursa Malaysia announced a new sector classification on the 24th of September 2018 to facilitate the comparison between Bursa Malaysia and other global equity markets. The five new sectoral indices on the main market were (1) the energy sector; (2) the healthcare sector; (3) the telecommunications and media sector; (4) the transport and logistics sector; and (5) the utilities sector.

Furthermore, according to Felix Research (2018), the Senior Vice-President of Information Services at Bursa Malaysia, Fareedah Hussein, announced that Bursa Malaysia had deleted the infrastructure sector, hotel sector, mining sector and trading and services sector, while the next three sectors were renamed and broadened as follows: (1) the finance sector was changed to the financial services sector; (2) the consumer sector changed to the consumer products and services sector; and (3) the industrial sector changed to the industrial products and services sector.

This research examined whether the historical sector compositions could be used to develop optimal forward-looking sector allocation strategies for a conventional portfolio in Bursa Malaysia over the out-of-sample period from 1 December 2006 to 30 November 2017.Unlike the majority of prior studies that employed the ex-post analysis, this research develops the ex-ante sector allocation strategy for conventional portfolio and compares it with the market proxy.Therefore, themain objectivesof this researchare:

1. To perform forward-looking portfolio optimisation on the hypothetical conventional portfolio based on its historical sector compositions over moving windows in Bursa Malaysia over the examination period from 1 December 2005 to 30 November 2017.
2. To evaluate the risk and return characteristics and risk-adjusted performance of the optimised sector allocation strategies in Bursa Malaysia, and compare them with the market proxy over the same examination period from 1 December 2005 to 30 November 2017.

2. Literature Review

Performance attribution is a process that decides the valuable different assets that generate fund returns (Hsieh, 2010). According to Sharpe's (1992) approach, the return-based style decomposition of a fund relies on a multi-factor model that contains, as its factors, various investment styles, and asset classes. During the January 1985-December 1989 examination period, the performance of 395 mutual funds in the USA was analysed by Sharpe (1992). The mutual funds included utility funds, balanced funds, growth, and income funds as well as growth funds. Sharpe (1992) also employed 12 asset classes and styles. According to style exposure which was updated monthly, the results show that the *R*-squared of the out-of-sample was more than 80% over the examination period. Thus, the Sharpe (1992) approach remarkably explained the performance of the mutual funds in the USA.

Faber (2007) developed the Tactical Asset Allocation (TAA) model from January 1972 to December 2005. TAA refers to the active strategies that aim to improve portfolio performance by predicting the timing of changes between assets composition over time. The asset classes were real estate, commodities, US bonds and US and foreign stocks, all these asset classes were equally weighted. The results revealed that the TAA strategy got a higher Sharpe ratio compared to the buy and hold strategy. Moreover, the maximum drawdown (MAX DD), which is the worst loss that investors could have made for their portfolio in a specific period, for the TAA strategy was around 9%, while it was more than 40% for all asset classes, except for the US bonds.

Hsieh, Hodnett and Van Rensburg (2012) applied the tactical style allocation model to the global equity portfolios. This model refers to the active strategies that aim to improve the portfolio’s performance by predicting the timing of changes between different investment styles over time. The main objective of their study is to assess the risk-adjusted performance of hedge fund strategies and global equity portfolios in different economic regimes over the out-of-sample period from January 1994 to December 2008. The two optimal portfolios constructed were: (1) the global value index, the global momentum index, and the risk-free proxy; and (2) the global value index and the global momentum index. The reason for adding the risk-free proxy was to investigate whether its presence was necessary for the optimal portfolio during the global financial crisis (GFC). A series of rolling 36-month (month *t*-36 to month *t*) weighted least-squares regressions are estimated to define the optimal style weights that will maximise the Sharpe ratio. The authors compared the risk-adjusted performance of the optimal portfolio with the risk-adjusted performance of the global value index and the global momentum index as well as the MSCI World index. The results demonstrated that the optimal portfolios outperformed the global value index and the global momentum index as well as the MSCI World index in terms of the risk-adjusted performance measures. Also, the risk-free proxy provided good protection to the optimal portfolios during the GFC.

