DEVELOPING A NEW STOCK SCORING MODEL FOR *SHARIAH*-COMPLIANT INVESTMENT

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In the name of Allah, the most compassionate and most merciful

Abstract

This study aims to develop a new stock scoring model, M_Score model, that based on the *musharakah* parameters by using a momentum technique that separate the out-performing *Shariah*-compliant stocks from the under-performing. Motivation for this study is centred towards the performance dragged from *Shariah*-compliant stocks in relative to the conventional stocks during the stock market recovery and the out-performance of *Shariah*-compliant portfolio attributed by a few stocks only. Hence, separating the out-performing from the under-performing *Shariah*-compliant stocks will enhance the portfolio returns. In doing so, a quantitative research in time series analysis is designed to measure the momentum, periodical changes, of the *musharakah* parameters. The essential *musharakah* parameters identified are industry performance, management style, profitability ratios and capital growth. These *musharakah* parameters are then represented by the financial indicators such as sector return, book value, cash flow, equity return, asset return, total assets and enterprise value to determine the momentum of stock price returns.

There are several main findings based on the quantitative analysis of the research results. First, this study has evidenced that *musharakah* parameters explain stock price returns since they have monotonic positive relationship with the newly developed M_Score model. Second, the model improves its statistical significance when the financial indicators are progressively added into the equation. Importantly, the M_Score model requires all *musharakah* parameters to be included in generating robust results. Third, there has been no concern on the temporal issue in the M_Score model since it responds well to every stock market cycle and to diverse investment horizons. Fourth, the M_Score model also has monotonic positive relationship with company size, stock orientations, trading volume, stock price or leverage position. Fifth, the predictive power has improved substantially when the M_Score model employs active investment strategies i.e. long-only and long-short and has further improved when the restriction is relaxed by allowing short selling.

On another note, this study has contributed in several ways. On theoretical side; in contrast to efficient market hypothesis theory, the M_Score model shows that stock market is inefficient and therefore, stock price returns are predictable. Although past performance is no guarantee of future returns, historical data remains the ideal tool to forecast the stock prices. As on the empirical side; the M_Score model captures most of the financial information and helps process recent information better. When applied to various portfolio strategies, the M_Score model has shown that active investing produces higher excess returns than passive investing. Moreover, the M_Score model does not discriminate stock specific characteristics like the company size, value or growth orientation, liquidity, stock price and leverage position. On methodological side; unlike many other models, using momentum of multiple financial indicators on M_Score model has addressed the concern of single variable biasness. Furthermore, the M_Score model does not require long historical data to produce robust results. In addition, the model is flexible to handle missing values and can withstand the outliers. Accordingly, this study discovers that the M_Score model can assist those investing in *Shariah*-compliant stocks to make informed investment decisions by using the model as an alternative investment analysis tool to forecast stock price returns, to determine market timing and to construct profitable stock portfolio returns.

To Father, Mother, Mother in-law, Wife, Daughters and Son

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Lastly, thanks to my parents, wife, children, and friends who bear this lengthy exercise with me and always lending courage as well as love.

Any remaining errors are my own.

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List of Symbols and Abbreviations

Abbreviation	Meaning
AAOIFI	**A**ccounting and **A**uditing **O**rganisation for **I**slamic **F**inancial **I**nstitutions
APT	**A**rbitrage **P**ricing **T**heory
BVA	**B**ook **V**alue
CAPM	**C**apital **A**sset **P**ricing **M**odel
CCAPM	**C**onsumption **C**apital **A**sset **P**ricing **M**odel
EMH	**E**fficient **M**arket **H**ypothesis
GICS	**G**lobal **I**ndustry **C**lassification **S**tandard
ICAPM	**I**ntertemporal **C**apital **A**sset **P**ricing **M**odel
IPO	**I**nitial **P**ublic **O**fferings
MPT	**M**odern **P**ortfolio **T**heory
OCF	**O**perating **C**ash **F**low
ROA	**R**eturn **o**n **A**ssets
ROE	**R**eturn **o**n **E**quity
RSI	**R**elative **S**trength **I**ndex
SACSC	***S**hariah* **A**dvisory **C**ouncil of **S**ecurities **C**ommission
SDF	**S**tochastic **D**iscount **F**actor
TEV	**T**otal **E**nterprise **V**alue
TOA	**To**tal **A**ssets
TSR	**T**otal **S**ector **R**eturn

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Chapter One

Introduction

1.1 Background of the Study

During financial market difficulties, *Shariah*-compliant stocks were resilient as compared to conventional stocks. In many major instances, the *Shariah*-compliant stocks out-performed the overall stock market during the financial crisis such as Indian Ocean Tsunami in 2004, United States Subprime Meltdown in 2007, Global Financial Crisis in 2008 and Eurozone Debt Crisis in 2011 as discovered by Kamso (2013). Although the *Shariah*-compliant stocks tend to out-perform over a long-term period, the stock price returns registered a performance dragged during stock markets recovery in global stock markets (Jawadi, et al., 2014) and in Malaysia stock market as well (Abdullah, et al., 2007). Besides that, noticeably, the out-performance relies on strong performance of a few *Shariah*-compliant stocks (Setiawan & Oktariza, 2013). Moreover, the *Shariah*-compliant stocks out-performed the broad benchmark because of exclusion of the conventional financial services stocks, higher exposure to technology stocks and low financial gearing stocks (Saiti, et al., 2014). Therefore, the ability to separate the out-performing *Shariah*-compliant stocks from under-performing *Shariah*-compliant stocks is necessary to enhance the stock portfolio returns.

Considerable studies have been conducted on the performance of stock portfolio returns for *Shariah*-compliant stocks particularly by Reddy and Fu (2014); Sukmana and Kholid (2012); Hasan et al. (2005); and Hussein (2004) in analysing the returns performance attributions. Nevertheless, the studies have not shown a separation between the out-performing and the under-performing stocks. On the other hand, the existing momentum investing strategies are not intuitive and harder for

investors to digest (Grundy & Martin, 2001). Hence, this study aims to develop a new stock scoring model using fundamental analysis with momentum investing technique based on principle of *musharakah*, referred as M_Score model, to separate between the out-performing from the under-performing *Shariah*-compliant stocks. The principle of *musharakah* governs the permissibility and conducts for investing in *Shariah*-compliant stocks (Al-Zuhayli, 2003). Consensus amongst the *Shariah* scholars agree that there are four essential *musharakah* parameters deduced as industry performance, management style, profitability ratios and capital growth. These *musharakah* parameters are then conceptually integrated with fundamental analysis. Thus, applying momentum investing on fundamental analysis of *musharakah* parameters produces a robust and intuitive stock scoring model in separating out-performance with under-performance *Shariah*-compliant stocks.

Studying *Shariah*-compliant stocks requires research in a developed Islamic capital market with a strong regulatory framework that matches the international practice. Bursa Securities Malaysia has that where it is the most comprehensive and sophisticated Islamic capital market in the world as claimed by Furqani and Mulyany (2009). The bourse existence and innovations have influenced the development of Islamic capital market products and offerings within Malaysia as well as in the global markets (Laldin, 2008). Therefore, using *Shariah*-compliant stocks listed on Bursa Securities Malaysia is essential as a proxy to global Islamic capital market for various types of stock within diverse industrial sectors. In this study, data from June 1997 to September 2016 are observed because that was the earliest official *Shariah*-compliant stocks list issued by the *Shariah* Advisory Council of Securities Commission (SACSC). Moreover, only stocks with sufficient data will be considered and the same time must be within the approved list of *Shariah*-compliant stocks issued by SACSC. Those secondary data extracted for this study is mainly from the earnings statements and balance sheets reporting supplied by the Bloomberg Professional.

This study helps the investors to distinguish between the out-performance and under-performance of *Shariah*-compliant stocks. Therefore, separating the quality stocks with other stocks will assist

the investors to enhance the stock portfolio returns. Consequently, the M_Score model helps those investors that invest in the *Shariah*-compliant stocks to have an informed investment decision by using the new stock scoring model that acts as an alternative investment analysis tool in forecasting the stock returns. Furthermore, the new stock scoring model will add to the existing choices of momentum investing techniques that help investors to improve the returns of their stock portfolio. Hence, the M_Score model acts as an intuitive and yet a robust model for investors, given its capabilities to capture most information of financial data, especially in processing the recent information while less depending on the historical data in producing better results. Subsequently, the investors can rely on the model's robustness in analysing and understanding their investment preference on maximising the source of returns especially on the *Shariah*-compliant stock as well as for the entire stock portfolio.

The rest of this chapter is essentially underpinning the entire study which starts with detailing the background of the study. In Section 1.2, the statement of problem centred around the investment performance with the establishment of related issues in providing a clear path on the research aim and objectives that aim to narrow down the research gaps. The details of the research aim and objectives in developing a new stock scoring model of M_Score model are presented in Section 1.3. On the other hand, Section 1.4 helps this study to construct comprehensive research questions. Following that, the theoretical framework on this study is rigorously discussed in Section 1.5. Whereas Section 1.6 sets the boundaries for this study that assembled with appropriate scope, limitations and assumptions to ensure focus in maintaining research quality. In addition, highlights on the significance of the study to the investors and fellow researchers are presented in Section 1.7. Thereafter, Section 1.8 articulates the research design for this study. While Section 1.9 presents the overview of the thesis.

1.2 Problem Statement

Smart investors require a reliable investment analysis tool that can help them predicting the magnitude of the stock returns in managing a profitable stock portfolio. A robust investment analysis tool must be responsive to any financial economic events, does not discriminate given specific stock characteristics and able to assimilate with any stock portfolio strategies.

Relying on the out-performance of *Shariah*-compliant stocks as a portfolio for the entire investment period is not sufficient since the financial market events may not be in favour during certain market cycles (Ashraf & Mohammad, 2014). In some instances, the *Shariah*-compliant stocks are not performing well during the market recovery period after the major financial market crashes in marketplaces like Malaysia (Mansor & Bhatti, 2011), Saudi Arabia (Merdad, et al., 2010), Europe (Alam & Rajjaque, 2010) and United States (Al-Khazali, et al., 2014). During the market recovery period, stocks like banking and other highly leverage companies tend to out-perform the other stocks (Wang, et al., 2009). The out-performance is mainly due to an accommodative economic policy like lower interest rate and greater credit supply (Borio, 2014), that has attracted the consumers and businesses to obtain credit facilities to service the debts. This phenomenon creates disadvantages to the *Shariah*-compliant stock portfolio since they are unable to have position in a banking stocks and highly leverage geared companies. Having said that, *Shariah*-compliant stock portfolio can rely on other consumer-linked industries such as autos and household durables within the consumer discretionary sector.

Therefore, by separating the out-performing and under-performing stocks, investors can have a solid underlying out-performing stocks to improve the portfolio returns (Piotroski, 2000). Likewise, some investors are relying on a few stocks that contribute to the overall portfolio performance (Goetzmann & Kumar, 2008). For that, investors can use a robust and intuitive stock scoring model to forecast the stock price returns and at the same time is able to separate the quality stocks from the entire portfolio. In this study, an analysis technique is created to evaluate the *Shariah*-compliant

stocks strictly based on certain financial indicators of a company using a time series analysis. The new stock scoring model provides investors with an option to objectively rank the stock based on its aggregate financial indicators in selecting the out-performing stocks and omitting the under-performing stocks. The selection of the stock can be measured within the same industry or market universe. Moreover, a good model should be able to resilient through any financial economic events and does not discriminate between stock specific characteristics. Although other fundamental analysis or technical analysis can provide similar assistance, there is no conceptual explanation for variables or factors selected in investors preferred investment strategy (Roll & Ross, 1980). The alternative to fundamental analysis of forecasting stock returns in this study is conceptually driven by the principle of *musharakah*. In addition, Dania and Malhotra (2013) suggest that the principle-based investing, such as *Shariah* investing, works better with fundamental analysis.

1.3 Research Aim and Objectives

This study aims to develop a new stock scoring model by using a fundamental analysis with a quantitative approach based on *musharakah* parameters in determining the direction or momentum of *Shariah*-compliant stock prices. The momentum strategy that generates the trade signal is then used to separate the winning from the losing stocks. In meeting the research aim, this study develops three main research objectives in providing a clear direction of the research works. The research objectives are organised as follows:

1. To explore the statistical relationship between the stock price returns and the newly developed M_Score model based on the *musharakah* parameters.

The stock price returns are defined as a quarterly investment performance where it measures the stock prices movement between the two quarters. Additionally, the dividend is included in return calculation if declared during the observation period. Therefore, the distribution of stock price returns is a tabulation of investment performance for *Shariah*-compliant stocks on a given composite

score of the M_Score model. The composite score of M_Score model is a quantitative approach to determine the direction or momentum of stock price returns. It signifies a trade signal to separate between out-performing from under-performing *Shariah*-compliant stocks. Tabulating the stock price returns in relation to the composite score leads to the distribution of stock price returns. A bigger composite score should translate to a higher stock price returns and vice versa for a lower composite score. Hence, distribution of stock price returns for pseudo stock portfolio to M_Score model illustrates the separation between out-performing and under-performing *Shariah*-compliant stocks. With that, the portfolio returns will be improved through the selection of a quality stocks. Therefore, by validating the first research objective of this study, investors can use the new stock scoring model to separate the under-performing stocks in the existing stock portfolio or to add only out-performing stocks into the stock portfolio.

2. To investigate the robustness and intuitiveness of the newly developed M_Score model.

A robust model allows the new stock scoring model to respond to any financial economic events without any breakdown or adjustment. Financial economic events trigger an impact to the stock market of which resulting to a bullish or bearish market. Many models have the capabilities to out-perform in a bullish market and not otherwise. In addition, a robust model should be flexible enough to handle issues like missing values and a newly listed company (IPO). On the other hand, an intuitive model is able explain the source of stock returns and must be adaptive to the specific stock characteristics. Therefore, the challenge for this study is to show that the new stock scoring model adjusts to various conditions while maintaining its predictive power. At the same time, institutional and sophisticated investors require a portfolio manager or an investment analyst to explain the source of returns. With that, any successful investment model or strategy should be able to tabulate the source of returns in the portfolio attribution analysis.

3. To examine the return and risk of selected stock portfolio strategies using the newly developed M_Score model.

A reliable stock scoring model should respond to any portfolio strategies. In this study, pseudo portfolio of buy-and-hold, long-only and long-short investment strategies are created to test the investment returns given a few selections of investment strategies. The former strategy is the reference portfolio for the investment performance analysis. Whereas, the long-only investment strategy is where the investors purchase a stock when a buying signal triggers and disposing the stock before the signal ends. As for the long-short investment strategy, it takes the advantage of both stock prices direction. A buy signal will prompt a buy long stock and sell signal will suggest a sell short stock. Short selling is where an investor sells the borrowed stock at a higher price with intention to buy back at a lower stock price in the future. It is a worth noting that, the practice of short selling in Islamic finance is still developing and remains unsettled. Another pseudo portfolio strategies evaluated are those based on stock orientation and company size. The former has three pseudo portfolios, value style, blend style and growth style portfolios. Whereas, company size has a small, medium and large capitalisation stocks. In addition, these pseudo portfolios are adjusted for weighting schemes. The equal weighted, price weighted and market capitalisation weighted schemes is selected to examine the investment performance. The rationale is to avoid any biasness of this study towards specific stock characteristics like company size, stock orientation, trading volume, stock price, leverage, trade position and weighting schemes.

1.4 Research Questions

In fulfilling the research aims and objectives, this study addresses these three specific research questions of the M_Score model distribution in relation to the stock price returns; model robustness and intuitiveness; and portfolio strategies profitability. The three primary research questions are presented as follows:

1. How does the M_Score model newly developed by this study, explain the distribution of the stock price returns?

In meeting the first research objective, this study requires an investment analysis tool that explains stock returns as well as can generate better relative returns for stock portfolio. The M_Score model when applies the *musharakah* parameters provides a composite score that correlates to distribution of stock price returns. Hence, the distribution of stock returns improves by shifting to the right of the table partition. In another word, a stock with higher composite score will have a better stock price returns in the future. Additionally, the relationship of composite score and stock price returns is further confirmed with statistical significance tests and correlation analysis.

2. How does the M_Score model newly developed by this study, respond towards the stock market temporal and stock specific characteristics?

The stock market temporal refers to the financial economic events that normally correlates with the state of the stock market cycle. It is a common behaviour of the economy between expansion (growth) and contraction (recession) phases. Macroeconomic factors such as gross domestic product, interest rates, employment rate and consumer consumption can indicate the current phases of the economic cycle. Hence, a good stock scoring model should be able to respond to these financial economic events with persistent results. On the other hand, stock specific characteristics refer to common traits that effecting the stock price returns anomaly. Thus, excess stock price returns by the M_Score model should be the key effect to the anomaly. Whereas, the stock specific characteristics should not be the contributing effect to the stock price returns anomaly. Although stock price returns may be influenced by the stock specific characteristics, microeconomic and macroeconomic factors, the M_Score model explains the stock price returns better by applying the *musharakah* parameters. Moreover, the source of the stock price returns is important for investors to articulate and rationalise their investment decision for a given individual stock or stock portfolio.

3. How does the return and risk perform on selected stock portfolio strategies using the M_Score model newly developed by this study?

A good stock scoring model should be able to help investor to make an informed investment decision. As an investment analysis tool, the adaptability and applicability of a stock scoring model must be universal to various portfolio strategies. Growing a portfolio depends on many factors such as investor risk tolerance, time horizon and the amount of capital that can be invested. In this study, the selected portfolio strategies are buy-and-hold, long-only and long-short investment strategies. In addition, the portfolio strategies based on stock orientations, company sizes and weighting schemes are included. These portfolio strategies create 81 permutation of pseudo stock portfolios which are commonly used by the investors. Therefore, the new stock scoring model will be a preferred investment analysis tool if it adapts well with those investment strategies. Moreover, the M_Score model provides a flexibility to the investors in choosing their suitable stock portfolio strategies.

1.5 Theoretical Framework

Fundamental analysis is an approach to evaluate the stock pricing by examining a mix of macroeconomic and microeconomic factors; and stock unique characteristics as shown in **Error! Reference source not found.**. Although the fundamental analysis emphasis on stock valuation, most investors realise that all of the stock prices are affected by the common factors among them. For instance, macroeconomic factors like growth of gross domestic product, unexpected variations in interest rate, drastic movements in inflation rate or foreign exchange rate outlooks can affect all stock prices to some different levels depending on the stock's unique characteristics. Having said that, Rosenberg and Marathe (1976) developed the theory that suggests microeconomic properties such as industry sector membership, financial structure or stock orientation implicitly encompass the properties of macroeconomic factors on individual stocks. The linkage between macroeconomic events and microeconomic characteristics in that theory has given a great impact on the asset pricing since then. However, there are a long list of factors to be selected for model development. Instead

of selecting the factors randomly, this study leverages on the emergence of Islamic finance practice by applying the principle of *musharakah* as a conceptual framework.

Equation 1-1: Stock Prices to Factors

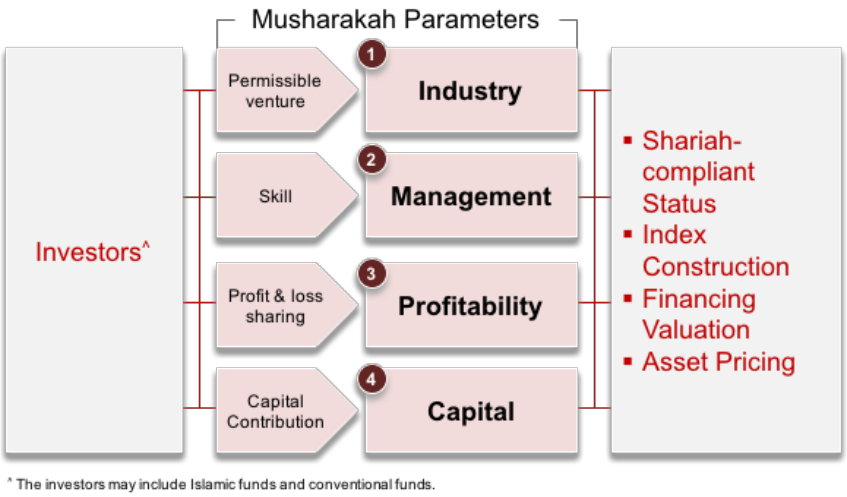
$$R_i = F_1 + F_2 + \cdots + F_n$$

where, R is the stock price returns, i, and F is the macroeconomic and/or microeconomic factors, n, affecting stock price returns.

On the other hand, the principle of *musharakah* can be applied to ascertain the *Shariah*-compliant status of securities (Usmani, 1999); to construct index for securities (Abdul-Rahman, et al., 2010); to value project financing (Jaffar & Isa, 2011); and to evaluate asset pricing (Selim, 2008). *Musharakah* in direct translation is a commercial partnership where a group of investors combine either their investment capital or expertise together. They share the profits proportionately while having similar rights and liabilities as the investors. There are four essential elements or parameters that must be observed in applying the principle of *musharakah* as shown in Figure 1-1 below. The four *musharakah* parameters are business activity, management of the business, profit and loss sharing and capital contributions (Al-Zuhayli, 2003). First, a company must be at all time operates in a permissible business activity. Those like alcohol related activities, pork and non-permissible commodities, financial transaction based on interest and other activities contradict with *Shariah* are not allowed. Though some allowance is permitted depending on certain circumstances as described in the later Section 3.4. Second, the management of the business is conducted by the consents and equal rights of all the participating investors in the company. Existing forms of company structure including public firms, the investors have equal rights as well. For example, the investors of listed companies assign their powers in respect of company management, to some among them is referred as a board of directors or any other title that is deemed appropriate. Additionally, they may appoint external parties to manage the business company. Third, profits, if any, are to be distributed among the investors in company based on proportions agreed among them in advance. The profits

distribution to each investor must be allocated as a proportion or percentage with no fixed amount can be assigned for any investor. For instance, the listed companies distribute their profit according to the capital contributed by investors. Meanwhile, majority of the scholars are unanimously of the opinion that the loss, if any, shall be borne by the investors proportion to their capital contributions. In all types of *musharakah*, the loss is borne based on the capital invested. Fourth, the capital contributed by the shareholders may be unequal. However, majority of the scholars in view that the capital contributions should be in the form of currency and not as in-kind resources. The capital contributed in the form of equal units of currency are called shares and the intended investors may buy as many shares as they wish. This market conduct has unanimously been accepted as *urf* (custom) and is therefore meets the *Shariah* requirements. To recap, there are four *musharakah* parameters one needs to observe i.e. business activity, management of the business, profit and loss sharing and capital contributions. Hence, these four *musharakah* parameters in which the microeconomic traits are essential in this study as a conceptual framework towards asset pricing for *Shariah*-compliant stocks.

Figure 1-1: Theoretical Framework of *Musharakah* Parameters[1]



Source: Usmani (1999) and Al-Zuhayli (2003)

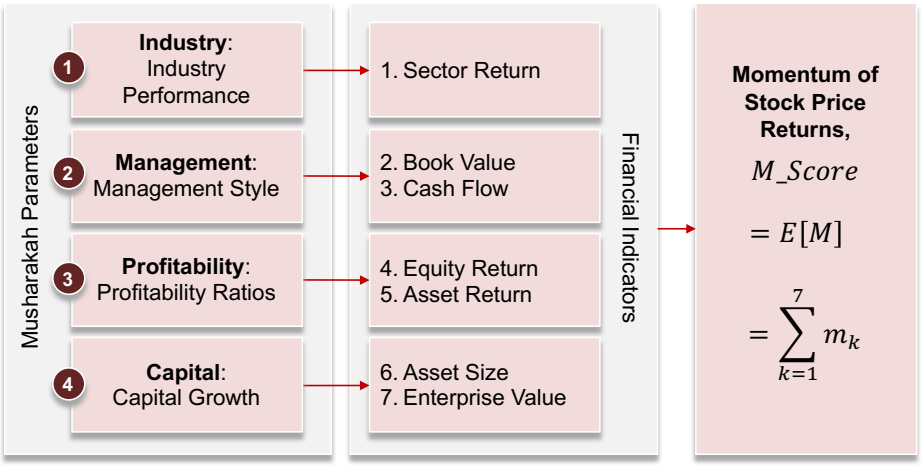
In this study, the perspective of those parameters in M_Score model as microeconomic traits are measured as industry performance, management style, profitability ratios and capital growth. To quantify those *musharakah* parameters, this study selects seven financial indicators that best explained the four *musharakah* parameters. Having said that, selection of the financial indicators is backed by the literatures that are aligned with the *Shariah* principle of *musharakah*. Moreover, the financial indicators are supported by the previous empirical research through the statistically significant analysis and correlational studies. As for the industry performance, it is represented by the sector return. Whereas, the management style is represented by the book value and cash flow. While, the profitability ratios are represented by equity return and asset return. Finally, the capital growth is represented by asset size and enterprise value. With that reference, the sector return describes the sensitivity of a stock against its peers within the same industry. Whereas, the book value and cash flow explained how well the management of a company uphold its operational

[1] Interestingly, the legendary investor, Warren Buffet, also applies similar parameters when investing in stocks as studied by Hagstrom (1997).

efficiency. While, equity return and asset return justified the investors investment valuation in the company. And, capital growth and enterprise values described the ability of a company to bring it to the next level in a competitive environment. To make these financial indicators more meaningful in terms of market timing, this study adopts a momentum investing in searching for direction or momentum of stock price returns.

Momentum investing with the observations of fundamental analysis can add value to the stock price returns (Asness, et al., 2013). Jegadeesh and Titman (1993) describe that momentum investing is a strategy that follows a historical trend of a stock prices. For example, investor takes a long position in a stock which has recently shown upward stock price increases and short sell a stock which has recently experienced downward stock price movements. With that, momentum investing assumes that the stocks tend to behave similarly in the future given its past performance. Therefore, a stock with positive returns will keep rising and a stock with negative returns will keep falling. Instead of relying on a single historical stock prices or trading volumes, this study observes the fundamental factors which conceptually elaborated by the *musharakah* parameters, see Figure 1-2. Hence, a new stock scoring model is established to measure these phenomena.

Figure 1-2: Conceptual Framework for Momentum of Stock Price Returns[2]



The M_Score model investigates historical two-period in time series analysis for a quarterly data of financial indicators in determining the momentum of stock price returns. Then, each indicator is measured with rate of change between two quarters of which transpose into a score, M_Score as shown in **Error! Reference source not found.** below. Whereas, a combination of the indicators' scores will form a composite score (also known as M_Score, without the word model after it). A positive change should result a higher score which ranges from minimum of 0 to maximum of 100 and vice versa. Therefore, the higher composite score will suggest a higher expected stock price returns in the following quarter. In addition, this study examines the insights behind the M_Score model using the microeconomic factors. This is to show on how the model is linked to mainstream the fundamental analysis and the market timing. In developing the new stock scoring model, this study looks for financial indicators that explain stock price returns, similar to the fundamental analysis in stock price discovery. Moreover, this study emphasizes the additional role of the model

[2] Notation m_k refers to ΔSector Return = ΔTotal Sector Return; ΔBook Value = ΔNet Asset Value; ΔCash Flow = ΔOperating Cash Flow; ΔEquity Return = ΔROE; ΔAsset Return = ΔROA; ΔAsset Size = ΔTotal Assets; and ΔEnterprise Value = ΔTotal Enterprise Value.

as compared to the traditional stock analysis and denotes the insights that the M_Score model can offer.

Equation 1-2: Changes in Stock Price Returns to Changes in Factors

$$\Delta R_i = \Delta F_1 + \Delta F_2 + \cdots + \Delta F_n$$

where, ΔR_i is the rate of change in stock price returns, i; and ΔF_n is the rate of change in microeconomic factors, n, that affecting the stock price returns.

In summary, the fundamental analysis and momentum investing theories together with the principle of *musharakah* act as a basic element in developing a research framework for this study. The unique proposition of *musharakah* parameters combined with vigorous momentum investing, in which the former is the basis of investing in *Shariah*-compliant stocks, can indicate the momentum of stock price returns. Eventually, the M_Score model helps to separate out-performing from under-performing stocks and assist investors to make an informed decision.

1.6 Scope, Limitations and Assumptions

Although this study is working towards the perfection of the M_Score model, it sometimes must confine to a certain boundary. This does not make the study loss its traction to develop a new stock scoring model that is robust and intuitive. Having said that, the scope, limitations and assumptions stated below are not exhaustive and only those that pertinent are considered by this study.

1.6.1 Scope of the Study

This study is conducted to develop a robust and intuitive stock scoring model for *Shariah*-compliant stocks in Malaysia. The research horizon for this study is set to be since the beginning of officially announced *Shariah*-compliant stocks list by the SACSC on June 1997. As for the cut-off period, this study ends the research on September 2016 to accommodate for data management and research analysis in timely manner. Nevertheless, this study has excluded the listed funds such as close-ended

funds, real estate investment trusts and exchange traded funds. These funds are excluded from this study since it comprises of portfolio of stocks or assets which require difference set of price modelling approach (Bello & Janjigian, 1997) (Kao, et al., 1998).

Next, universe for the dataset of this study will be the 636 *Shariah*-compliant stocks listed on Bursa Malaysia Securities as approved by the SACSC with sufficient financial information. Although this study wishes to include the data from other stock markets, the maturity and sophistication of Islamic finance ecosystem in general and Islamic capital market specifically that focus on *Shariah*-compliant stocks are very limited. These are important elements to ensure that the dataset is fully reflected on all available information particularly in relation to Islamic finance.

Additionally, dataset used in this study are primarily derived from the financial statements and periodical reports as well as releases. Instead of going through each individual company financial statements and periodical reports, these secondary datasets are extracted from the financial information service provider. This approach may avoid any data transportation error due to typo as well as redundancy. Moreover, dataset from the financial information service provider allows a flexibility in data management and better data quality.

Lastly, all stocks with sufficient data are being considered in this study. More importantly, there is no biasness towards stock characteristics like company size, industry membership its belong and stock orientation. Company size may refer to total assets or market capitalisation of a company. Whereas, industry membership refers to grouping of stocks based on industry classification standards defined by the like of global industry classification standard, GICS® and industry classification benchmark, ICB®. These standards are developed by the Standard & Poor's® and MSCI®; and FTSE Russell® respectively. Hence, this emphasised that the new stock scoring model takes more holistic view in analysing stock prices.

1.6.2 Assumptions of the Study

Fama (1970) coins the idea of efficient market hypothesis where given all the available information, investors will not able to out-perform the overall market over period. In contrast to the theory, this study assumes stock market is inefficient. In other words, investors can beat the broad stock market with right stocks selection and assets allocation. Many studies have shown that their investment models or strategies have out-performed the overall stock market with significant profits. For instance, Jegadeesh and Titman (1993) in their work, discover that by buying a stock that has performed in the past will generate a positive return performance in medium term investment horizon. Hence, stock price momentum can attribute to the investment profitability.

In addition, investors are assumed to be perfectly rational and driven by self-interest. This suggests that investors will assign a utility threshold to every stock in the portfolio based on the expected return and risk characteristics. Hence, the stocks that generate the highest utility threshold will be selected (Jolls, et al., 1998). Furthermore, every investor in the stock market is supposed to have an access on the same set of information.

