FINANCIAL RATIOS AND PORTFOLIO CONSTRUCTION

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ABSTRACT

This paper aims to provide empirical evidence of portfolio construction using the current, return on equity, and debt-to-equity ratio across the top three industries in Malaysia. This study analysed 30 companies listed on Bursa Malaysia from three different industries: the energy industry, the plantation industry, and the consumer products and services industry. We find that all 17 portfolios generate positive returns except Portfolio 12. There is no statistically significant difference between the mean of the portfolio with the highest ratios and the mean of the portfolio with the lowest ratios for the three financial ratios. The results of the study provide valuable insight for portfolio managers and investors.

Keywords: Fundamental Analysis; Efficient Portfolio; Current Ratio; Return on Equity; Debt-to-Equity Ratio; Modern Portfolio Theory

INTRODUCTION

No matter how much you agree, investing is typically done to increase one's net worth. Stock purchases are the most popular way for investors to increase their wealth compared to other investment options. Individuals face investment dilemmas when deciding the way to select and build an optimal portfolio and how much risk to take. For obvious psychological reasons, investors tend to prioritize the fundamental investment principle that aligns with the notion that higher risk is associated with higher expected returns.

To maximize the expected rate of return, diversification appears to be one of the strategies investors can employ. The goal of diversifying a portfolio is to improve its risk-return profile by reducing the correlation between its holdings (Lim & Ong, 2021). Investors can get the best possible return on their investments by creatively combining different asset classes or making different choices based on their preferred investment strategies. According to Balcilar *et al.* (2014), holding a globally diversified fund can help investors further mitigate risk. This is because, on the efficient frontier, globally diversified portfolios would outperform domestic-only portfolios. Markowitz (1952) pioneered the concept of portfolio theory in his work titled "Portfolio Selection". He emphasized how investors can choose a mix of assets that aims to give the highest possible return for a given level of risk. His work showed how balancing different investments with low correlations can reduce the total risk of a portfolio.

Identifying suitable stocks for portfolio construction poses a significant challenge, as highlighted by Poornima and Remesh (2019). The main goal of an investor is to maximize their returns, or the amount of money they make on their investment, while minimizing their risk, or the likelihood of losing money on their investment (Rout & Panda, 2019). According to Naveen (2014), putting all of one's money into a single stock is extremely risky and can lead to significant losses. Instead, the construction of an ideal portfolio can help to reduce the risk associated with investing.

As reported by Krishnamoorthy and Mahabub Basha (2022), investors often struggle with choosing the correct stocks to invest in within the stock market. When constructing a portfolio, individuals often encounter uncertainty regarding investment decisions such as the selection of investment destinations, determining the appropriate amount to invest, and allocating the proportion of their investment in different stocks. This confusion can be attributed to a lack of financial literacy and awareness, which presents a challenge for investing in the capital markets.

In general, the main objective of portfolio construction is to minimize risk by diversifying the assets held within the portfolio (Nanda *et al.*, 2010). Thalassinos *et al.* (2012; 2023) propose that fundamental analysis serves as a method for forecasting forthcoming stock prices and evaluating the significance of fundamental elements that impact these future prices. Fundamental information refers to the comprehensive assessment of a company's overall condition as revealed through its financial statements, which provide insights into its performance. These statements can reveal certain fundamental details such as financial ratios, cash flow, and other performance indicators that are linked to stock prices. In this study, we are using financial ratio analysis as it can provide a wealth of information. According to Herawati and Putra (2018), the financial ratio is a frequently employed technique to assess financial statements. Connecting different figures

within the financial statements enables the interpretation of a company's financial situation and performance. Thus, investors should look more deeply at how share prices change by using financial ratios to do fundamental analysis as it can let investors estimate the price of a share of stock.

However, several research studies have explored the impact of various financial ratios on return rates (Witkowska *et al.*, 2021). To put it differently, investors may utilize specific financial ratios to make informed decisions. Nonetheless, in most cases, the choice of characteristics is subjective and based on past experiences, market analysis, or available literature. There are many research papers exploring how various financial ratios impact rates of return. For example, a previous study done by Herawati and Putra (2018) studied the effect of fundamental factors on stock prices. Dewi and Suaryana (2013) and Daniel (2015) have conducted previous studies that suggest a detrimental impact of DER on the stock prices, whereas Pandansari (2012) conducted studies that indicate a positive effect. Studies documented found mixed empirical results. Therefore, this paper aims to provide empirical evidence for the formation of an efficient portfolio by comparing three selected financial ratios (current ratio, return on equity, and debt-to-equity ratio) across the top three industries listed on Bursa Malaysia.

The primary goal of this study is to develop optimal portfolio selection strategies within the context of 30 companies listed on Bursa Malaysia. Consequently, the specific objective of this study is to analyze the relationship between the current ratio and portfolio performance. The second objective of this study is to examine the relationship between return on equity (ROE) and portfolio performance. The third objective is to investigate the relationship between the debt-to-equity ratio and portfolio performance. Lastly, the fourth objective is to analyze whether industry-based portfolio can be more efficient than financial ratio-based portfolio.

The motivation of this paper is to identify a selection process for portfolios that relies on industry-specific financial ratios. An efficient portfolio can generate higher returns while maintaining a certain level of risk, or lower risk while providing a certain level of return. These expectations can be established by the investor, and the paper seeks to find a way to select the most efficient portfolio from a set of portfolios among the industries. The implications of this study are valuable for investors, traders, and brokers who can make better-informed investment decisions based on industries and more precise return estimates using financial ratios. Additionally, the findings of this study provide insights to the academic community by deepening their understanding of the significance of financial ratios in forming a portfolio and their ability to predict stock returns within specific industries.

In this study, the research has been organized in the following manner, including the introduction. In Section 2, a collection of past studies related to this study will be discussed. Section 3 describes the empirical methodology of data analysis. Section 4 elaborates on the results of the research and Section 5 provides final remarks and suggestions for future studies.

LITERATURE REVIEW

Portfolio theory is a widely established framework with comprehensive literature available in the form of high-quality textbooks. From various sources, there is ample information and resources that provide an in-depth understanding of the subject. According to Elton and Gruber (1997), Markowitz often regarded as the "father of modern portfolio theory," introduced ground-breaking concepts in his seminal works in 1952 and 1959. His original book and article provided a comprehensive framework for modern portfolio theory, laying the foundation for subsequent developments in the field. Markowitz formulated the portfolio problem as a decision involving the trade-off between the mean (expected return) and variance (risk) of a portfolio of assets.

He proved the fundamental theorem of mean-variance portfolio theory, which states that, under certain assumptions, an optimal portfolio can be found by either maximizing the expected return for a given level of risk (variance) or minimizing risk (variance) for a given level of expected return. This led to the concept of the efficient frontier, which is a set of portfolios that offer the highest expected return for a given level of risk or the lowest risk for a given level of expected return. However, it is important to note that Markowitz's model did not incorporate the behavioural aspects of investors, such as their sentiments, risk appetite, time horizon, and investment objectives. These factors play a significant role in shaping investment decisions but were not considered in Markowitz's original model. Nevertheless, Markowitz's pioneering work laid the groundwork for modern portfolio theory and remains a crucial reference in the field of finance. It is widely recognized for its insights and suggestions that have influenced subsequent developments in portfolio management (Mittal & Mandal, 2022).