Lam, Jaaman and bin Ismail (2013) aimed to find the optimal portfolio composition on Bursa Malaysia over the January 2003-June 2008 examination period, by applying the Beasley weighted model (2003). To enhance the index tracking approach, this approach seeks to achieve a return of portfolio similar to the return of the index, without the purchase of all stocks listed in the index. The authors used the weekly return of 54 stocks from the Kuala Lumpur Composite Index (KLCI), now known as FTSE Bursa Malaysia KLCI[1].

[1]The Kuala Lumpur Composite Index (KLCI) consisted of 100 blue-chip stocks, while the FTSE Bursa Malaysia KLCI only consists of 30 blue-chip stocks.

The results show that the optimal portfolio consists of different weights of 40 stocks, while the number of stocks in KICI consists of 100 blue-chip stocks. It is evident from the results that the risk and return performance of the optimal portfolio outperforms the risk and return performance of the KLCI since the optimal portfolio has a lower risk accompanied by a higher return.

It is arguable that, before portfolio managers select portfolio components, they should first select the sectors they should invest in. Gupta and Basu (2009, 2011) debated that constructing portfolios from different sectors allowed investors to produce a higher risk-adjusted return than the benchmark. Moreover, Cavaglia, Melas and Tsouderos (2000) and Vardharaj and Fabozzi (2007) argued that the sector allocation strategy may be considered an important strategy to maximise returns.Cavaglia et al. (2000) also asserted that investors who apply the sector allocation strategy would get a higher risk-adjusted return compared to investors who apply the passive investment strategy. Supporting results for this were obtained by Hsieh and Hodnett (2011a). According to Morrison and Tuominen (2018), the importance of the sector factor has significantly increased and might even dominate the country-specific factors in determining the returns of the equity index.

Vardharaj and Fabozzi (2007) investigated the US and global markets' performance attribution, as well as the emerging market equity portfolios over the January 1995-December 2007 examination period. The authors argue that asset allocation that depends on different sectors, and asset allocation that depend on different investment styles should not be taken into account separately, because the style allocation strategy is similar to the sector allocation strategy, since a sector's behaviour adopts the attributes of a specific style. The authors concluded that the economic sector indices and size indices, as well as value indices, can explain 90% of returns' variations in equity.
This studyis different from other studies since it develops and compares the performance of the *ex-ante* sector allocation strategy for a conventional portfolio, with the performance of the market proxyin Bursa Malaysia over the out-of-sample period from 1 December 2006 to 30 November 2017.This was done by applying the Tactical Sector Allocation (TSA), which is an active strategy that aims to improve portfolio performance by changing the sector composition based on the performance of their risk and return.

3. Methodology

The data of this research was obtained mainly from the database accessed through subscription from the Taiwan Economic Journal (TEJ). The research employs monthly data, since daily and weekly data contain a large amount of random white noise (Mun, Vasconcellos& Kish, 2000). The return of a stock is estimated by calculating the return on investment (ROI). The ROI for stock *i* in month *t* is obtained directly from the TEJ database.

The research only examines the tradable sectors before 24 September 2018 since, as mentioned earlier, Bursa Malaysia restructured the sector classification from this date, whereby some new sectors were added and others were removed or renamed. The study does not take the restructured sectors into account as they came into being after 30 November 2017, the end date of the examination period of this research. The research also excludes any sector whose average market value was less than 10% of the total market valueover the examination period. According to the research data, Table 1 displays the percentage of the market value for each sector relative to the total market value at the end of November for each year over the 1 December 2005–30 November 2017 examination period.

Table 1 Market Value for Prominent Sectors Relative to the Total Market Value Over the Examination Period (Expressed as Percentages)

The results from the table indicate that the sectors that have an average market value exceeding 10% in relation to the total market value are the trading and services sector, consumer sector, industrial sector, plantation sector, and financial sector. These sectors are used for the analysis of the conventional portfolio. The sectors whose market value is lower than 10% in relation to the total market value, which is referred to as "others" in the table, include the technology sector, properties sector, construction sector, mining sector, and hotel sector.