Next, executing an active portfolio strategy will definitely incur a transaction cost. The related costs for stock trading include, but not limited to, brokerage fees, stamp duty, clearing fees, etc. Since, the new scoring model tests several portfolio strategies, a different costs structure will prevail. Naturally, some of the strategies in the absence of transaction costs generate higher gross return. However, in most studies, transaction costs do not result inferior to portfolio total return. Instead, the costs of purchasing a stock and thereafter selling it, is much smaller with persistent stock price momentum (Gârleanu & Pedersen, 2013). Therefore, this study assumes no transaction costs as adding one may not necessarily provide a distinctive result between the pseudo portfolio strategies.

As for the stock prices, they are assumed to be random while the financial information extracted from the income statements and balance sheets namely book value, cash flow, equity return, asset

return, asset size and enterprise value are assumed to be independent and identically distributed where each random variable stated has the same probability distribution as the others and all are mutually independent. Additionally, since this study is heavily depending on the secondary data provided by the financial information service provider, this study assumes all the secondary data gathered from data provider maintains its accuracy and quality. It is crucial for this study to starts with a reliable data in ensuring the robustness of the research in achieving optimal results.

Lastly, this study makes an assumption that the seven selected financial indicators are proxies to the four *musharakah* parameters based on practical industrial experience and market practice as well as previous studies in conventional finance. For instance, the sector return represents the industry parameter; book value and cash flow represent management parameter; equity return and asset return represent profitability parameter; and asset size and enterprise value represent capital parameter of *musharakah*.

1.6.3 Limitations of the Study

The modern history of Islamic finance in Malaysia can be traced back about 50 years ago with the establishment of Muslim Pilgrims Savings Corporation in 1963. Nonetheless, the Islamic capital market such as *Shariah*-compliant stocks gained tractions in 1993 through the offerings of two Islamic unit trust funds. Although, various studies can be found on the principle of *musharakah* they are focusing more on the financing application of the principle rather than the equity part of the principle. Moreover, most of the old texts and scriptures discussion on *fiqh muamalah* (legislations or application methods of *Shariah* principles in commercial transactions including financial activities) are mainly written in classical Arabic language which may be difficult to grasp. At the same time, the English translation is very limited and may not achieve the original messages intended by the Islamic scholars. Given that background, this study finds the peer reviewed literatures are very limited when it comes to subject of *Shariah*-compliant stocks particularly on the principle of *musharakah* in asset pricing and explaining stock price returns.

Moreover, large data size is required in this study to observe the company fundamentals and to accommodate the time series analysis. Hence, tendency for a missing value of financial statements is greater. Financial statements are sourced from the secondary data i.e. financial information service provider. There are two possible causes of the missing value. Omission of data while transmitting from company's financial statements or error when transposing the data from financial information service provider's system into the spreadsheet. Besides that, missing value may occur particularly in first one-fourth of the observation periods where quarterly results are yet to be compulsory for public dissemination. Though the M_Score model is robust enough to respond on the missing values, this incident may result to a less intuitive model.

Furthermore, some of the financial information are only available on a quarterly basis. However, this study applies a time series analysis in which it works better with a higher frequency of dataset like daily information. The limitation is that the financial statements used are only available on a quarterly basis at best except for stock prices and market value of which can be retrieved on a daily basis. Higher frequency of dataset will make the new stock scoring model process recent data more effectively. Thus, making recent financial statements more reflective and help the new stock scoring model to respond better. Furthermore, quarterly releasing of financial statements may mean a company's fundamentals have significantly changed. Hence, the quarterly results may show that the investment decisions have been lagged in timing. This consequence lead to a lack of opportunity to react quickly to exit the stock investment. Although quarterly data can be perceived out-of-date and losing recent information, it has some advantages in terms of trading transaction related expenses and data acquisition related costs.

Also, the new stock scoring model focuses on stock price's direction not value. Implementation requires purchasing of a stock when price about to increase and selling a stock when price starts declining. In other words, the new stock scoring model indicates optimal spot to trade a stock. Awaiting the lowest stock price to purchase or the highest stock price to sell is not an ideal approach

since investors might miss the opportunity to optimise their returns. Moreover, market forces determine the daily (continuous) changes of stock prices because of supply and demand. If more investors want to purchase a stock than to sell it, then the stock price increases and otherwise the stock price will fall. Notwithstanding, the concept of supply and demand is easy to grasp. However, the challenge is what makes investor favours a certain stock and does not favour another stock.

1.7 Significance of the Study

Despite the growing interest in Islamic finance generally and *Shariah*-compliant investments particularly, there are limited empirical research that study the financial applications based on the principle of *musharakah*. Having said that, numerous attempts have been applied for determining *Shariah*-compliant status of the securities (stock and Islamic bond or *sukuk*), construction of financial index and valuation of project financing as well as asset pricing. However, application using a principle of *musharakah* in forecasting the stock price returns is very new. Thus, this study offers some new empirical evidences from different perspectives. First, the *musharakah* parameters represented with financial indicators can predict the stock price returns. Second, the M_Score model based on *musharakah* parameters can separate the out-performing and under-performing stocks. At the end of this study, the M_Score model is likely to assist those investing in *Shariah*-compliant stocks to have an informed investment decision by using the model as an alternative investment analysis tool in forecasting the stock price returns and constructing a profitable stock portfolio.

Moreover, the *Shariah*-compliant stocks listed on Bursa Securities Malaysia have not been thoroughly studied despite the significance of the Malaysian stock market being the world's largest and the most established Islamic capital market (Laldin, 2008). Having a complete Islamic capital market ecosystem makes *Shariah*-compliant stocks listed on Bursa Malaysia Securities as an interesting dataset and observations. Further to that, *Shariah*-compliant stocks have relatively long historical data that can be traced back since 1997. Besides its long historical data, the stock market has been supported by robust regulatory framework covering all aspects of Islamic finance

activities. More important, there are abundant of institutional and retail investors who subscribe to *Shariah*-compliant investments philosophy. These characteristics make *Shariah*-compliant stocks listed on Bursa Malaysia Securities as an important subject matter.

Additionally, momentum strategy refers to studying the strength of stock prices or trade volume in each time frame. The strategy uses single component in data analysis for forecasting technique which is also known as a technical analysis. Concerns of the investors regarding the technical analysis are their inability to explain the source of returns and their biasness towards the single factor. Addressing those concerns, this study offers a blend of multi factor fundamental analysis to explain the source of returns and to remove the single factor biasness with the assistance of technical analysis in stock prices discovery. This combination is a unique proposition that demonstrates the collaborations between fundamental and technical analysis, instead of working in silos, they can work hand in hand.

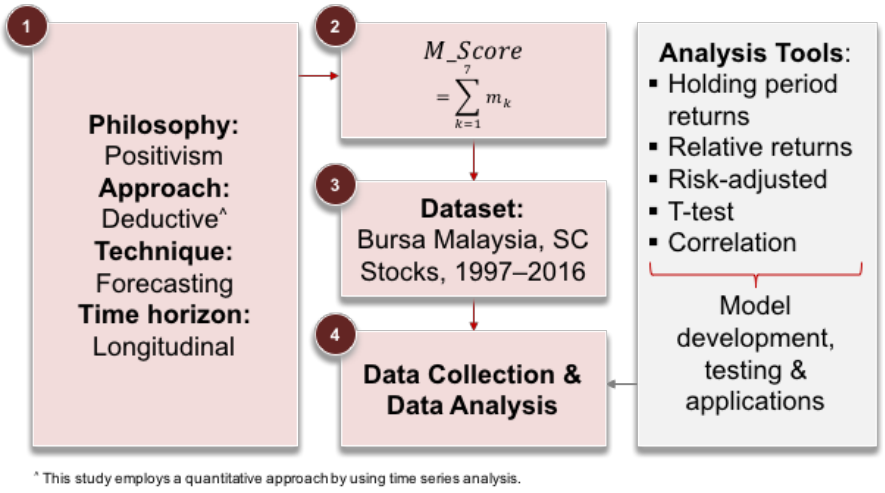
The other importance of this study is related to a modern portfolio theory. Momentum investing employs many similar mathematical tools where technical analysis which is viewed as contradict to the modern portfolio theory. For example, the effectiveness of both fundamental and technical analysis is disputed by the efficient market hypothesis which states that stock prices are basically unpredictable (Fama, 1970). However, many empirical studies have shown that investors can predict stock price returns while stock prices adjusted themselves (Cenesizoglu & Timmermann, 2012). Therefore, this study is essential in adding to the existing empirical evidences that the stock price returns are predictable from the perspective of Islamic finance. In addition, this study has also demonstrated that the *musharakah* parameters selected form part of the fundamental analysis.

With that, by fulfilling the research aims and objectives, this study is expected to fill in the gaps and to extend the works of the *Shariah* investing. Consequently, this study contributes to the body of knowledge and a development of Islamic finance to the next level.

1.8 Research Design

In modest form, the stock prices are explained by macroeconomic and microeconomic factors. However, the macroeconomic factors influence on individual stocks could be apprehended through the microeconomic characteristics. It can be captured in common factors such as capital formation, industry affiliation or association towards growth (Rosenberg & Marathe, 1976). Therefore, proposition of the factors selection in this study are deduced from the *musharakah* parameters like industry performance, management style, profitability ratios and capital growth in which represented by sector return, book value, cash flow, equity return, asset return, asset size and enterprise value indicators. These seven fundamental financial indicators are extracted from the financial statements and released of respective stock company under study. Figure 1-3 below summarised the research process for model development and examination using systematic and scientific methods.

Figure 1-3: Research Process for Stock Scoring Model Development



Shariah-compliant stocks listed on Bursa Securities Malaysia is the primary universe in this study. The stocks are selected from the latest list of *Shariah*-compliant securities issued by the SACSC and are categorised by their respective industry groups. In addition, compliant to the *Shariah* requirements are based on two tier criteria: business criteria and financial criteria (Securities Commission, 2014). Generally, the stocks selected must conform with the type of business that is

permissible by *Shariah* and must pass the financial threshold for cash and debt positions. Moreover, each stock must qualify for certain conditions such as; need to be actively traded on the stock exchange; need to have sufficient data of at least a fundamental financial indicator for the period of study; and must be assigned with recognised industrial classification standard in representing its respective industry sector.

This study conducts a quantitative research with time series analysis of the secondary data obtained from the financial information service provider. The time series analysis applied two-quarter observations throughout this study in establishing the M_Score model that suggests the momentum of stock price returns is influenced by the rate of changes in financial indicators. As for the study period, an observation horizon begins the same as when Malaysia first introduced its Islamic equity capital market in June 1997 until the recent quarter where the list of *Shariah*-compliant securities issued by SACSC and financial information required are available as of September 2016. The historical financial data are gathered quarterly for each financial information required from the respective financial statements of a stock company. Financial indicators like total sector return, book value, operating cash flow, return on equity, return on assets, total assets and total enterprise value as well as data like stock prices, market capitalisation, book value ratio, trading volume, leverage ratio and earnings are gathered for computation of the composite score and the investment performance analysis respectively.

Each financial indicator of M_Score model is assigned with a score to determine its momentum for next quarter and the composite score of the indicators are expected to denote the direction of stock prices. The momentum of stock price returns is measured by a rate of change of financial indicators between two quarters. Whereas, the composite score is computed for an average of all seven scores of the financial indicators which ranges from 0 to 100. As for the total sector returns, the aggregate stock prices in the same sector are tabulated over the period. Thereafter, the composites of equally weighted stocks are based to the reference divisor to form a total sector return. It behaves as a

benchmark of aggregate performance to the referred industry sector. Tabulation of the composite scores relative to the stock price returns creates the distribution of stock price returns. This process is repeated for each industry sector and pseudo stock portfolio.

The M_Score model expects a higher composite score should result a better stock returns in the future. Whereas, future stock price returns are lesser given a lower composite score. Typically, a score more than 50 and reaching 100 suggests a positive stock returns in the following quarter. On the other hand, a score of 50 and reaching 0 would behave otherwise. Therefore, the new stock scoring model will fit well if the composite scores are statistically significant and highly correlated to distribution of stock price returns. In addition, the new stock scoring model envisages a higher correlation between composite score and stock price returns in any financial economic events and for every stock portfolio strategy. At the same time, a good model should result long-only and long-short strategies performing better than buy-and-hold portfolios in any given financial economic circumstances and common traits. Furthermore, for every indicator to be a good yardstick, it must be statistically significant in explaining the stock price returns. The significance tests are conducted for various portfolio strategies namely buy-and-hold, long-only and long-short portfolios with the stocks are rebalanced every quarter or every year in each industry sector as well as the entire stocks of this study. Therefore, the M_Score model should have greater predictive capability if the fundamental financial indicators are statistically significant and highly correlated with the stock returns. Moreover, when M_Score model applied to the various stock portfolio strategies, the model produces a positive stock portfolio returns. With that, investors should have a robust and intuitive investment analysis tool to make an informed investment decision during the stocks selection process in generating a profitable stock portfolio.

1.9 Overview of the Thesis

The structure of this study is as follows. In Chapter One, it starts with the introduction of this study including the problem statement; research aim and objectives; significant of the study; research

questions; theoretical framework; scope, limitations and assumptions; and research design of the study. The sections in the chapter provide research foundation to this study.

While, in Chapter Two, this study turns to the new stock scoring model exploring and discussing on the asset pricing theories, fundamental analysis and momentum investing. It discusses the seminal works on asset pricing models, financial indicators and investment techniques that require to examine the stock prices of which need a supporting conceptual framework in making the model robust and intuitively appealing.

Subsequently, the supporting conceptual framework is then being discussed in Chapter Three, deliberating on the principle of *musharakah* that focuses in momentum of stock price returns. In addition, the origin and the applications of principle of *musharakah* are also presented.

In Chapter Four, this study turns to the research methodology of quantitative analysis in developing a new stock scoring model. The time series analysis with longitudinal approach are explained with systematic and scientific methods.

The next two chapters present empirical results. In Chapter Five, the financial and return characteristics of the secondary data are then tabulated as evidences about *Shariah*-compliant stocks. It describes the common characteristics of the *Shariah*-compliant stocks as compared to the previous studies. Moreover, this study analyses the relationship between the stock price returns and the respective financial indicators. Subsequently, this chapter analyses the cross-sectional variation in stock returns given the *musharakah* parameters. Furthermore, the chapter observes and analyse the distribution of stock price returns by composite scores. Thereafter, this study measures the model fitting to the respective portfolio strategies.

Whereas, in Chapter Six, the robustness check is conducted by analysing the stock price returns performance towards the major financial economic events occurred during the period. The chapter further analyses the M_Score model by measuring the influence towards stock returns by company

size partitions stock orientation, trading volume, stock price and leverage partitions. In getting to the bottom of investor's ultimate investment objective, this study analyses the raw stock price returns and risk adjusted returns when the model implemented on the respective investment portfolio strategies.

Lastly, this study concludes in Chapter Seven by summarising the findings and thereafter, tabulating the contributions of this study from the theoretical, empirical and methodological perspectives. Besides that, the chapter presents the critical reflections on the research findings and theoretical considerations; policy implications and recommendations; and limitations and recommendation for future research.

Chapter Two

Anatomy of Stock Scoring Models

2.1 Introduction

The theoretical and empirical reviews of stock scoring models are originated from the previous research by several prominent authors whom rigorously concern on establishing a basic understanding of asset pricing. Asset pricing studies have been evolving since the eighteenth centuries with the concept of a utility function in investment. However, the greater attention to the asset pricing studies was only began in the 1960s. Not much progress on the empirical side of the studies but the advancement in the computing technology has enabled more complex mathematical equations to be addressed efficiently. In this chapter, the focus is on seminal works of asset pricing theories particularly on stocks asset class. Subsequently, this chapter deliberated on the empirical works surrounding the asset pricing theories.

In this chapter, the deliberation of asset pricing as the subject area is set to stage for further discussion throughout the study. It touches subjects like the milestone of asset pricing theory predominantly developed in the later part of the twentieth century and continue to evolve till today as presented in Section 2.2 . Following that, the section reviews the previous empirical research works on the prevailing asset pricing theories. Then, Section 2.3 presents the components of fundamental analysis which have been explored in detail, particularly, an analysis across industry performance, management style, profitability ratios and capital growth. Those components are essential to fulfil the research aim and objectives of this study. The discussions are then followed by the subject of momentum investing which is another central area for market timing as presented

in Section 2.4. Moreover, it observes the convergence of fundamental analysis and momentum investing in uncovering the asset pricing model. On the other hand, Chapter 2.5 discusses the ways that asset pricing models can be implemented on commonly used portfolio strategies. Lastly, Section 2.6 concludes this chapter.

2.2 Theoretical and Empirical Review of Asset Pricing Models

Asset pricing is a study of understanding the way of financial assets are being priced which includes stock, bond and hybrid instrument (Cochrane, 2009). Motivation for price discovery, is for the investor to enjoy the financial returns. Generally, the asset with a lower price tend to generate higher rate of return and there are financial assets that pay higher average returns than other like stock and bond. LeRoy and Werner (2014) highlight that there are two central principles in the asset pricing. First, no arbitrage principle suggests that the market forces will align financial asset prices so that it will eliminate the arbitrage opportunities. For an arbitrage opportunity to occur, the financial asset need to have a chance to be included in a portfolio with no cost, no loss and possibility of a gain. Second, market equilibrium principle states that financial market investing seller and investing buyer balance each other and, as a result, financial asset prices become optimised. Normally, when there is too much investing seller for a financial asset, the price goes down and vice versa when there too much investing buyer. The consequences for balancing effect of investing seller and investing buyer will result a state of equilibrium.

2.2.1 Asset Pricing Theories

In answering the question around how a financial asset is priced, the financial economists have developed various asset pricing models for determining the required or expected rate of return on a financial asset. The discussions related to asset pricing model can be traced back in the eighteenth

century. Daniel Bernoulli[3] in 1738 examined the proposition that an investor's risk tolerance level should contain not only the potential losses that can occur, but also the investment's utility function or intrinsic value of stock prices. The argument is not accepted by him since this method was unable to determine multiple scenarios that possibly happen. However, Bernoulli claims that the determination of the value of an item must not be based on its price, but rather on the utility it yields (Sommer, 1954, p. 24). Hence, he implicitly initiates the concept of higher risk will result to a higher return. For example, to increase the rate of returns of a fixed income portfolio, an investor can blend the portfolio with stocks of which have a higher risk or volatility as compared to the fixed income securities (Sommer, 1954). Since then, the development of asset pricing model has evolved modestly until the portfolio selection theory was introduced in 1950s.

2.2.1.1 Portfolio Selection Theory

A risk averse investor can optimise a portfolio by diversifying the securities selection while managing the market risk (Markowitz, 1952). This theory of portfolio selection in investment management has been one of the most important and influential economic theories. Over the years this theory evolves to commonly known as modern portfolio theory (MPT) where it is possible for an investor to build an optimal portfolio using efficient frontier that maximise the expected stock return for a given risk threshold. Markowitz suggests that analysing one specific stock is not enough in understanding the expected risk and return. Therefore, diversifying into the basket of securities, will reduce the riskiness of the portfolio.

Alternative framework was the safety first model, developed independently by Roy (1952) although, the model has many similarities to Markowitz's model. Essentially, both models are addressing the same investors' concern on the probability that their investment will not cross the unintended risk

[3] The original Bernoulli works was in Latin and later translated by Sommer (1954) in English.

level. Hence, the model represents the expected securities return as the dependent variable whereas risk as the independent variable. As a result, this has been accepted as standard by the investment professionals. Since Markowitz published the seminal paper a few months earlier than Roy, the father of portfolio theory is generally referred to Markowitz.

2.2.1.2 Mean-Variance Frontier

In helping individual investor identifies an optimal portfolio, Tobin (1958) improvises the Markowitz's model further. The improvised model assists the investors to optimise the investment portfolio between riskless asset (such as cash and government bonds) and risky asset (such as bonds and stocks). Tobin model illustrates that the non-cash assets are independent from the cash in the investment allocations. Hence, the decision for asset allocations between non-cash assets will determine the investor' risk appetite.

An intuitively appealing asset allocation model is then proposed by Tobin (1958) to support his work. Tobin model suggests the asset allocations problem in stages where the first level should aggregate within the assets and thereafter, between the asset types. Hence, the risk aversion or risk tolerance of an investor can be managed with asset mix i.e. allocation to cash or government bonds and other assets. However, an optimal investment portfolio must be independent regardless an investor risk appetite. This proposition of separation theorem provides a foundation to construct an efficient portfolio. Although the separation theorem explained the portfolio selection process, Markowitz's full covariance model is still required. This is because of the onerous in data and computational requirements of this method, especially for applications that hold individual securities.

In United Kingdom stock market and even more in the United States, there are well over 2,000 stocks listed on the exchange. Computing 2,000 stocks using the Markowitz model requires an about 2,000,000 risk and return characteristics i.e. 1,000x of each stock. Although possible with the current

computing technology, it is clearly impossible data requirement during 1950s and 1960s. However, this can be easily done during that time if the stock universe is limited to a few dozen stocks. Sharpe (1963) has addressed these challenges with his simplified model for portfolio analysis. Taking an insight from Markowitz (1959), Sharpe concurs that stocks will move in tandem with broad stock market. The model assumes that stock price returns are generated with a known mean and variance; and linearly correlated with market index with a known degree of exposure. Given only three parameters required for each stock, the risk measurement and portfolio optimisation processes have been greatly simplified. Sharpe's method is readily extended to take on broader and sophisticated factor models for asset pricing. The Markowitz's full covariance model and Sharpe's index model, along with Sharpe's introduction of the capital asset pricing model marked the beginning of modern finance.

2.2.1.3 Capital Asset Pricing Model

After the previous work of Markowitz on portfolio diversification and modern portfolio theory, the capital asset pricing model (CAPM) was introduced. Treynor (1961) (1962), Sharpe (1964), Lintner (1965a) (1965b) and Mossin (1966) had independently developed the model. The rigorous work on the asset pricing theory began in the same year the book of portfolio selection by Markowitz was published. Although Treynor's academic literature occasionally cited, Bernstein (1992) finds that the most important paper was never published and always referred as an unpublished manuscript. This important manuscript was written by Treynor (1962) in the paper titled "Toward a Theory of Market Value of Risky Assets", an unsigned rough draft which is undated. The motivation of the paper is to establish the framework for a theory of market value which incorporates risk. The paper has several objectives. First, to show that under the assumptions, optimal portfolio balancing behaviour by individual investors leads to proposition of the famous Modigliani and Miller (1958) research paper. Second, to explore the manner in which risk affects investment value. Third, to introduce the concept of insurability where insurable risks have a negligible effect on the cost of

capital. The paper shows that the risk premium for each stock is proportional to the covariance of the portfolio with the total of all the stocks in the market.

Subsequently after Treynor (1962) started his work on asset pricing, an article on relationship between securities prices and risk attributes was written by Sharpe (1964). The article issued by Sharpe mentions that the diversification strategy in the asset allocations reduce the portfolio risk. Nevertheless, each asset carries its own risk which is not being addressed by the research paper. Having said that, he constructs market equilibrium theory given the level of risk based on the asset prices. The market equilibrium theory suggests a clear relationship between the asset prices and the various risk components. The paper was published (after revision) the following year. Thereafter, Lintner (1965a) (1965b) and Mossin (1966) independently published separate papers to supplement the Sharpe (1964) paper. The CAPM remains an important reference for modelling investor's expected return until the 1980s.

Following the presentation of the Sharpe, Lintner and Mossin research papers, many authors have loosened the rigid assumptions that underline the original CAPM. One of the prominent authors is Black (1972), who suggests that the CAPM must be modified when riskless asset is not available which commonly known as the zero beta CAPM. Another significant version is by Brennan (1970), who discovers that the initial framework of CAPM is remained the same, but taxes are introduced into the equation. Mayers (1972) proves that when the investment portfolio comprises illiquid assets, the CPAM also remains the same as the initial framework. Thereafter, Solnik (1974) and Black (1974) have expanded the CAPM to cover the international investments. If the same assumptions are loosened up, the strength of the CAPM will be more robust (Williams, 1977). Finally, there are several models that extent the CAPM from the typical one period structure to a continuous time setting.

The CAPM together with the portfolio theory frameworks and the development of risk management create an important impact on the investment management industry. Treynor and Black (1973)

present a case, to link the CAPM with index model of Sharpe (1963) in portfolio construction. They mention that investors can decide to manage a completely diversified portfolio and differentiate it against the rest of the market. The approach has trigged the idea of market neutral hedge funds. The current portfolio optimisation and risk management techniques in the industry are often advancement from the concept introduced by Treynor and Black.

2.2.1.4 Arbitrage Pricing Theory and Multi Beta Pricing Model

When Roll (1977) critique rolling on the unrealistic for diversified portfolio to include all available assets, Ross (1976) has prepared the alternative model called the arbitrage pricing theory (APT) that could potentially solve the issues in CAPM while still holding the underlying idea of the latter. The main concept behind the APT is that there are some numbers of systematic effects influencing long-term average stock price returns. Nonetheless, there is an absence of definite number of systemic effects required to make the APT works.

However, the APT is essential to the introduction of multi factor model. Unlike Sharpe (1963) single factor model, there are many factors that represent the fundamental elements in the company and the economy. The multi factor models permit a stock to have more than one factors to measure returns. Each measure captures the influence of respective pervasive factor to the stock price returns. This can be similar to the multiple betas in intertemporal CAPM (ICAM) (Merton, 1973). Nevertheless, Ross (1976) mentions that the APT is much more an arbitrage relationship than an equilibrium function. For instance, if the stocks share the same specific characteristics, then the stocks will have a linear function with the same expected stock price returns. Otherwise, there will be a potential arbitrage for a long-short trading strategy to profit from risk-return disparity.

The payoff of a portfolio is when there is no specific risk for each stock. Therefore, investors could just leverage on one another as stock prices will move in tandemly. However, the payoff will become more challenging when stocks do have specific risk. In this scenario, a diversified portfolio is more

meaningful to have a variety of stocks with unique characteristic and a portfolio requires an infinite number of stocks. With a finite set of stocks, each of which has specific characteristic, the APT model restriction will only be an approximation. Since the initiation of the APT, the selection of factors, the quantity of factors and the interpretation has been intensely deliberated. In the earliest empirical research of the APT, Roll and Ross (1980) use factor analysis that permits inference of the factors from the dataset on stock price returns. Their findings show that there are optimal four microeconomic factors in the stock market. The benefit of factor analysis study is that the factors discovered from the dataset explain a large fraction of the risks in that dataset over the period under consideration. The shortcoming is that the factors discovered mostly have no economic explanation. Because of that, Roll and Ross (1980) urge that a work should be focused at discovering a more intuitive statistical explanation of the underlying factors.

Another perspective of factor analysis selection is to measure fundamental macroeconomic variables as the factors selection. Among the earliest research based on macroeconomic factors was by Chen et al. (1986). They discover that stock prices are significantly influenced by several factors. First, the changes in industrial production. Second, the yield spread between short-term and long-term government bonds. Third, the spread between low-and high-grade bonds. Fourth, the changes in expected inflation. Fifth, the changes in unexpected inflation. The yield spread between short-term and long-term government bonds is translated as an indicator for the economic cycle. Whereas, the yield spread between low-grade and high-grade bonds is considered as an indicator for overall market risk in the economy. Nevertheless, although after considering these macroeconomic factors, the broad stock market performance has no further effect on the average individual stock prices. Similarly, as many would assume, the crashes on oil prices also have no additional effect on stock prices.

Having said that, there are intense debates surrounding APT regarding the testability of the CAPM. Shanken (1982) (1985) states that for individual stocks the approximation implied by the APT is so

vague that it leads to very impossible to test whether the APT is correct or incorrect. Moreover, while the expected stock price returns for any stock or portfolio is related only approximately to its factor influences, the actual factors selection in relation to stock prices requires additional assumptions. He says that if the studies on APT hold onto its restriction, even for stocks, they are essentially testing an equilibrium form of the APT. Hence, they are again challenged with all the inherent problems that arise when testing the CAPM. Although Dybvig and Ross (1985) have countered to these arguments of the APT's restriction, the fact remains that, like the CAPM, there are major limitations to any empirical research of the APT.

2.2.1.5 Consumption Model

The research by Merton (1973) though acclaimed as a major discovery where an asset has a greater value if its marginal contribution to wealth is greater. Nevertheless, the discovery was at the same time in contrast with the basic intuition of the CAPM. Having said that, Breeden (1979) resolved Merton's ICAPM with the standard CAPM by emphasising the separation between wealth with consumption. In an intertemporal structure, Breeden presented that investors' preferences need to be expressed over consumption. Therefore, when the value of an additional investment payoff in a portfolio is higher, the consumption will be lower in that portfolio. Whereas, when the value of additional investment is low, optimal consumption is high. Nevertheless, this is not always relevant for wealth when investment opportunities are uncertain. The implication is that assets are valued by heir marginal contribution to future consumption and not wealth. Breeden's model which is known as the Consumption CAPM (CCAPM) permits assets to be priced with a single beta, β, as in the standard CAPM. In contrast to the latter, the CCAPM's beta is measured not with respect to aggregate market wealth, but with respect to an aggregate consumption flow. As mentioned by Breeden, the higher that an asset's beta with respect to consumption, the higher its equilibrium expected rate of return.

One bothering characteristic of both Merton's ICAPM and Breeden's CCAPM persisted. Although in these studies, the demand side of the capital markets was intricately developed up from the microeconomic selections of investors, the microeconomic selections of methods which decide the allocation of stocks were predominantly not considered. Therefore, Merton (1990) articulates as in the development of the early CAPM, the analysis highlights the demand side of the capital markets and thus treats as largely exogenous the dynamics of the supply curves for stocks. Consequently, the model does not specify all the structural equations of endogenous behaviour needed for a full equilibrium analysis of the method.

Cox et al. (1985a) were the early to originate an explicit rational expectations equilibrium that endogenously determines the stock prices. In fact, LeRoy (1989) and Breeden (1979) had cited the work of Cox et al. (1985a) as a working paper dated in 1977. They state that the model are not only the preferences of investors and the fundamental sources of risk, but also the underlying productive technology in the economy (Cox, et al., 1985a, p. 336). This framework for the first time in financial economics allowed an intriguing possibility to link the interest rate and the yield curve to the fundamentals of the economy. Asset pricing models such as the original CAPM, ICAPM and CCAPM had used the interest rate as known exogenously. Having said that, the previous studies of interest rate have always been on ad-hoc maturity premium. In a related study, which had originally been part of the general equilibrium study, Cox and Ross (1976) claim that while the focus of such modern and extensive analyses of the term structure for clarifying and testing the term premiums is necessary, there are two problems with this method. First, the requirement for a better knowledge of the factors of the term premiums. The earlier theories are basically only hypotheses which say little more than that forward rates should or need not equal expected spot rates. Second, all the theories are implied in ex ante terms and to be testable, the theories must be accompanied with ex post realisations. They go on to deem the challenge of defining the term structure as being a challenge in general equilibrium theory and their approach consist essentials of all the earlier

theories. Hence, the model uses fundamental factors to predict the interest rate and the structure of the entire yield curve that will affect the term structure.