The Markowitz model aimed to achieve the maximum expected return or minimum risk for a given portfolio by optimizing the allocation of various securities. Through diversification, where assets with imperfectly positively correlated returns are combined, modern portfolio theory seeks to reduce the overall variance of the portfolio's return. The model looks for ways to minimize the total variance of the portfolio's return by strategically combining assets with different returns to achieve an optimal risk-return trade-off (Lee *et al.*, 2016).

Overall, portfolio theory has been extensively explored and documented, making it a reputable and widely accepted framework in the field of finance. It is a testament to the significance and longevity of portfolio theory as a well-established and widely accepted concept in the field of finance.

Current Ratio

According to Eljelly (2004), the current ratio serves as a metric to assess a company's capability to fulfil its short-term obligations using its current assets within a specific period. A higher current ratio suggests better performance in managing assets. This ratio is critical for assessing an organization's liquidity, and companies often prioritize profitability when evaluating its significance at the operational or industry level. Based on research conducted by Suryana and Anggadini (2020), it has been established that a higher current ratio signifies the presence of robust liquidity within a company. This liquidity empowers the company to meet its financial obligations by effectively settling its debts. The current ratio serves as a measure to assess the financial

position of a company, revealing the extent to which its current assets can adequately cover its existing liabilities.

Multiple studies have demonstrated a positive correlation between the current ratio and stock prices (Irman & Purwati, 2020; Suryana & Anggadini, 2020; Manalu *et al.*, 2020). Irman and Purwati (2020) researched Indonesian Stock-listed automotive and component companies, examining the impact of the debt-to-equity ratio, and current ratio on the return on assets. Their findings revealed a significant relationship between the current ratio and the return on assets. Similarly, Suryana and Anggadini (2020) found a positive association between the current ratio and stock prices. Manalu *et al.* (2020) focused on analysing the influence of financial ratios on profit growth. Their research indicated a significant influence of the current ratio on profit growth, as evidenced by a probability value of 0.000<0.05. This implies that an increase in the current ratio corresponds to an increase in the company's profit growth.

Nevertheless, several studies have discovered that the relationship between the current ratio and stock return is not statistically significant (Herawati & Putra, 2018; Witkwowska *et al.*, 2021; Petcharabul & Romprasert, 2014; Öztürk & Karabulut, 2018). In a study done by Herawati and Putra (2018), they found that the current ratio variable, with a probability value of 0.8678 did not affect stock returns. This was supported by Witkwowska *et al.* (2021). His findings also showed the current ratio is negatively correlated with portfolio construction. Petcharabul and Romprasert (2014) employed an OLS estimate to test the relationship between financial ratios and stock returns. They pointed out that the current ratio does not influence stock returns. Similarly, Öztürk and Karabulut (2018) used a panel data regression model to examine time series of cross-sectional observations and also found that the current ratio is insignificant towards stock returns.

Return on Equity

The study has concluded that the findings have a significant positive effect on stock prices. The T-test outcomes demonstrated that the t-value for ROE (16.745) is markedly greater than the critical t-value of 2.01174. It can be concluded that ROE has a statistically significant and beneficial influence on stock prices (Juwita & Diana, 2020). Besides that, Har and Ghafar (2015) stated that ROE also exhibits a positive relationship with stock returns with $\beta = 0.432$.

However, Saputra (2022) stated that there is no significant association between the return on equity (ROE) and stock prices. It should be noted that ROE is a crucial metric in a company's financial reports, as it allows investors or shareholders to evaluate the efficacy of their equity in generating profits. As the ROE value increases, it is associated with strong company performance, which contributes to the rise in stock prices. This is due to a higher ROE value which is indicative of a company's capability to generate higher profits for its shareholders, making it an attractive prospect for potential investors.

In a study conducted by Rochim and Ghoniyah (2017), it was stated that there is a significant relationship between return on equity (ROE) and stock return. The analysis suggested that ROE has a noticeable impact on stock returns. Furthermore, the study revealed that firm size has a positive impact of 0.256 on stock returns, with a significance value of 0.000, which is below the threshold of 0.05. As a result, the empirical data supports and validates the hypothesis. A higher

ratio indicates that the company effectively utilizes its existing equity to generate returns, indicating efficient performance.

According to Talamati and Pangemanan (2015), the impact of return on equity (ROE) on stock prices is not straightforward because ROE alone does not provide a complete picture of a company's overall value. Although a high ROE may appear attractive, it does not necessarily indicate that the company is financially healthy or sustainable. For instance, a company with a high ROE could be leveraging debt excessively to raise funds instead of issuing shares, which is a significant risk to investors. Therefore, the relationship between ROE and stock prices is complex and depends on a range of factors beyond just the ROE figure.

Heikal *et al.* (2014) stated that return on equity (ROE) has a positive and significant impact on stock prices. The favourable association between ROE and earnings growth is attributable to the company's efficient management of its capital, resulting in higher profitability. Similarly, Mudzakar and Wardanny (2021) asserted that ROE has a significant influence on changes in stock returns, as a higher proportion of profits indicates better utilization of the company's cash flow, leading to improved performance and increased investor appeal.

Lastly, Adawiyah and Setiyawati (2019) also stated that return on equity has a positive and significant influence on stock returns. A higher ROE indicates better management of the company's capital to generate profits for shareholders. As net profit increases, so does the ROE value, making the company's shares more attractive to investors. Consequently, this drives up the company's stock price, impacting stock returns. The original statement underscores that ROE positively influences stock returns as it reflects the company's ability to efficiently manage its capital and generate profits.

Debt-to-Equity Ratio

The leverage ratio is used to evaluate a company's capacity to finance its assets through debt. This ratio reflects the balance between debt and equity financing within a company, indicating its ability to fulfil financial obligations based on its financial structure. In the late 1990s, Barber *et al.* (1996) discovered that the debt-to-equity ratio was a more reliable predictor of stock returns compared to the market value of equity. According to Dita and Murtaqi (2014), the debt-to-equity ratio (DER) is a financial indicator that reveals the proportion of debt and equity used by a company to finance its assets. A lower DER indicates that the company relies less on borrowed funds and has a stronger equity position.

Some studies found that the relationship between DER and stock return is positive (Herawati & Putra, 2018; Mukherji *et al.,* 1997; Irman & Purwati, 2020; Berk & Tutarlı, 2021; Zulkarnain & Sulistiyowati, 2022). Furthermore, Herawati and Putra (2018) utilized F-tests in their study and found that changes in stock prices, both positive and negative, are impacted by the debt-to-equity ratio (DER). The result indicates that the probability value of DER (0.6048) is greater than the α value of 0.05. This implied that it can be concluded that DER has a positive impact on stock price in the portfolio measurement. Furthermore, Mukherji *et al.* (1997) demonstrated that debt-to-equity has a positive relationship with stock returns for portfolios. The research conducted by Irman and Purwati (2020) further supported this finding. Their study utilized multiple linear

regression analysis and demonstrated that the debt-to-equity ratio has a significant positive impact on the return on assets. Berk and Tutarlı (2021) used mean-variance optimization to investigate 30 blue-chip stocks in Istanbul Stock Exchange based on Modern Portfolio Theory (MPT). The results showed that debt-to-equity could generate an efficient portfolio. This finding is also similar to a study done by Zulkarnain and Sulistiyowati (2022).