The optimal forward-looking sector allocations are determined according to their historical sector compositions based on TSA over moving windows. Following the methodology of Hsieh et al. (2012), this research attempts to predict the optimal sector allocations (weights) that maximises the Sharpe ratio for a portfolio over the out-of-sample period from 1 December 2006 to 30 November 2017. The return of the portfolio depended on sectors' returns are estimatedas follows in Equation 1:

$$r_{p,t} = [(\widehat{W}_{s1} . r_{s1,t}) + (\widehat{W}_{s2} . r_{s2,t}) + \ldots + (\widehat{W}_{sn} . r_{sn,t})] + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where:

$r_{p,t}$: is the returns of the portfolio in month *t*;

$\widehat{W}_{s1}$, $\widehat{W}_{s2}$ and $\widehat{W}_{sn}$: are the weights of sectors s_1, $s_{2.....}$ to sn in the portfolio p;
$r_{s1,t}$, $r_{s2,t}$ and $r_{sn,t}$:are the returns of sectors $s_{1,}$ $s_{2.....}$ to sn. in month t; and
ε_i: :is the error term for the regression that represents the return of the portfolio which is not explained by the sector exposures.

The optimal portfoliois estimated to find each sector weight that maximises the Sharpe ratio. The monthly Sharpe ratio for the portfolio in year t is computed as follows in Equation 2:

$$SR_{p,t} = \frac{\bar{r}_{p,t} - \bar{r}_{f,t}}{\sigma_{p,t}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

where:
$\bar{r}_{p,t}$:is the monthly average returns of the optimal portfolio p in year t;
$\bar{r}_{f,t}$:is the monthly average returns of the risk-free proxy in year t; and

$\sigma_{p,t}$:is the standard deviation of the optimal portfolio monthly returns in year t.

To ensure that the return of the optimal sector portfolio is positively and entirely attributed to the constituent sector indices, two restrictions are employed: (1) the sum of the sector weights equals 100%; and (2) the weight of each sector is between 0% and 100%. Thus, the evaluation only employs a long-only base. The two optimal forward-looking sector allocations developed in this research are:

12-for-1 strategy: A series of rolling 12-month (month t-12 to month t) OLS regressions are estimated every month for a long-only base for each of the selected sectors over the 1 December 2005 to 30 November 2017 examination period. The objective is to estimate the optimal forward-looking sector allocations using Equation 1 that maximises the Sharpe ratio in Equation 2. After that, the weights of the optimal sector allocations are employed to estimate the sector weights for the next month (t +1). This procedure is repeated every month until the optimal sector allocations from 1 December 2006 to 30 November 2017 are estimated.

12-for-3 strategy: Similarly, a series of rolling 12-month (month t-12 to month t) OLS regressions are estimated every three months for a long-only base for each of the selected sectors over the 1 December 2005 to 30 November 2017 examination period. The objective is to estimate the optimal forward-looking sector allocations using Equation 1 that maximises the Sharpe ratio Equation 2. The weights of the optimal sector allocations are employed to estimate the sector weights for the next three calendar months (t +3). This procedure repeats every three months until the optimal sector allocations from 1 December 2006 to 30 November 2017 are estimated.

The reason for choosing the 12-for-1 strategy is to allow the optimal sector allocation to take advantage of the short-term returns' movements of stocks in the respective sectors. On the other hand, the 12-for-3 strategy is chosen since it is considered less sensitive to the market changes compared to the 12-for-1 strategy and so it offers a chance to ride out the fluctuation of stock movements in the respective sectors. To determine which is the best sector to invest in during the global financial crisis, the risk-free proxies are not taken into consideration when constructing the optimal sector allocation. Also, this study aimed to define which sectors investors should invest in, and which sectors to avoid. Hence, the transaction cost is not taken into account for both types of strategies.