From the time when some exceptions are given to assist the work in dynamic asset pricing (Constantinides & Duffiel, 1996), the focus has primarily been on smoothening the underlying assumptions of the work developed by Merton (1973); Breeden (1979); and Cox et al. (1985a) (1985b) and establishing a general framework connecting dynamic asset pricing to the earlier research of Arrow and Debreu (1954). The leading hindsight from ICAPM is that various risk factors are needed to explain the stock prices. While the multi period work was being considered, many studies were also trying to use this hindsight to obtain a single period models that could better explain the returns and risks.

2.2.1.6 Stochastic Discount Factor

About a decade ago, Cochrane (2009) has refreshed and extended the previous works of CCAPM and marginal rate of substitution. He develops a stochastic discount factor (SDF) approach to asset pricing which conceptually covers all types of instruments including stocks. The SDF suggests that the price of a stock is measured by discounting its future payoff by a qualified SDF in order for the expected present value of the payoff is equal to the current stock price. In actual setting, determining a qualified SDF is impossible and studies must depend on certain SDFs to extrapolate the price of a stock. While testing whether an asset pricing model is accurately valid is fascinating, a more worthwhile work for empirical studies is to identify how misspecification of a model is and to validate the performance relative to the alternative asset pricing models. The latter work needs an immense approach of model misspecification. Although many practical approaches can be utilised, the one developed by Hansen and Jagannathan (1997) has gotten remarkable attention in the empirical asset pricing research. Several studies have utilised their proposed approach, called the Hansen-Jagannathan distance (HJ-distance), both as a model diagnostic and as a tool for model selection. For instance, Jagannathan and Wang (1996); Jagannathan et al. (1998); Campbell and

Cochrane (2000); Lettau and Ludvigson (2001); Hodrick and Zhang (2001); Dittmar (2002); Farnsworth et al. (2002); Chen and Ludvigson (2009); Kan and Robotti (2009); Li, Xu and Zhang (2010); and Gospodinov et al. (2013) have effectively utilised it. Asset pricing models in SDF form are usually estimated and tested using generalised method of moment (GMM) techniques. Essentially, the SDF approach and the HJ-distance metric are valid regardless the asset pricing model is linear or not in a distribution of risk factors. Although, asset pricing can be validated using HJ-distance metric, this study uses the common statistical analysis such as correlation and significant tests.

As the expected stock price returns have a linear function in beta pricing model, Black et al. (1972) and Fama and MacBeth (1973) suggest the cross-section regression (CSR) analysis as the preferred approach in empirical finance since it is simple and intuitive. While there are various versions of the CSR approach, the fundamental method always contains two steps or passes. In the first pass, the betas of the test stocks are estimated using the usual ordinary least squares (OLS) time series regression of stock price returns on some common factors. Whereas, the stock price returns in second pass on the test stocks are regressed on the betas estimated from the first pass. Operating this second pass CSR on a period by period basis allows getting the time series of the intercept and the slope coefficients. The average values of the intercept and the slope coefficients are then applied to estimate the expected stock price returns for risky stocks with no systematic risk and factor risk premium. In addition, the error term is calculated from these time series as well. Since the approach is simple and intuitive, CSR methodology has always been the commonly used tool to measure model misspecification and factors relationship study (Kan, et al., 2013) (Kandel & Stambaugh, 1995). This shows the magnitude of beta for the model in the cross-section analysis in average stock price returns for a set of stock portfolios.

Following the revision of SDF and other asset pricing theories, this study has identified several areas for consideration in the conceptual framework and empirical research. Therefore, the emphasis is

given to the underlying concept in factors selection and to the need for more responsive method in estimating and analysing stock price returns.

2.2.2 Empirical Research on Asset Pricing Theories

The focus of the empirical research in asset pricing is on applications of econometric methods in finance. Discussions in this study include assessments of asset pricing models, return predictability in time series and cross-section, empirical findings of capital market deficiencies, analyses of individual and professional investor behaviour. The highlights help this study to understand the asset pricing subject better with the interplay among economic theory, econometric methods and important empirical results. Moreover, it could explore into new research areas of current studies.

2.2.2.1 Risk and Volatility

The risk is simply classified as volatility as in the eminent EMH and MPT theories. The two assume that investors are generally risk adverse. Therefore, they are prepared to consume more risk in expecting for higher returns. At the same time, investors are willing to get lower returns for a less risky investment. As Markowitz (1952) and Sharpe (1964) looked for an explanation of risk, they picked volatility to define risk. This is when the higher the volatility of the stock portfolio, represented as either in terms of standard deviation or beta, the higher is the risk. The theories have gained tractions both in academia community as well as investment professionals since they are modest and comprehensive to be studied further in the empirical works.

Nonetheless, these theories are not deemed practical by the investment professionals as it required a large amount of data. Notwithstanding its theoretical importance, detractors of the theories argue whether it is a right investment tool since their setting of the stock market does not represent the actual domain in many ways (Damghani, 2013). The risk, return and correlation methods applied by the theories are based on expected stock price values, that indicates that they are mathematical equations about future value. Instead, the expected value of stock price returns is explicit in the

MPT's equations; and are implicit in the definitions of variance and covariance. In practice, investors must replace the estimates using historical data of return and volatility in the equations. In most studies, the expected values unable to process the recent information when the historical data are generated (Low, et al., 2016).

In more vital concern, investors are trapped with estimating key values from historical stock market data as the theories wanting to model risk in terms of the likelihood of losses, nevertheless states nothing about the attributes to those losses. Moreover, the risk estimation used are probabilistic in description, not structural. Another shortcoming with the Markowitz approach is that the variance of stock portfolio is not a whole amount of the risk taken by the investor. For instance, computation of value at risk for a given stock portfolio, is impossible if the distribution is unknown and only the variance and mean are available. Therefore, the Markowitz approach does not inform an investor which portfolio investor can afford to buy if investor wants to maximise the portfolio risk. However, in the event an investor needs to operate the Markowitz approach to pick a suitable portfolio, investor could use a robust statistical technique to measure extreme the values (Fantazzinni, 2009).

2.2.2.2 Market Beta

The debate of CAPM in empirical studies suggests that most applications of the model are invalid as claimed by Fama and French (2004). This is due to the assumption that the variance of returns is a suitable estimation of risk. Hence, the returns are assumed to be normally distributed or bivariate analysis. Unlike other risk measures which is reflecting the dynamic and choices of investors' preference, it is not the case for CAPM. Therefore, as for financial investments risk is not always equate to variance but somewhat it is the probability of losing the payoff that is asymmetrical (Lee, et al., 2010). The CAPM assumes that all existing and potential investors have access to the same set of information and accept concerning the risk and expected return of all investments.

Furthermore, the model assumes that the probability functions of existing and potential investors equal to the actual distribution of stock price returns. Another set of likelihoods is that existing and potential investors' outlooks are biased, triggering stock market prices to be informationally inefficient. This likelihood is examined in the field of behavioural finance, which adopts psychological assumptions to provide alternatives to the CAPM such as the overconfidence-based asset pricing model developed by Daniel et al. (2001).

Additionally, the CAPM does not seem to sufficiently describe the variation in stock price returns. Many empirical researches show that low beta stocks may offer higher returns than the CAPM would expect. The research by Black et al. (1972) had found an evidence to support this claim. Regardless the assumption of investors is rational or irrational, it makes the EMH misleading. This finding suggests that there is an arbitrage opportunity for investors to out-perform the broad stock market.

Another drawback in the CPAM is that investors replace the market portfolio with a stock index as a proxy. The replacement lead to inaccurate inference to the validity of the CPAM since market portfolio is not totally covering whole the stock market. Hence, the CAPM might not be empirically studied (Roll, 1977). The market portfolio comprises of all opportunity set of investments in which each investment is allocated based on its size. This is purely based on investors risk profile and not referring the investors preference in terms of investment and market selections. The model also assumes that all investments are infinitely divisible as to the quantity which may be bought or sold. Hence, the CAPM should in theory comprise all types of investments that are held by the investors.

The CAPM assumes economic factors optimise over a short-term period, and in fact investors with longer-term positions would optimally choose long-term inflation linked securities instead of short-term instruments as this would be more risk-free investment to such a factor. Furthermore, the CAPM assumes on only two periods, hence there is no chance to profit and rebalance the portfolios

continuously over time. The main understandings of the CAPM are extended and generalized in the ICAPM of Merton (1973) and CCAPM of Breeden (1979).

2.2.2.3 Aggregate Consumption Models

Some empirical research of the CCAPM discovers several model application issues concerning the aggregate consumption. The issue begins with the statistical data on aggregate consumption used is not consumption directly, instead it is the costs for consumption goods and services since the goods bought are not certainly consumed straightaway (Breeden, et al., 1989). Hence, the data will be biased, although the aggregation will result the biasness to be lessen. At the same time, the aggregate consumption may indicate a leading or lagging in the economic cycle. Moreover, the dataset used are not discrete in nature, instead represent consumption for a certain time horizon for at least a month or a quarter. On the other hand, the asset prices are mostly accessible on a daily or even intraday basis. Additionally, the dataset is produced from samples and this could lead to the issue of sampling errors.

As compared to the CAPM which uses a market portfolio, the use of consumption-based data also has an advantage. As the market portfolio that is identified does not normally consist of imperative assets like properties or human capital, the consumption dataset includes a much bigger portion of the actual consumption. Other than the issue of the data on an empirical study, numerous econometric concerns like the construction of the portfolio with the highest correlation, has given the changes in aggregate consumption, which is similar to the market portfolio in the CAPM.

Breeden et al. (1989) discover that as expected the excess returns of a zero-beta portfolio are relatively small, while they are comparatively bigger in the CAPM. For the period of 1929 and 1982, they find that the market price of consumption risk is higher than the observing period using quarterly and monthly data. At the same time, the linearity of excess returns and consumption risk

is dispersed as the data quality improved during the sub-period between 1947 and 1982. This observation implies that data quality is a central factor in interpreting the findings.

Therefore, the findings indicate a weak support for the CCAPM just like the findings in the CAPM. Like other models and particularly CCAPM, it is unable to determine source of asset returns in the short-term period. However, this could also be the result of omission of consumption data for the periods less than a month. The CCAPM illustrates that with a time varying risk aversion, where the risk aversion depends on the historical asset returns, the CCAPM turn out to be much more dependable on the data.

2.2.2.4 Multi Factor Models

The utmost issue in solving the APT is to choose the risk factors where it can either be constructed by finding a portfolio of investments that has a high correlation with certain microeconomic factors or by choosing other factors like macroeconomic data. The benefit of the former method is that expected investment returns for the macroeconomic factors is that it can simply be extracted from the market and the risk can be predicted from market dataset. The selection of these factors for macroeconomic data brings a lot more challenges. As a result, many studies use statistical approaches instead to form factor portfolios and estimating the relevant variables (Campbell & Viceira, 2002). To determine the characteristics of the factor models, investor can either use theoretical frameworks or statistical approaches to identify these characteristics including risk. The commonly used statistical methods are factor analysis and principal components analysis.

There are many studies examining the explanation of investment returns using APT (Fama & French, 1996a). The factors mostly selected in these works are related to dividends or earnings, book to market value, the market capitalisation of a company and the variance of asset returns. Majority of the studies show that between three to five factors are adequate to explain the investment returns. Nevertheless, adding more factors does not improve the model performance substantially

as discovered by Fama and French (1992) (1993) (1996b). The empirical results show that the APT can explain the observed returns relatively better for long-term and medium-term periods. For investment period of less than a year, the model is not able to explain the dataset sufficiently. As compared to the present value model, the investment period can be reduced substantially from four to about one year. However, like the CAPM there are other factors that cannot be explained adequately.

Unlike the CAPM which assumes a linear relation between the assets by replacing the covariance with the assumption of a linear function to risk factors, the advantage of APT in this circumstance is that it is not required to form a market portfolio and to contain all the assets. Additionally, the APT also allows to limit the analysis to a selected group of assets given that the number of assets is adequately sizeable for the approximation to hold. The more assets integrated, the more accurate the result will be. Nonetheless, by limiting to only some limited assets the asset pricing relationship will not fail as in the CAPM, but only turn out to be less accurate and more statistical noise.

To summarise the empirical works of asset pricing, most all the results show that the asset pricing models can explain the risk and return. On the other hand, there are some concerns centred towards the theoretical frameworks, model assumptions and dataset. First, the justification or rationale for selecting the variables or factors that explain stock price returns of the models. Second, the models' responsiveness given the asset characteristics and financial market dynamics. Lastly, the existence of historical data quality for the model estimations. With those concerns in mind, this study develops a new stock scoring model that addresses as much of the issues while maintaining its robustness and intuitiveness.

2.3 Fundamental Factors Affecting Stock Price Returns

In the earlier section, the previous empirical studies within the asset pricing theories have been meticulously discussed to help guiding this study. In particular, the theories centred around multi

factor investing that is gaining traction and importance. With that, this section is narrowing the discussion into several fundamental factors that explain stock price returns as previously studied by several prominent authors. The fundamental factors in discussion are industry performance, management style, profitability and capital size. This section discusses those fundamental factors from the conventional perspectives that eventually relates to Islamic principle of *musharakah*.

The legendary Graham and Dodd (1934) said that the fundamental analysis is the method to evaluate the stock's intrinsic value based on the mixture of macroeconomic and microeconomic factors as well as stock specific characteristics. Although the fundamental analysis concentrates on the evaluation of an individual stock, majority of the institutional and sophisticated investors acknowledge that all stocks share common factors. As example, the macroeconomic factor like changes in monetary policy, such as interest rate can influence all stocks to various magnitude based on the stock specific characteristics. Rosenberg and Marathe (1976) discovered that the influence of macroeconomic factors can be explained by the microeconomic factors like industry classification, capital structure or growth orientation.

The discovery of connection between macroeconomic factors and microeconomic variables lead to a huge impact on investment management industry ever since. This study develops the fundamental factor model using the microeconomic factors that conceptually derived from the certain Islamic principle. When developing a fundamental factor model, this study selects the variables based on the principle of *musharakah* as a guiding foundation. Instead of cherry picking the variables, this study looks for variables that explain stock price returns and investment philosophy behind the model. This study also emphasises that motivation of developing the new stock scoring model is primarily as a complementary role to the existing fundamental factor model.

The primary aim of a fundamental factor model is to identify variables that are significant to predict the stock price returns. These models use microeconomic variable like industry membership, net asset value, cash flow, equity return, asset return, asset size and enterprise value. The initial step

when developing the fundamental factor model is to select the microeconomic variables. These exercise with the help of a guiding principle such as *musharakah* can assist investors in selecting the significant variables instead of random selection. The following task is to identify the best fundamental financial indicators to represent the essential elements of the principle. Finally, the fundamental factor model should quantify the selected variable in order to forecast the stock price returns at the same time explain the source of stock price returns. Those variables such as industry performance, management style, profitability and capital size have a significant anomaly impact to the stock price returns.

2.3.1 Industry Performance Factors Influence on Stock Price Returns

The performance of investment portfolio within the industry dimension will be measured by the importance of industry factor in explaining stock price returns and by the capability of predicting this factor. This study reviews the previous papers that focus on the significant of industry factor in predicting stock price returns. In principle, the country factor will be more influential as the capital markets become more integrated. Similarly, the industry effect will be more significant when the capital markets have more integrations.

The beginning of academic research on industry as a factor that explains returns started in the 1960s. As an example, King (1966) and Meyers (1973) in their research on U.S. stock price returns find industry factor contribute a significant impact. Subsequently, the important of industry factor was mentioned by Lessard (1974), who analysed the industry contribution in a global market context based on the analysis of market and sector indices. The research highlights that the country factor is more significant than the industry factor on stock price returns at the global market level. Moreover, the results by Grinold et al. (1989) consistent with Lessard (1974). Nevertheless, they are substantial differences for the country or industry in the study. Grinold, Rudd and Stefek (1989) conclude that “most countries are more important than most industries, but that the most important industries are more relevant than the least important countries”.

There are several other research papers that yield similar findings of the important of the country effect over the industry effect. These findings are shown by Drummen and Zimmermann (1992); Beckers et al. (1992); Heston and Rouwenhorst (1994); Heston and Rouwenhorst (1995); Beckers et al. (1996); Griffin and Karolyi (1998); Rouwenhorst (1999); and Kuo and Satchell (2001). The exception to this rule is a study conducted by Roll (1992) which presents results about how industry factors being the most important factor.

Although, the previous studies above collectively stand with their conclusions and arguments, at the same time there are emergence of importance of industrial factors as shown in other studies. The earlier research papers that make such a claim were Baca et al. (2000) and Cavaglia et al. (2000). Their findings show that the effect of country factor was relatively two to three times more that the industry factor but since then this ratio has been reducing significantly. They had studied 10 industries in seven largest countries for the period from 1979 to 1999 and 36 industries in 21 countries for the period from 1986 to 1999 respectively.

In addition, there is convincing indication that the industry is more important factor than the country given the development in the stock market. As an example, Galati and Tsatsaronis (2003) discovered that in 1997, 20 percent of European investment managers mentioned that attribution of portfolio returns was towards country factor. However, in 2001, these beliefs changed with more than three-quarter of the investment managers said that allocation to industry factor generated more returns as compared to country factor.

Brooks and Del Negro (2004) (2005) also have similar results but on a global scale and from different views. Brooks and Del Negro (2004) discover that the increase of industry effect is because of trajectory growth in information technology industry. When the bubble in the industry burst and the market corrected, the influence of the industry factor is less obvious. Brooks and Del Negro (2005) also highlight the constraints in methodology proposed by Heston and Rouwenhorst (1994) (1995) which is referred by majority of the research papers. The methodology classified the industry

and country by the origin of the companies where there are listed. Clearly, this strict assignment particularly for large and diversified companies operate across countries and industrial sectors. Brooks and Del Negro (2005) suggest that factor models may respond better given the less restrictive assumptions.

Isakov and Sonney (2004) discover that the importance of the industry effect has grown significantly along with its impact on stock price returns. Similar findings were discovered by Ferreira and Ferreira (2006) for period from 1975 to 2001 in the 11 European Monetary Union (EMU) countries. Equivalent conclusions and validation of the earlier findings are tabulated by Moerman (2008), which is based on data from 1995 to 2004 for EMU countries. In a detail study of 34 countries that comprise of 11 emerging markets, Phylaktis and Xia (2006) present that the relative importance of the industry effect has increased from 1992 to 2001. This is essential to attain an appropriate portfolio diversification.

2.3.2 Management Style Factors Influence on Stock Price Returns

An extensive academic empirical research papers have been published on style factors investing like value and growth styles. There are various fundamental financial indicators to measure the value or growth orientation of a stock, among them are book value and cash flow. Lower book value or cash flow indicates value orientation of a stock and vice versa. This study reviews these papers, examines the various explanations for the performance of value versus growth stocks, reviews the empirical research on the alternative explanations and provides some recent findings based on extended dataset. The subject of value and growth styles is a main example of the productive exchange of ideas between academic research and investment practice. The findings from academic findings have led to the basis of investment strategies that are extensively adopted in equity portfolios. At the same time, concerns faced by portfolio managers and investment consultants like methods for classifying value or growth styles and the construction of style specific benchmark

indexes for performance measurement, have encouraged ongoing study and expansion in the research literature.

The catalyst of academic interest in value and growth styles can be referred to Fama and French (1992) and Lakonishok et al. (1994). The Fama and French (1992) findings have challenged a long-followed capital asset pricing model which emphasize on the market beta effect. On the other hand, Lakonishok et al. (1994) discovered that the out-performance of value over growth stocks is because of investors behaviour towards expected growth rates of book value, cash flow, etc. Since then, many empirical researches have shifted their attention to the book value, cash flow, etc. as the leading explanatory factors for the cross-sectional study of mean stock price returns.

Substantial amount of academic studies on the book value effect and related anomalies have come to concur that value style investment strategies, on average, out-perform growth style investment strategies. However, there are less agreements on the underlying rationale for the out-performance of the stock price returns. Fama and French (1992) found that the higher stock price returns of value style is due to their increased risk and challenged the efficient market hypothesis. Whereas, Lakonishok et al. (1994) attributed the profits from value style investing to the underlying investor behaviour and the agency costs of institutional investment management. Moreover, Kothari et al. (1995) explained that the source of stock price returns to value style investing rested on procedural concerns of biasness in dataset selection. On the other hand, a rigorous study by Chan et al. (1995) found that no such bias can enlighten the disparity of the stock price returns value and growth styles investing.

The academic research on value style investing has had a significant influence on institutional investment management. Value and growth styles are now broadly being used to determine the investment strategy adopted by the portfolio managers. Furthermore, the works have been influential in the construction of style specific indexes that were used in performance measurement and attribution analysis. Many such indexes are based on a factor that has been extensively used in

academic works such as book value and this has become an important indicator of a portfolio's orientation toward either growth or value style.

This study revisits the empirical academic studies on value and growth styles investing from different perspective, unlike others. For example, Campbell (2000) and Fama (1998) have shown extensive studies of the theoretical issues involved in the deliberation over value and growth styles investing. Moreover, many studies in behavioural finance have covered the styles investing to explain stock price returns or examine the alternative explanations for the anomalies of value style (Barberis & Thaler, 2003) (Hirshleifer, 2001) (Shleifer, 2000) (Scott, et al., 1999). In avoiding any redundancy of these works, this study emphasis on the empirical sides of the discussion. This study begins by examining the results on the performance of portfolio returns based on the style factors.

2.3.3 Profitability Factors Influence on Stock Price Returns

Financial statement analysis like profitability, has traditionally been part of the fundamental analysis used for pricing the stocks. The analysis of profitability has typically focused on equity return and asset return. Taking from the current studies on accounting-based valuation, this study outlines a profitability analysis for evaluating stock price returns. Standard profitability analysis is adopted and elaborated that is accompanied with a predictive analysis. Moreover, an analysis of operating activities is separated from the analysis of financing activities. This study focuses on assisting investors to predict momentum of stock price returns in which will determine the trading signals. Therefore, profitability analysis is presented as a matter of direction of the profitability ratios in the following period, with predicted ratios deemed as fundamental financial indicators for stock prices.

The traditional way of fundamental analysis was very much centred in the periodic financial statements. For example, Graham et al. (1962) were not analysing the stock prices, beta estimation and asset allocation. Nevertheless, they analyse fundamentals using the financial statements that were linked to stock value in an ad hoc manner. Therefore, there was limited understanding on the

impacts of the financial ratios such as profit margin or inventory turnover in determining the stock values. Additionally, there was no comprehensive analysis to summarise the financial statement information in relation to the stock values.

Since then, many academic studies have been joining to discover on how financial statements can influence the stock prices. The extensive studies of time series of earnings by Brown (1993) focuses on forecasting earnings with valuation in mind. Studies such as Fairfield et al. (1996), Lev and Thiagarajan (1993), Ou (1990), Ou and Penman (1989) and Lipe (1986) have studied the role of particular financial statement information and ratios in forecasting. Nevertheless, these studies have been conducted without much structure and no practical approach. Having said that, the robust empirical correlations have been acknowledged, but the studies have not generated a convincing financial statement analysis for stock valuation.

Taking on recent research on accounting-based valuation, this study ventures to produce a principle approach to financial statement analysis for stock valuation. The principle approach does not only identify the relevant ratios, but also provide a foundation to the analysis based on a certain principle. Hence, the fundamental analysis is very much grounded in the financial statements and is provided with more intuitiveness. The principle approach differs from the merely empirical approach as in Ou and Penman (1989) where they identified financial ratios that predicted earnings movements in the dataset. Nevertheless, there was no rationale to selection of the identified ration. The principle approach is also differing to that as in Lev and Thiagarajan (1993) who leave it to investment professionals to classify ratios that they use in practice.

Stock pricing involves in forecasting returns. Forecasting is led by a stock pricing model that specifies what is to be forecasted. For example, the dividend discount model directs the investment analyst to forecast dividends. Since it emphasises on accrual accounting financial statements, the residual income valuation model had recently revived through the work of Ohlson (1995) and Feltham and Ohlson (1995). The model operates as an analytical device to arrange view about

forecasting and analysing financial statements for determining stock pricing. Additionally, the model is a testimony of how profitability ratios have assisted in measuring the stock price returns. The profitability ratio analysis in this study follows the standard identification of financial statements on how information in the financial statements are related to equity return and asset return.

2.3.4 Capital Size Factors Influence on Stock Price Returns

Since the last 30 years, studies have identified several related regularities in stock prices that have been regarded as anomalies. It has been found that the capital or size of the firm, as measured by the asset size and market value of a company, are all correlated in the cross-sectional analysis against the future stock price returns. Furthermore, these factors have been identified to explain the cross-sectional variation in stock returns better than the CAPM or any other factor models. Schwert (1983) argues that, rather than being examples of asset pricing anomalies, these regularities are all consistent with many other findings in which all asset returns have satisfied each of the well-known asset pricing model. The size factor related to empirical regularities is widely regarded as anomalous because most researchers believe that it cannot be explained within the current asset pricing paradigm. The size factor anomaly is generally recognized as the most prominent contradiction of the paradigm that reflects on the investors' understanding of the size factor anomaly.

The economic explanation of asset size and market value factors is that they separately quantify the company size and returns. Banz (1981) and the following studies on the size factor anomaly have resulted on two important empirical findings. First, the studies showed that the logarithm of market value is an inverse predictor of stock price returns. Second, when a risk is controlled for by using an asset pricing model like the CAPM, the studies showed that the enterprise value has explanatory power over the part of stock price returns which are not explained by the CAPM. Subsequently, market value and stock price returns will be inversely correlated in the cross-sectional analysis. Moreover, if either the asset pricing model is unspecified, or the empirical specification is incorrect,

this study demonstrates that, as long as this misspecification does not imply a positive relation between size factors and the stock price returns predicted by the model, the logarithm of market value will be inversely correlated with the residual stock price returns. Hence, the findings offer a theoretical explanation of the size effect within the existing asset pricing model.

On the other hand, Lo and MacKinlay (1990) and Black (1992) have rejected the empirical studies that implicitly use a size factor as a proxy for stock price returns and risk. They highlight that is no satisfactory theoretical explanation has been acknowledged that predicts such relationship. However, this study provides a theoretical explanation of why size factor of a stock measures returns. The difference between the theoretical explanation in this study and all previous research is that the explanation does not rely on a presumed relation between a particular characteristic of the stock and its returns. Instead this study claims that, regardless the methods to determine stock price returns, the empirically validated relation between these factors and stock price returns should always be monitored.

Although Berk (1995) argued that there is no justification to regard the size factors as an asset pricing anomaly, it does provide a reasonable theoretical justification for using market value factor to escalate the explanatory power of an empirical research. For example, the stocks used in asset pricing studies can be certain to demonstrate significant cross-sectional difference in the stock returns if market value is used to construct stock portfolios. While earlier empirical research was used market value in this approach, Lo and MacKinlay (1990) have highlighted that these studies provide no theoretical basis for their methodology. Additionally, Lo and MacKinlay (1990) have quizzed the conclusions of these empirical findings. However, this study argues that regardless the method used, the findings in these empirical findings are indeed still binding.

The theoretical discussions in this study suggests factors such as market value and asset size have a significant role in the empirical studies. While the econometric research remains, introducing

underlying principle for factors selection is the upmost important as it provides justifications and makes the model more intuitive.

2.4 Market Timing in Stock Scoring Model: Exploring Momentum Investing

The academic interest in momentum investing has gained traction since 1990s with the like Jegadeesh and Titman (1993) and Asness (1994). A study by Asness et al. (2015) suggests that momentum investing generates better return anomalies as compared to the other investment styles like size or value styles. Moreover, the momentum's effect appears in nearly all company sizes, industrial sectors, other asset classes and global markets. Having said that, the performance of momentum investing depends on the investment time horizon. For instance, many research papers of momentum investing omit the most recent month as there is existence of a reversal or contrarian effect in stock price returns. This can be due to the liquidity or microstructure problems. In general, trading based on a single stock momentum seems to be a less effective strategy over a short historical time horizon, particularly those with less than one month. In contrast, the momentum investing is extremely profitable at intermediate time horizons of up to 24 months. The stock returns performance is more pronounced for the period range of 6 to 12 months range. Nevertheless, the strategy will reverse at longer time horizons such as over 24 months (Asness, et al., 2015). Furthermore, Jegadeesh and Titman (1993) research largely get the credit for finding the momentum effect in academia studies. Their research indicated that simple relative strength index (RSI) methods that rank stocks based on their historical 3 to 12 months' stock price returns will be able to predict relative performance over the next 3 to 12 months.

Study has revealed that momentum investing is exceptionally useful when comingled with a value style since both are negatively correlated. Grinblatt and Moskowitz (2004) discover that a value and momentum mixture alleviates the extreme negative stock price returns experienced by the value investors. For example, during the tech bubble of the late 1990s and early 2000 or subprime crisis in 2008 many investors experienced deteriorating performance. Study also suggests that momentum

investing can be a contributing element to value style. Asness (1997) discovers that although value stocks have been losing over longer-term period, they will out-perform by a wider margin over 6 to 12 months.

On the other hand, the potential explanation to these phenomena are the investors behaviour and the trending effect. Trailing the seminal research of Kahneman and Tversky (1979), there are two potential behavioural explanations. First, investors slow to respond to new information. They state that different investors receive news from different sources and react to news over different time horizons and in different ways, creating an anchoring and adjustment effect whereby in which individuals update their views only partially when faced with new information, slowly accepting its full significance. Second, asymmetric reactions to profitable and non-profitable investments. They explain that investors tend to sell winning investments prematurely to lock in gains and hold on to losing investments too long in the hope of breaking even. The disposition effect creates an artificial headwind such that when good news is announced, the price of an asset does not immediately rise to its true value because of premature selling or lack of buying.

Another interesting finding by Scowcroft and Sefton (2005) is that, for the big capitalisation stocks, the stock price momentum is predominantly influenced by the momentum of a stock's wider industry sector classification and not by the momentum of the individual stock itself. As any other investment strategy, momentum investing does not deliver investment gains continuously. In the case of Hancock (2010), he discovered that the momentum investing deteriorated during periods of excessive stock market volatility and that the momentum investing had lower relative performance in the first six months after the stock market corrections during bullish and bearish stock market. He had made a point that a stock price volatility is not in favour for momentum investing, mainly because stock price volatility is related to inverse for average stock returns and not following the trend pattern. Referring to the Asness et al. (2015) and Jegadeesh and Titman (1993), profitability of the strategy is relative to the short time investment horizon. Hence, the transaction expenses of

momentum investing are greater than those of value and growth styles investing. However, the costs are not extremely high to make momentum investing unattractive to the investors (Israel & Moskowitz, 2010).

There are several ways for momentum investing to work. Many leading indicators like momentum investing derived from the momentum oscillators. It indicates signal or trend relationship between dataset. For instance, momentum investing measures the rate of change of stock's prices or earnings or any other fundamental data. As these components change, the directions of stock prices will also change in tandemly. The bigger the rate of change in stock prices, the higher the quantum of momentum over the periods. As stock prices increase swiftly between periods, the greater the increase in the stock prices momentum. When the stock prices begin to reduce gradually, the momentum of stock price returns will also be slowing down. If the stock prices start to trade sideways, the momentum of stock process begins to decay from previous high levels. However, falling momentum because of flat trading is not necessarily means bearish signal. Instead, the stock prices signalling that momentum is heading to a closer median level. Momentum indicators use many formulae to compute the price or fundamental data changes. Commonly used oscillator like RSI, measures the differences of the average price or fundamental data change of the recent periods with the average change of the previous periods (Wilder, 1978). There are noticeably many advantages of using momentum indicators. Early signals for trade entry and exit are the primary advantages (Swinkels, 2004). Momentum indicators produce more signals and therefore, permit more opportunities to trade. Furthermore, the early signals can also indicate the level of strength or weakness for the price momentum.