However, the above finding contrasts with the research conducted by Witkowska *et al.* (2021) which stated that the debt-to-equity ratio is negatively correlated with portfolio construction for non-financial companies listed on the Warsaw Stock Exchange. According to Petcharabul and Romprasert (2014) who examined the relationship between financial ratios and stock returns in the technology industry, it was found that the debt-to-equity ratio does not influence stock returns. Banerjee (2019) also proved that debt-to-equity could not predict stock returns or was statistically insignificant towards stock returns. Moreover, Jais *et al.* (2012) conducted a study in Malaysia by examining financial ratio usage against stock return prediction and reported that debt to equity is negatively correlated to a future return. Kusmayadi *et al.* (2018) analysed 45 companies on Indonesia Stock Exchanges. The results showed that the partial debt-to-equity ratio has a significant negative effect on stock returns. Kamar (2017) also supported these findings. The author used the OLS method with a linear regression model and reported that debt-to-equity has no significance on stock prices.

METHODOLOGY

The study's primary aim was to provide empirical evidence regarding the feasibility of obtaining portfolios with the lowest risk and highest return by using financial ratios, which include the current ratio, return on equity (ROE), and debt-to-equity ratio. In this study, non-probability sampling with the purposive sampling technique has been used to select companies. This study analysed 30 companies listed on Bursa Malaysia. 10 companies are chosen from the energy industry, 10 companies are chosen from the plantation industry and another 10 companies are chosen from the consumer products and services industry. These three industries have been chosen as the top performers in 2022 (Ho, 2023). This study will examine portfolios based on financial analysis and sector analysis for one year. The stock return will be calculated by using the daily closing price. Hence, the historical data for the closing price will be obtained for the year 2022. This study utilized secondary data from companies listed on Bursa Malaysia and historical data from Yahoo Finance.

Data Description

This study aims to investigate the possibility of obtaining portfolios with the lowest risk and highest return by grouping portfolios based on financial analysis. Financial analysis involves calculating ratios using information from a company's balance sheet, statement of cash flows, and income statement. Quantities like liquidity, solvency, turnover, profitability, and market-based indicators are all represented by these ratios. Return on equity (ROE) and the debt-to-equity ratio are chosen as two widely used financial analysis calculations for this study (Witkowska *et al.*, 2021). Sami (2021) mentioned that the current ratio is considered one of the financial ratios that

specifically identify assets or securities to avoid bad investments. Therefore, three financial ratios are used to construct portfolios. This study will also include industry-based portfolios to examine whether the construction of an efficient portfolio with a higher return or lower risk is effective by grouping the companies' stocks by the same industry.

Portfolio Construction

After the current ratio, return on equity, and debt-to-equity ratio are computed for all companies, the portfolio can be constructed based on the criteria stated in the literature review. Five portfolios are constructed based on the current ratio, in which the first portfolio consists of five companies with the highest current ratios, the second portfolio consists of five companies with the lowest current ratios, the third portfolio consists of companies with current ratios higher than 2, the fourth portfolio consists of companies with current ratios lower than 2 and the last portfolio consists of companies with current ratios between 1.5 and 2. The table below shows five portfolios that will be constructed based on the current ratio.

Table 1
Five portfolios based on current ratio.

Portfolio	Criteria
Portfolio 1	5 companies with the highest current ratios
Portfolio 2	5 companies with the lowest current ratios
Portfolio 3	Companies with current ratios higher than 2
Portfolio 4	Companies with current ratios lower than 2
Portfolio 5	Companies with current ratios between 1.5 and 2

Based on the literature review, four portfolios are constructed based on return on equity. The first portfolio consists of five companies with the highest return on equity, the second portfolio consists of five companies with the lowest return on equity, the third portfolio consists of companies with return on equity higher than 0.2 and the last portfolio consists of companies with return on equity lower than 0.2. The table below shows four portfolios that will be constructed based on return on equity.

Table 2
Four portfolios based on return on equity.

Portfolio	Criteria
Portfolio 6	5 companies with the highest return on equity
Portfolio 7	5 companies with the lowest return on equity
Portfolio 8	Companies with return on equity higher than 0.2
Portfolio 9	Companies with return on equity lower than 0.2

For the debt-to-equity ratio, five portfolios are constructed. The first debt-to-equity-based portfolio consists of five companies is constructed based on the highest debt-to-equity ratio. The second portfolio consists of five companies constructed based on the lowest debt-to-equity ratio. The third portfolio is constructed based on a debt-to-equity ratio between 1.5 and 2. The fourth portfolio is constructed based on a debt-to-equity ratio higher than 2 and the last portfolio is constructed based on a debt-to-equity ratio lower than 2. The table below shows five portfolios that will be constructed based on the debt-to-equity ratio.

Table 3
Five portfolios based on debt-to-equity ratio.

Portfolio	Criteria
Portfolio 10	5 companies with the highest debt-to-equity ratios
Portfolio 11	5 companies with the lowest debt-to-equity ratios
Portfolio 12	Companies with debt-to-equity ratios higher than 2
Portfolio 13	Companies with debt-to-equity ratios lower than 2
Portfolio 14	Companies with debt-to-equity ratios between 1.5 and 2

After that, industry-based portfolios will be constructed by grouping all companies based on industry with different current ratios, return on equity and debt-to-equity ratios. As mentioned above, three industries are selected to form the portfolios: energy, plantation and consumer products and services. 10 companies are included for each industry. By doing so, we can observe whether an efficient portfolio can be constructed based on industry even if the companies in the same industry have different financial ratios, in which some companies may have high ratios while others may have low ratios. The table below shows the construction of a portfolio based on sectors with different current ratios, return on equity, and debt-to-equity ratios.

Table 4
Three portfolios based on industries.

Portfolio	Criteria
Portfolio 15	10 companies from the energy industry
Portfolio 16	10 companies from the plantation industry
Portfolio 17	10 companies from the consumer products and services industry

Mean-Variance Model

After all portfolios are constructed, a mean-variance model is used to calculate each portfolio's return and risk. The expected returns and risks of the portfolios are calculated based on Modern Portfolio Theory. For a portfolio of *N* assets, the portfolio return is calculated by the formula below:

$$E\,(R_p) = \mu = \sum_{i=1}^{N} w_i \mu_i$$

$E\,(R_p) = \mu$: Expected return on the portfolio invested
w_i = weight of security *i* in the portfolio
μ_i = Expected return on security *i*

Risk is measured by variance or standard deviation. The portfolio risk is calculated by the formula below:

$$\sigma_2 = \sum_{i=1}^{N} \sum_{i=1}^{N} w_i w_j \sigma_{i,j}$$

σ_2 = Risk of the portfolio (variance)
w_i = Weight of the security *i* in the portfolio
w_j = Weight of the security *j* in the portfolio
$\sigma_{i,j}$ = Covariance between securities *i* and *j*

Once the expected returns and risks are calculated for each portfolio, an efficient portfolio will be determined based on the return on equity and debt-to-equity ratio. Each portfolio is weighted equally in this study, in which various studies used an equally weighted strategy to construct portfolios (Urbán & Ormos, 2012; Ahuja, 2015; Battaglia & Leal, 2017; Taljaard & Maré, 2021).