Market Proxy

According to Hsieh and Hodnett (2011b), constructing a market proxy from available sample stocks is essential to conduct a fair evaluation of portfolios that are constructed from the same pool of sample stocks. Therefore, this research employs a portfolio that consists of all conventional stocks in the research data (hereinafter, All CP)

Risk-free Proxy

With regards to choosing the risk-free proxy, this research employs the 3-month Bank Negara Treasury bills (T-Bills) rate as the risk-free proxy. Using the 3-month T-Bills is consistent with numerous studies conducted in evaluating the performance of funds and portfolios, such as Abdullah and Abdullah (2009), Hamzah, Rozali and Tahir (2010) and Ong, Teh, Soh and Yan (2012).

In the beginning, this research evaluates the performance of conventional stocks in their respective sectors. The evaluation is conducted by computing the average return, standard deviation, and beta coefficientas well as the traditional risk-adjusted performance measures, namely, the Sharpe ratio, the Treynor measure, and Jensen's alpha. The return correlation analysis between different kinds of stocks is also considered.Then the research graphically compared the return and maximum drawdown performance (Max DD) of the two optimisation strategies (12-for-1 and 12-for-3) with its market proxy, the All CP. The Max DDmeasure assumes the worst loss investors could have had for their portfolio in a specific period. It measures the difference between the greatest peak-to-trough decline in portfolio value over a period of time before a new peak is achieved. Afterward, the performance of the 12-for-1 and 12-for-3 strategies for the optimal sector allocations is compared mathematically against its market proxy.

The evaluation is conducted by applying the average return, standard deviation, and beta coefficient as well as selected risk-adjusted performance measures, namely, the Max DD, the Sharpe ratio, the Treynor measure, and Jensen's alpha.

4. Results

Descriptive Analysis for Prominent Sectors

The results of the risk and return characteristics and the risk-adjusted performance of the conventional stocks in their respective sectors over the 1 December 2005–30 November 2017 examination period are presented in Panel (a) in Table 2. While Panel (b) presents the return correlation analysis of the same stocks over the same examination period. The table also presents the results of the All CP.

Table 2 Performance Evaluation for Prominent Sectors

Unlike González, Jareño and El Haddouti (2019) who concluded that the financial sector exhibited the worst sector performance compared to other sectors, the results in Panel (a) indicate that the financial stocks outperform the majority of other stocks concerning the return (1.08%), while the highest risk-adjusted performance is between the financial and plantation stocks. The highest standard deviation (5.79%) and beta coefficient (1.088) are also found in the financial stocks. Yet, the industrial stocks have the lowest return (0.72%) and the lowest three risk-adjusted performance measures, while the lowest risk is found in the consumer stocks since they posted the lowest standard deviation (3.47%) and beta coefficient (0.725).

When comparing the performance of the All CP with the performance of the conventional stocks in their respective sectors, it is evident that the All CP outperforms the trading and services stocks as well as the industrial stocks in terms of risk, return and all three risk-adjusted performance measures. On the other hand, the All CP does not outperform the plantation and financial stocks in terms of return and all risk-adjusted performance measures even if the standard deviations of these stocks are higher than the standard deviation of the All CP (4.45%). While the beta coefficient of the All CP is higher than the beta coefficient of the plantation stocks but lower than the beta coefficient of the financial stocks. Furthermore, the return of the All CP outperforms the return of the consumer stocks, whereas the consumer stocks outperform the All CP concerning the standard deviation, beta coefficient, and all risk-adjusted performance measures.

To better understand the movement between the prominent sectors on their respective market proxies, the return correlation analysis is conducted in Panel (b). The results reveal that the correlation coefficients between all stocks' returns, as well as between these stocks' returns and the All CP return are strong and significant at a 1% level, where their correlation coefficients are (0.993) and larger. Hence, the stock returns move in the same way as the returns of other stocks and the returns of the All CP.

4.1 Optimal Forward-looking Sector Allocation Strategies

This section aims to present the *ex-ante* sector allocation strategies for the conventional portfolio, and compare it with their market proxy, the All CP, over the out-of-sample period from 1 December 2006 to 30 November 2017 (a total of 132 months). The results are illustrated in Figure 1. Chart (a) of the figure presents the sector components for the 12-for-1 strategy and 12-for-3 strategy, while Chart (b) presents the return and Max DD performance for both kinds of strategies and the All CP.