The empirical results on the momentum investing are compelling. For instance, Geczy and Samonov (2016) have observed dataset of stocks for 212 years and concluded that momentum investing has a significant and robust historical performance record. With that research, it has independently qualified many of the empirical findings related to a momentum investing. As momentum investing

is very well studied previously, Geczy and Samonov (2016) consider that the momentum anomaly might be an effective investment strategy since the stock price returns related with momentum investing could be driven by natural investors behavioural bias.

Asness et al. (2015) said that the concept of momentum investing is compelling not just because investors are hungry for a diversification and new strategies but also for its durability in the real world. Relatively, few other strategies have survived the transition from research paper to real world portfolio management, the way momentum investing does. In the textbooks, minting profits looks easy because the standard asset pricing theory suffers from so called return anomalies where sources of excess returns above and beyond what is implied by the academic investment models. But exploiting these anomalies in actual portfolios is hard. Trading costs, taxes and other frictions take a toll. And many profitable return patterns that look solid in the financial laboratory have an annoying habit of disappearing when the crowd comes rushing in.

2.5 Investment Strategies for Construction of Stock Portfolio

There is a long list of portfolio strategies where an investor can pick and choose. However, only several categories are commonly followed and implemented to achieve optimal portfolio returns. They can be either market, weighting, style or principle-based portfolio strategies. Selecting a portfolio strategy typically depends on investment philosophy advocated by an investor. The investment philosophy sets a guiding principle for an investor in investment decision making process. With that, this section will deliberate the four categories of portfolio strategy that is commonly being practised by the investment community.

2.5.1 Market based Strategy

Only three possible stock positions investor can have in at any point of time. Investor can make a new purchase of a stock; sell and buy-back later; or holding it since purchase the stock. These permutations lead to the three essential portfolios namely buy-and-hold strategy, long-only strategy

and long-short strategy. Another possible portfolio strategy is short-only strategy. Nevertheless, sell-short will not be discussed since it is not commonly being practised as a standalone portfolio strategy. More so, short selling is highly debatable within the Islamic finance fraternity for its permissibility.

In buy-and-hold strategy, an investor purchases the stocks and keeps them for a long time and will only sell it when cash is needed. This investment strategy illustrates that investors view that in the long run stock markets deliver an attractive rate of return even while considering a degree of volatility. The obvious advantage is that this investment strategy could be easily implemented where investors just need to buy the stocks and hold if possible. This is as passive as any passive investment strategy can get. Another advantage of this investment strategy is that investors can avoid trading anxiety resulted from the short-term stock prices volatility. Moreover, investors can have a peace of mind because of temporary shock in stock prices movement by using this buy and hold investment strategy if it happens. On the other hand, Shiryaez et al. (2008) said that investors can enter the stock market on the lows and sell on the highs does not always work because such market timing gives negative results, at least for retail or unsophisticated investors, so it is better for them to simply buy and hold the stocks. Next, the assumption of the efficient market hypothesis for this investment strategy in which every stock is always fully valued will make the stocks trading irrelevant. Some investors take the buy-and-hold investment strategy to the highest level where one should never sell a stock unless you need the money. Having said that, a slightly different between buy-and-hold strategy and long-only strategy for this study is that the former will hold the stock since the beginning of study until the end of study period.

Long-only investment strategy is an investment strategy adopted by many sophisticated investors nowadays. A long stocks position indicates a purchasing transaction, whereas a short position denotes an investor is set to liquidate the stocks. With that, the long-only investment strategy means investors are only buying stocks and will not enter short selling positions although the stocks are

expected to decline in prices. The assumption of long-only investment strategy like any other investment strategies is that the riskier the stock, the higher the return is expected from that stock. Hence, if investors are to hold a long position for all risky stocks, they are expected to generate higher return for the portfolio. However, the timing of when this return is generated is pretty much depending on the performance of the stock market. According to Lo and Patel (2008), executing a long-only investment strategy has more flexibility and possibility for alterations in its portfolio construction. While selling short can barely turn to profit over the long run bullish market, for long-only investment strategy chances are better for it to make higher profits. In addition, the long-only investment strategy can be simply indexed which makes the attribution analysis of these portfolios ingenuous and straightforward. Another major advantage of long-only investment strategy is their high liquidity. Long-only investment strategy hold high liquidity stocks with an opportunity to sell anytime. In addition, this investment strategy offers a clearer transparency relative to other type of investment strategies available to the investors. Challenges related to the long-only investment strategy is that they are normally have high volatility particularly during stock market crisis or downfall. In this study, the investment strategy demonstrates to buy a stock when there is a signal notified and to dispose the stock in the following period.

Long-short investment strategy is normally associated to the hedge fund managers where the investment strategy comprises buying stocks that are anticipated to rise in price and shorting stocks that are anticipated to fall in price (Jacobs, et al., 1999). This long-short investment strategy provides an opportunity to the investors to generate profits regardless the market conditions that is bullish (up) markets or bearish (down) markets unlike other investment strategies that have limitation to act during bearish markets. Having said that, the long-short investment strategy comes with its own difficulties. These include the challenges in estimating the overall portfolio risks it exposed to and the constraint to manage unsuccessful short positions actively. The loss of unsuccessful short positions can increasingly be a main part of the stock portfolio and the loss can rise without limit that will jeopardise the whole portfolio. However, the strategy will make profits when the investors

successfully predict the direction or momentum of the stocks in the portfolio. The investors need to optimise the use of the readily available dataset and the investors also needs to make better use of the available dataset than the other enormous numbers of qualified investors. This investment strategy has been primarily implemented by the hedge fund managers and the sophisticated institutions. Therefore, this study is using the investment strategy to observe the robustness of the M_Score model as compared to the investment strategies that investors normally used in managing their respective portfolios.

2.5.2 Weighting based Strategy

It is necessary for investors to distinguish between equal weighted, price weighted and value weighted as well as fundamental weighted portfolio since these weighting schemes have an important role in asset pricing. In this subsection, the key attributes of these weighting schemes are discussed in great details.

Many empirical studies have shown that equal-weighted portfolio has out-performed the other strategies based on the optimisation as in Jacobs et al. (2014); DeMiguel et al. (2009); and Duchin and Levy (2009). On the other hand, Kritzman et al. (2010) discover that equally diversified portfolio is still inferior to optimized portfolios as the preceding findings have issues in data limitation. These studies attribute the out-performance of equal-weighted portfolios to the variance in the expected risk of the optimized portfolios. Nevertheless, the studies do not analyse the source of excess returns in the equal-weighted portfolios. Therefore, it is one of the focus in this study.

Unlike the studies by Granger et al. (2014) which focus on balancing between asset classes, Willenbrock (2011); Mulvey and Kim (2009); and Booth and Fama (1992) examine arbitrary equal-weight portfolios to a buy-and-hold strategy. They discover that the former has out-performed better than the latter because of diversification benefits. Nevertheless, Willenbrock (2011) comments that the source of the incremental return is not diversification but rebalancing, which is driven by the

volatility of asset returns. However, the study does not differentiate the excess returns and return components of equal-weighted and value-weighted portfolios.

In the recent study by Dichtl et al. (2014), they discover that the weighting-based portfolios have out-performed buy-and-hold strategies in terms of risk-return trade-off. Additionally, Bolognesi, Torluccio and Zuccheri (2013) argue that the total return disparities of equal-weighted and value-weighted portfolios is because of exposure to systematic risk factors although they cannot explain the reason of the disparities in excess returns. Moreover, Chow et al. (2011) show that many passive investing strategies such as an equal-weighted indexing have out-performed their value-weighted equivalents capitalisation factor.

In the recent trend of indexing, fundamental based weighting is better strategy as compared to value style and capitalization style (Arnott, et al., 2005). Under certain conditions, these fundamental weights may deliver a better performance than value weights (Kaplan, 2008), which is argued to be partially because of implicit value investing, similar to the equal-weighted portfolios. In the work of Perold (2007) and Perold and Sharpe (1988), the capitalization weighting is associated to a momentum strategy while many other index construction methods, including equal weighting, are based on a contrarian strategy. With that, in this study, regardless the weighting schemes, the new stock scoring model work on any strategy but albeit different degree of out-performance.

2.5.3 Style based Strategy

Besides organising a portfolio based on transaction or weighting based schemes, an investor can consider style-based strategy. In this subsection, the debates in style investing are primarily between investment style based on valuation, market capitalisation, sector and geographical selection in constructing a stock portfolio.

Fama and French (1992) and Lakonishok et al. (1994) have started the academic interest in value and growth style investing strategies. Since then, their models have become an intimidation to the

CAPM which lead to the fatality of market beta models. Consequence to their studies, researchers have paid additional attention to the like book-to- market value and company size as the leading explanatory factors of average stocks returns in the cross-sectional analysis. These studies had developed upon previous studies of stock market anomalies. For instance, Basu (1977) discovered that stocks with low price-earnings ratio tend to have higher average returns as compared to the stocks with high price-earnings ratio. In addition, as for the Japanese stock market, Chan et al. (1991) discovered value style investing strategy resulted a superior performance

There has been a consensus among the academic community that value investment styles on average out-perform growth investment styles based on the substantial empirical results from the studies on the book-to-market effect and related anomalies. Nevertheless, there has been no uniform agreement on the underlying reasons for such out-performance. Among others, Fama and French (1992) said that the inefficient market and higher risk consumption attributed to the higher returns of value investment styles. Moreover, Lakonishok et al. (1994) pointed to the cognitive biasness in investors behaviour as well as the costs of hiring institutional portfolio manager led to the profit in value investment styles. Yet another explanation for the returns to value investing style is due to the data selection biasness on the methodology of the studies (Kothari, et al., 1995). Having said that, Chan et al. (1995) discovered that no such bias can describe the disparity between value and growth investment styles' performance.

One of the early return anomaly discoveries in style investing is the small capitalisation or small company effect. The main finding of this return anomaly is that over long-term investment horizons, small capitalisation stocks out-perform large capitalisation stocks (Banz, 1981) (Reinganum, 1981). Subsequently, Dimson and Marsh (1999) mention that the ultimate return anomaly of small company effects is that inconsistency with market efficiency hypothesis. On the other hand, Schwert (2003); Horowitz et al. (2000); and Bhardwaj and Brooks (1993) dispute the small capitalisation stocks anomaly. They found that the small capitalisation stocks anomaly has extinct since the initial

publication of the studies that exposed the small company effect. However, the concern of small capitalisation stocks out-performance remains a topic of discussion across continents. More recently, a study shows that the high returns to small capitalisation stocks may be country dependent and demonstrate the benefits for international investors in enhancing their risk-return performance.

Finding the return anomaly is a key to enhance the portfolio returns. Another investment style that investors considered is the adoption of more passive sector allocation strategies. In begins with holding the stocks in portfolio based on their market capitalisation. The debate here relies on the modest assumption that market is efficient (Doeswijk & Vliet, 2011). They in the opinion that stock markets do not price sectors efficiently during the short-term periods. Thus, in any economic cycles some sectors are over-priced and some are under-priced. This is similar to the over-weighting or under-weighting an individual stock. Therefore, investing in all sectors at existing market weights would thus mean over-weighting the overvalued sectors and under-weighting the undervalued industries (Dou, et al., 2014), which is contrary to the sector strategist has in mind. Alternatively, investors can have sectors rotational strategy by following various macroeconomic variables such as interest rate, foreign exchange rate and oil prices to predict sector returns. These variables have direct influence and more sensitive to some sectors (Tan, et al., 2016) (Narayan, et al., 2014).

2.5.4 Principle based Strategy

An investor needs a guidance or principle in making a long-term investment decision first before starting to think on the selection of stocks to purchase. A principle-based investing is the foundation of sensible investing. They make investors more focus on portfolio construction in generating optimal returns while sidestepping the emotional element that can jeopardize the rational thinking and sound investment of decision making. In this subsection, three prominent principle-based investments are explored and deliberated.

Motivated by the values crisis during the recent financial events, financial system is now hammered with ethical, governance, social and environmental issues of the modern world. Paranque (2017) and Lagoarde-Segot (2015) highlighted the issues where economic relations can be considered as the adjustment of variables for maximizing shareholders value. In self-regulated markets, the framework of sustainable and responsible finance is also applicable. Studies were initially attracted to understand the pivotal relationship between corporate social performance (CSP) and corporate financial performance (CFP) of companies (Margolis, et al., 2007) (Orlitzky, et al., 2003). After institutionalizing corporate social responsibility and sustainable development in portfolio strategies (Revelli, 2016), the discussion on the CSP and CFP relationship are then rationally changed to the discussion on financial performance of socially responsible investments (SRI). However, based on the various empirical results, studies have found that there is no common understanding to conclude SRI has either a positive or a negative result on the financial performance, or even no impact at all. Additionally, a recent meta-analysis of 85 analyses and 190 empirical tests by Revelli and Viviani (2015) finds that, there is no distinction between the SRI financial performance and the broad stock market.

Over the last ten years, the SRIs have registered a remarkable development. According to the U.S. Forum for Sustainable and Responsible Investments, SRIs account for more than one-fifth of the global capital market as at the end of 2016 with a size of about USD9.0 trillion. These statistics suggest the outstanding significance for both investors and researchers. Other than the CFP, private and institutional investors are progressively concerned in the CSP of a company. For instance, the companies being more encouraged to develop a non-monetary objective in their strategic planning. Nonetheless, most investors consider social concerns just as a side condition while a maximization of the investment return remains as the main goal. In this case, the debate of whether there is a relationship between the financial and social performance of a firm surfaces. Even investors without non-monetary interests could benefit from the prospective relationship to enjoy the excess returns. A meta-analysis by Orlitzky et al. (2003) discovers that the CFP is positively correlated with the

CSP while the dependence is bidirectional and simultaneous. In another study, Wallis and Klein (2015) highlight that there is a certain level of indication for an out-performance of socially responsible over broad stock market.

Given the scenario shown above, environmental, social and governance (ESG) ratings provide for a more suitable method, as they deliver a direct assessment of the CSP at company level. Dedicated rating agencies describe a certain set of parameters encompassing a range of sustainability matters. Every company in the rating universe is assigned with a certain rating score. As compared to SRI funds and indices, ESG ratings produce a significantly more accurate understanding of how sustainability features have an impact of company's return in a large panel dataset. Hence, investors can gain abnormal returns by buying stocks with high ESG scores and shorting low ESG scores. Having said that, many empirical works focusing on a single ESG rating database. Therefore, there is a possibility that the abnormal returns are directly depending on the underlying rating method. Dorfleitner et al. (2015) uncover significant differences in returns distribution, level and risk of various ESG rating approaches. Furthermore, many researches on ESG is based on very short time-series analysis since the establishment of the rating agencies are only exist in last ten years.

Although there is empirical validation that the financial performance of a company is attributed by its ESG score, this claim must be critically reviewed since many researches is using a single ESG dataset. Dorfleitner et al. (2015) finds that the ESG ratings of MSCI, Bloomberg and KLD are significantly different in terms of both returns distribution and risk. Hence, these findings may also affect a possible correlation with financial performance. For this reason, it is crucial to consider every ESG rating providers in the studies. Consequently, their study uses multiple ESG rating concepts. They consider both the overall ESG level and the pillars in terms of the environmental, social and governance performance. Moreover, since their database carries on until 2012, they have included recent developments in their analysis.

Another approach to the principle-based investing is the faith-based. A leading example of faith-based investing is Islamic finance, which began as a relatively modest endeavour in some Arab countries since the late 1970s. Islamic investing distinguishes itself from conventional investing in its apparent compliance with the principles of Islamic law or *Shariah* (El-Gamal, 2006). Additionally, faith-based investing advises screening before investing in businesses considered (Hasanuzzaman, 1997). The growth of principle-based investing, such as Islamic investing, has been accelerating in terms of the number of countries in which it operates, monetary value, and product offerings. The surge in Islamic investing has been possible due to major breakthroughs in religious rulings related to equity investments (Hussein, 2004) (Hakim & Rashidian, 2004).

The body of knowledge related to the financial performance of faith-based investing has been increasing, although scholarly studies are still scant. BinMahfouz and Ahmed (2014) evaluates the Islamic investing as compared to the sustainable and socially responsible investing. Whereas, Hassan and Girard (2011) examined the market efficiency and time-varying risk of faith-based index funds. Additionally, Hakim and Rashidian (2004) used the CAPM to observe faith-based compliant index in correlation with the Dow Jones World Index and Dow Jones Sustainability World Index. At the same time, Hussien (2004) also studied the performance of faith-based investing. Their consensus is that *Shariah* investing as a portfolio strategy can relatively generate abnormal returns on its own and additional returns could be earned by leveraging on the existing investment styles and techniques.

Faith-based Islamic investments are created via adherence to *Shariah* principles. This exclusionary process is referred to as qualitative screening. Islamic principles preclude investments in industries such as alcohol, pornography, gambling, and firms that engage in activities that involve interest-bearing debt obligations. The exclusion of interest-bearing issues creates complexity with respect to portfolio construction, as most firms either have cash reserves that are invested, in which case they earn interest, or use leverage, in which case they pay interest. Laldin (2008) states that

anchoring *Shariah* principles is the philosophy that money should be used to measure the value of assets and has no intrinsic value of its own. Financial transactions need to be linked to an activity or an underlying physical asset and frequent trading of stocks is forbidden because it is viewed as a form of gambling. Nonetheless, many scholars agree that public listed companies adhere to the principle of *musharakah* which is discussed in the following chapter.

2.6 Conclusion

The asset pricing subject has been progressing since the eighteenth century. However, since 1960s, the development of asset pricing model was centred towards extension of the single index model and empirical investigation of the modified models. Thereafter, many studies have been focusing on the multi index model or multi factor model since it is more intuitive. Additionally, the seminal works on the asset pricing have been on arbitrage assumptions, risk-return analysis and portfolio optimisation. As a branch of asset pricing, fundamental analysis lays the common fundamental financial indicators that link companies together. These common indicators can influence the stock prices such as industry performance, management style, profitability and capital size of which the core subjects in this study that relates to *musharakah* parameters.

On the hand, to understand the market timing impact that common indicators have on stock prices is to consider the momentum investing strategy. The mantra of momentum investing is that historical data will influence the future stock prices to a certain level. Additionally, momentum investing applies to various stock portfolio strategies that suit investors investment philosophy. Enhancing stock returns with momentum of financial indicators in any stock portfolio strategies are an ideal investment approach over any investment horizon period. However, selection of the financial indicators in momentum investing will be more profound with a strong conceptual framework like principle of *musharakah* in developing robust and intuitive stock scoring model.

Chapter Three

Conceptual Framework of Stock Scoring Model in accordance with the Shariah Principle of *Musharakah*

3.1 Introduction

Islamic finance is limited to financial transactions involving an entrepreneurial investment, subject to the legal prohibitions. The permissibility of risky capital investment without explicit interest earning has spawned several finance techniques under the Islamic law. However, this study specifically focuses on profit-sharing contracts or *musharakah*. In contrast to debt-based contracts, the *musharakah* initiates the permanent transfer of existing real assets from one investor to another investor in passing through the transactions. Moreover, the profit-sharing contracts between investors are the agreement to share any gains of profitable projects based on the quantum of funding or ownership of the asset by each investor. The equity participation and loss sharing in a *musharakah* contract is similar to a joint venture, where investors are jointly contributing the funds to an existing or future project, either in a form of capital or in kind, and ownership is shared according to each party's financial contribution. Although profit sharing is similar to a *mudharabah* (trustee type) contract, losses are generally borne according to the equity participation. Therefore, investors need to observe the essential elements of *musharakah*, refers as *musharakah* parameters. Hence, the objective of this chapter is to establish a conceptual framework for stock scoring model in accordance with *Shariah* principle of *musharakah*.

While the *musharakah* parameters are tabulated, the influence of *musharakah* parameters on stock prices and portfolio returns was not discussed rigorously in the past studies. Hence, Section 3.2

starts with discussion on the modern era of Islamic finance and thereafter, in Section 3.3, reviewing the origin and essential elements of *musharakah*. Whereas, Section 3.4 discusses the application of *musharakah* for stocks. Before that, it observes the permissibility to invest in the context of listed stocks. Thereafter, the differences among stocks screening methodologies are also being discussed. In addition, this section evaluated the performance attributions of *Shariah*-compliant stocks. On the other hand, Section 3.5 is deliberating the influence of *musharakah* parameters on the stock prices and the portfolio returns pragmatically. Hence, the alchemy among fundamental analysis, *musharakah* parameters and momentum investing are being explored in deriving the momentum of stock price returns. Finally, Section 3.6 concludes this chapter.

3.2 *Shariah* Principles in Modern Islamic Finance

In Malaysia, the modern era of Islamic finance began its journey since 1963. It started with the establishment of pilgrimage fund board (Tabung Haji, TH) and then followed by the formation of the first Islamic bank backed with the specific regulatory framework. The development of Islamic finance industry led to the creation of National *Shariah* Boards for central bank and securities commission. Since then, the National *Shariah* Boards have spurred the trajectory growth of the Islamic finance industry with common standards and practices for primary principles in Islamic finance (Ariff, 2017).

Islamic finance is described as financial transactions that observed the main tenets of Islamic law (or *Shariah*). Essentially, the primary references of *Shariah* are the holy *Quran* and *Hadith* where, *Sunnah*, *Ijma*, *Qiyas* and *Ijtihad* are the secondary references. Bakar et al. (2008) elaborated that the holy *Quran* is the book of revelation given to the Prophet Muhammad; *Hadith* is the narrative relating the deeds and utterances of the Prophet Muhammad; *Sunnah* refers to the habitual practice and behaviour of the Prophet Muhammad during his lifetime; *Ijma* is the consensus among religion scholars about specific issues not envisaged in either the holy *Quran* or the *Sunnah*; *Qiyas* is the use of deduction by analogy to provide an opinion on a case not referred to in the holy *Quran* or the

Sunnah in comparison with another case referred to in the holy *Quran* and the *Sunnah*; and *Ijtihad* represents a jurists' independent reasoning relating to the applicability of certain *Shariah* rules on cases not mentioned in either the holy *Quran* or the *Sunnah*.

Relying on those primary and secondary references, the Islamic economists like Abdullah and Chee (2010) have listed the five main pillars of Islamic finance. First, believe in divine guidance. A person needs to follow the commands of Allah s.w.t. which includes in conducting financial transactions. Second, prohibition of *riba*. A payment of interest on a loan is not permitted and forbidden such as paying interest on a borrowed money from a conventional bank. Third, avoidance of non-permissible business activities and commodities. Like socially responsible investment, business in obscene entertainment and commodities such as alcohol and pork are not allowed to be watched and consumed respectively. Fourth, risk sharing is encouraged. It is a concept of equitable distribution of risk, profit and loss in promoting for transparency, mutual trust and fairness as well as avoidance of ambiguity among the parties involved. Fifth, real economic activities. All the underlying transactions are required to be based on the real assets (tangibles or intangibles) to avoid any speculation and unjustifiable asset inflation.

Guided by these key pillars, Islamic financial products are structured as an alternative to conventional financial products. Predominantly, the Islamic financial instruments can be categorised in the following principles like sale-based principle, lease-based principle, and profit-sharing based principle (Hassan & Mahlknecht, 2011). Besides that, there are principles namely fee based principle, benevolent loan principle, third party guaranteed principle and many other supporting principles used in the current modern Islamic finance practice. In the case of *Shariah*-compliant equity products, all of them are developed based on a profit-sharing principle. So far, to the knowledge of this study, no other *Shariah* principle has been used to develop the *Shariah*-compliant stock related instruments other than *musharakah*.

3.2.1 Sale Related Principle

The fundamental concern in Islamic finance is the contemporary deliberations on prohibition of *riba* or interest. In modern Islamic text, the two terms are treated seamlessly. Thus, the *riba* or interest are used interchangeably. Although the interest is prohibited, Islam permits the *bai'* or sale. The seminal opinions of Islamic scholars and Islamic economists lead to a contemporary thinking in this subject of the distinction between sale-based and interest-based transactions.

Maududi (1961) considered the main distinctions between sale and interest are the equitable distribution of capital and the efficient management of risk. In interest based financial instrument, the borrower takes all the risk so that the lender consumes risk free underlying asset. Therefore, the transaction is perceived as socially inequitable and economically inefficient. On the other hand, sale or trade that exposes to market or business risk is deemed equitable and efficient. These distinctive differences between the two are then signified as criteria to separate the interest-based transactions with the sale or trade.

A commonly used of sale-based contract in financial transaction is *murabahah*. The transaction involves selling an asset (or commodity) at a cost price plus a certain profit margin agreed upon, where the mark-up can be a percentage of cost price or absolute amount. Having said that, hoarding an asset with intention to sell it at a higher price in a later date is not allowed in *murabahah* unless the delay is because of the distance to transport the asset (Al-Zarqani, 1936) (Al-Qarafi, 1994). In addition, a profit margin without a reasonable specification in *murabahah* is not allowed (Al-Qurtubu, 2000). On the other hand, Abidin (2012) mentioned that hoarding of an asset with motivation to sell it without notifying the buyer but payment at original cost is preferable. Moreover, the permissibility of *murabahah* on condition of full disclosure. However, if there is ambiguity on the asset condition, the buyer has the option to accept or decline the purchase (Al-Qurtubi, 2003).

In modern practice, the buyer (borrower) has a total disclosure of the profit margin, that is, the cost price, transportation cost, mark-up price, and the like. Moreover, the borrower is deemed to be the ultimate buyer, not the financial institution although it responsible for sourcing and negotiating with the original seller (Masood, 2010). However, it is also an acceptable approach where the financial institution appoints the borrower as the agent to negotiate and purchase from the supplier (Hegazy, 2007). Since it is the borrower who decides on the supplier and chooses the goods, the financial institution can mitigate the risks to the borrower.

In addition to the cost-plus *murabahah*, there are several other permutations of *Shariah* principles that are commonly used in the sale transactions like *bithaman ajil* (deferred payment sale), *salam* (advance payment sale), *istisna* (commissioned or pre-ordered production), *inah* (sale on credit), *tawaruq* (converting an asset into money) and *dayn* (sale of debt). Nonetheless, all these principles are applied in debt financing and there is no literature referred to the used of sale-based principle in equity related instruments.

3.2.2 Leasing Related Principle

Another category of Islamic financial instruments is the lease-based principle. The principle of *ijarah* is similar to a conventional leasing but it is not exactly the same. This is where the financial institutions act as the lessor by purchasing the asset and thereafter, leasing it to the lessee. The lease payment is determined at the beginning of the contract and paid over the term of temporary use of the existing asset. The object of an *ijarah* lease contract is a desirable, known, permissible and accessible usufruct. Therefore, *ijarah* can be seen as the sale of usufruct (El-Gamal, 2006). According to Ebrahim and Tan (2001), *ijarah* has both characteristic of debt and equity. The former is behaving similar to an asset backed securities whereas the latter will have a residual market value which can be surplus or deficit.

The financial lease in is referred as *ijarah wal iqtina* in which the lessee can choose to buy the asset at the end of the tenancy term. The lessor is then structuring the rental payments that includes the pre-determined resale price in the form of a call option premium. Hence, the tenant (or borrower) can gradually obtain a legal asset ownership for an agreed sales price. However, the financier (or lender) has the right to sell or dispose the asset in the event where the option is not exercised at maturity of the lease transaction (Shariff & Rahman, 2004).

Another type of leasing is the sale and lease back arrangement. Ayub (2009) mentioned that the sale and lease back arrangement is also permissible in principle of *ijarah* where the lessee make an outright sale of the asset to the lessor and thereafter, leases it back. In this arrangement, the *ijarah* contract is only valid once the financier has acquired the underlying asset. Although it is an outright sale, this arrangement allows the initial owner to acquire back with the consent of the lessor. This arrangement is commonly structured by the Islamic bond (*sukuk*) instrument, that is used as an underlying transaction.

Vogel and Hayes (1998) and Warde (2000) found that there are three main distinctions between conventional leasing and *ijarah* in relation to concern of *riba* (interest) and *gharar* (ambiguity). First, the lessor in *ijarah* must be the ultimate owner of the underlying asset. Islamic scholars set stern conditions on this to make sure that the lessor who collects the rental gets the material ownership of the asset. Hence, the Islamic scholars insist that all the expenses related to maintenance and insurance are assigned to the lessor as the owner of the asset. In contrast, the leasing agreement may include maintenance and insurance costs in the conventional leasing. Second, since the asset usufruct is intangible, the economical and operational benefits are potentially risky and unstable. Therefore, the lessee is allowed to terminate the arrangement given the usufruct shows less valuable than expected. Third, in conventional leasing, there are several types of future sale and option used to measure remaining value of the asset at the end of lease agreement. Under the principle of *ijarah*, this arrangement must be carving-out from the lease agreement.

Ijarah structures are mainly used for hire purchase of motor vehicle. Other than that, *ijarah* is mainly applied to structure a *sukuk*. Thus, it is not common to see its usage in the equity structure since there is no usufruct for ordinary shares (Ghuddah, 1998).

3.2.3 Equity Related Principle

Equity related instruments are commonly structured based on a profit-sharing principle. In the current market practice, equity products use *mudharabah* and *musharakah* as the underlying *Shariah* principle (Al-Suwailem, 1998). Even though these two principles are perceived as equity structure, they are also widely use in debt financing structure such as *sukuk* (Saad & Mohamad, 2012).

Typically, principle of *mudharabah* is used in structuring bank deposits (Zainal, et al., 2009) and debt financing although it has low participation by the Islamic banks (Che Arshad & Ismail, 2011). *Mudharabah* is a profit-sharing structure where an investor(s) provides the capital and the other party provides the manpower or expertise. The investor is known as *rabb al-mal* while the other party who provides *khibra* (expertise) is known as *al-mudharib*. While investor(s) and expertise provider share the profits, if any, only investor(s) will assume the losses. Hence, this has led to controversial issue since the mudharabah deposit does not share same risk as conventional deposit (Mirza & Baydoun, 2000). On the other hand, Bacha (1997) proposed a more practical way for the Islamic banks to offer *mudharabah* financing with a reasonable risk management.

The other equity related principle is *musharakah*. Usmani (1999) defined it as an agreement or partnership between investors on both capital and profit. It is also known as profit sharing and loss bearing contracts. In contrast to principle of *mudharabah*, only one party bears the losses. Nevertheless, this kind of arrangement does not appeal to the Islamic banks since they cannot consume such a high risk (Meera, et al., 2005). Having said that, there has been great innovation with the introduction of *musharakah mutanaqisah* where borrower progressively own the property

(Meera & Abdulrazzaq, 2009). This is similar to conventional home equity financing. As for the profit-sharing ratio, it is generally determine based on their capital contribution. Hence, distribution of income will be proportionated to their capital.