Descriptive Statistics

This study includes descriptive statistics for each portfolio. According to Nick (2007), descriptive statistics are often used on a sample to estimate the characteristics of a population. Characteristics, or traits, that we measure on an item or from another source are often called variables because they vary from one item to another. This study will focus on the mean, standard deviation, kurtosis, and skewness and compare them among portfolios.

Two-Sample T-Tests

This study will apply two-sample t-tests. Two-sample t-tests compare the means of precisely two groups. According to Snedecor and Cochran (1989), it is used to examine if two population means are equal. The standard form tests the following hypotheses:

H_0: The two-population means are equal.
H_1: The two-population means are not equal.

If the p-value for the two-tailed form of the t-test is more than the significance level of 0.05, the null hypothesis cannot be rejected. This indicates that two population means do not show any different at the 0.05 significance level whereby they are equal. The null hypothesis is rejected when the p-value for the two-tailed form of the t-test is more than the significance level of 0.05. This indicates that two population means are different at the 0.05 significance level.

EMPIRICAL FINDINGS

Descriptive Statistics

Table 5
Descriptive Statistics for Daily Current Ratio-Based Portfolio Returns.

	Portfolio 1 (5 companies with the highest ratios)	**Portfolio 2** (5 companies with the lowest ratios)	**Portfolio 3** (12 companies with ratios higher than 2)	**Portfolio 4** (18 companies with ratios lower than 2)	**Portfolio 5** (8 companies with ratios between 1.5 and 2)
Mean	0.000292	0.000712	0.000402	0.000935	0.000996
Standard Deviation	0.012684	0.013163	0.012099	0.010110	0.010355
Sample Variance	0.000161	0.000173	0.000146	0.000102	0.000107
Kurtosis	1.902428	0.848905	0.998697	0.370735	1.299686
Skewness	-0.194263	0.109848	-0.265806	-0.287792	-0.269376
Count	242	242	242	242	242

Table 5 reports descriptive statistics for daily excess return for five current ratio-based portfolios for the year 2022 (242 observations). The average return is given by the mean. The mean for Portfolio 1 is 0.000292, Portfolio 2 is 0.000712, Portfolio 3 is 0.000402, Portfolio 4 is 0.000935, and Portfolio 5 is 0.000996. The mean shows the centrality of portfolio returns, which is the average performance of the portfolios over the sample period.

Both the standard deviation and variance capture how dispersed the return observations are around their mean. The standard deviation captures the volatility of portfolios' returns and is a measure of risk. The standard deviation is the square root of the variance. The standard deviation of Portfolio 1 is 0.012684, Portfolio 2 is 0.013163, Portfolio 3 is 0.012099, Portfolio 4 is 0.010110 and Portfolio 5 is 0.010355.

Skewness is about the symmetry of a distribution. A symmetric distribution has a skewness of zero. However, it is common for stocks to be asymmetric. If the skewness is between -0.5 and 0.5, the data is nearly symmetrical. If the skewness is between -1 and -0.5 (negative skewed) or between 0.5 and 1 (positive skewed), the data is slightly skewed. If the skewness is lower than -1 (negative skewed) or greater than 1 (positive skewed), the data is extremely skewed. The values

of skewness for Portfolio 1, Portfolio 2, Portfolio 3, Portfolio 4 and Portfolio 5 are between -0.5 and 0.5 which shows the distribution is nearly symmetric.

The degree to which a distribution's tails are weighted determines its kurtosis. The kurtosis figures can tell you if your data has more of a left or right tail. The kurtosis of the normal distribution is 3. If the kurtosis of a data set is high, then the tails will be long and there will be many outliers. If the kurtosis is low, then the tails will be short and there will be fewer outliers. All portfolios have a kurtosis value less than 3. This indicates the distribution is platykurtic, whereby the excess kurtosis value is negative.

Table 6
Descriptive Statistics for Daily Return on Equity-Based Portfolio Returns.

	Portfolio 6 (5 companies with the highest ratios)	**Portfolio 7** (5 companies with the lowest ratios)	**Portfolio 8** (5 companies with ratios higher than 0.2)	**Portfolio 9** (25 companies with ratios lower than 0.2)
Mean	0.000633	0.000817	0.000633	0.000740
Standard Deviation	0.012033	0.018715	0.012033	0.010272
Sample Variance	0.000145	0.000350	0.000145	0.000106
Kurtosis	0.962367	0.455647	0.962367	0.788041
Skewness	0.177568	0.239999	0.177568	-0.553364
Count	242	242	242	242

Table 6 reports descriptive statistics for the daily excess return for four return on equity-based portfolios for the year 2022 (242 observations). The mean for Portfolio 6 is 0.000633, Portfolio 7 is 0.000817, Portfolio 8 is 0.000633, and Portfolio 9 is 0.000740. The standard deviation of Portfolio 6 is 0.012033, Portfolio 7 is 0.018715, Portfolio 8 is 0.012033, and Portfolio 9 is 0.010272.

The values of skewness for Portfolio 6, Portfolio 7, and Portfolio 8 are between -0.5 and 0.5. This indicates that the data is nearly symmetrical. Meanwhile, the skewness for Portfolio 9 is -0.553364 which is between -1 and -0.5. This shows that the portfolio return is slightly negatively skewed. The value of kurtosis for all portfolios is less than 3. This indicates the distribution is platykurtic, whereby the excess kurtosis value is negative.

Table 7
Descriptive Statistics for Daily Debt-to-Equity-Based Portfolio Returns.

	Portfolio 10	**Portfolio 11**	**Portfolio 12**	**Portfolio 13** (27	**Portfolio 14**

	(5 companies with the highest ratios)	(5 companies with the lowest ratios)	(3 companies with ratios higher than 2)	companies with ratios lower than 2)	(2 companies with ratios between 1.5 and 2)
Mean	0.000399	0.000479	-0.000223	0.000827	0.001331
Standard Deviation	0.010282	0.013869	0.009364	0.010794	0.019645
Sample Variance	0.000106	0.000192	0.000088	0.000117	0.000386
Kurtosis	0.631198	4.510664	2.830387	0.655146	0.436716
Skewness	0.119461	0.134125	-0.359293	-0.484597	0.222546
Count	242	242	242	242	242

Table 7 reports descriptive statistics for the daily excess return for five debt-to-equity-based portfolios for the year 2022 (242 observations). The mean for Portfolio 10 is 0.000399, Portfolio 11 is 0.000479, Portfolio 12 is -0.000223, Portfolio 13 is 0.000827 and Portfolio 14 is 0.001331. The standard deviation of Portfolio 10 is 0.010282, Portfolio 11 is 0.013869, Portfolio 12 is 0.009364, Portfolio 13 is 0.010794 and Portfolio 14 is 0.019645.

The value of skewness for Portfolio 10 is 0.119461, Portfolio 11 is 0.134125, Portfolio 12 is -0.359293, Portfolio 13 is -0.484597, and Portfolio 14 is 0.222546. All portfolios have skewness between -0.5 and 0.5 which means the distribution is nearly symmetrical. The value of kurtosis for all portfolios except Portfolio 11 is less than 3. This indicates the distribution is platykurtic, whereby the excess kurtosis value is negative. Since the kurtosis value of Portfolio11 is 4.510664 which is more than 3, the distribution is leptokurtic, whereby the excess kurtosis value is positive.