Figure 1 Sector Compositions and Performance for the Optimised Conventional Portfolios

Chart (a) Sector Compositions for the Optimised Conventional Portfolios

Chart (b) Return and Max DD performance for the Optimised Conventional Portfolios

By employing the 12-for-1 strategy, the results of Chart (a) indicate that, from the beginning of the examination period in December 2006 to the crisis period in mid-2007, the optimal sector allocation is heavily depending on the trading and services sector, plantation sector and, to a lesser extent, on the financial sector. The benefits of portfolio diversification decreased or disappeared in the crisis period. Therefore, the 12-for-1 strategy does not change its sector allocation from the plantation sector during the crisis period, which suggests that the plantation sector is more efficient in mean-variance compared to other sectors during the market crash. However, at the beginning of June 2009, the trading and services sector improves dramatically to 100% in the optimal sector allocation. A short time after this dramatic improvement, the sector allocation falls again to 0% in September 2009, where it remains for the majority of the examination period. Afterward, from October 2009 until March 2014, the optimal sector allocation is mainly dependent on the financial sector followed by the plantation and consumer sectors. Yet, after March 2014, the consumer sector recovers significantly to 100% until September 2016.

From September 2016 to the end of the period, the financial sector returns as the main sector in the optimal sector allocation with 100% and, to a lesser extent, the plantation and consumer sectors. The representation of the industrial sector in the optimal portfolio is fairly negligible over the entire examination period.

By employing the 12-for-3 strategy, the results in the figure show that the similarity between the 12-for-1 and 12-for-3 strategies is expected. The optimal sector allocations for the 12-for-3 strategy are mainly dependent on the trading and services sector, the financial sector, and the plantation sector before the global financial crisis in mid-2007. However, during the crisis period, the optimal sector allocation is completely dependent on the plantation sector until the first half of 2009. Then, shortly after the dramatic increase in the trading and services sector to 100% in the second half of 2009, it falls again to 0% by the end of October 2009. The optimal sector allocation climbs in November 2009, mostly on the consumer sector, financial sector, and plantation sector until June 2014, with more concentration on the financial sector. However, from June 2014 until September 2014, the optimal sector allocation returns to the trading and services sector with 100%. Subsequently, the optimal sector allocation changes dramatically towards the consumer sector with 100% in general, until November 2016. Yet, after November 2016, the financial sector is considered as the most important sector in the optimal sector allocation with more focus on the plantation sector in 2017. Nevertheless, the optimal sector allocation to the industrial sector is particularly low over the entire examination period.

Chart (b) displays the return and Max DD performance of the 12-for-1 and 12-for-3 strategies as well as the All CP. With regards to the return performance, the results show that the returns of the two strategies and the All CP are moving up and down in tandem. The return performance before September 2007 is similar between the two strategies and the All CP. However, after September 2007, the return of the 12-for-1 and 12-for-3 strategies moderately outperform the return of the All CP until February 2011. Thereafter, they diverge significantly, where the return of the All CP is outperformed by the other two strategies until the end of the examination period. On the other hand, when comparing the return performance of the 12-for-1 strategy with the return performance of the 12-for-3 strategy, it is observed that the 12-for-1 strategy performance is similar to the 12-for-3 strategy from the beginning of the examination period until around October 2007. Afterward, the return of the 12-for-1 strategy slightly outperforms the return of the 12-for-3 strategy until the end of the examination period.

Concerning the Max DD performance, it is evident from the results that the Max DD performance for the two strategies is mostly similar to the Max DD performance of the All CP from December 2006 until August 2007 as well as 2013 and 2014. However, during the other periods, the Max DD of the 12-for-1 and 12-for-3 strategies are better than the Max DD of the All CP, since their Max DD are mostly lower. The Max DD for the 12-for-1 strategy is generally similar to the Max DD for the 12-for-3 strategy over the majority of the examination period.