Prominent scholars like Al-Zuhaily (2003) and Usmani (1999) specifically mention that the current company structure generally complies with the principle of *musharakah*. Hence, by observing the essential elements or parameters in the principle of *musharakah*, Islamic funds can invest in the company (private or listed). There are three main characteristics in the company structure that make it compliant with the principle of *musharakah*. First, all investors or shareholders have the same rights to the distribution of income (e.g. dividends) proportionate to their capital contribution. The same applies if the company incurs losses in which investors must bear. Second, the investors must contribute to the capital of the company in order to entitle for distribution of income. While the capital contributions will determine the entitlement to the percentage of income, it also determines the voting rights of the investors in the company. Third, with the voting rights, investors have a say on how the management of the company should be run. They may be elected to the management team or simply appointing external party to manage the company for remunerations. Although the external party does not bear the losses in this arrangement, it will not trigger similarity with principle of *mudharabah* since the external party is not contributing to the capital and they are paid with reasonable remunerations. The notable distinction concerning *musharakah* and *mudharabah* is that in the former, losses are shared whilst in the latter, losses are borne solely by the investors.

3.2.4 The Purity of *Musharakah* for Stocks Investment

Musharakah is claimed by many Islamic scholars and Islamic economist to be the purest form of Islamic finance where equity-based provides the foundation of the prosperous economic model (Iqbal and Mirakhor, 2011; Ayub, 2009; El-Gamal, 2006; Usmani, 2004; and Warde, 2000). Discussions on Islamic economics or Islamic finance in *fiqh muamalah* always begins with the concept of profit sharing or partnership that is referred as *shirkah*. The concept covers elements of

risk management and equitable distribution of resources that are pillars to framework of Islamic finance. Nonetheless, the word *musharakah* is not discovered in the classical literature of *fiqh muamalah*. However, the word *musharakah* has been introduced recently by the Islamic scholars and Islamic economists in referring to a specific type of *shirkah*, that is, the *shirkat ul amwal*. This is where two or more investors invest some of their capital in a joint commercial venture or business services by forming a company and share the risk. Therefore, the *musharakah* has a distinctive feature to differentiate between the two financial systems as well as its application to the concept of investing.

Mirakhor and Zaidi (2007) mentioned that the main difference between an Islamic or interest-free banking system and the conventional interest-based banking system is that, under the latter, the interest rate is either fixed in advance or as a simple linear function of some other benchmark rate, whereas, in the former, the profits and losses on a physical investment are shared between the creditor and the borrower according to a formula that reflects their respective levels of participation. Therefore, interest-bearing instruments are replaced by a return-bearing instruments in Islamic finance in which are structured in a partnership form. The profit and loss sharing concept implies a direct concern regarding the profitability of the investment on the part of the Islamic financial institutions which requires active participation.

As a business commercial, the commitment to the creditor and the profitability of the business venture are equally important. This is where the concept of profit-sharing acts as the balancing point. Hence, the profit-sharing contract offers superior properties for risk management since the commitment to the creditor is reduced in unfavourable business cycle as every party is accountable during the downside. Unlike the conventional system, the financiers may ask capital repatriations simply because of their credit channels might dry up because of financiers overreacting to the bad news although the business of the borrowers remain profitable. This is because the financier's own profitability is not directly affected by the volatility of the borrowers' business but rather to the

interest changes. In other words, interest payments are due irrespective of profitability of the borrowers' business. On the other hand, in the Islamic finance, these temporary shocks would generate a different response because the financier regularly receive the information on the ups and downs of the borrowers' business in computing their share of the profits. This arrangement offers a great advantage of information flow since the commitment from the borrower to the financier is on a continuous basis and not in some discrete periods.

For this and other reasons, Islamic scholars and Islamic economists have stressed that profit and loss sharing concepts promote greater stability in financial markets. With that, the Islamic financial instrument encourages financiers to emphasise on the long run in their relationships with their partners (or 'borrowers'). However, this emphasis on long term relationships in profit and loss sharing contracts means that there might be higher costs in some areas, particularly regarding the need for monitoring performance of the business venture (Iqbal & Mirakhor, 2011).

3.3 Essential Parameters of *Musharakah*

Although the principles of *Shariah* require financial institution to offer instruments based on an interest free, this does not suggest that such instruments are charitable affairs (Usmani, 2004). In the case of *musharakah* structure, investors are expected to share in the profits earned or losses from its investment where Zaher and Kabir-Hassan (2001) argued that *musharakah* has a robust risk management framework as well as inclusive arrangement between parties.

Musharakah has similar structure with the investment partnership concept in which the partners or investors are sharing the profit and loss derived from business venture. Many classical texts in Islamic finance validate the similarity of principle of *musharakah* to *shirkah* or stock company or limited partnership. Interestingly, the conduct of *musharakah* has long being practised way before the Prophet Muhammad's initial disclosure. Since then, the practice of *musharakah* in business and commercial activities has been classified as part of *Shariah* by righteousness of *Sunnah* of the

Prophet Muhammad. In this context, the definition of *shirkah* is primarily referred to a business partnership and joint partnership in commercial activities regardless the profit or sociopreneurship (business activities where the revenue is then channel for social cause). Hence, the business partnership is generally forming for business venture purposes, whereas, the joint partnership forms for a specific investment scheme (International Islamic University Malaysia, 2005). For that, there are four essential elements or parameters in *musharakah* that need to be observed such as industry selection, management agreement, profitability position and capital structure.

The principle of *musharakah* derives its legitimacy from the four main sources such as the holy *Quran*, the righteousness *Sunnah* of the Prophet Muhammad as well as the consensus between of eminent *Shariah* scholars (Bank Negara Malaysia, 2013).

Primary source is the holy Quran as the main reference. In the holy *Quran*, the following *ayah* (verses) are validating the legitimacy of *musharakah* for the practice in commercial business transactions and other Islamic finance transactions predominantly in equity-related instruments. First, one of the verses reads as: "…but if more than two, they share in a third..." (Al-Nisa':12). Though the verse cited is primarily concentrating on the inheritance allocations, many *Shariah* scholars look at it in a bigger perspective. They deduce the meaning of the sharing as permissibility to establish partnership (Rosly, 2010). Second, in the following verse referred by *Shariah* scholar: "Verily many are the partners (in business) who wrong each other except those who believe and work deeds of righteousness and how few of them…" (Al-Sad:24). This verse further confirming the legitimacy of the partnership concept.

The other primary source is the righteousness *Sunnah* of the Prophet Muhammad. The are several narrations that are commonly used to validate the practice of principle of *musharakah* of which is applied in the *fiqh muamalah* or Islamic finance transactions. First, the narration of Abu Hurayrah: "Abu Hurayrah said that: The Prophet, said: Allah says: I am the third [partner] of the two partners as long as they do not betray each other. When one of them betrays the other, I depart from them."

(Sunan Abu Daud[4]). Second, the narration of Abu Al-Minhal: "Abu Al-Minhal narrated that Zayd ibn Arqam and Al-Barra' ibn 'Azib were partners, and they bought silver in cash and credit. Their practices were brought to the Prophet, and the Prophet pronounced that what was bought on cash then they could benefit from it and what was bought on credit then they should reject it." (Musnad Ahmad[5]). Those narrations signify that the Prophet Muhammad approved the partnership formed between the companions. However, he disapproved their conduct of business transactions of purchasing silver (*ribawi* item[6]) on credit term.

Whereas, the secondary sources which is the *Ijma* or consensus of the *Shariah* scholars substantiate the legitimacy of principle of *musharakah*. For instance, Imam Ibn Al-Munzir states in his book *Al-Ijma*': "And they (Muslim jurists) agree on the validity of partnership where each of the two partners contributes a capital in dinar or dirham, and co-mingles the two capitals to form a single property which is indistinguishable, and they would sell and buy what they see as (beneficial) for the business, and the surplus will be distributed between them whilst the deficit will be borne together by them, and when they really carry out [as prescribed], the partnership is valid." Therefore, the modern practice of partnership in form of modern stock company and other legal format like limited liability partnership, mutual company and fund are accepted by many *Shariah* scholars.

Given the legitimacy of the principle of *musharakah* for financial products and particularly, for application in stock instruments, there are consensus among scholars in determining the essential elements of principle of *musharakah*. The core four *musharakah* parameters are business parameter; management parameter; profit and loss sharing parameter; and capital contributions parameter.

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[4] One of the six major *hadith* collected by Abu Daud.
[5] The *hadith* collected by *Sunni* scholar Ahmad ibn Hanbal or also referred as Hanbali.
[6] A substance or commodity whose exchange within each category must be in equal measure or weight.

3.3.1 Business Parameter of *Musharakah*

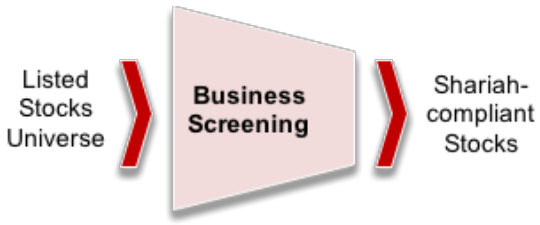
As discussed in the section earlier, there are four essential elements or parameters for principle of *musharakah* and one of them is business parameter. Importantly, all *Shariah* principles of Islamic finance require an observation on this parameter. There are several business activities not permitted by *Shariah* such as taking part in interest-based transactions, dealing with gaming activities; consumptions and productions alcohol and pork; and dealing with illicit entrainment like pornography (Usmani, 2004 and Al-Zuhayli, 2003). However, having strict observations on those requirements seem ambitious particularly in multi races and religious countries. Hence, Islamic scholars through their *Ijtihad* and reasoning in the *Shariah* advisory council of the regulators establish certain threshold for company that has mix of business activities (Securities Commision, 2007).

There is a standardisation of the prohibition of certain business activities for the listed companies by the *Shariah* advisory boards globally as illustrated in Figure 3-1. For instance, all scholars agree that the conventional financial services institutions like banks and insurances; gaming companies like casino operators; and alcohol related industries are prohibited. Some scholars are considered as highly leverage companies should be deemed as non *Shariah*-compliant since it perceives to trading debt instead of a company. However, there is different opinion in determining the permissibility to invest in defence related industries (Mahfouz & Ahmed, 2014). Again, there are different sets of benchmarks used to determine *Shariah*-compliant status for the company with a mixed of businesses. In some jurisdictions like Malaysia and Indonesia, the financial regulators use their *Shariah* department or division stipulate the criteria of permissibility business for *Shariah*-compliant stocks. Interestingly, regulators in the Middle East allow the financial institutions or the market players to determine the criteria of permissible business.

Since the *Shariah*-compliant stocks exclude certain industry, the ideal way to eliminate those stocks within the non-permissible industries is by observing their assigned industrial classification. Each

stock will be assigned with their respective sector, industry group, industry and sub-industry. There are two prominent standards normally used by the institutional investors, the industrial classification benchmark (ICB®) and the Global Industry Classification Standard (GICS®). However, the former is widely used by the institutional investors globally (Boni & Womack, 2006). In maintaining the standard, the GICS® regularly engages the stakeholders like investment managers and analysts as well as the company itself for input and feedbacks to increase accuracy. Thus, this study will exclude the industries that are not permitted by *Shariah* by observing their industrial classification up to sub-industry level.

Figure 3-1: Business Screening of *Shariah*-compliant Company



Source: Usmani (2004) and Al-Zuhayli (2003)

3.3.2 Management Parameter of *Musharakah*

There are two approaches for the management of *musharakah* venture as described by Al-Zuhayli (2003). One, managing the *musharakah* venture by every capital contributor or investment partner or investor. This approach suits the practice in private or unlisted company. Two, managing the *musharakah* venture by a certain investment partners or; partner or by the external appointments selectively. The latter is commonly being practised in the public listed company as shown in Figure 3-2. Nonetheless, in *musharakah* context, there is no literature specifically discussing about the management level or category in the company's governance structure i.e. management

representation in board of directors or in senior executives[7]. The availability of many permutations of leadership roles in a company will lead to various management styles. Therefore, measuring the management style is the way to distinguish between the out-performing and the under-performing managers over a long-term period.

Figure 3-2: Management Selections of *Shariah*-compliant Company

Source: Al-Zuhayli (2003)

In the case of the appointed manager(s) whom is also the investor, the pre-agreed remunerations are permitted given the skills, experiences and knowledge offered. In addition, the appointed manager(s) is entitled to the profit distributions that proportionate to their holdings. Alternatively, investors in the *musharakah* venture may decide to appoint the external party to manage the venture based on the appropriate principle like *wakalah* (agency), *ujrah* (fee) or *mudharabah* (entrepreneur partnership). Any waiver of the right to vote, if any, must be stipulated up front in the shareholders agreement. Failing which, may be deemed as an oppression to the investors. Therefore, the appointed managers act as the responsible party will be accountable for any losses resulted by his or her negligence or misconduct or contravene of management agreement, if any.

[7] Chief Executive Officer, Chief Financial Officer, Chief Operating Officer, etc.

The essential element of management as based on the principle of *musharakah,* has put a close attention to the appointment of the managers or executives that have their own management style. Therefore, it is necessary to evaluate the management style since it will determine the company's specific characteristics as in Barberis and Thaler (2003), Hirshleifer (2001), Shleifer (2000), and Scott et al. (1999). Nonetheless, many executives notice that the visibility of business expansion arise when they keep the distance from the company's daily operations. In other word, micromanaging the company as one of the management styles. Therefore, developing an appropriate performance evaluation method for the company is important in assessing the business performance. The evaluation method can provide an in-depth analysis on the current performance of the company. This will provide an indication of the overall performance of the executive management. Moreover, the evaluation method will project the probable long-term performance of the company.

With that, this study analyses the management style in terms of its value or growth orientation in the company. Hence, the management style is one of the fundamental financial indicators that needs to be used in this study for the new stock scoring model. Moreover, the management style indicator can further distinguish between the out-performing and under-performing managers over a period of time. Typically, in the market practice, the value or growth orientation is observed by the percentile of price-to-book value or price-to-cash flow as compared to their peers. The higher percentile of the ratios will normally indicate that the stock is a growth oriented. Otherwise, the company is considered as a value stock. Growth and value are two fundamental approaches, or styles, in stock investing[8]. Growth manager focuses on the strong earnings growth of the company while value manager focuses on the company's sustainability to distribute dividends and at the same

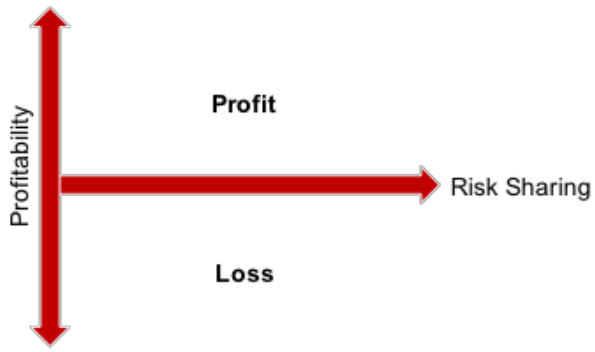
[8] Similar approach may be applied to stock unit trust funds.

time to remain competitive. Since the two styles complement each other, they can help to add diversity to the stock portfolio when they are used together.

3.3.3 Profit and Loss Sharing Parameter of *Musharakah*

In *musharakah* venture, the profits are calculated as a total revenue after considering all the related costs and expenses incurred while managing the venture (Arshad & Ismail, 2010). Thereafter, the company is allowed to distribute all the profits derived from the venture if they decided to distribute. However, profits distribution from the capital is not permitted since it is not an earning derives from the venture. Having said that, in assessing a potential company to invest, evaluating the persistency of the company in delivering a sustainable growth is crucial. The common practice by investment analysts are to observe the profitability growth of a company over a long-term period normally over a five-year horizon. Figure 3-3 illustrates the two-dimensional diagram of profit and loss sharing concept in *musharakah*.

Figure 3-3: Profit and Loss Sharing of *Shariah*-compliant Company



Source: Maheran (2010) and Arshad and Ismail (2010)

The profit and loss sharing can be in custom as a fixed percentage proportionate to the capital contributions. Hence, investors are entitled to the profits and bear the losses, if any, proportionately. In the case of profits distribution, it should only gain from the actual business profits or realised profits like assets sale (Maheran, 2010). With that, as one of the *musharakah* parameters, profitability growth considers a return on equity as the leading indicator.

Optimal assets utilisation can best describe the ability of a company to make use their available resources efficiently. Such measurement can be part of the company performance assessment, where, investors favour the company with a stable and rising returns from the assets' utilisation. (Rosly & Zaini, 2008). For the assets utilisation rate, an investor can measure the profitability growth by considering the return on assets and return on capital employed for appraising the company performance. Nevertheless, the latter ratio, has its limitation where adjustment is required for the cash holding in order to get a better understanding of the ratio. Since most of the *Shariah* stock screening methodology exclude company with high cash holdings, considering return on capital employed to represent profitability growth will be redundant.

The other possible measurement for profitability growth is the profit margin of a company. This is measured by the ratio of earnings before income tax and depreciation charges to sales. Thus, other than measuring the asset return or capital return based performance, assessing the profit margin can be a potential good profitability growth indicator as articulated by Al-Suhaibani and Naifar (2014). Nevertheless, the profit margin varies among the industries. With that, it is not appropriate to generalise every industry that has similar profit margin.

In a contrary result, the company may incur losses from the venture as a result of natural business risk. Similar to the distribution of profits, the losses have to be aggregated evenly amongst the investors proportionate to the capital investments (Lewis & Mohamad, 2014). No special treatment for any investor is permissible as the wisdom behind the principle of *musharakah* is mutual risk sharing. This concept is well blended with the modern form of company formation including the public listed companies.

With that, a favourable managed company is the one that is persistently delivering a sustainable and keep uprising the profitability growth over a long-term horizon in which is normally measured over a five-year period. The indicators of equity return and asset return like return on equity and return on assets are the most applicable indicators for profitability growth. Therefore, this study examines

the fundamental financial indicators that best explained as the profitability growth parameter, to be the key parameter used in the research methods. Additionally, these profitability indicators are commonly used by the investment community in valuing the stocks. Subsequently, the stock valuation will provide a relative value as compared to their respective peers or to the overall market.

3.3.4 Capital Contributions Parameter of *Musharakah*

Yousfi (2013) mentioned that the main requirements of a rightful *musharakah* capital is the willingness and voluntary to participate in the venture. Hence, the capital can be invested by the investors within the *musharakah* venture in the form of a tangible and intangible assets as illustrated in Figure 3-4. The tangible asset is defined as a hard cash valued at a face value or real estate of other physical assets. Whereas, the intangible asset is defined as other assets like intellectual property and goodwill. Therefore, the capital growth is the pertinent indicator in determining the expansion of the company size and business valuation. With that, as one of the fundamental financial indicators, this study analyses the capital growth represented by the asset size and enterprise value.

Figure 3-4: Capital Contributions of *Shariah*-compliant Company

Source: Al-Suwailem (1998), Yousfi (2013) and Rahman (2014)

Subsequently, Yousfi (2013) further clarified that the assets in foreign currency denomination shall be valued at a pre-determined exchange rate on the onset. As for the tangible assets other than non-monetary assets, they are valued by using an external party valuation that are accepted by all

investors. The external party can be the government agencies, specialists or valuers, or as agreed upon by all investors prior to the business venture. Consistent with the requirement as stipulated by the *Sunnah*, *musharakah* capital must not comprise of loan financing, debts or any other form of credit facilities. These include all kinds of account receivables and expenses payable from other investors or other persons since they are deemed as debt obligations. In addition to the debt obligations, any non-cash asset contribution with an elemental debt obligation as part of the capital can be considered in computing the *musharakah* capital. However, the asset with debt element that is more than 50 percent of the asset value is not allowed. Having said that, the asset that carries the debt using the Islamic financing mode such as *sukuk* is permissible.

Additionally, the money market instruments like fixed deposits and short-term placement with the Islamic financial institutions are permissible as part of the contributions in a *musharakah* capital structure. The total capital contributed from each investor needs to be determined up front. Every investor needs to have an agreement on the method of capital payment whether in lump sum or on a staggered basis over a period of time. Any additional capital contributions can also be included upon the agreement among all investors. In this case, there will be some changes in holding stakes by each investor where non-contributing investors will see reductions in their shareholdings. The investors however have a right to terminate or modify the *musharakah* contract based on the new capital contributions. Failing to commit the capital as stipulated and agreed by the investors, it will be treated as a breach of contract.

Furthermore, the monetary and non-monetary assets of the *musharakah* capital investment can be commingled in a single account. This is to convince the investors on the rights of the company that will always be ranked as *pari passu*. Post capital contribution, the investors will undertake the rights, commitments and debts of the *musharakah* venture as agreed in the shareholders agreement. Having said that, the capital contributed by the investors will not be guaranteed as argued by Al-Suwailem (1998). In the case where one of the investors is acting as the agent for the other investors, any

partnership misconduct or negligence will be the sole responsible of the agent investor. The agent is the have to compensate the losses of business venture to the other investors should the agent caused the losses of the investment. The investment losses are referred as an impairment. Therefore, after the business venture is terminated, the agent is responsible to pay all the losses to the other investors proportionate to the capital contributions by the respective investors.

Rahman (2014) describes that the transfer or assignment of *musharakah* capital to the existing investors or other party is permissible. However, their existing terms and conditions of the *musharakah* agreement is remained unless agreed by all investors. Moreover, the *agreement* can include a provision that allows an investor to tender redemption of its shareholding of the *musharakah* venture to the existing investors subject to the accepted terms and conditions. In addition, a new investor can participate in the *musharakah* venture in the period of existing venture subject to the agreement. Therefore, for this study, the asset size and enterprise value can represent the capital structure of *musharakah* parameter.

3.4 Concept and Application of Shariah Principle of *Musharakah* on Stocks

Permissibility to invest in *Shariah*-compliant stocks is based on the observation of *musharakah* parameters. Thus, the current practice of the company structure formation is typically compatible to the *musharakah* parameters. Having said that, a stock company needs to observe all the *musharakah* parameters (Accounting and Auditing Organization for Islamic Financial Institutions, 2010) to achieve the *Shariah*-compliant status. Hence, Islamic funds and other investors can have the permissibility to invest in stock companies including the public listed stocks.

Although there are various stock screening methodologies being referred by the investors, the concept and the observation of *musharakah* parameters remained the same. Perhaps, the only difference is the tolerance level when it comes to companies with mixed business activities. Having said that, *Shariah* promotes scholars' own judgement or *ijtihad* based on local circumstances. This

study further extents the discussion in reviewing the permissibility to invest in listed stocks. Thereafter, studying the stock screening methodology and subsequently, understand the performance attribution of the *Shariah*-compliant stocks are crucial.

3.4.1 Permissibility of Investing in *Shariah-compliant* Stocks

The market conduct of Islamic finance particularly in the Southeast Asia and Middle East is so much driven by the regulators. As for the stocks or equity related instruments, the regulators have issued specific guidelines for the Islamic securities. In the case of Malaysia and Indonesia, the SACSC issued the resolutions of the Securities Commission *Shariah* Advisory Council (Securities Commision, 2007) and National *Shariah* Board of Indonesian Council of *Ulama* issued guidelines on application of *Shariah* in the mechanism of equity securities trading market in a regular stock exchange (National Shariah Board of Indonesian Council of Ulama, 2011) respectively. Both governing bodies have set an eligibility based on set of criteria which work out to be similar for criteria of business activity and financial threshold.

Whereas, in the Middle East, Central Bank of Bahrain (2012) and Capital Market Authority of Saudi Arabia (2006) issued the *Shariah*-compliant collective investment undertakings. Although there was no direct ruling on dealing with *Shariah*-compliant stocks, it has been governed under a fund or the investment regulations. Basically, each financial institution will have its own basis but the essential element of *Shariah* permissibility remains the same.

On the other hand, the international bodies like Accounting and Auditing Organization for Islamic Financial Institutions (2010) published *Shariah* standards for Islamic financial institutions has clearly stated that listed companies are a modern version of *shirkah* or *musharakah* which is currently known. The other influential body, Islamic Financial Services Board (2009) published the guiding principles on governance for Islamic collective investment schemes which is similar to the one issued by the Central Bank of Bahrain.

Although there are some differences in mechanisms to determine the *Shariah*-compliant status, the form of the *Shariah* is always observed by the Islamic scholars globally (Hesse, et al., 2008). Fair to say that, the opinions and *ijtihad* of those Islamic scholars are based on the circumstances of the local contexts. These may include the law of the land, business customary, demographic and tax rules. Nonetheless, it is important to appreciate the groundwork of *Shariah*-compliant stocks in Malaysia as per the following excerpt by the Securities Commission (2016, p. 15).

> "The Islamic Instrument Study Group and SACSC carried out their study from various angles, including considering the views from within and outside the country before publishing the initial list of Shariah-compliant securities. However, the criteria used as a basis to review the securities are constantly updated based on the research and case studies of all the listed securities on Bursa Malaysia Securities. This is to ensure that Shariah-compliant securities go through the appropriate review process, in line with the requirements for the development and progress of the Islamic capital market in this country."

Although there are various rationales for the permission to invest in the *Shariah*-compliant stocks, there are consensus of the underlying *Shariah* principle applied i.e. *musharakah*. Perhaps, the differences are merely on the quantum and variables of the *musharakah* parameters.

3.4.2 Stock Screening Methodology

There are various rulebooks in guiding the investors being issued or published by the regulators, international standard setting bodies and index providers (Derigs & Marzban, 2008). Although there are differences in the technicality of the rulebooks, all of them agree that criteria for permissible and non-permissible stocks for primary business activity must be considered in screening the stocks. The requirements for financial ratios like capital gearing or leverage using *riba* based instruments are taken into consideration. Any tainted income must be cleansed from its capital gains and

dividend payable, if any, with an agreed formula. *Shariah* views deception or *gharar* needs to be considered during the stock screening in which suggests a transparency in dealings with the *Shariah*-compliant stocks (Wilson, 1997). There are several stock screening methodologies that are widely being observed by the investors namely SACSC and other index providers like S&P Dow Jones®, FTSE®, MSCI® and Russell®.

3.4.2.1 The Origins of Stock Screening

The notion of stocks screening before investing is referring to the *Shariah* principle where Muslims should not involve in any activities that is against the Islamic teachings (Laldin, 2008). Having said that, *Shariah* acknowledges that shareholdings in a listed stock is considered a proportionate ownership of the stock company's business and assets. However, Muslim investors are therefore not allowed to invest in the stocks that involved in non-permissible business activities and owned prohibited assets. Since the legacy of conventional banking that relying on interest-based system, many listed companies end up with dealings with prohibited banking facilities that is based on interest, although it is not part of their major business activities (Ho, et al., 2012).

Since the listed stocks play a major role in the economy development, Islamic scholars have issued stocks screening guidelines that comprise of permissible business activities and certain financial screening methods (Securities Commision, 2007).

Prior to 1983, Malaysian investors had a few leads to invest in *Shariah*-compliant stocks as there were stocks that were obviously non-permissible. Securities Commission (2007) had listed a non-permissible stocks that are based on their business activities such as: (a) Financial services based on interest; (b) Gambling and gaming; (c) Manufacture or sale of non-*halal* products or related products; (d) Conventional insurance; (e) Entertainment activities that are non-permissible according to *Shariah*; (f) Manufacture or sale of tobacco based products or related products; (g) Stockbroking or share trading in *Shariah* non-compliant securities; and (h) Other activities deemed

non-permissible according to *Shariah*. Having said that, there was limited guidelines in determining the stocks *Shariah*-compliant status although the principal business activities seemed to be permissible. At the same time, there was also a possibility that these stocks might involve in a numerous of non-permissible secondary business activities.

With that background, the earlier attempt to provide a list of *Shariah*-compliant stocks was initiated by the first regulated Islamic bank in Malaysia, Bank Islam Malaysia Berhad, in 1983 (Besar, et al., 2009). It was then followed by the introduction of the world's first *Shariah* equity index in 1996 by RHB Securities Berhad, a prominent investment bank at that time (Adil, et al., 2013). At the same time, SACSC constructed the very own *Shariah*-compliant stocks screening methodology in 1995 (Hussin, et al., 2012). However, the first list of *Shariah*-compliant securities was issued only two years after. Since then, the list was widely followed by the investors and fund managers and more so, it became the sole standard for *Shariah* investing in Malaysia.

3.4.2.2 Methods in *Shariah* Screening

Other than SACSC, there are other *Shariah* boards that apply a different stocks screening methodology respectively. Hence, the determination of *Shariah*-compliant status of a stock may differ among the methods applied. Although the methods among them have a slight distinction, the underlying *Shariah* principle for it is still observed (Khatkhatay & Nisar, 2007) and in line with the principle of *musharakah*. Besides the regulators, there are index providers whom came out with their own version of stocks screening methodology like Standards & Poor's®, Dow Jones® and FTSE®. Moreover, their coverage comprises of stocks listed on exchanges all around the world. However, SACSC holds its exclusivity on screening the stocks which are listed on the Bursa Malaysia Securities. On the other hand, the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) does not stipulate any screening methodology. However, AAOIFI has stated in the Standard Number 21: Financial Papers (Shares and Bonds); that a company's cash

and debt should not be more than 30 percent of the assets. This method is then followed by the Standard & Poor's®, Dow Jones® and FTSE®.

The primary screening process in the SACSC's methodology is the removal of companies that are involved in a non-permissible business activity. Thereafter, the benchmark tests are applied for companies with a mixed business which is based primarily on items in the financial statements. The basis of using financial statements is to have an overview of the company's business activities for the whole year period (Securities Commission, 2014).

As highlighted by the Securities Commission, the 5 percent benchmark – used to assess the level of mixed contributions from activities that are clearly prohibited such as *riba* (interest-based companies like conventional banks), gambling, liquor, and pork. The 10 percent benchmark – used to assess the level of mixed contributions from activities that involve the element of *umum balwa*[9], which is a prohibited element that affect most people and difficult to avoid. An example of such contribution is the interest income from fixed deposits in conventional banks. This benchmark is also used for tobacco related activities. The 20 percent benchmark – used to assess the level of contribution from a mixed rental payment from *Shariah* non-compliant activities such as a rental payment from premises used in conjunction with gambling, sale of liquor, etc. The 25 percent benchmark – used to assess the level of mixed contributions from activities that are generally permissible according to *Shariah* and have an element of *maslahah*[10] to the public, but there are other elements that may affect the *Shariah* status of these activities. Among the activities that belong to this benchmark are hotel and resort operations, share trading, stockbroking and others, as these activities may also involve other activities that are deemed as non-permissible according to the *Shariah*.

[9] An unfavourable widespread situation affecting most people which is difficult to avoid.
[10] Public good or benefit.

To enhance the stocks screening process, SACSC through SC as the securities market regulator has the authority to seek for further clarifications on the composition of non-permissible income and dividends, which are normally not disclosed in the financial statements. In this way, the SACSC stock screening process is more holistic and gains more credibility from the investors locally and abroad (Pok, 2012).