Table 8
Descriptive Statistics for Daily Industry-Based Portfolio Returns.

	Portfolio 15 (Energy Industry)	**Portfolio 16** (Plantation Industry)	**Portfolio 17** (Consumer Products and Services Industry)
Mean	0.001310	0.000483	0.000374
Standard Deviation	0.016810	0.014863	0.007254
Sample Variance	0.000283	0.000221	0.000053
Kurtosis	0.087048	1.631572	1.092973
Skewness	0.112180	-0.016981	0.034650
Count	242	242	242

Table 8 reports descriptive statistics for daily excess return for three industry-based portfolios for the year 2022 (242 observations). The mean for Portfolio 15 is 0.001310, Portfolio 16 is 0.000483, and Portfolio 17 is 0.000374. The standard deviation of Portfolio 15 is 0.016810, Portfolio 16 is 0.014863, and Portfolio 17 is 0.007254.

The values of skewness for industry-based portfolios, which are Portfolio 15, Portfolio 16 and Portfolio 17 are between -0.5 and 0.5. This indicates the portfolios' returns are nearly symmetrical. The value of kurtosis for all portfolios is less than 3. This indicates the distribution is platykurtic, whereby the excess kurtosis value is negative.

Investment Decisions and Recommendations

Table 9, Table 10, Table 11 and Table 12 show the expected return, risk, and coefficient of variation of the portfolio based on the current ratio, return on equity, debt-to-equity ratio, and industry respectively. The main reference utilized for this analysis is the work by Berk and Tutarli (2021). In their study, they employ return on equity ratios derived from the financial statements of the companies. The expected returns and risks of the portfolios are then computed using the principles of Modern Portfolio theory. By employing these methodologies, Berk and Tutarli provide valuable insights into the construction and evaluation of portfolios. Followed by support from other references done by (Witkowska *et al.*, 2021).

Table 9
Expected Return and Risk of the Portfolio Based on Current Ratio.

Portfolio	Expected Return (%)	Variance (%)	Standard Deviation (%)	Coefficient of Variation
Portfolio 1	0.0292	0.0160	1.2658	43.35
Portfolio 2	0.0712	0.0173	1.3135	18.45
Portfolio 3	0.0402	0.0146	1.2074	30.03
Portfolio 4	0.0935	0.0102	1.0089	10.79
Portfolio 5	0.0996	0.0107	1.0334	10.38

From the given table, all portfolios generate positive returns. Portfolio 5 has the highest expected return of 0.0996%, suggesting it may offer the greatest potential for returns among the given portfolios. Portfolio 4 has the lowest variance (0.0102%) and standard deviation (1.0089%), indicating it has the least amount of risk or volatility among the portfolios. Although Portfolio 2 has a higher expected return (0.0712%), it also has a higher variance and standard deviation compared to Portfolio 4, suggesting it carries more risk. Portfolio 3 has a moderate expected return (0.0402%) and a relatively lower variance and standard deviation compared to Portfolios 1 and 2. Portfolios 1 and 2 have similar expected returns, but Portfolio 1 has a lower variance and standard deviation, implying that it may be a more favorable choice for risk-averse investors.

According to Brown (1998), there may be problems with the data or the experiment is out of control if the coefficient of variation is higher than 30 percent. The higher the coefficient of variation, the higher the dispersion level around the mean. By referring to the table above, it is clear that the values of the coefficient of variation for Portfolio 1 and Portfolio 3 are higher than 30%. Therefore, these two portfolios are not recommended to investors as they carry high risks. It is considered a very good coefficient of variation when its value is less than 10. If the coefficient of variation is between 10 and 20, it is considered good and it is acceptable when the coefficient of variation is between 20 and 30.

When considering the trade-off between risk and return, investors aim for higher returns and conclude that Portfolio 5 is more appealing and the most favorable. This particular portfolio comprises 8 companies with current ratios ranging between 1.5 and 2. Therefore, investors aiming for higher returns would find Portfolio 5 more appealing because it provides the highest expected return while still maintaining a relatively low level of risk, as indicated by its lower standard deviation compared to the other portfolios. Not only that, Portfolio 5 has the lowest coefficient of variation, which is 10.38%. Thus, investors seeking for a balance between potential returns and risk may favor Portfolio 5 over the other options. Husna and Satria (2019) stated that a high current ratio does not necessarily indicate a company's financial strength, as it can be a result of poor cash and inventory management. A high ratio, such as a value exceeding 3.00, could suggest that the company has the ability to pay off its current liabilities three times over. On the other hand, it could also imply that the company is not effectively utilizing its current assets or securing financing.

Table 10
Expected Return and Risk of the Portfolio Based on Return on Equity.

Portfolio	Expected Return (%)	Variance (%)	Standard Deviation (%)	Coefficient of Variation
Portfolio 6	0.0633	0.0144	1.2008	18.97
Portfolio 7	0.0817	0.0349	1.8676	22.86
Portfolio 8	0.0633	0.0144	1.2008	18.97
Portfolio 9	0.0740	0.0105	1.0251	13.85

From the given table, Portfolios 7 to 10 generate positive returns for all. We can observe that Portfolio 7 has the highest expected return (0.0817%) among all the portfolios. However, it also has the highest standard deviation (1.8676%), indicating a relatively higher level of risk associated with this portfolio. Portfolio 9, on the other hand, has the second-highest expected return (0.0740%) and the lowest standard deviation (1.0251%) among the portfolios. This implies that Portfolio 9 offers a relatively attractive risk-return profile. Both Portfolio 6 and Portfolio 8 have the same expected return (0.0633%) and standard deviation (1.2008%). They rank third in terms of expected return and second in terms of standard deviation.

When making investment decisions based on return on equity, Portfolio 6 and Portfolio 8 have the same expected return of 0.0633%. In the portfolios listed in Table 6, both portfolios consist of five companies, with the highest ratio in Portfolio 6 and ratios higher than 0.2 in Portfolio 8. This means that a higher ROE has the potential to deliver relatively favourable returns to investors, as there will be more profit. Investors should consider selecting diversified portfolios that exhibit a return on equity (Berk & Tutarli, 2021). This is also supported by Rochim and Ghoniyah (2017), if a company’s return on equity (ROE) increases, it is likely to experience higher net profit generated from its own capital. However, according to Talamati and Pangemanan (2015), the return on equity does not tell us everything about a company's value. If a company is raising capital through borrowing rather than issuing shares, even a high return on equity will hide this fact. Since Portfolio 6 and Portfolio 8 have a coefficient of variation (18.97) higher than Portfolio 9 (13.85), this study suggests that investors can choose Portfolio 9, which consists of 25 companies with a return on equity lower than 2. This is because Portfolio 9 has the highest expected return and lowest risk, with the lowest coefficient of variation.

Table 11
Expected Return and Risk of the Portfolio Based on Debt-to-Equity Ratio.