4.2 Performance Evaluation of the Optimal Forward-looking Sector Allocations

The performance evaluation of the optimal forward-looking sector allocations for the conventional portfoliosover the out-of-sample period from 1 December 2006 to 30 November 2017 is summarised in Table 3. The table presents the results of the risk and return characteristics and the risk-adjusted performance of the conventional 12-for-1 and 12-for-3 strategies, as well as the All CP.

Table 3 Performance Statistic Results for Optimal Forward-looking Sector Allocations

The results of the conventional optimal forward-looking sector allocations in Panel (a) indicate that the 12-for-1 strategy achieves a higher return (1.03%) compared to the return achieved by the 12-for-3 strategy (1.01%) and the All CP (0.68%). While the standard deviation of the All CP (4.50%) is lower compared to the standard deviation of the 12-for-1 strategy (4.72%) and the 12-for-3 strategy (4.79%). However, the 12-for-1 strategy has the lowest sensitivity to market fluctuations, since its beta coefficient (0.942) is the lowest. The results of the Max DD show that the 12-for-1 strategy has the lowest Max DD (-0.425%) compared to the Max DD of the 12-for-3 strategy (-0.440%) and the Max DD of the All CP (-0.443%). Concerning the risk-adjusted performance, the 12-for-1 and 12-for-3 strategies outperform the All CP in the three risk-adjusted performance measures. However, the 12-for-1 strategy achieves a higher Sharpe ratio (0.167) and Jensen's alpha (0.004) compared to the Sharpe ratio (0.160) and Jensen's alpha (0.003) of the 12-for-3 strategy. Treynor measure (0.008) for the 12-for-1 strategy and the 12-for-3 strategy is the same.

Therefore, it is evidentthat the conventional 12-for-1 and 12-for-3 strategies outperform their market proxy in terms of the return, beta coefficient, and the three risk-adjusted performance measures. That is a good result, since Firth (1977), Carhart (1997), Abdel-Kader and Qing (2007) and Benos and Jochec (2011) concluded that the majority of mutual funds could not outperform their respective market proxies. Moreover, the results are in line with Cavaglia et al. (2000), Vardharaj and Fabozzi (2007) and Basu (2009, 2011), who argued that the sector allocation strategy may be considered an important strategy to maximise returns.

Therefore, the historical sector compositions can be used efficiently to develop the optimal forward-looking sector allocation strategies for the conventional portfolio.

5. Conclusion

The main objective of this chapter is to perform forward-looking portfolio optimisation based on their historical sector compositions over moving windows, and compare them with their market proxy over the out-of-sample period from 1 December 2006 to 30 November 2017. The results indicate that the financial, plantation, and consumer sectors are prominent in the optimal sector allocation for the conventional 12-for-1 and 12-for-3 strategies over the majority of the examination period. However, the representation of the industrial sector is not significant. The plantation sector is considered as the main sector of the optimal sector allocation in 2017, and it is also considered as the safest cushion during the global financial crisisperiod. In terms of the return and Max DD performance, the 12-for-1 and 12-for-3 strategies outperform the market proxy over the examination period. However, the 12-for-1 strategy slightly outperforms the 12-for-3 strategy in terms of return, but their difference in the Max DD performance is not significant. The resultalso indicated that the return and risk-adjusted performance of the 12-for-1 and the 12-for-3 strategies outperformed their market proxy. However, the market proxy had the lowest risk as measured by standard deviation but accompanied by a higher risk measured by the beta coefficient and Max DD.Therefore, the historical sector compositions can be used properly to develop the optimal forward-looking sector allocation strategies for the conventional portfolio. The results also suggested that the 12-for-1 strategy for a conventional portfoliois the best strategy to invest in on Bursa Malaysia compared to the 12-for-3 strategy and market proxy in terms of return and risk-adjusted performance.