3.4.2.3 Financial Ratios for Stock Screening

The other component of stock screening of *Shariah*-compliant companies is the financial criteria. Generally, the stock screening process uses the financial ratios extracted from the balance sheet of the companies. Financial information like debt and cash positions will be observed. When two items are significantly large for a company, then the trading of that stock is akin to a trading of a *dayn* (debt) and leading to *riba* (interest) itself, that are not permitted by *Shariah*. However, to be permissible by *Shariah*, the transaction or exchange of cash and debt must be done at a face value. This accounting-based screening is predominantly adopted by the global index providers such as S&P®, Dow Jones® and FTSE® (Ho, 2015).

On the other hand, Hussin et al. (2015) highlighted that the SACSC did not adopt the balance sheet approach because it recognises that companies could substantially transact in a non-permissible activities before the balance sheet date and this would not be captured or reflected at all in the balance sheet date, not to mention when companies undertake a window dressing of the balance sheet. However, the SACSC does acknowledge the balance sheet as a useful tool in recording the company's cash, debt or receivables which do not comprise a significant portion of its entire assets.

Though trading of debt is not permissible unless at a face value, there is a certain maximum threshold permitted that is depending on *ijtihad*. In the case of a *sukuk* issued by the Islamic Development Bank in 2003, the underlying assets constituted of no less than 51 percent of *ijarah* financing assets that categorised as equity-based. This leads to a permissibility of a maximum of

debt receivable of 49 percent in the form of *murabahah* and *istisna* financing which are debt-based (Tariq & Dar, 2007). Thereafter, in 2009 when Islamic Development Bank wanted to issue *sukuk wakala bil istismar*, the underlying financing assets were reduced to a minimum of 30 percent equity-based financing. The limited supply of equity-based financing assets leads to this tolerable threshold of a maximum of 70 percent. Therefore, the pronouncement of a *fatwa*[11] depends on *ijtihad* of conditions surrounding the events (Tariq & Dar, 2007).

3.4.2.4 An Analysis of Index Screening Outcome

BinMahfouz and Ahmed (2014) found that the *Shariah*-compliant companies listed on Tadawul of Saudi Arabia and Bursa Malaysia Securities were 81 percent and 30 percent based on Standard &Poor's® methodology. This is because, Malaysia had less companies with large market capitalisation, high trading liquidity and large shares free floats. Additionally, there were more Malaysian listed companies that have higher leverage. While more than 20 percent of Malaysian companies had passed the filtering test, further *Shariah* screening has caused fewer Malaysian on the *Shariah*-compliant companies list as compared to Saudi Arabian.

Noticeably, a low leverage capital structure is a consequence of an underdeveloped debt capital market in certain countries. Furthermore, low leverage is not because of a company is debt averse but rather a consequence of the economic and market conditions of a country. In other words, the tendency of companies to consume debt are because of changes or development in market conditions. Therefore, the number of *Shariah*-compliant companies that are not passing the financial ratios test will rise concurrently. Since there are more companies tapping into *sukuk* market in the Middle East, there is a possibility that they may take over Malaysia as the leading sukuk market.

[11] Scholar opinion or a ruling on a point of *Shariah* given by a recognized authority.

Hence, it would be interesting to see whether companies passing the financial ratios test later on having *sukuk* market to develop in their countries.

Although the number of *Shariah*-compliant stocks are limited in the Standard & Poor's® list, the actual number is higher apparently. The reasons for the smaller number are the proprietary eligibility screening that had removed small capitalisation, illiquid and small free float companies; and debt screening. The Standard & Poor's® screening unfortunately removes stocks that are otherwise *Shariah*-compliant but not eligible because of small capitalisation, illiquid and small free float companies which are nothing to do with *Shariah* requirements. Therefore, it displaces the choice which could otherwise be made available to investors.

3.4.2.5 *Ijtihad* of the SACSC

When the SACSC came up with the screening methodology, it was intended to cater for the Malaysian market, considering *maslahah*, *urf* and other secondary sources of *fiqh muamalah*. Securities Commission (2016) said that, the creation of benchmarks is the result of a pragmatic approach in recognising the diversity within the social fabric i.e. the diverse ethnic, socio-economic and religious background in Malaysia. The barometer reflects varying the degrees of *Shariah* tolerance measured against the degree of maturity of the Islamic financial industry. What was instituted in Malaysia was the *ijtihad*, after assessing the local market conditions. By *ijtihad*, SACSC envisages these benchmarking to be relevant to the modern times and of course within the permissible *Shariah* framework. It was not meant as a strict black-and-white screening methodology, but rather one that reflects the domestic *urf*. Market conditions in one jurisdiction may be unique to another. For example, one may question why is that 10 percent becomes the ceiling for interest-income received? The explanation is that, at one point, Islamic banks are still new to the market and it takes time for the market to migrate their deposits into the Islamic banks. Thus, there is an element of tolerance and 10 percent was the *ijtihad* and certainly that this *ijtihad* can be revisited as and when the market environment develops.

There is precedent that for example when Dow Jones® revised its interest income ratio before eliminating it and adopting a trailing 24-month average market capitalisation from the previous 12-month base. As Obaidullah (2005, p. 15) of Islamic Research and Training Institute stated "...screening is a subject matter of continuous change in the light of new insights and that these should not be taken as 'divine' rules of Shariah compliance...". Thus, investors can make their own choice and the SACSC screening methodology may be well applied in other jurisdictions although its benchmarks could possibly differ because of the unique conditions there. Therefore, investors can certainly apply their own *ijtihad* guided by the learned scholars in the absence of other screening methodology in their own country.

3.4.3 Performance Attributions of *Shariah*-compliant Stocks

Superior performance of *Shariah*-compliant relative to broad market as mentioned at the beginning does not end there. Sadeghi (2008) discovers that those stocks when included as *Shariah*-compliant approved list generates higher stock price returns. Additional to that, the change of status of the stock increases the trading volume and bid-ask spread. Similarly, a study in the Middle East stock markets shows that the *Shariah*-compliant stocks perform better in terms of stock prices and trading volume. Although its works are just like conventional stocks when it is included in the primary index, *Shariah*-compliant stocks have an advantage of having wider investors base where Islamic funds and conventional funds can participate (Abdelsalam, et al., 2014). Hence, being and maintaining the *Shariah*-compliant status will provide a value added to the shareholders and prospective investors.

A strong case for investors in the non-traditional markets to diversify their portfolio into *Shariah*-compliant stocks. The portfolio diversification opportunity is very clear through a component of broad market indices and ethical based indices together with the *Shariah* indices (Kok, et al., 2009). Moreover, the *Shariah*-compliant stocks offer protection to the downside risks when they show

resilient during the market downturn and slightly under-performs during the growing economy trend (Alam & Rajjaque, 2010).

The various methodologies adopted by the regulators, index providers and international standard setting bodies for *Shariah*-compliant stocks screening have caused unnecessary debate since the core of the *Shariah* principle is always being observed and never being compromised. Considering the empirical study by El-Khamlichi (2014), suggests that the *Shariah* indices performance higher than its peers in conventional and broad market indices. Furthermore, the *Shariah* indices Dow Jones® and Standard & Poor's® showed that they are not correlated to the broad market indices which an investor may take it as an opportunity to leverage on as a long-term diversification purpose.

Global financial crisis previously had hit hard on the financial markets all over the world including those investing in *Shariah*-compliant stocks. A recent study shows that investing in *Shariah*-compliant portfolio of Asia Pacific and Emerging Market has made them resistant from shock of global financial meltdown (Arshad & Rizvi, 2013). Additionally, Miniaoui et al. (2015) in their research of the Middle East markets suggest the same where the Dow Jones Islamic Market Index GCC remained unaffected. Nonetheless, the volatility behaves similarly to their conventional counterpart indices.

3.5 The Alchemy of *Musharakah* and Momentum Investing

The current research papers and financial applications of *musharakah* are predominantly skewed towards method of debt financing although the principle is recognised as equity-based concept. Nonetheless, many research papers views *musharakah* as the purest form of Islamic finance specifically when being practised for investment purposes. Investment in *Shariah*-compliant stocks which is accepted as the modern version of *musharakah* as they observe the essential elements of the *musharakah* principle.

As mentioned in the earlier chapter, there are strong association between the *musharakah* parameters and the fundamental factors. For instance, the business; management; profit and loss sharing; and capital contribution parameters are within the fundamental analysis. An investment analyst looks the business parameter from the point of sector or industry performance. Whereas, the profit and loss sharing parameter is the key in many fundamental analyses as such to analyse the profitability ratios. While, management parameter can be of style analysis where investors categorised the value and the growth of stocks. Moreover, capital contribution parameter will lead to analysing the capital strength of the company.

3.5.1 *Musharakah* Parameters and Fundamental Factors

The essential elements of the *musharakah* principle comprises of four core parameters namely permissible business activity or industry; management of the venture; profit and loss sharing; and capital contribution (Al-Zuhayli, 2003). Deduce from these parameters, this study assumes that characteristics of the *Shariah*-compliant stock are explained by these four parameters. Furthermore, these *musharakah* parameters can be simplified into industry performance, management style, profitability ratios and capital growth, please refer to Section **Error! Reference source not found.** for more detail discussions. The best explanation or representation of these parameters is by substituting the fundamental data into the financial indicators. Using fundamental financial indicators like sector return, book value, cash flow, equity return, asset return, asset size and enterprise value will make the parameters more intuitive. Therefore, with the background of multifactor asset pricing model, this study summarises this phenomenon by assuming that the *Shariah*-compliant stock returns behaviour is a combination of the aggregate indications of sector return, book value, cash flow, equity return, asset return, asset size and enterprise value.

These are where the sector return indicator represents the industry performance parameter, the book value and cash flow indicators represent the management style parameter. On the other hand, profitability ratios parameter is represented by the equity return and asset return indicators and asset

size while the enterprise value indicators represent the capital growth parameter. Many empirical researches show that the fundamental data is able to explain the stock returns in their cross-sectional studies (Brooks, 2014).

3.5.2 Momentum of Stock Price Returns: A Conceptual Framework

Advantages of using the four *musharakah* parameters in analysing the stock price returns is the composition of macroeconomic and microeconomic events together with the stock specific characteristics. The other advantage is the intuition of the financial indicators that are based on the macroeconomic and microeconomic events traits in which explained the stock price returns. In this context, industry performance reflects the macroeconomic event that explains the stock returns while the other parameters reflect the microeconomic events. On the other hand, microeconomic events like management style, profitability ratios and capital growth parameters explain the stock price returns. Moreover, adding-on the size and style specific characteristics, the *Shariah*-compliant status can be seen as a specific stock characteristic, that can affect all the *Shariah*-compliant stocks in varying its degrees. Beyond the stock price returns, financial indicators with the help of technical analysis can predict the momentum of the stock price returns.

Momentum investing is a strategy where the investors are taking a long position in stocks that experience an upward historical data and shorting stocks that experience a downward historical data. This is based on the assumption that stocks performance in the past tend to behave similarly in the future for some periods. Essentially, Jegadeesh and Titman (1993) said that this means that the 'winning' stocks will keep rising and the 'losing' stocks will keep falling. In some regards, momentum investing can be like holding them for a relatively short period, then selling them before any unfavourable price changes. Thus, momentum investing contradicts with traditional investment theory. The approach takes a contrarian view from the fundamental 'buy low, sell high' strategy which is often referred as a large proponent of small capitalisation and value style investing. In fact, the momentum theory violates even the weak form of the efficient market hypothesis, suggesting

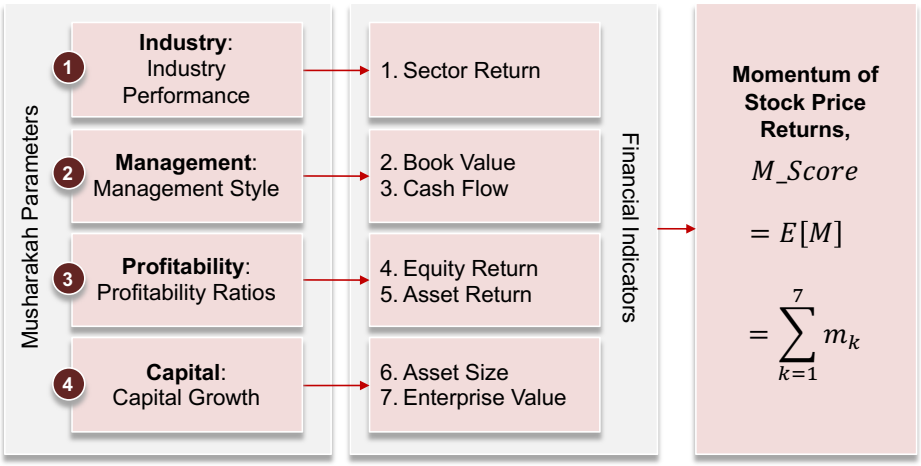
that markets are not informationally efficient, since investment decisions based on information of a past stock performance can generate abnormal returns. This interesting breakthrough has led to Fama (1998), the authority in the efficient market hypothesis, devising the momentum effect as the 'premier market anomaly'. Moreover, the multi factor momentum is a new approach to investing in avoiding biasness.

The principle of *musharakah* of which the basis used in determining the *Shariah*-compliant status of a stock (Al-Zuhayli, 2003) can indicate the momentum of stock price returns. This is where the four *musharakah* parameters namely industry performance, management style, profitability ratios and capital growth observed for price discovery as shown in

Figure 3-5. Each of the parameter is represented by measurable financial indicators that are deduced from the previous empirical studies. Therefore, the direction for momentum of stock price returns is implied by the aggregate changes of all the seven financial indicators illustrated by mathematical notation $E[M]$, where m_k are △Sector Return is equal to △Total Sector Return; △Book Value is equal to △Net Asset Value; △Cash Flow is equal to △Operating Cash Flow; △Equity Return is equal to △Return on Equity; △Asset Return is equal to △Return on Assets; △Asset Size is equal to △Total Assets; and △Enterprise Value is equal to △Total Enterprise Value[12].

[12] △ is the changes of fundamental financial indicators between two periods.

Figure 3-5: The M_Score Model



Musharakah as claimed by many, is the purest form of Islamic finance. It is the most inclusive principle in Islamic finance that has four essential parameters represented through the financial indicators. The financial indicators, with the help of technical analysis, can explain the momentum of stock price returns. Hence, the framework above shows the relationship between momentum of stock price returns with the financial indicators. The *musharakah* parameters, in which the basis of investing in *Shariah*-compliant stocks, can indicate a momentum of the stock price returns. Hence, investors can use the conceptual model as the underlying stock scoring model in making an informed investment decision to enhance their stock portfolio returns.

3.6 Conclusion

The modern era of Islamic finance in Malaysia begins its journey in 1963 with the establishment of pilgrimage fund as a saving institution. Since then, the Islamic finance industry experiencing a trajectory growth year after year. The main pillars in Islamic finance are prohibition of usury, gambling, impermissible commodities, avoidance of ambiguities and dealing with real economic transactions. Based on these pillars, the Islamic finance products are being classified accordingly. For example, profit sharing contract like principle of *musharakah* is used in both investment and financing product structures. The principle of *musharakah* is believed to be the purest form of

Islamic finance. It is characteristics of risk sharing and loss bearing a unique and appealing *Shariah* principle of *musharakah*, when adopted in the financial products.

Importantly, there is consensus among *Shariah* scholars that they are four essential elements of *musharakah*, also known as *musharakah* parameters, in which comprises of business, management, profitability and capital. Furthermore, the applications of the principle of *musharakah* which is normally used to determine the *Shariah*-compliant status of products structure has now been extended into the index construction, financing valuation and asset pricing estimation. When the latter uses the *musharakah* parameters in its fundamental analysis on the momentum investing technique, it creates a new dimension for M_Score model to indicate the direction or momentum of the stock price returns.

In the context of *Shariah*-compliant stocks, *musharakah* parameters through its financial indicators, explained the behaviour of stock prices. The industry performance parameter is best represented by the sector return. Whereas, the book value and the cash flow work well for the management style parameter. At the same time, profitability ratios by *Shariah*-compliant company can be represented by the return on equity and the return on asset indicators. While total assets and enterprise value are associated with the capital growth parameter, hence, these seven indicators may assist the investor in determining the momentum of the stock price returns. Thereafter, it helps investor to make an informed investment decision and subsequently assists in constructing a profitable stock portfolio by selecting the out-performing *Shariah*-compliant stocks and removing the under-performing stocks.

Chapter Four

Research Methodology

4.1 Introduction

Many previous research methodologies used in asset pricing studies were focused on a cross-sectional relationship between stock price returns and macroeconomic and microeconomic factors (Fama and French, 1992; 1993; 2006a and 2006b). The researchers want to explore the associations of the source of returns through its statistical relationship. In the later part, the research evolves into digesting the risk characteristics by computing the covariance matrix of the stocks. Nevertheless, most of the models developed, although maintaining their statistical significance, do not address the market timing concern i.e. when should investor purchase and dispose the stock. Hence, the objective of this chapter is to present a systematic and scientific research process for this study.

Having said that, Jegadeesh and Titman (1993) introduce a momentum strategy to accommodate the market timing. The strategy seems to be successful over a long-term period but in some cases, it tends to be very costly and the earned returns may not be able to cover it. Furthermore, their dependency is purely on the singular historical data that tend lead to a biasness of which it may result to misleading the trade signals.

In this chapter, the model development starts with determining its research philosophy as per Section 4.2 and thereafter, followed by the research approach in Section 4.3. Thereafter, the research strategy in Section 4.4 sets the direction of this study in meeting the research aim and objectives, in which to develop a new stock scoring model for *Shariah*-compliant stocks. The model indicates the

momentum of stock price returns. Then, in Section 4.5, the research design is crafted to provide foundation for the research methods in a later part. Consequently, the data collection techniques are explained in Section 4.6 since this is another important component for obtaining quality results. Additionally, this study develops the mathematical modelling or empirical model for measuring the momentum of stock price returns in Section 4.7. Lastly, this chapter mentions the rigorous approach in analysing the results and conclude the chapter in Section 4.8.

4.2 Research Philosophy

This study is based on the fundamental analysis of which it derived from a secondary financial data. In this positivist approach, the role of this study is confined to the data collection and interpretation through its objective, and at the same time, the research results are observable and measurable (Collins, 2010). Therefore, the positivism philosophy which intends to ascertain the robustness and intuitiveness of the stock scoring model is used in meeting the research aim and objectives. To recap, the research's aim is to develop a new stock scoring model in determining the momentum of the stock price returns for *Shariah*-compliant stocks. Details regarding the effectiveness of the new stock scoring model are measured using the objective means namely investment performance analysis, thereby warranting a positivist approach. Having said that the interpretivism approach is used in selecting the financial indicators for the respective *musharakah* parameters.

Positivism relies on the measurable observations that take this study into a statistical analysis. Moreover, the researcher has no conflict of interest and is independent throughout this study where the data is purely extracted from a secondary financial data. Generally, positivist study adopts a deductive approach and positivism relays that the study needs to be focused on the facts (Crowther & Lancaster, 2008). Therefore, this study embraces positivist paradigm where it is based purely on an actual financial information and considers that the investors are rationale.

This study adopts four main principles of positivism philosophy as suggested by Ramanathan (2008). First, logic of the new stock scoring model is persistent across the asset pricing models. Second, the new stock scoring model aims to predict momentum of stock price returns and sets to be intuitively appealing. Third, the new stock scoring model will be empirically observable and will be tested during the research process. Lastly, common sense is not permitted to bias the research findings.

In this positivistic examination, principle of *musharakah* is used in asset pricing model to develop the theoretical framework that to be tested during the research process. For this study, positivism relies on the statistical approach using the time series analysis where the chosen method is applied mathematically to operationalize the new stock scoring model and deal with empiricism. Therefore, this study is only concerning with secondary financial data and results that can be measured directly (Wilson, 2010). From this perspective, secondary financial data and results can be assessed objectively.

Nevertheless, Easterby-Smith et al. (2012) highlight the concerns in epistemology for positivism lead to the following three set of shortcomings. Firstly, historical data or experience presumes as a reliable source of information. However, there are several basic and important concepts where reasoning and timing are not based on the historical information. Secondly, positivism assumes that there is a deviation of actions of the persons or relationships between the persons. Thirdly, adoption of positivism in financial studies and other studies can be discredited for depending purely on existing state of financial economic environment. Therefore, research findings in positivist studies are predominantly descriptive, thus they lack understanding into the issues in detail. However, this study is addressing those concerns by considering only the relevant recent historical information in estimating the future occurrences. Additionally, the new stock scoring model is set to be intuitively appealing.

4.3 Research Approach

The research questions presented earlier express a need for understanding more about the asset pricing theories as the research domain. Hence, a quantitative research approach based on the observations and analytical studies from the secondary financial data is deliberated to meet the research aim and objectives (Bernard & Bernard, 2012). One dimension of quantitative research is calculating the equation that lead to a study on a relationship between variables and they are estimated using statistical tools. However, for the calculation to be appealing, one must also ensure that the variables calculated are statistically significant and highly correlated. Hence, in this quantitative research, the requirement for understanding of asset pricing theories in advance is required to assess if the variables used are meaningful.

Research approach to the data collection relies on the secondary financial data. Those financial data are supplied by a reliable a trusted third party financial data service provider. The financial data was then extracted from the company's financial statement (earnings statement and balance sheet) reporting in their periodic announcements. For this study, there are no inference on the financial data although they may have missing values and data outliers. No inference policy is established to ensure that this study is consistent with the research philosophy adopted which is positivism.

Moreover, the research approach to data analysis relies on the statistical tests. Primarily, the tools package like *t*-statistics analysis and correlation studies are used in examining the relationship between the variables used. On top of that, analysis tools like holding period and relative studies are used in analysing the results. Hence, the relationship between the momentum of stock returns and fundamental financial indicators in this study is observed. Furthermore, the significant tests and correlation studies are conducted to analyse the relationship between composite score and distribution of returns in the decile table. The decile table is partitioned by the average mean; 10th, 25th, median, 75th and 90th percentiles; and percentage of positive returns.

4.4 Research Strategy

There is a long list of research strategies of which Galliers (1991) has listed fourteen research strategies that are commonly being practised. Having said that, only three main strategies used by most studies namely examinations, surveys and case studies because of the great benefits associated by using them (Robson, 2002). As for this study, the examinatory strategy with emphasis on forecasting approach is used as the research strategy.

Forecasting research involves in this study uses the time series analysis techniques in making predictions on the momentum of a stock prices. The selected strategy is a practical form of research since it attempts to adapt with swift changes in fundamental data of a company in the current volatile stock markets and it predicts the impacts of these swift changes on stock prices. A robust and intuitive scoring model can be developed with a sufficient information being processed deductively although the approach faces the challenges in the complexity of the real world events.

A deductive approach is concerned on developing a hypothesis based on the existing theoretical framework and then designing a research strategy in testing the hypothesis (Pellissier, 2008). In this study, deductive means reasoning from a specific stock prices to the general stock prices. The movement of *Shariah*-compliant stock prices could be explained by the *musharakah* parameters. Therefore, all the *Shariah*-compliant stock prices are implied with the *musharakah* parameters given the fundamental financial indicators that represent the parameters. With that, a deductive design provides a motivation for this study to test this relationship for all *Shariah*-compliant stocks listed on Bursa Malaysia Securities. Moreover, the deductive approach can be derived from the propositions of the principle of *musharakah*.

This deductive research approach explores the principle of *musharakah*. Thereafter, it tests the principle to ensure its validity given a stock industry membership, asset size and investment strategy adopted by the investor. Snieder and Larner (2009) mentioned that the deductive approach is

embracing the logical thinking more often and the reasoning starts with a concept (principle of *musharakah*) that leads to a new hypothesis. The data observations in this hypothesis is tested for a confirmation or a rejection of the hypothesis. In this study, the hypothesis – price returns of *Shariah*-compliant stocks are explained by the *musharakah* parameters in which represented by the seven financial indicators as per discussion in Section 3.5.

4.5 Research Design

Explanatory quantitative research in this study is a formal, objective, systematic process in which financial data are used to obtain information about the historical state of stock prices. The research design is used to describe variables; to examine relationships among variables; and to determine cause-and-effect interactions between variables. The variables can explain that the *Shariah*-compliant stock returns are influenced by the *musharakah* parameters namely industry performance, management style, profitability ratios and capital growth. In addition, the *musharakah* parameters are best represented by the financial indicators like performance of sector return; book value and cash flow; equity return and asset return; and asset size and enterprise value for industry performance, management style, profitability ratios and capital growth respectively. Therefore, amalgamating the fundamental analysis with time series analysis techniques have resulted a robust and intuitive stock scoring model.

The fundamental analysis of the *Shariah*-compliant stocks listed on Bursa Securities Malaysia is the primary subject in this study. The stocks are selected from the latest list of *Shariah*-compliant securities as issued by the SACSC and are categorised by their respective industry groups. Compliant to the *Shariah* requirements are based on two tier criteria: business criteria and financial criteria. Generally, the stocks selected must ensure that their type of business is permissible by *Shariah* and must pass the financial threshold for cash and debt positions as shown in Subsection 3.4.2. In addition, each stock must qualify for certain conditions, such as, must be actively traded

on the stock exchange, need to have sufficient data of at least a single financial indicator for the period of study and must be assigned with GICS® to represent its industry group.

This study conducts a quantitative research from the secondary data obtained from the financial information service provider. The research period starts at the same time as when Malaysia was first introduced the Islamic equity capital market in June 1997 until the recent quarter where list of *Shariah*-compliant securities issued by SACSC and financial information required are available, September 2016. The historical financial data are gathered on a quarterly basis from the respective periodical announcements of the stock company's financial statements. For each stock, financial data consist of stock price (include dividend, if any), book value, cash flow, equity return, asset return, asset size and enterprise value are gathered for computation of the score and thereafter, for distribution of a stock price returns analysis.

The investment performance analysis of the stock price returns distribution uses tool like holding period to measure the stock returns given the indicated time frame. Another tool like relative return analysis is used to compare the stock portfolio returns between various investment strategies. The investment strategies available for comparison are buy-and-hold, long-only and long-short strategies. Next investment analysis tool used is the risk adjusted returns. Although higher returns should suggest better investment, a smart investor must consider the amount of risk taken to enjoy such higher returns. Hence, having a risk adjusted returns will make the investment performance analysis more meaningful and well represented. Lastly, statistical analysis tools like significant test and correlational studies are measured for conformity of robustness and intuitiveness of the new scoring model. All the investment performance analysis tools mentioned are applied for better understanding in each fundamental financial indicator and the new stock scoring model collectively.

Each of the financial indicator is assigned with a score to determine its momentum of stock price returns for the next quarter. The composite score of the indicators are expected to indicate the direction of stock price returns. A higher composite score should result a better stock price returns

in the following period whereas the lower composite score should result a lower stock returns in the next period. The new stock scoring model will be a good model if the probability of predicting right momentum or direction of stock price returns is higher at all times. At the same time, a good scoring model should result long-only and long-short portfolios performing better than buy-and-hold portfolios in any given market circumstances. In addition, for every financial indicator to be a good yardstick it must be statistically significant in explaining the stock price returns and highly correlated with the composite scores. The significant tests are conducted for various portfolio strategies namely buy-and-hold, long-only and long-short portfolios with stocks are rebalanced every quarter or year in each industry group as well as aggregate stocks. Therefore, the new stock scoring model will be a robust and intuitive investment analysis tool when it has a greater predictive power of which holdings statistically significant financial indicators.

4.6 Research Methods

The primary method of this study is to collect the secondary data of companies' financial information for the new stock scoring model. Thereafter, the model assigns a score and composite score based on the changes of the financial information between periods. The new stock scoring model is also referred as the M_Score model. Formation of a portfolio is uniquely done with a combination of core fundamental financial analysis with a provision of technical analysis. With that, the new stock scoring model starts by tabulating the financial indicators that represent the industry performance, management style, profitability ratios and capital growth elements of *musharakah* parameters. Subsequently, the *musharakah* parameters will be represented with sector return – industry performance; book value and cash flow – management style; equity return and asset return – profitability ratios; and total asset and enterprise value – capital growth. Each indicator will be assigned a score for its relative strength performance between two periods and the score range for all indicators are between 0 to 100.

Many research papers like Aldin, Dehnavi, Hajighasemi and Hajighasemi (2012); Beneish, Lee and Tarpley (2001); Mukherji, Dhatt and Kim (1997); and Muller (1994) state that the fundamental analysis using financial statements has the ability to explain stock returns. Financial information such as assets size, liabilities, share capital, sales, revenue and cash flow are commonly used by the investors to forecast the stock price returns.

In this section, empirical model for stock scoring is explained in Subsection 4.6.1. Thereafter, the scoring process of financial indicators are constructed with formation of the pseudo portfolios for comparative analysis and model testing. At the same time, computation of trade signals is explained before ending the subsection. Whereas, Subsection 4.6.2 explains methods of collecting data. The subsection ends with data analysis techniques as in Subsection 4.6.3 for model statistical significance tests; model robustness and intuitiveness checks; and portfolio returns analysis.

4.6.1 Developing the Empirical Model for Stock Scoring

The centre of this study is the M_Score model itself. It begins with the model equation which is formulated based on the principle of *musharakah* as its foundation and extending the work of Wildner (1978) in relative strength index (RSI) formulation. This study extends the RSI works by factoring the acceleration rate or degree of freedom in financial indicators to increase the model responsiveness. With that in mind, the scoring process of financial indicators come to take place in the following steps. First, tabulation of summation for the seven financial indicators – sector return, book value, cash flow, equity return, asset return, total asset and enterprise value. Second, the computation of the changes in the financial indicators between two periods. Thereafter, the trade execution is conducted to illustrate the out-performing and under-performing stocks. This is conducted by tabulating the distribution of stock price returns in the decile table. Subsequently, this study tests the M_Score in various portfolio strategies as to expose this study to the practical implementations. Before that, the distribution of stock price returns in decile table are analysed using statistical significant tests and correlational studies.

The scoring process starts with calculating the quarterly changes of each of the financial indicator. Subsequently, each of the financial indicators is assigned with a score given its relative performance as compared to the previous quarter. Thereafter, combination of the indicators, mean score, will form an aggregate or a composite score. *Shariah*-compliant stock with higher composite score is expected to have better stock price returns. The scores indicate the degree of strength for momentum of stock price returns. Thus, the equation for stock scoring model is written as follows:

Equation 4-1: M_Score

$$M\_Score = E[M] = \sum_{k=1}^{7} m_k$$

where, M_Score or $E[M]$ is the mean score between 0 to 100 for each financial indicator, M and m_k is the score for quarter to quarter changes of the k^{th} financial indicators which has seven in total. While the quarter to quarter change of m_k is calculated as the following:

Equation 4-2: m_k

$$m_k = 100 - \left[\frac{100}{1 + \left(\frac{v_1}{v_0}\right)^{\mathbf{v}}}\right]$$

where, v_1 is the value of a financial indicator in the current period (quarter); v_0 is the value of a financial indicator in the previous period (quarter) and $\mathbf{v}$ is the degree of freedom, d.f., where the d.f. is the maximum numbers of $k/2$. Mathematically, the score and composite score will only be between 0 to 100 regardless the quantum of the changes.