Portfolio	Expected Return (%)	Variance (%)	Standard Deviation (%)	Coefficient of Variation
Portfolio 10	0.0399	0.0105	1.0260	25.71
Portfolio 11	0.0479	0.0192	1.3840	28.89
Portfolio 12	-0.0223	0.0087	0.9345	-41.91
Portfolio 13	0.0827	0.0116	1.0772	13.03
Portfolio 14	0.1331	0.0384	1.9604	14.73

Based on the information provided in Table 11, Portfolio 14 has the highest expected return (0.1331%) among all the portfolios, indicating it has the potential for the highest return on investment. Portfolio 12 has a negative expected return (-0.0223%), implying that it is expected to result in a loss. Portfolio 13 has a relatively high expected return (0.0827%) compared to Portfolios 10 and 11, indicating it may offer a better return on investment. Portfolio 11 has a higher variance (0.0192%) and standard deviation (1.3840%) compared to other portfolios, suggesting it has a higher level of risk. Portfolio 12 has the lowest standard deviation (0.9345%) among the portfolios, implying it has the lowest level of risk. Portfolio 14 has the highest standard deviation (1.9604%), indicating it carries a relatively higher level of risk. Portfolio 10 has a moderate expected return (0.0399%) and standard deviation (1.0260%), suggesting a balanced risk-return profile.

According to Berk and Tutarli (2021), low debt-to-equity portfolios with lower risk can perform better. In the case of Portfolio 13, it has the highest expected return (0.0827%) with the lowest coefficient of variation among all the portfolios listed in Table 11 is more diversified. The coefficient of variation of Portfolio 13 is 13.03 which is considered good. This indicates that, on average, investors can expect to earn a higher return from this portfolio compared to the others. Overall, in Table 11, several portfolios are listed with their corresponding expected returns, variances, and standard deviations based on their debt-to-equity ratios. Among these portfolios, Portfolio 10, Portfolio 11, Portfolio 13, and Portfolio 14 all generate positive returns, albeit at different levels. Portfolio 13 emerges as the most favourable choice among the portfolios, featuring a composition of 27 companies. Within this portfolio, the selected companies possess debt-to-equity ratios lower than 2, indicating a preference for relatively a lower leverage.

Table 12
Expected Return and Risk of the Portfolio Based on Industry.

Portfolio	Expected Return (%)	Variance (%)	Standard Deviation (%)	Coefficient of Variation
Portfolio 15	0.1310	0.0281	1.6775	12.81
Portfolio 16	0.0483	0.0220	1.4832	30.71
Portfolio 17	0.0374	0.0052	0.7239	19.36

Based on the information provided in Table 12, each of the portfolios has a positive return. Each of the industries has been among the top performers in 2022 (Ho, 2023). Portfolio 15

generates the highest return with the highest risk. Meanwhile, Portfolio 17 generates a lower expected return, and therefore it also has a lower risk.

Investors seeking potentially higher returns and willing to accept higher risk may consider allocating a portion of their investment to Portfolio 15, which consists of 10 companies in the energy industry as it has the lowest coefficient of variation of 12.81, which is considered good. Considering the preference for potentially higher returns and the willingness to accept higher risk, Portfolio 15 emerges as a suitable option.

Statistical Significance of Portfolio Returns

Table 13
T-test Results for Portfolio with the Highest Current Ratio and the Portfolio with the Lowest Current Ratio.

	Portfolio with the highest current ratio	***Portfolio with the lowest current ratios***
Mean	0.02918	0.0712
Variance	0.002941342	0.006925065
Observations	5	5
Pooled Variance	0.004933204	
Hypothesized Mean Difference	0	
df	8	
t Stat	-0.945935527	
P(T<=t) one-tail	0.185936057	
t Critical one-tail	1.859548038	
P(T<=t) two-tail	**0.371872113**	
t Critical two-tail	2.306004135	

Table 13 shows the t-test results for the portfolio with the highest current ratio and the portfolio with the lowest current ratio. The output indicates that the mean for the portfolio with the highest current ratio is 0.0292 and for the portfolio with the lowest current ratio is 0.0712. The mean of the portfolio with the lowest current ratio is less than the mean of the portfolio with the highest current ratio. Based on the result, the p-value for the two-tailed form of the t-test (0.3719) is greater than the significance level of 0.05, so the null hypothesis cannot be rejected. This means that there is no statistically significant difference between the mean of the portfolio with the highest current ratio and the mean of the portfolio with the lowest current ratio. Thus, the result indicates that there is not sufficient evidence to support the claim that the mean of the portfolio with the

lowest current ratio is significantly greater than the mean of the portfolio with the highest current ratio.

Table 14

T-test Results for the Portfolio with the Highest Return on Equity and the Portfolio with the Lowest Return on Equity.

		Portfolio with highest ROE	***Portfolio with lowest ROE***
Mean		0.0633	0.08166
Variance		0.00657154	0.00659839
Observations		5	5
Pooled Variance		0.006584964	
Hypothesized	Mean		
Difference		0	
df		8	
t Stat		-0.357738745	
P(T<=t) one-tail		0.364896775	
t Critical one-tail		1.859548038	
P(T<=t) two-tail		**0.729793551**	
t Critical two-tail		2.306004135	

Table 14 shows the t-test results for the portfolio with the highest return on equity and the portfolio with the lowest return on equity. The output indicates that the mean for the portfolio with the highest return on equity is 0.0633 and for the portfolio with the lowest return on equity is 0.0817. The mean of the portfolio with the lowest return on equity is larger than the mean of the portfolio with the highest return on equity. Based on the result, the p-value for the two-tailed form of the t-test (0.7298) is higher than the significance level of 0.05, so the null hypothesis cannot be rejected. This means that there is no statistically significant difference between the mean of the portfolio with the highest return on equity and the mean of the portfolio with the lowest return on equity. Therefore, the result indicates that there is not sufficient evidence to support the claim that the mean of the portfolio with the lowest return on equity is significantly greater than the mean of the portfolio with the highest return on equity.

Table 15

T-test Results for the Portfolio with the Highest Debt-to-equity Ratio and the Portfolio with the Lowest Debt-to-equity Ratio.

		Portfolio with highest DER	***Portfolio with lowest DER***
Mean		0.03988	0.04788
Variance		0.009191067	0.001494007
Observations		5	5
Pooled Variance		0.005342537	
Hypothesized	Mean		
Difference		0	

df	8
t Stat	-0.173055825
P(T<=t) one-tail	0.433452954
t Critical one-tail	1.859548038
P(T<=t) two-tail	**0.866905907**
t Critical two-tail	2.306004135

Table 15 shows the t-test results for the portfolio with the highest debt-to-equity ratio and the portfolio with the lowest debt-to-equity ratio. The output indicates that the mean for the portfolio with the highest debt-to-equity ratio is 0.0399 and for the portfolio with the lowest debt-to-equity ratio is 0.0479. The mean of the portfolio with the lowest debt-to-equity ratio is larger than the mean of the portfolio with the highest debt-to-equity ratio. Based on the result, the p-value for the two-tailed form of the t-test (0.8669) is larger than the significance level of 0.05, so the null hypothesis cannot be rejected. This means that there is no statistically significant difference between the mean of the portfolio with the highest debt-to-equity ratio and the mean of the portfolio with the lowest debt-to-equity ratio. Therefore, the result indicates that there is not sufficient evidence to support the claim that the mean of the portfolio with the lowest debt-to-equity ratio is significantly greater than the mean of the portfolio with the highest debt-to-equity ratio.