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The Tables and the Figure

Table 1 Market Value for Prominent Sectors Relative to the Total Market Value Over the Examination Period (Expressed as Percentages)

	Trade/service	**Consumer**	**Industrial**	**Plantation**	**Finance**	**Others**
Nov. 2006	26.9%	21.0%	15.7%	9.9%	16.2%	10.2%
Nov. 2007	23.0%	18.8%	15.4%	11.5%	19.1%	12.2%
Nov. 2008	36.3%	21.6%	9.7%	10.3%	14.2%	8.0%
Nov. 2009	32.6%	20.2%	10.7%	11.3%	16.4%	8.8%
Nov. 2010	34.9%	19.2%	9.5%	11.0%	16.4%	9.0%
Nov. 2011	39.1%	15.3%	9.8%	14.8%	13.8%	7.3%
Nov. 2012	33.3%	17.5%	12.3%	14.5%	14.3%	8.1%
Nov. 2013	35.9%	15.8%	9.8%	15.4%	13.9%	9.3%
Nov. 2014	37.0%	15.2%	8.9%	13.7%	14.5%	10.6%
Nov. 2015	31.3%	17.7%	11.0%	14.2%	13.2%	12.5%
Nov. 2016	39.3%	19.2%	12.1%	14.3%	1.3%	13.8%
Nov. 2017	30.5%	17.4%	14.9%	7.5%	16.0%	13.6%
Average	33.35%	18.24%	11.64%	12.37%	14.12%	10.28%

Table 2 Performance Evaluation for Prominent Sectors

Panel (a)Performance Statistic Results for Prominent Sectors

	Conventional Stocks					
	Tra/Ser.	**Con.**	**Ind.**	**Pla.**	**Fin.**	**All CP**
Return	0.79%	0.81%	0.72%	0.96%	1.08%	0.82%
Std. Dev.	4.77%	3.47%	4.65%	4.80%	5.79%	4.45%
Beta Coefficient	1.048	0.725	1.017	0.860	1.088	1.000
Sharpe Ratio	0.114	0.161	0.102	0.147	0.143	0.128
Treynor Measure	0.005	0.008	0.005	0.008	0.008	0.006
Jensen'sAlpha	-0.001	0.001	-0.001	0.002	0.002	0.000

Panel (b) Return Correlation Analysis

	Conventional stocks					
	Tra/Ser.	**Con.**	**Ind.**	**Pla.**	**Fin.**	**All CP**
Tra/Ser.	1.000					
Con.	0.994	1.000				
Ind.	1.000	0.993	1.000			
Pla.	0.998	0.999	0.998	1.000		
Fin.	1.000	0.996	1.000	0.999	1.000	
All CP	1.000	0.996	1.000	0.999	1.000	1.000

All correlations are significant at 1%.

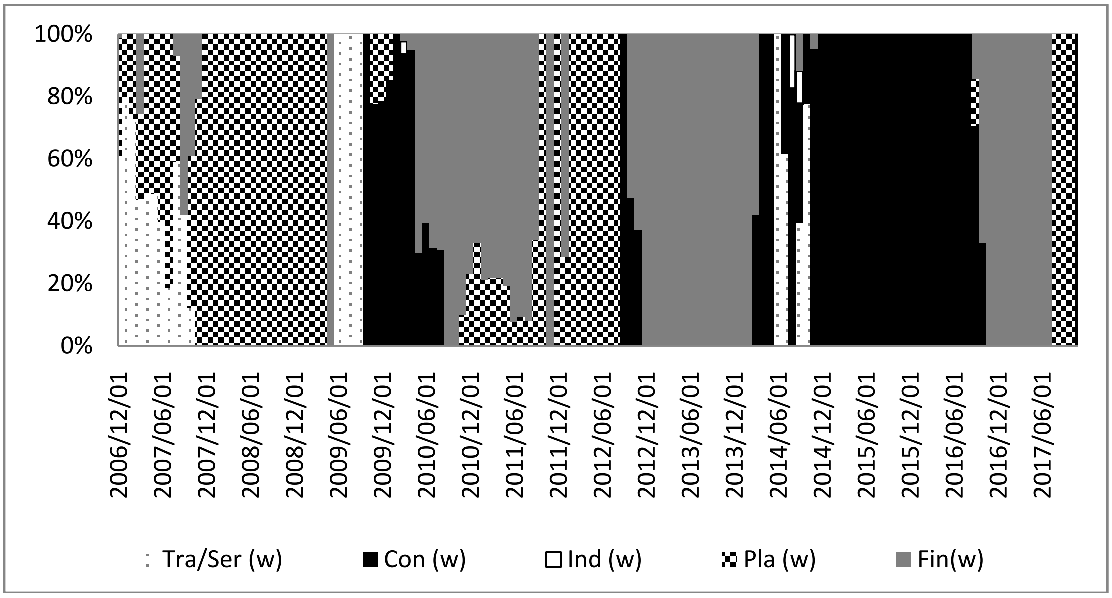
Table 3 Performance Statistic Results for Optimal Forward-looking Sector Allocations