Equation 4-1 is essentially the summation of average score for the seven fundamental financial indicators. The notation, M_Score is selected to give the new stock scoring model a distinctive and presentable model with its self-explanatory meaning where 'M' represents the principle of *musharakah* which is the underlying foundation of this new stock scoring model. While the '$Score$'

is the expected result from computation of the equation above. Although the *musharakah* comprises of four essential parameters, the representations of it comprises of seven financial indicators where each parameter is represented with two indicators (excluding total sector return) to avoid data biasness and handle missing values. Nonetheless, by having too many representations for each indicator, it may lead to a potential collinearity issue (redundant information). Therefore, having a total of core seven financial indicators, streamlining the whole process. The core seven financial indicators are selected rigorously at its best to represent the *musharakah* parameters. Selection is done with the backing of seminal work in the existing literatures and research as critically deliberated in the Section 3.2 and Section 3.3 while Section 3.5 concludes the two sections. Therefore, each of the indicator is generating a positive integer, 0 to 100, to simplify the interpretations and analysis exercises. Having said that, the new stock scoring model is only interested in the average score of all financial indicators. Mathematically, there will be no negative integer and score above 100 in this model equation. In the event of no data available for the respective indicator, the model omits the average count of the total score where it appears 'blank' instead of '0' in the scoring spreadsheet. Therefore, it is important to distinguish between no data and score of '0' in this exercise as the latter means very weak momentum for the said indicator. Interesting highlight about the model is that it is still working although there are several missing data of the indicators. The model still works as long as it is left with at least a single indicator. This responsive flexibility shows robustness of the model which a key aim in M_Score model. Nonetheless, investors need to appreciate that a single indicator may result biasness and may not provide a holistic view of the momentum of stock price returns to the investors.

Equation 4-2 is principally classified as a momentum oscillator in which measures the velocity and magnitude of directional for price movements, where momentum is the rate of the rise or fall in stock price. An oscillator is a technical analysis indicator that varies over time within a band that is used to discover the short-term strength or weak conditions of a stock price momentum. The notation, m_k is a modification of Wildner (1978) works for a relative strength index that has become

one of the most prevalent oscillator indices. Indicators such as stock prices, book value, asset size and enterprise value are always generating positive figures. Hence, no adjustment is required in calculating m_k. However, indicators such as cash flow, equity return and asset return indicators require some adjustment since they may generate negative figures. Hence, the relative strength indicator needs to have additional treatments for the same reason. The following are the adjustments required in computing m_k. If v_1 is negative and v_0 is positive with v_1 is greater than v_0 in absolute term; or if v_0 is negative and v_1 is positive with v_0 greater than v_1 in absolute term; or if v_1 and v_0 are negative with v_1 is greater than v_0, then $\frac{v_1}{v_0}$ need to be absolute returns (value of a number is the number without its sign). Whereas, if v_1 is negative and v_0 is positive with v_1 is smaller than v_0 in absolute term; or if v_0 is negative and v_1 is positive with v_0 smaller than v_1 in absolute term, then $\frac{v_1}{v_0}$ need to switch into $\frac{v_0}{v_1}$ in the Equation 4-2 and need to be absolute returns. With all those equations, this study is now ready to compute the m_k, where it represents the sector return, book value, cash flow, equity return, asset return, asset size and enterprise value.

In translating the outcomes, a score of 50 or more is suggesting that the future stock price returns, i.e. the following quarter, stock price returns will have positive stock price returns. On the other hand, a score of less than 50 is suggesting the future stock price returns will have negative stock price returns. Therefore, a stock trading is considered a 'win' when the M_Score result is between 50 and 100, whereas, it is considered 'loss' when the M_Score result is between 0 but less than 50. This study resolves that the stock with a score closer to 100 will have higher positive stock price returns as compared to those closer to a score of 50 and a stock with a score closer to 0 will have lower negative stock price returns as compared to those closer to 50 (read as less than 50 and exact 50 score is excluded). After all, the distribution of the scores as compared to the stock price returns is the ultimate motivation since it shows how good M_Score model in fitting the data. This study appreciates that the new stock scoring model is very unlikely to have 100 percent forecasting accuracy given the inefficiency of the stock markets (Lim & Brooks, 2011). However, this study

does not set any threshold of accuracy rate to be considered as a good forecasting model because the important in this exercise is to separate the out-performing from the under-performing stocks. In other word, enhancing the portfolio returns is more pertinent than measuring the forecasting accuracy rate.

At the end, most of the investors like pension funds are primarily concern on the long-term portfolio performance rather than the short-term impulsiveness. Moreover, sophisticated investors require an investment tool like the M_Score model that is intuitive where the model can explain the source of stock returns; and to some extent source of risks as well.

4.6.1.1 Scoring Process of Fundamental Financial Indicators

Computing the Equation 4-2 starts with gathering sufficient data from the Bloomberg Professional® terminal. Thereafter, this study replaces the notation k with the respective financial indicators like sector return, book value, cash flow, equity return, asset return, asset size and enterprise value. Each of them will be represented by the total sector return (TSR), net asset value (NAV), operating cash flow (OCF), return on equity (ROE), return on assets (ROA), total assets (TOA) and total enterprise value (TEV) respectively. The Equation 4-3, 4-4, 4-5, 4-6, 4-7, 4-8 and 4-9 will then be rewritten as follows:

Equation 4-3: $m_{sector\ return}$

$$m_{sector\ return} = 100 - \left[\frac{100}{1 + \left(\frac{TSR_1}{TSR_0}\right)^{\mathbf{v}}}\right]$$

Equation 4-4: $m_{book\ value}$

$$m_{book\ value} = 100 - \left[\frac{100}{1 + \left(\frac{NAV_1}{NAV_0}\right)^{\mathbf{v}}}\right]$$

Equation 4-5: $m_{cash\ flow}$

$$m_{cash\ flow} = 100 - \left[\frac{100}{1 + \left(\frac{OCF_1}{OCF_0}\right)^{\mathbf{v}}}\right]$$

Equation 4-6: $m_{equity\ return}$

$$m_{equity\ return} = 100 - \left[\frac{100}{1 + \left(\frac{ROE_1}{ROE_0}\right)^{\mathbf{v}}}\right]$$

Equation 4-7: $m_{asset\ return}$

$$m_{asset\ return} = 100 - \left[\frac{100}{1 + \left(\frac{ROA_1}{ROA_0}\right)^{\mathbf{v}}}\right]$$

Equation 4-8: $m_{asset\ size}$

$$m_{asset\ size} = 100 - \left[\frac{100}{1 + \left(\frac{TOA_1}{TOA_0}\right)^{\mathbf{v}}}\right]$$

Equation 4-9: $m_{enterprise\ value}$

$$m_{enterprise\ value} = 100 - \left[\frac{100}{1 + \left(\frac{TEV_1}{TEV_0}\right)^{\mathbf{v}}}\right]$$

There are situations in the spreadsheet where m_k generates errors because of missing figures for v_1 or v_0 from the data source. In managing those errors, '#DIV/0!' or '#VALUE!' signs are omitted from the computation of the M_Score by leaving the cell with no figure " ". Please note that, there is a difference between no figure and zero in the cell. The latter will not be counted in the divisor,

where zero value will add up to the divisor although it is zero. This will help the equations to sum other indicators that have integer results since the new scoring model sufficiently requires only a single indicator to compute the M_Score. Although a sanity check is applied for the outlier in the data input, the score may yield an extreme result of either near to 0 or near to 100 which is deemed as an authentic result.

In this study, net asset value refers to the value of an asset less all the liabilities as shown in latest balance sheet. As for the assets, the amount is referred to the actual cost of the assets minus any depreciation, amortization or impairment costs made against the assets. Traditionally, a company's book value is calculated by total assets less intangible assets and liabilities. However, in practice, depending on the method of the calculation, the book value may sometimes comprise of goodwill, intangible assets, or both. Whereas, operating cash flow is where company generates the cash amount from incomes it brings in minus the costs related to the long-term capital investments or investment in financial assets. To calculate the operating cash flows, the model includes the cash amount received from the customers and the cash disbursed to the suppliers where the variance between the two, produces the operating cash flows.

While, return on equity refers to the profitability of a business in relation to the book value of shareholder equity, also known as the net assets or assets minus liabilities. It is a measure of how sound a company utilises investments to produce the earnings growth. Then, return on assets refers to how profitable a company is relative to its total assets. The ratio suggests the efficiency of company's management utilises its resources to produce earnings. Return on assets is measured by comparing the company's annual earnings to the total assets where it is presented as a percentage.

On the other indicator, total assets refer to the latest value of entire gross investments, liquid assets, receivables and other assets as they are presented on the balance sheet. While, enterprise value refers to a measure of a company's total value, often used as a more comprehensive alternative to stock's market capitalisation. The market capitalisation of a company is simply its stock price multiplied

by the number of shares a company has outstanding. Enterprise value is calculated as the market capitalisation including debt, minority interest and preferred shares, minus total cash and cash equivalents. Under normal circumstances, the minority interest and preferred equity is effectively zero, although this need not be the case. Computation of enterprise value is more compressive and normally use to value a company in merger and acquisition deal. Hence, investor will have more holistic view on the company's valuation

The aggregate stock prices of all the *Shariah*-compliant stocks within the same industry group, S_t is referred as the total sector return (TSR). There are several ways to calculate the TSR like equal weighting, price weighting and size weighting. For, equal weighting, each stock is given the same representation among stocks in the TSR. Whereas, price weighting is where the representation of a stock in a portfolio depends on the stock prices. The higher the stock price, the more weight the stock has in the TSR. While size weighting is a representation by market capitalisation, which is ordinary outstanding shares multiply with the stock price. The weighting impact works similar to stock price. Having said that, this study decides to use the equal weighting over the others given its advantages. Among others, equal weighting treats all the stocks fairly regardless their value of stock prices and company size. It is important in this study to eliminate any potential biasness in developing the new stock scoring model. However, in the investment performance analysis shown in Subsection 4.6.3 those type of TSR is compared to analysing the new stock scoring model as well as validating the dynamisms of the M_Score model. To design such a TSR, this study formulates an equation as shown in Equation 4-10 similar to the stocks index calculation by major index providers like FTSE® and S&P®.

Equation 4-10: S_t

$$S_t = \frac{\sum_{j=1}^{n} p_{jt}\, w_{jt}}{D_t}$$

where, t is time the TSR is computed; n is the number of stocks in the TSR; p_{jt} is the stock prices of company, j, at time, t; w_{jt} is the weighting equal exposure of company, j, at time, t, that is computed as $\frac{100}{p_{jt}}$; and D_t is a divisor of the TSR at time, t. In calculating D_t, each TSR has a unique denomination that is altered to maintain the stability of the TSR's prices across changes due to corporate actions such as dividends payment. If any, changes in weights due to corporate actions are allocated proportionally throughout all underlying stocks. The divisors are computed as per Equation 4-11 below.

Equation 4-11: D_{t+1}

$$D_{t+1} = D_t \left[\frac{\sum_{j=1}^{n} (p_{jt}\, w_{jt}) \pm \Delta f_{t+1}}{\sum_{j=1}^{n} (p_{jt}\, w_{jt})} \right]$$

where, D_{t+1} is the divisor at time, $t+1$; D_t is the divisor at time, t; and Δf_{t+1} is the difference between the stocks in the TSR at closing and the stocks in the TSR after computation factors have been adjusted.

As mentioned before, the GICS® is chosen given its widely used by the institutional investors globally (Vermorken, 2011) and more so, the structure strictly reflects the current state of industries in global investment markets and the classification consists of the four tiers of analysis, ranging from the most general sector to the most specific sub-industry. They are 24 industry groups in GISC® namely Energy, Materials, Capital Goods, Commercial & Professional Services, Commercial & Professional Services, Transportation, Automobiles & Components, Consumer Durables & Apparel, Consumer Services, Media, Retailing, Food & Staples Retailing, Food, Beverage & Tobacco, Household & Personal Products, Health Care Equipment & Services, Pharmaceuticals, Biotechnology & Life Sciences, Banks, Diversified Financials, Insurance, Software & Services, Technology Hardware & Equipment, Semiconductors & Semiconductor Equipment, Telecommunication Services, Utilities and Real Estate industries (MSCI, 2017).

4.6.1.2 Pseudo Portfolios

A successful stock trade needs to be tested with various pseudo portfolios. It requires appropriate distinctive investment strategy; specific characteristic; definite investment horizon; and suitable weighting scheme. First, this study creates three commonly used investment strategies to understand the effectiveness of M_Score model namely buy-and-hold, long-only and long-short investment strategies. The latter investment strategy is the benchmark or reference portfolio, where it also known as passive investing. Whereas, the other two investment strategies are considered as an active investing. Second, commonly referred portfolios based on specific characteristics are value or growth orientations; and company sizes. Third, an investment horizon of quarterly and yearly rebalanced portfolio is formed to provide a bit more colour on the impact of market timing between two periods for this model. Lastly, the influence of weighting schemes is taken into consideration in simulating the new stock scoring model.

Buy-and-hold investment strategy is where an investor purchases the stocks and holds them until portfolio exits. The exit could be due to the need to redeem the total investment amounts as requested by the investor for some reason. A slightly different between the buy-and-hold strategy and the long-only strategy for this study is that the former will hold the stock since the beginning of study until the end of study period. Whereas, long-only will purchase a stock when it triggers and dispose the stock for sell signal.

Long-only investment strategy is currently adopted by many sophisticated investors since most of them have a restricted investment mandate where short sale is deemed to be too risky. In this study, the investment strategy demonstrates to buy a stock when there is a buy signal and to dispose the stock in the following period when sell signal trigger.

Long-short investment strategy is normally subscribed by the hedge fund managers and sophisticated institutional investors. It operates in any stock market directions. In a bullish stock

market, the strategy will buy-long a stock. In contrast, the strategy will short-sale a stock when the stock market is deemed bearish. In this transaction, it will sell the stock at higher price and buy back at lower price in later date for profits. Nevertheless, in the event that the stock increases in price, it will be a loss with greater quantum. Having said that, this study is using the investment strategy to observe the robustness of the M_Score model as compared to the investment strategies that investors normally used in managing their respective portfolios.

Value and growth styles stocks in this study are using the price to book value to distinguish the two stock orientations. A lower price to book value is referred as value stocks. While those stocks with higher price to book value is considered as growth stock. However, if a stock is fall between these values it determined as blend style stocks. Normally, value stocks are seen in recession proof industries like utilities and healthcare. As for the growth stocks, they tend to belong to the like of the technology related industries.

Small and big companies as discussed in the earlier chapter have distinguished the behaviour in terms of its risk and return. As the name applies, small companies are those with smaller market capitalisation as compared to big companies that have larger market capitalisation. Generally, the partition between small, medium and large stocks are segregated based on the percentile. Small cap stocks are those below 33.3 percentile and the stocks assigned above 66.6 percent are considered lar cap stocks. Whereas, those are in between being referred as medium capitalisation stocks.

One-Quarter (or Quarterly) investment horizon setting is the base of this study in which the data input is gathered and the scoring is computed. The default period is starting from June 1997 to September 2016. Although this study expects that shorter time horizon will deliver a better result it is bound by limitations where some financial data are only publicly available on a quarterly basis at its best, such as book value, cash flow, equity return, asset return, asset size and enterprise value. Once the base results (one-quarter) have been generated, it is compared to the one-year results for efficiency analysis to suggest that closer time horizon will fruit better results. One can expect a

better result for closer time horizon since the investors would respond to the recent information rather than the old information or obsolete data.

One-Year (or Yearly) investment horizon maintains the data input as quarterly, however, computation of the stock returns for the three investment strategies – buy-and-hold, long-only and long-short – are done on yearly basis. This will give a room for comparison of results between One-Quarter and One-Year for better understanding as well as able to establish solid conclusion. To recap, for one-year investment horizon, the data input and the M_Score remain to be calculated on a quarterly basis but the investment performance analysis is done on an annual basis. Another reason for one-year analysis is to investigate the trend for full year results which is the audited financial statements.

Equal weighting scheme is a classic idea where an investor put the same amount of investment money in each stock in a portfolio as shown in Equation 4-12 below. This weighting scheme is some of the oldest technique to identify specific characteristics of stocks that generates the excess return. Choueifaty and Conard (2008) agree that the equal weighting scheme will limit the drawdown of a single stock. Example, just imagine went the largest stock like Tenaga Nasional Berhad dropped in stock prices, it may bring down the whole market index, Kuala Lumpur Composite Index (KLCI), although other component stocks on the index have an increase in stock prices. This study uses equal weighting scheme to avoid biasness by treating all stocks as equal regardless its specific characteristic.

Equation 4-12: w_j^E

$$w_j^E = \frac{1}{N}$$

where, E is the notation for equal weighted, j is the stock for that particular period and N is the total number of stocks for that particular period.

Price weighting scheme creates a portfolio consist of stocks that are represented by a proportion to the total number of stocks rather than by stock price, market capitalization, earnings or other factors, Equation 4-13. The Dow Jones Industrial Average (DJIA) is an example of a benchmark based on the price weighted. As the name applies, the stocks with greater stock price change will have a greater influence in the overall portfolio and those with smaller stock price change will be relatively having marginal influence. Nevertheless, the challenge is when the company announces a stock split of which it can create a disorder situation that leads to wrong pricing. Issue as such requires an adjustment in the divisor to reflect the stock split by way recalculating the divisor. This price weighting scheme is important to compare how well the new scoring model responds to various weighting schemes.

Equation 4-13: w_j^P

$$w_j^P = \frac{P_j}{\sum_{j=1}^{N} P_j}$$

where, P is the notation for price weighted, P_j is the stock price, j is the stock for that particular period and N is the total number of stocks for that particular period.

Market capitalisation weighting scheme is the most commonly referred by the investors especially institutional investors. Thus, investors may be able to reduce risks by having a portfolio that is skewed towards large and well-established stocks (Cremers & Petajisto, 2009). The considerations for the scheme are stock price and number of outstanding shares as show in Equation 4-14 below. The equation below seems to suggest that the bigger company in terms of size will easily impacting the portfolio performance given any changes in the stock price or market value. On the other hand, there are other newly introduced weighting schemes available in the market, but this study decided to focus on those mentioned weighting schemes as starting point for evaluating the M_Score model.

Equation 4-14: w_j^M

$$w_j^M = \frac{Q_j P_j}{\sum_{h=1}^{N} Q_h P_h}$$

where, M is the notation for market capitalisation weighted, Q_j is the number of outstanding shares, P_j is the stock price, $Q_h P_h$ is the summation of market capitalisations for all stocks for that particular period.

Stock market dynamics are then observed to test out the model robustness in responding towards the bullish and bearish stock market proxy by Kuala Lumpur Composite Index (KLCI). This study has selected seven major financial economic events that occurred within the Asian region as well as in the global financial markets of which contributed to great impact on the Malaysian stock market as summarise in Figure 4-1. Primarily, the stock markets shake up are derived from the economic recessions that drives the volatility of stock returns (Hamilton & Lin, 1996).

During the period of 1997 till 2016, the first major event was the (1) Asian Financial Crisis, during the period it had gripped much of East Asia of which Southeast Asia countries like Thailand, Indonesia and Malaysia were much affected. It began in July 1997 and had raised fears of a worldwide economic meltdown due to financial contagion started in Thailand with devaluation of Thai Bhat (THB) currency. Within a span of 18 months, the KLCI, a benchmark index for Malaysia stock market, was dived to -79 percent which had suffered most of the retail and institutional investors across the board. Tragic economic event was then followed by a strong stock market recovery with stock market returns of +286 percent.

Throughout the third quarter of 1997 till early of 2000, the (2) Dot-com Bubble was experiencing a historic speculative bubble during which stock markets in developed countries experience their stocks prices rise swiftly from the growth in internet industry and other related industries. This

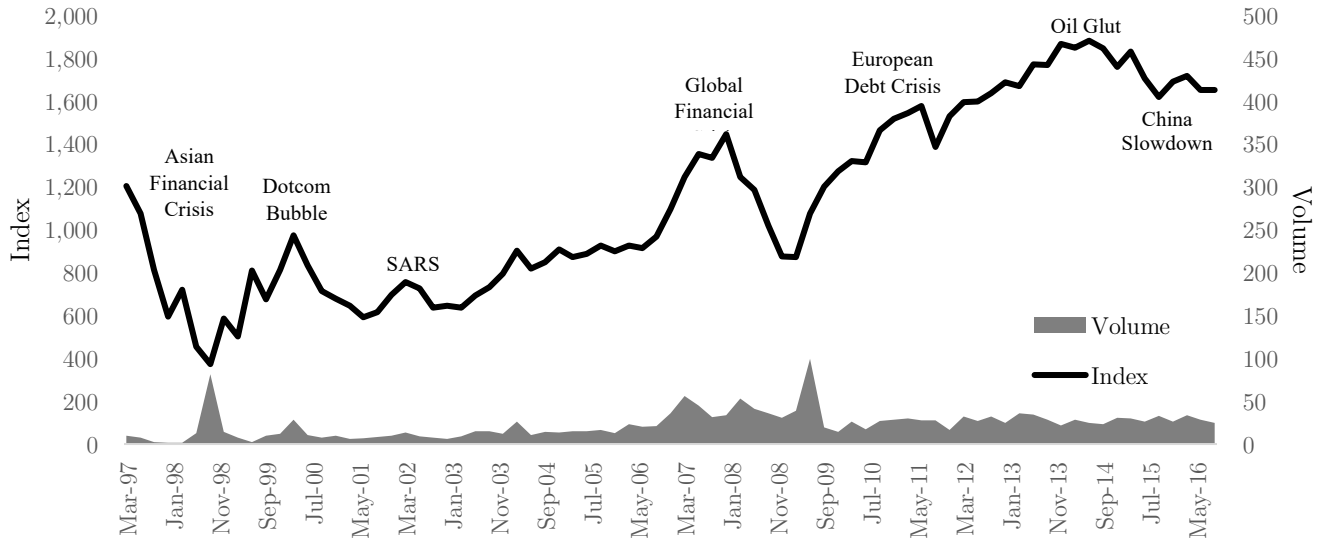
historic moment had pushed down the stock market recovery earlier to south of -46 percent which lasted in April 2001.

Next following event was the (3) Severe Acute Respiratory Syndrome (SARS) where this epidemiological respiratory disease registered a casualty rate of 9.6 percent as reported by the World Health Organization (WHO). For just within weeks, the SARS had spread to other 37 countries in 2003 that started in Hong Kong and had caused the stock market in Malaysia and stock markets in the region (Nippani & Washer, 2004). Subsequently, (4) Global Financial Crisis in 2007 till 2008 which started with subprime crisis was seen as the worst financial crisis by many analysts and economists since the black Friday crisis in the 1930s (Piketty & Saez, 2013), (Reinhart & Rogoff, 2011) and (Griffith-Jones, et al., 2010). The financial crisis had threatened the total collapse of large financial institutions in the United States which was prevented by the bailout of banks by the Federal Reserve. Nonetheless, the stock markets are still declining globally where in Malaysia alone it had dropped to -40 percent. However, the stock market recovered by more than double in the next two and half years.

Following that, (5) European Debt Crisis often referred to as sovereign debt crisis of the 'PIIGS' (Portugal, Ireland, Italy, Greece and Spain) was an ongoing crisis that has been affecting the countries of the Eurozone (Navaretti, et al., 2010). A group of ten central and eastern European banks had asked for a bailout from the European Central Bank by using bonds. In just three months starting July 2011, the investors saw a drop of -17 percent. Thereafter, (6) oil glut since its peak in the middle of June 2014 had sent the shock waves across the energy industry and at the same time impacting the Malaysian energy stocks to sell off while dragging down the broader market.

Lastly, (7) China Slowdown had caused panic to the investors worldwide as the country reported a slow growth for the first time in the past 25 years ago (Giap, et al., 2016). All those major financial economic events are considered in this study in evaluating the responsiveness and sensitivity of the M_Score model.

Figure 4-1: Rise and Fall of the Kuala Lumpur Composite Index[13]



Source: Bursa Malaysia Securities

[13] There were seven major financial economic events within 1997-2016 that impacting the KLCI, a benchmark stock index for Bursa Malaysia. First, Asian Financial Crisis started in Feb-97 till Sep-98 with the index dropped by 79% and rebounded by 286% increase. Second, Dotcom Bubble started in Feb-00 till Apr-01 with the index dropped by 45% and rebounded by 46% increase. Third, SARS started in Apr-02 till Mar-03 with the index dropped by 23% and rebounded by 145% increase. Fourth, Global Financial Crisis started in Jan-08 till Oct-08 with the index dropped by 40% and rebounded by 92% increase. Fifth, European Debt Crisis started in Jul-11 till Sep-11 with the index dropped by 17% and rebounded by 38% increase. Sixth, Oil Glut started in Sep-14 till Dec-14 with a dropped by 10% and rebounded by 11% increase. Lastly, China Slowdown started in April-15 till Aug-15 with the index dropped by 16% and rebounded by 5% increase as at Sep-16.

4.6.1.3 Trade Signals

The first test is to separate between winner and loser by using the M_Score model derived from the equations above as the guidance. The stocks that have a composite score of more or equal to 50 is expected to earn a positive return. Otherwise, the composite score of less than 50 is expected to produce a negative return. This study lets the spreadsheet does the computation for the composite score as well as determining the winner and loser by indicating the signal 'BUY' or '$SELL$' for every trading period. A composite score of 50 to 100 in the current period will trigger a 'BUY' signal while a composite score of 0 to less than 50 in the current period will trigger a '$SELL$' signal as shown in Equation 4-15 below. These signals are then compared to the actual stock returns in the following period. The actual stock returns will show what should investors do to win the stock trades in any given period where the same trade signals are used. A signal of 'BUY' indicates that the stock prices have risen from the current period to the following period or simply indicates a gain while a '$SELL$' signal indicates the stock has caused a loss to the investors. A modest formula as per Equation 4-16 below is used by the new stock scoring model to determine the actual signals.

Equation 4-15: Trade Signal

$$BUY = 50 \leq M\_Score \leq 100$$

$$SELL = 0 \leq M\_Score < 50$$

Equation 4-16: Trade Profitability

$$Gain = BUY = \frac{p_2 - p_1}{p_1}, for\ p_2 > p_1$$

$$Loss = SELL = \frac{p_2 - p_1}{p_1}, for\ p_2 < p_1$$

where, p_1 is the stock price in the current period and p_2 is the stock price in the following period in which the periods under this study are for quarterly and yearly analysis. When, $p_2 > p_1$ it will show positive rate of change while $p_2 < p_1$ will show negative rate of change.

To determine a winner and loser, this study matches the signals in each period between forecast trade signal indicated by the M_Score model and the actual trade signal as evaluated in the spreadsheet. Hence, a trade is considered a win if both signals for forecast and actual are the same and a loss if the trade has opposite signals as per Equation 4-17 shown below. A step further is required after completing the forecasting exercise to ensure its translation into gains or profits in which the following paragraph explains in great details.

Equation 4-17: Winner and Loser to Composite Score

$$Winner \begin{cases} Forecast: BUY = 50 \leq M\_Score \leq 100; and \\ Actual: BUY = \dfrac{p_2 - p_1}{p_1}, for\ p_2 > p_1 \\ or \\ Forecast: SELL = \ 0 \leq M\_Score < 50; and \\ Actual: SELL = \dfrac{p_2 - p_1}{p_1}, for\ p_2 < p_1 \end{cases}$$

$$Loser \begin{cases} Forecast: BUY = 50 \leq M\_Score \leq 100; and \\ Actual: SELL = \dfrac{p_2 - p_1}{p_1}, for\ p_2 < p_1 \\ or \\ Forecast: SELL = \ 0 \leq M\_Score < 50; and \\ Actual: BUY = \dfrac{p_2 - p_1}{p_1}, for\ p_2 > p_1 \end{cases}$$

Translating a winning trade into gains or profits demands a precise coherent forecasted trade signal and actual direction for the investment strategies. When both forecast and actual indicate BUY signals, the best portfolio to be executed is a buy-and-hold, long-only or long-short investment strategies. However, when both forecast and actual indicate BUY or $SELL$ signals, the best portfolio to be executed is the long-short investment strategy. Having said that, the long-only portfolio will

dispose the stocks that indicate the $SELL$ signal. Whereas, the buy-and-hold portfolio will keep the stocks till end of this study period. Generally, investors that generate the most profits will be those who are investing in a long-short investment strategy followed by a long-only investment strategy and subsequently a buy-and-hold investment strategy if it is a winning trade. Nevertheless, being a loser will be very costly for the investors, particularly for a long-short investment strategy as one will have to bear the loss for any wrong trades. As for the long-only investment strategy, it will experience a loss when a BUY signal does not materialise as expected and will not generate loss since the investment strategy does not involve in short-selling of stocks. On the other hand, the buy-and-hold investment strategy is where an investor purchases stocks and keeps them for a long-time horizon. Investor with a view that in the long run stock market generates a good rate of return even while considering a degree of volatility. Hence, the trade executions will help this study to evaluate the trading success. The higher rate of trading success, is the better for this study. In other word, the new stock scoring model is a good investment analysis tool for the investors to consider, if the statement above holds.

4.6.2 Methods of Collecting Data

This study is principally used the Malaysian *Shariah*-compliant stocks listed on Bursa Malaysia Securities during June 1997 to September 2016. In addition to that, the stocks must maintain the *Shariah*-compliant status throughout this study as determined by the SACSC. All stocks are then segregated based on their respective industry group since the computation of the score is depending on the sector return as one of the indicators. As for industry group membership, this study uses GICS® that covers all *Shariah*-compliant stocks of which to be disseminated into 24 industry groups, if available, as defined by GICS®. For each company, fundamental financial information is collected every quarter as announced. Then the information is extracted from a widely used financial information provider, Bloomberg Professional®.

Data collected from each stock are divided into two categories namely descriptive information and financial figures. As for the descriptive information, this study extracted the company's full name and industry group membership. The latter is used to ensure that there is no redundancy in data collection and to ensure only data for primary ordinary shares are collected since there are instances where stocks are cross listed in other stock exchange. The former is crucial since the computation of sector returns is very depending on the industry group membership. Any stock that is not classified for industry group membership is assigned to the one that has similar business activities as described in their corporate profile and at the same time tally with the Bursa Malaysia Securities own industry categorization.

As for the financial figures, this study extracted the company's stock prices, dividends, book value, cash flow, equity return, asset return, asset size and enterprise value as well as market capitalisation, trading volume, price to book ratio, leverage ratio and total earnings. In defining the above, the basic stock prices refer to the end of day for that selected quarter closing price while considering corporate actions like dividend distributions, if any. Whereas, the total stock's total return is the performance of the stock prices and dividend as well as other corporate actions such stock split, share swap in corporate merger, dividend in specie, etc.

Next after the financial figures, book value is defined as the net asset value of the company at the end of each quarter which normally unaudited figures save for the final quarter as it is coincided with the fiscal year reporting statements. The other financial figure cash flow describes the cash flow resulted from operating activities or free cash flow from operations which basically cash generated from operations less taxation and interest paid, investment income received and less dividends paid.

Then, equity return is defined as return on equity where it measures the company profitability in relation to the shareholders' equity. The following figures are the asset return which are defined as the return on assets where it measures the profitability of a company's asset in generating income.

These ratios are used to measure of how well a company uses its capital resources and investments in generating its earnings growth.