Table 16
T-test Results of the Portfolio for the Energy Industry and Plantation Industry.

		Energy Industry	***Plantation Industry***
Mean		0.001305	0.000483242
Variance		0.000001459098	0.0000000978569
Observations		10	10
Pooled Variance		0.0000007784648	
Hypothesized	Mean		
Difference		0	
df		18	
t Stat		2.082599984	
P(T<=t) one-tail		0.025912275	
t Critical one-tail		1.734063607	
P(T<=t) two-tail		**0.05182455**	
t Critical two-tail		2.10092204	

Table 16 shows the t-test results for the energy industry-based portfolio and the plantation industry-based portfolio. The output indicates that the mean for the energy industry-based portfolio is 0.001305 and for the plantation industry-based portfolio is 0.000483. The mean of the energy industry-based portfolio is larger than the mean of the plantation industry-based portfolio. Based on the result, the p-value for the two-tailed form of the t-test (0.0518) is larger than the significance level of 0.05 but less than the significance level of 0.1, so the null hypothesis can be rejected at the

10% significance level. This means that there is a statistically significant difference between the mean of the energy industry-based portfolio and the mean of the plantation industry-based portfolio. Therefore, the result indicates that there is sufficient evidence to support the claim that the mean of the energy industry-based portfolio is significantly greater than the mean of the plantation industry-based portfolio at the 10% significance level.

CONCLUSION

This study successfully achieved its primary goal of developing optimal portfolio construction for 30 companies listed on Bursa Malaysia. Evidence from the findings showed that portfolios with higher current ratios, a lower return on equity, and lower debt-to-equity ratios can generate positive returns and lower risks with more diversification. This study also highlights the importance of considering industry-based factors in portfolio selection. Therefore, incorporating both financial analysis-based selection and industry-based criteria into Modern Portfolio Theory, the selection of efficient portfolios can be further improved.

The implications of this study are twofold. From a theoretical perspective, the findings contribute to the existing body of knowledge in portfolio management by establishing a positive relationship between the current ratio, return on equity (ROE), and debt-to-equity (D/E) ratio and firm performance. Additionally, the study introduced a new variable by considering industry-based factors to construct an efficient portfolio compared to previous studies within the Modern Portfolio Theory. In summary, it could be said that all these criteria could well generate efficient portfolio by utilizing the Modern Portfolio Theory (MPT) which generates maximum returns within an acceptable level of risk.

The findings suggest that portfolio managers should consider companies with higher current ratios, lower return on equity (ROE), and lower debt-to-equity (D/E) ratios to enhance portfolio performance. A higher current ratio indicates that a company has enough liquidity to meet short-term obligations, reducing the risk of default or financial difficulties and instilling investor confidence in the company's stability. Similarly, a lower return on equity signifies better returns on shareholders' investments, attracting investors seeking higher profitability based on the results of this study. Lower debt-to-equity ratios indicate a reduced level of debt compared to equity, minimizing financial risk and vulnerability to interest rate fluctuations. Additionally, incorporating industry-based factors into portfolio construction can contribute to more efficient portfolios. By taking industry-specific factors into account, investors can distribute their investments across different industries, mitigating the risk associated with any particular sector. The findings reveal that industry-based factors can generate positive returns and acceptable risk within a diversified portfolio. This diversification acts as a safeguard against industry-specific shocks or downturns and fosters a well-balanced portfolio.

Appendix

Table A1

Grouping of Companies into Portfolios Based on Current Ratio

Portfolio	**Ticker**	**Company**	**Current Ratio**
Portfolio 1 (5 companies with the highest ratio)	CEPAT	Cepatwawasan Group Berhad	3.0569
	GENTING	Genting Berhad	2.9541
	F&N	Fraser & Neave Holdings Bhd	2.6756
	KMLOONG	Kim Loong Resources Berhad	2.5925
	DIALOG	Dialog Group Berhad	2.4346
Portfolio 2 (5 companies with the lowest ratio)	UZMA	Uzma Berhad	1.1528
	HEIM	Heineken Malaysia Berhad	0.9782
	BAT	British American Tobacco (Malaysia) Berhad	0.9167
	HIBISCS	Hibiscus Petroleum Berhad	0.9086
	NESTLE	Nestle (Malaysia) Berhad	0.7079
Portfolio 3 (12 companies with ratios higher than 2)	CEPAT	Cepatwawasan Group Berhad	3.0569
	GENTING	Genting Berhad	2.9541
	F&N	Fraser & Neave Holdings Bhd	2.6756
	KMLOONG	Kim Loong Resources Berhad	2.5925
	DIALOG	Dialog Group Berhad	2.4346
	JTIASA	Jaya Tiasa Holding Berhad	2.3753
	DAYANG	Dayang Enterprise Berhad	2.2945
	YINSON	Yinson Holdings Berhad	2.2157
	SWKPLNT	Sarawak Plantation Berhad	2.182
	PPB	PPB Group Berhad	2.1807
	GENP	Genting Plantation Berhad	2.1522
	KLK	Kuala Lumpur Kepong Berhad	2.0405
Portfolio 4 (18 companies with ratios lower than 2)	COASTAL	Coastal Contracts Bhd	1.9889
	BKAWAN	Batu Kawan Berhad	1.9763
	DELEUM	Deleum Berhad	1.8939
	UMCCA	United Malacca Berhad	1.8582
	IOICORP	IOI Corporation Berhad	1.7804
	CARIMIN	Carimin Petroleum Berhad	1.7768
	UMW	Umw Holdings Berhad	1.7671
	SIME	Sime Darby Berhad	1.6555
	TSH	TSH Resources Berhad	1.4159
	QL	QL Resources Berhad	1.4017
	PETDAG	Petronas Dagangan Bhd	1.3555
	PERDANA	Perdana Petroleum Berhad	1.288
	MHB	Malaysia Marine and Heavy Engineering Holdings Berhad	1.2214
	UZMA	Uzma Berhad	1.1528
	HEIM	Heineken Malaysia Berhad	0.9782

	BAT	British American Tobacco (Malaysia) Berhad	0.9167
	HIBISCS	Hibiscus Petroleum Berhad	0.9086
	NESTLE	Nestle (Malaysia) Berhad	0.7079
Portfolio 5 (8 companies with ratios between 1.5 and 2)	COASTAL	Coastal Contracts Bhd	1.9889
	BKAWAN	Batu Kawan Berhad	1.9763
	DELEUM	Deleum Berhad	1.8939
	UMCCA	United Malacca Berhad	1.8582
	IOICORP	IOI Corporation Berhad	1.7804
	CARIMIN	Carimin Petroleum Berhad	1.7768
	UMW	UMW Holdings Berhad	1.7671
	SIME	Sime Darby Berhad	1.6555