	12-for-1	**12-for-3**	**All CP**
Return	1.03%	1.01%	0.68%
Std. Dev.	4.72%	4.79%	4.50%
Beta Coefficient	0.942	0.970	1.000
Max DD	-0.425	-0.440	-0.443
Sharpe ratio	0.167	0.160	0.098
Treynor measure	0.008	0.008	0.004
Jensen's alpha	0.004	0.003	0.000

Figure 1 Sector Compositions and Performance for the Optimised Conventional Portfolios

Chart (a) Sector Compositions for the Optimised Conventional Portfolios

(1) 12-for-1 Strategy



(2) 12-for-3 Strategy

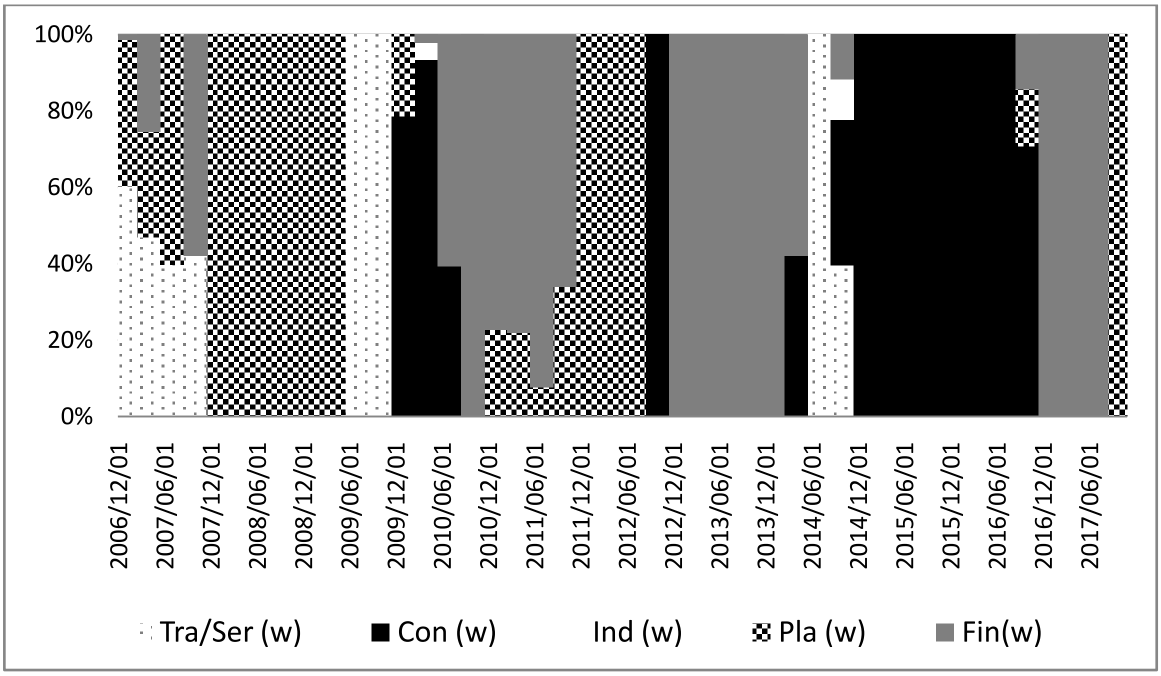


Chart (b) Return and Max DD performance for the Optimised Conventional Portfolios