Table A2
Grouping of Companies into Portfolios Based on Return on Equity

Portfolio	**Ticker**	**Company**	**Return on Equity**
Portfolio 6 (5 companies with the highest ratio)	NESTLE	Nestle (Malaysia) Berhad	0.9904
	HEIM	Heineken Malaysia Berhad	0.8452
	BAT	British American Tobacco (Malaysia) Berhad	0.6961
	HIBISCS	Hibiscus Petroleum Berhad	0.2965
	TSH	TSH Resources Berhad	0.2462
Portfolio 7 (5 companies with the lowest ratio)	CARIMIN	Carimin Petroleum Berhad	0.0404
	MHB	Malaysia Marine And Heavy Engineering Holdings Berhad	0.0382
	PERDANA	Perdana Petroleum Berhad	0.0195
	UZMA	Uzma Berhad	0.0125
	GENTING	Genting Berhad	0.0008
Portfolio 8 (5 companies with ratios higher than 0.2)	NESTLE	Nestle (Malaysia) Berhad	0.9904
	HEIM	Heineken Malaysia Berhad	0.8452
	BAT	British American Tobacco (Malaysia) Berhad	0.6961
	HIBISCS	Hibiscus Petroleum Berhad	0.2965
	TSH	TSH Resources Berhad	0.2462
Portfolio 9 (25 companies with ratios lower than 0.2)	KMLOONG	Kim Loong Resources Berhad	0.1817
	YINSON	Yinson Holdings Berhad	0.1816
	IOICORP	IOI Corporation Berhad	0.165
	BKAWAN	Batu Kawan Berhad	0.1526
	KLK	Kuala Lumpur Kepong Berhad	0.1519
	SWKPLNT	Sarawak Plantation Berhad	0.1379
	PETDAG	Petronas Dagangan Bhd	0.1361
	COASTAL	Coastal Contracts Bhd	0.1351
	F&N	Fraser & Neave Holdings Bhd	0.1281

	DELEUM	Deleum Berhad	0.1229
	JTIASA	Jaya Tiasa Holding Berhad	0.1059
	UMW	UMW Holdings Berhad	0.0949
	GENP	Genting Plantation Berhad	0.091
	DIALOG	Dialog Group Berhad	0.0895
	QL	QL Resources Berhad	0.087
	PPB	PPB Group Berhad	0.0836
	CEPAT	Cepatwawasan Group Berhad	0.0823
	DAYANG	Dayang Enterprise Berhad	0.0759
	UMCCA	United Malacca Berhad	0.0752
	SIME	Sime Darby Berhad	0.0725
	CARIMIN	Carimin Petroleum Berhad	0.0404
	MHB	Malaysia Marine and Heavy Engineering Holdings Berhad	0.0382
	PERDANA	Perdana Petroleum Berhad	0.0195
	UZMA	Uzma Berhad	0.0125
	GENTING	Genting Berhad	0.0008

Table A3
Grouping of Companies into Portfolios Based on Debt to Equity

Portfolio	**Ticker**	**Company**	**Debt to Equity Ratio**
Portfolio 10 (5 companies with the highest ratio)	NESTLE	Nestle (Malaysia) Berhad	4.6745
	BAT	British American Tobacco (Malaysia) Berhad	2.6041
	YINSON	Yinson Holdings Berhad	2.2078
	HEIM	Heineken Malaysia Berhad	1.883
	HIBISCS	Hibiscus Petroleum Berhad	1.5033
Portfolio 11 (5 companies with the lowest ratio)	KMLOONG	Kim Loong Resources Berhad	0.3751
	SWKPLNT	Sarawak Plantation Berhad	0.3467
	UMCCA	United Malacca Berhad	0.2741
	CEPAT	Cepatwawasan Group Berhad	0.2328
	PPB	PPB Group Berhad	0.089
Portfolio 12 (3 companies with ratios higher than 2)	NESTLE	Nestle (Malaysia) Berhad	4.6745
	BAT	British American Tobacco (Malaysia) Berhad	2.6041
	YINSON	Yinson Holdings Berhad	2.2078
Portfolio 13 (27 companies with ratios lower than 2)	HEIM	Heineken Malaysia Berhad	1.883
	HIBISCS	Hibiscus Petroleum Berhad	1.5033
	UZMA	Uzma Berhad	1.4017
	PETDAG	Petronas Dagangan Bhd	0.9452
	GENTING	Genting Berhad	0.9382

	BKAWAN	Batu Kawan Berhad	0.9113
	MHB	Malaysia Marine and Heavy Engineering Holdings Berhad	0.8978
	KLK	Kuala Lumpur Kepong Berhad	0.8838
	SIME	Sime Darby Berhad	0.8465
	QL	QL Resources Berhad	0.8316
	UMW	UMW Holdings Berhad	0.7391
	DELEUM	Deleum Berhad	0.7219
	IOICORP	IOI Corporation Berhad	0.6986
	CARIMIN	Carimin Petroleum Berhad	0.6806
	GENP	Genting Plantation Berhad	0.656
	JTIASA	Jaya Tiasa Holding Berhad	0.6271
	DIALOG	Dialog Group Berhad	0.5652
	COASTAL	Coastal Contracts Bhd	0.4809
	DAYANG	Dayang Enterprise Berhad	0.431
	PERDANA	Perdana Petroleum Berhad	0.4057
	F&N	Fraser & Neave Holdings Bhd	0.4042
	TSH	TSH Resources Berhad	0.388
	KMLOONG	Kim Loong Resources Berhad	0.3751
	SWKPLNT	Sarawak Plantation Berhad	0.3467
	UMCCA	United Malacca Berhad	0.2741
	CEPAT	Cepatwawasan Group Berhad	0.2328
	PPB	PPB Group Berhad	0.089
Portfolio 14 (2 companies with ratios between 1.5 and 2)	HEIM	Heineken Malaysia Berhad	1.883
	HIBISCS	Hibiscus Petroleum Berhad	1.5033

Table A4

Grouping of Companies into Portfolios Based on Industries

Portfolio	**Ticker**	**Company**
Portfolio 15 (Energy Industry)	DIALOG	Dialog Group Berhad
	YINSON	Yinson Holdings Berhad
	HIBISCS	Hibiscus Petroleum Berhad
	DAYANG	Dayang Enterprise Berhad
	COASTAL	Coastal Contracts Bhd
	MHB	Malaysia Marine and Heavy Engineering Holdings Berhad
	DELEUM	Deleum Berhad
	CARIMIN	Carimin Petroleum Berhad
	PERDANA	Perdana Petroleum Berhad
	UZMA	Uzma Berhad

Portfolio 16 (Plantation Industry)	IOICORP	IOI Corporation Berhad
	KLK	Kuala Lumpur Kepong Berhad
	BKAWAN	Batu Kawan Berhad
	GENP	Genting Plantation Berhad
	KMLOONG	Kim Loong Resources Berhad
	TSH	TSH Resources Berhad
	UMCCA	United Malacca Berhad
	JTIASA	Jaya Tiasa Holding Berhad
	SWKPLNT	Sarawak Plantation Berhad
	CEPAT	Cepatwawasan Group Berhad
Portfolio 17 (Consumer Products and Services Industry)	NESTLE	Nestle (Malaysia) Berhad
	PPB	PPB Group Berhad
	PETDAG	Petronas Dagangan Bhd
	GENTING	Genting Berhad
	SIME	Sime Darby Berhad
	QL	QL Resources Berhad
	F&N	Fraser & Neave Holdings Bhd
	HEIM	Heineken Malaysia Berhad
	UMW	UMW Holdings Berhad
	BAT	British American Tobacco (Malaysia) Berhad

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