Furthermore, the asset size is defined as the total assets of a company that includes tangible and intangible assets. Subsequently, the enterprise value is defined as total equity, preferred shares and minority interest less long-term debt, cash holdings and value in associate subsidiaries. Enterprise value is normally the theoretically takeover price of a company in merger and acquisition exercise. In addition, it is significantly different from the market capitalisation as the former is more accurate in representing the company value.

As for the analysis of pseudo portfolio strategies, leverage ratio is defined as a company's debt over its equity, it is a measure that looks at how much capital comes in the form of debt (loans) or assesses the ability of a company to meet its financial obligations. The other financial figures used for data analysis later is price to book ratio that defines as stock price by the book value per share. This price to book ratio indicates the growth orientation of a stock i.e. value or growth stock. As for the market capitalisation, stock prices multiply with outstanding shares, it analyses the sensitivity of the stock scoring model to the company size. While trading volume, completed shares trading, examines the liquidity of a stock. Lastly, the financial figures used is total earnings, defined as earnings before tax interest and depreciation charges or EBITDA. This is essentially the technique to evaluate the company's performance without having to factor-in the financing decisions, accounting decisions or tax circumstances.

Missing data are treated carefully although it is not a major concern as the new stock scoring model is robust enough to handle with minimum of a single indicator. However, having all indicators in place is priority to avoid model biasness. On the other hand, any missing data is not going to be replaced with dummy data or information of a company with similar characteristic since this study wishes to maintain the actual data. Another concern for data input is the outliers. While it is a major concern, again, the new stock scoring model is robust enough to handle it since the indicators are

equally weighted. Example, an outlier can only influence the composite score by 14 percent (ratio of an indicator over other seven indicators). Please note that an outlier could be an actual data because of corporate actions such as new equity offering, merger, capital distribution, deleveraging and other corporate actions. Thus, considering the outlier data as such, is pertinent in getting the actual picture of stock performance. Not to mention, sometimes the outlier does happen because of the typo although it is very unlikely.

Once all the *Shariah*-compliant stocks are gathered, each company is categorically allocated to the respective industry group as they will be computed based on their respective industry group. Each company is classified into the industry group based on the criteria as determined by GICS® since the scoring is depending on the aggregate performance of each industry group.

Financial data are best collected using the secondary sources particularly those provided by the reputable financial information service providers like Bloomberg Professional®, Thomson Reuters®, Compustat® and other well established financial information service providers. These providers are used by the most institutional investors and sophisticated individual investors since the data or information provided are handy and pre-process for further analysis as well as up to date. The preference for this study is the Bloomberg Professional® since the researcher is familiar with the system that has been using for the past 15 years. Moreover, the system has a special function for Islamic finance related data which is very practical to use in this study. For example: Specific function like <ISLM> <GO> tells the information about stock's *Shariah*-compliant status as assigned by SACSC in which it has expedited the data universe selection process.

The start and the cut-off period for the data is set at June 1997 and September 2016 respectively. The quarterly announcement of financial results is set at the second month of that quarter in line with the regulatory requirements. However, the quarterly results are announced in the first month of the particular quarter and specifically during the second week, on average. In addition, the geographical focus function is set to Malaysia which include all *Shariah*-compliant stocks as

assigned by SACSC that are listed and actively traded on Bursa Securities Malaysia during those periods. Only the stocks with primary listing on Bursa Securities Malaysia and ordinary outstanding shares (exclude treasury shares) are selected in this process. The listed funds like real estate investment trust, exchange traded fund, closed end fund and special purpose acquisition company are excluded from this exercise. Since it is a quarterly exercise, all financial data required are then extracted at the end of the day of the closing date in that quarter[14]. Thereafter, industrial classification function, GICS®, is set to ensure that each stock is assigned with their respective industry group.

The above functions represent stock last price; stock total returns; net assets value; operating cash flow; return on equity; return on assets; total assets; enterprise value; current market capitalisation; trading volume; price to book ratio; debt to equity ratio; earnings before interest, tax and depreciation charges; book value; ordinary shares outstanding; return on capital employed; price to cash flow; price earnings ratio; current ratio; earnings before interest, tax and depreciation charges to revenue; book value per share and financial turnover respectively. Given all the input setting above, an equity search function in the system is used to generate the *Shariah*-compliant stocks universe that being segregated by each industry group. Next few columns to *Shariah*-compliant stocks universe are the data for fundamental financial indicators and other financial information for further finding analysis as in Subsection 4.6.3. Third, all the information gathered from the system is then recalled and downloaded in Microsoft Excel® spreadsheet since it is the best platform to run the computation and analysis for the model. The historical function in the Microsoft Excel® which

[14] These Bloomberg® functions are selected <PX_LAST>; <TOT_RETURN_INDEX_NET_DVDS>; <NET_ASSETS>; <CF_FREE_CASH_FLOW>; <RETURN_COM_EQY>; <RETURN_ON_ASSET>; <TOT_ASSET>; <CURR_ENTP_VAL>; <CUR_MKT_CAP>; <PX_VOLUME>; <PX_TO_BOOK_RATIO>; <TOT_DEBT_TO_TOT_EQY>; <EBITDA>; <BOOK_VAL>; <EQY_SH_OUT>; <RETURN_ON_CAPITAL_EMPLOYED>; <PX_TO_CASH_FLOW>; <PE_RATIO>; <CUR_RATIO>; EBITDA_TO_REVENUE>; <BOOK_VAL_PER_SH>; and <TURNOVER>.

embedded the Bloomberg® system module is used to tabulate the data. Although the model able to handle the outlier, a sanity check is conducted as precautious of data migration misalignment between the system and the spreadsheet.

With the required data tabulated on spreadsheet, organising the decimal points is important as some figures have been rounded up. Therefore, stock prices and stock returns have two decimal points; net assets value and operating cash flow to be to the nearest million (in Ringgit Malaysia, MYR); return on equity and return on assets have a decimal point; current market capitalisation and ordinary shares outstanding to be to the nearest million; debt to equity ratio, return on capital employed, price to book ratio, price to cash flow, price earnings ratio, current ratio and earnings before interest, tax and depreciation charges to revenue have a decimal point; and financial turnover, trading volume and enterprise value to be to the nearest million.

This study treats the data management carefully for better understanding in getting excellent results and a comprehensive analysis subsequently. At the end, it is about the data quality and integrity that concern all the numbers crunchers (Biddle, et al., 2009).

4.6.3 Data Analysis Techniques

This analytical subsection is leading this study to meet the three research objectives stated in Section 1.3 of research aim and objectives. To recap, the objectives of this study are; (1) To analyse the relationship of distribution of stock price returns with M_Score model based on the *musharakah* parameters; (2) To investigate the robustness and intuitiveness of the M_Score model; and (3) To examine the impact of the M_Score model on selected investment portfolio strategies. These objectives are achieved by analysing the statistically significant test and correlational studies for the distribution of the stock price returns. In addition, it will be tested with stock specific characteristics.

All those equations in Section 4.6 are calculated for One-Quarter and One-Year returns in relation to the composite scores of the model. The composite scores are then tabulated by decile table in

range of scores by rows [0-10, 10^{+}-20, 20^{+}-30, 30^{+}-40, 40^{+}-50, 50^{+}-60, 60^{+}-70, 70^{+}-80, 80^{+}-90 and 90^{+}-100]. Extra rows are created for the composite scores of 50 or less that is written as 'Low Score' and for the composite scores of more than 50 it is written as 'High Score'. Moreover, 'High – All and 'High – Low' rows are created for further analysis. The last rows are the results of *t*-test (*p*-value) and correlation coefficient for the mean returns, percentiles and percentage positive columns. As for the percentiles, the columns are divided into several categories namely mean, 10th, 25th, median, 75th and 90th percentiles where the last column indicate the number of stock observations.

The One-Quarter stock returns are calculated as the 3-month buy-and-hold of the stock starting at the beginning of the month in the following quarter. Return compounding ends on the last trading day in the quarter. As for the One-Year returns, similar calculation as the One-Quarter returns save for the period for buy-and-hold is 12-month and return compounding ends on the fourth quarter. Once calculated, *t*–test is used in analysing the distribution of stock returns. The *p*-values for the mean and percentiles are from two-sample *t*–tests of signed rank Wilcoxon (1945) tests. A low *p*-value of less than 0.01 suggests that the distribution of stock returns provides enough evidence that this study can reject the null hypothesis for the M_Score model. In other word, a *p*-value less than 0.01 is presumed statistically significant in this Wilcoxon test of stock price returns (Brooks, 2014). This study further shows that the paired *t*–test is feasible if the within-pair correlation is high. The correlational study measures the dependency between two sets of variables in the Spearman (1904) product-moment correlation coefficient. The correlation coefficient is obtained by dividing the covariance of the two variables by the product of their standard deviations. A higher correlation suggests that the composite score of M_Score model or individual financial indicators scores is correlated with stock price returns. This study uses function in the IBM SPSS Statistics® and Microsoft Excel® to run the results for the above tests since the data analysis tool pack is sufficient for this work of time series analysis.

In addition to the table for all stocks, the distribution of stock returns is then repeated for each industry group. There are 18 industries as identified by the Bursa Malaysia Securities to represent this study although GICS® classified to 24 industry group. Regardless the industry groups, the M_Score model can maintain its accuracy in forecasting ability. On the other hand, the decile table analysis by company sizes, stock orientations, trading volumes, stock prices and leverage positions are tabulated. For the company size, all stocks in each quarter with sufficient data are ranked based on the most recent quarter-end market capitalisation. The 33.3 and 66.7 percentages cut-offs from the previous quarter's distribution of market capitalisations are used to categorise the *Shariah*-compliant stocks into small, medium and large companies in each quarter. Whereas, stock orientations i.e. value, blend and growth styles stock use price to book ratio. As for the trading volume, it refers to share turnover that is described as the total number of shares exchanged during the previous quarter scaled by the average number of shares outstanding during the quarter. While stock prices as the name apply uses stock prices at end of the quarter. For leverage ratio, debt to equity is used with similar approach.

These decile rank testing is to validate whether the distribution of stock returns experiences a significant improvement when applying the M_Score model as the investment analysis tools in the price discovery. The improvement is expected not only on single investment horizon but also an improvement during any of the stock market cycles i.e. bullish, bearish and side-line stock market.

Testing the new stock scoring model will not complete without considering the responsiveness during the bullish and bearish stock market. Many other models are able to out-perform the broad stock market during the bullish and side-line stock markets. However, not many models generate higher return than stock market return during the downtrend stock market (Ahmad & Hussain, 2001). This study experiences the seven major financial economic events as explained in Subsection 4.6.1.2 which important to understand how the new scoring model responds to these pseudo portfolios. Like the above test, in the major financial economic events, the distribution of stock price

returns is tested with Wilcoxon and Spearman tests for One-Quarter and One-Year results. The non-parametric tests are chosen to study distribution of stock price returns that take on a ranked order. Another reason is the non-parametric methods make fewer assumptions and simplicity. Hence, making it a more robust data analysis tool.

In addition to major financial economic events, selection of the financial indicators is tested individually for the model responsiveness to the stock price returns. Instead of composite score, each individual score of financial indicators is tested with the stock price returns for its statistical significance and correlational coefficient. The process is similar to composite score where singular scores of sector returns, book value, cash flow, equity return, asset return, asset size or enterprise value is tested with mean stock returns in the observed quarter.

The tests on model responsiveness to the major financial economic events show that the new stock scoring model is robust and intuitive which important in this current volatile stock market post global financial crisis. Moreover, the model helps the investors to comprehend the source of the portfolio returns during the portfolio rebalancing and attribution analysis.

Besides the market dynamics, the new stock scoring model tests its responsiveness towards the two prominent pseudo portfolios for One-Quarter and One-Year results. The pseudo portfolios are referred as long-only and long-short strategies of which has been explained in Subsection 4.6.1.2. For each investment strategy, the portfolio is further split-up into three weighting schemes. The stocks for each pseudo portfolios are assigned with equal weighted, price weighted and market cap weighted schemes. These schemes are critical to show that the new scoring model is not bias to stock prices or company sizes. These testing are to examine the performance of the new stock scoring model for selected portfolio strategies (long-only and long-short). The portfolio performance is not only tested for a raw portfolio returns but also for a risk adjusted returns in which it represented by the standard deviation of stock returns.

Lastly, this study examines the new stock scoring model relative to the company size, stock orientation, trading volume, stock price and leverage position. The company size is defined as market capitalisation of a stock where a stock price multiply with outstanding ordinary shares. Whereas, stock orientation refers to value or growth style of a stock. The value or growth style is measured by the price-to-book ratio where lower ratio deems as value style and higher ratio will be growth style. As for the trading volume, it is measured with the ordinary shares that are changing hands during the trading hours. On the other hand, stock price is defined as low stock price or also known as penny stock and high stock price or also known as blue chip stock. Moreover, the leverage position is defined as debt-to-equity ratio of a stock where the long-term debt is divided with shareholders capital.

4.7 Limitations of Research Methodology

This study primarily observes the momentum of stock returns that indicates the direction of stock prices in the following period based on the relative strength of the historical financial indicators. However, the new stock scoring model does not design to indicate the value of stock prices specifically in the following period. As in the recent empirical studies by Jagannathan and Korajczyk (2017); Peltomäki (2017); and Asness et al. (2017), they highlight that market timing does not yield to better portfolio returns instead incurring agency costs, if relying on external portfolio manager. Moreover, purchasing at the lowest stock price and disposing at the highest stock price seem impractical because dynamism in demand and supply in a trading system.

Large data size is required in this study for empirical analysis to observe the company fundamentals and to accommodate the time series analysis. Hence, tendency for a missing value of financial statements is greater. Financial statements are sourced from the secondary data i.e. financial data service provider. There are two possible causes of the missing values. Omission of data while transmitting from company's financial statements or error when transposing the data from financial information service provider's system into the spreadsheet. Besides that, missing values may occur

particularly in the first one-fourth of the observation periods where quarterly results are yet to be compulsory for public dissemination. Though the new stock scoring model is robust enough to respond to missing values, this incident may result to a less intuitive model.

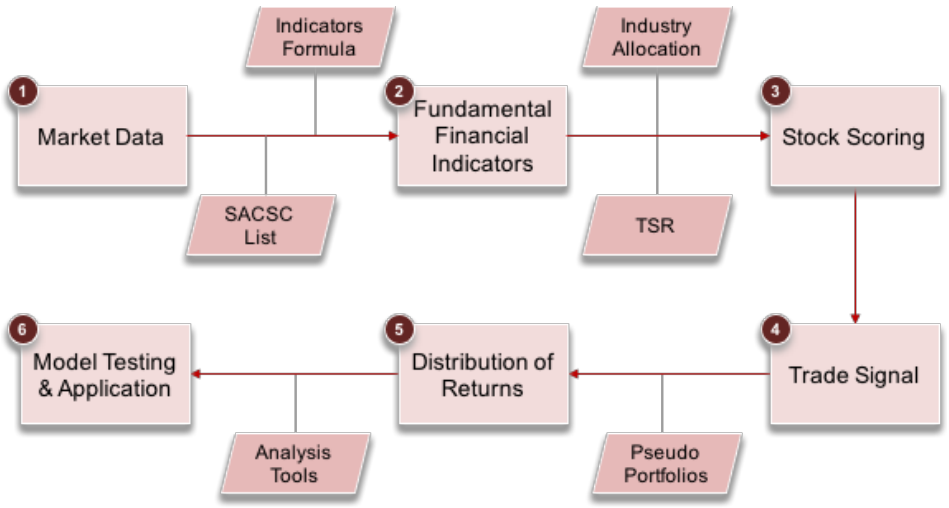
Some of the financial information are only available on a quarterly basis. However, this study applies time series analysis in which work better with higher frequency of dataset like daily information. The limitation is that the financial statements used are only available on a quarterly basis at its best except for the stock prices and the market value of which can be retrieved on a daily basis. Higher frequency dataset will make the new stock scoring model processes the recent data more effectively. Thus, making the recent financial statements more reflective and help the new stock scoring model to respond better. Furthermore, quarterly releasing of financial results may mean the company's fundamentals have changed significantly. Hence, the quarterly results mean the investment decisions has been lagged in timing. This consequence lead to a lack of opportunity to react quickly on exiting the stock investment. Although a quarterly data can be perceived as out-of-date by ignoring its recent information, it has some advantages in terms of trading transaction relates expenses and data acquisition related costs.

4.8 Conclusion

Developing the new stock scoring model or M_Score model suits positivist philosophy where the role of this study is limited to data collection and interpretation. Hence, the quantitative approach calculates the scores that derived from the equation in the momentum of stock price returns. At the same time, the model evaluates the relationship between composite scores and distribution of stock price returns. In relation to that, the research strategy uses forecasting technique to indicate the momentum of stock price returns based on the existing *musharakah* parameters – industry performance, management style, profitability ratios and capital growth. These parameters are then represented by the sector return, book value, cash flow, equity return, asset return, asset size and enterprise value.

As illustrated in Figure 4-2 below, each quarter between June 1997 and September 2016, this study identifies the *Shariah*-compliant stocks with sufficient data. The primary methodology is to form portfolios that based on the stock price returns and stock's composite score. The *Shariah*-compliant stocks with composite score of less than 50 are considered low score and expect these stocks to have negative stock returns performance in future. Whereas, high score stocks that have composite score of 50 or more are expected to have a positive stock price performance in the future. The first test compares distribution of stock returns between stocks with high composite score against the low composite score and the second test is between high composite score and overall composite score.

Figure 4-2: Stock Scoring Model Valuation Process



Given concerns on stationary and normality of the data for parametric test statistics, the primary results are tested using both non-parametric *t*-statistics analysis and correlation studies. Besides that, robustness and intuitiveness of the model are examined by observing the sensitivity to the financial economic events and effect of stock specific characteristics. Additionally, the M_Score model is assessed with adaptability towards various portfolio strategies like long-only and long-short; value and growth; and small cap and big cap with weighting schemes. At the same time, the model examined the sensitivity of the stock specific characteristics like stock orientations, company sizes, trade volumes, stock prices and leverage positions.

Chapter Five

Exploring the Statistical Relationship between Stock Scoring Model and Stock Price Returns

5.1 Introduction

In Chapter 2 and 3 the conceptual framework has been discussed and established for this study and Chapter 4 provides the outline for the research process. Therefore, the objectives of this empirical chapter are to explore the statistical relationship between the newly developed stock scoring model called M_Score model and the stock price returns. In addition, this empirical chapter also explores the characteristics of *Shariah*-compliant stocks. These explorations use the data of *Shariah*-compliant stocks listed on Bursa Malaysia Securities during June 1997 to September 2016 for 636 public companies in which comprises of 24 industry group classifications.

This empirical chapter uses a quantitative study with time series analysis for a reliable sample of dataset to achieve the optimal results. Since *Shariah*-compliant stocks have common specific characteristics, a rigorous analysis on the dataset is pertinent so that it comparable to those in previous studies as shown in Section 5.2. Generally, the common specific characteristics are lower leverage ratio as compared to the conventional peers; higher equity and asset returns over a long-term period; exclusion of certain industries and non-discrimination of stock specific characteristics.

In addition, this empirical chapter uses dataset that can be a proxy to other Islamic capital market. As claimed by many researchers, Bursa Malaysia Securities is the most developed and comprehensive Islamic capital market. Moreover, it has a complete ecosystem from fully *Shariah*-compliant stockbrokers to supporting professional services – legal, tax and audit firms as well

academic and research institutions. Besides that, the Islamic capital market in Malaysia is full of innovative products to accommodate the needs of investors like *Shariah* conscious individual investors and institutional investors like pension funds, pilgrimage fund, investment managers, *takaful* operators (Islamic insurers) as well as other Islamic financial institutions. Hence, having as many as wider stock universe provides a strong validation to the claim.

Following that, this empirical chapter illustrates the statistical descriptions of stocks universe used in constructing and testing the M_Score model. In addition, this study addresses the concern on the investible universe of *Shariah*-compliant stocks. Thereafter, the financial characteristics of the *Shariah*-compliant stocks are analysed, particularly on the unique features, as per Section 5.3. Whereas, the return characteristics are examined in the Section 5.4 to justify the needs to separate the out-performing from under-performing *Shariah*-compliant stocks.

In understanding statistical relationship between the newly developed stock scoring model and stock price returns, this study establishes a conceptual framework for momentum of stock price returns where the *musharakah* parameters explained the *Shariah*-compliant stock price returns. Each parameter is then represented by the seven financial indicators. Hence, the concern on ad hoc variables selection is addressed through understanding the relationship between the stock price returns and financial indicators. This is to ensure the variables selected have a meaningful economic and financial explanations as presented in Section 5.5 where it shows the relationship between one-quarter and one-year returns; individual scores of financial indicators and composite score of M_Score model. Having said that, one source of observed return pattern could be a different indicators' risk characteristics across *musharakah* parameters. Section 5.6 addresses this issue by controlling some of these correlated variables in cross sectional regression.

Moreover, the changes in the indicators between two periods will trigger trading signals as computed by the M_Score model. Thereafter, trading signals are transformed into a composite score and tabulated with distribution of stock returns in decile table. Hence, this empirical chapter

provides the empirical evidences of the conceptual framework in Section 5.7. The decile rank and model fitting are observed to investigate the relationships between composite score and the expected stock price returns as well as the forecasting accuracy rate. With that, this empirical chapter presents the results and discussions of the *Shariah*-compliant stock price returns based on changes of the financial indicators' signals. It tabulates the distribution of stock price returns in decile table by composite scores assigned using the M_Score computations to measure the statistical significance of the model. Moreover, the decile table shows the relationship between the composite scores with stock price returns. Section 5.8 concludes this empirical chapter by summarising the significance and predictability of the new M_Score model.

5.2 Stocks Universe Analysis

The formal screening methodology for the *Shariah*-compliant stocks was developed in 1995 by SACSC. However, the issuance of *Shariah*-compliant stocks list was first issued two years later (Securities Commission, 2011). Since then, it has been growing progressively at double digit compound annual growth rate (CAGR) of more than 10 percent in terms of market capitalisation, 1997–2016. Whereas, the total stock market listed on Bursa Malaysia registered a CAGR of 8.1 percent only for the same period (source: Bursa Malaysia and Securities Commission). During those periods, there has been 37 lists of *Shariah*-compliant securities issued by SACSC in which published twice a year with an exception of single issuance in 1997.

As at September 2016, the *Shariah*-compliant stocks comprises of 636 companies or about three-quarter of the total number of stocks listed on Bursa Malaysia Securities with market capitalisation shared about two-third as shown in Table 5-1. Whereas, the remaining one-third were predominantly distributed between conventional banking and gaming stocks in which among the top of large size companies. The number of *Shariah*-compliant stocks will be increasing to 671 companies. However, this study excludes the listed funds, suspended stocks and those without sufficient information for data sanctity. In terms of market value, the selected *Shariah*-compliant stocks are worth RM1,031

billion or about one-third of the total market value. This shows that there is sufficient universe of *Shariah*-compliant stocks for portfolio diversifications and rejected the concern that the investment universe is limited. Consistent with Lean and Parsva (2012); Guyot (2011); Alam and Rajjaque (2010); and Kok, Giorgioni and Laws (2009), there are opportunities for investors to construct profitable portfolio of *Shariah*-compliant stocks. Moreover, both Islamic and conventional investors or funds can trade the *Shariah*-compliant stocks regardless their value system, beliefs or investment philosophy.

With that, this study has collected sufficient dataset and well representing the universe of *Shariah*-compliant stocks. The wide-ranging universe is very crucial for this study to achieve its optimal results. At the same time, it has addressed the concern on the investability of *Shariah*-compliant stocks.

Table 5-1: Universe of Selected *Shariah*-compliant Stocks

	***Shariah*-compliant**	**Total Market**
Number of Stocks	636 (70%)	904
Market Values, *RM billion*	1,031 (62%)	1,667

Although there are 24 industry group classifications by GICS®, only 18 industries exist in Bursa Malaysia Securities or selected by this study as shown in Table 5-2. Some industries are excluded such consumer services, bank, diversified financial and insurance since it comprises of only one or two stocks in which is not sufficient and create biasness to represent the respective industry. As for a media sector, there is none that qualified as a *Shariah*-compliant stock. In addition, this study excludes listed funds such as real estate investment trusts (REITS), exchange traded funds (ETF) and closed-end funds (CEF) as they perhaps require a different approach in asset pricing model.

Interestingly, capital good industry has the most stocks with 135 companies. However, they do not represent the largest industry in terms of market value, but telecommunication services industry does with market value of RM202 billion for a total of 10 companies only. Another heavyweight is the utilities industry with an average of market value of RM10.5 billion per company. As mentioned earlier, the missing one-third of financial services related and gaming stocks attribute have attributed to the overall stock returns performance.

Another observation, the distribution of the service and industrial sectors is quite similar and representative to the Malaysian economic structure. This characteristic is beneficial in understanding the impact of major financial economic events on the stock market performances. Since Malaysian economics is export oriented with trade surplus for the past two decades, any global economic events may directly or indirectly influence the stock market performances. Notwithstanding, the global events may not necessarily impact the domestic market given the diversity in international trades where no single country dominates the Malaysian exports.

Table 5-2: Composition of Industries by *Shariah*-compliant Stocks and Market Value

Industry	**Number of Stocks**	**Market Value**, RM million
1. Automobiles & Components	12	13,944
2. Capital Goods	135	146,345
3. Commercial & Professional Services	21	3,950
4. Consumer Durables & Apparel	46	6,140
5. Energy	28	74,219
6. Food & Staples Retailing	71	146,726
7. Health Care Equipment & Services	10	75,164
8. Household & Personal Products	6	10,875
9. Materials	98	42,005
10. Pharmaceuticals, Biotechnology & Life Sciences	10	5,897
11. Real Estate	63	76,740
12. Retailing	18	15,760
13. Semiconductors & Semiconductor Equipment	13	8,546
14. Software & Services	30	8,573
15. Technology Hardware & Equipment	29	10,562
16. Telecommunication Services	10	202,226
17. Transportation	25	70,599
18. Utilities	11	115,724
Total Universe	636	1,031,000
Total Stock Market	904	1,667,000

In summary, the selected *Shariah*-compliant stocks universe comprises of 636 public companies with market capitalisation of RM1,031 billion. Hence, the dataset is sufficient to develop a robust and intuitive stock scoring model. Moreover, it has adequate dataset for the model testing and validations as well as model applications for investments decision making process.

5.3 Financial Characteristic Evidence about *Shariah*-compliant Stocks

There are 636 *Shariah*-compliant stocks considered in this study after filtering the whole stock market universe based on criteria mentioned in Section 4.6. Hence, dataset from these *Shariah*-compliant stocks are translated into 34,750 observations for one-quarter and 34,596 observations for one-year rebalanced portfolio.

Table 5-3 presents descriptive statistics on the financial characteristics of *Shariah*-compliant stocks and the performance of industry returns. The financial characteristics are tabulated for the seven financial descriptors representing the *musharakah* parameters and specific characteristics like market capitalisation, trading volume, leverage ratio, price to book value and net earnings.

The average (median) end-of-year market capitalisation is about RM2.0 billion (RM314 million) in which the smallest companies valued at RM40 million and the largest company has market capitalisation of nearly RM53 billion. These show that *Shariah*-compliant stocks do not discriminate between size of a company and consistent with Banz (1981). The same pattern occurs for the trading volume (VOL) and value or growth orientation (PBV) where *Shariah*-compliant stocks comprises of all range of liquid or illiquid stocks; and value or growth stocks.

On the other hand, the mean leverage ratio (1.7) is lower as compared to conventional stocks[15] (2.3) for the same study period. This is consistent with Ashraf, Felixson, Khawaja and Hussain (2017) and Sensoy (2016), that the *Shariah*-compliant stocks consists of low leverage companies. Additionally, as discussed in Subsection 3.4.3, *Shariah* investing comprises of good performing stocks over the long-term periods. Hence, during the observation periods, the average (median) ROE and ROA realisation are 6.9 percent (7.5 percent) and 3.6 percent (4.0 percent) respectively. These two specific characteristics i.e. low leverage and profitable companies are very unique to *Shariah*-compliant stocks. Consequently, given these two specific characteristics, it provides further justification for *Shariah*-compliant stocks to have its own asset pricing model or stock scoring model.

[15] Aggregate leverage ratio of FBM KLCI Index's component stocks extracted from the Bloomberg Professional®.

Table 5-3: Financial Characteristics of *Shariah*-compliant Stocks

Variable[16]	Mean	Median	Standard Deviation	Minimum	Maximum
TSR	307	199	267	46	1,058
BVA	1,049	263	2,137	41	26,067
OCF	11	1	37	-82	573
ROE	6.9	7.5	13.8	-27.1	108.8
ROA	3.6	4.0	9.7	-19.8	141.9
TOA	600	133	970	16	16,384
TEV	2,609	489	4,967	50	63,686
MKT	2,017	314	3,861	40	52,729
VOL	90	53	109	8	814
LEV	1.7	1.3	1.3	0.2	25.6
PBV	81.4	31.0	181.1	1.3	835.8
EAR	69	14	127	-2	2,290

Total Companies: 636
Total Sectors: 18
Total Data Observations: 34,750 (one-quarter) and 34,596 (one-year)

There are seven financial indicators that explain the *musharakah* parameters that being observed in this study. First, the mean and median aggregate index for all industries (TSR) is 307 and 199 points respectively. Given the base index of 100 in the beginning (base year = 1997) of this study, it will translate to a return of threefold on average. Whereas, if investors manage to market timing the lowest and highest point correctly, they will enjoy the investment returns 23 times of their initial capital within the span of about 20 years. In another word, an investor will double up the money every year. Thus, the scenario illustrates the importance of market timing (Jegadeesh & Titman, 1993) on top of having a good stocks selection process.

[16] MKT represents market capitalisation at the end of quarter in which is measured by total shares outstanding multiply with end of quarter closing stock price. VOL represents total trading volume that is transaction value traded during the quarter. LEV represents leverage ratio calculated as total long-term debts over total assets at the end of quarter. PBV represents price to book value ratio where stock price divided with book value per share at the end of quarter. EAR refers to earnings of the company that is represented by EBITDA.

Second, the book value (BVA) of the *Shariah*-compliant stocks is as small as RM41 million with the largest is about RM26 billion. This suggests that the selected *Shariah*-compliant stocks comprise of business with tangible or intangible assets in which is one of the essential elements in the principle of *musharakah* (Usmani, 1999).

Third, there are negative operating cash flows (OCF) amounted RM82 million. Hence, it is very crucial for the new stock scoring model to separate those stocks in the portfolio. Because with that kind of financial performance, the company's business will not be sustainable and thereafter may lead to insolvency if negative cash flows persist over time (Fairfield, et al., 1996).

Fourth, although the Table 5-3 shows there are companies that generate a negative return on equity (ROE), majority of the companies generate positive returns statistically since the median ROE is in positive territory. Fifth, similarly, the return on assets (ROA) behaves in the same pattern where majority of the *Shariah*-compliant stocks comprise of profitable companies over long-term periods (Sadeghi, 2008).

Sixth, total assets (TOA) of *Shariah*-compliant stocks are tabulated in a wide range with the smallest is RM16 million and the largest with RM16 billion. This is an important factor in forecasting a stock performance since TOA measures the ability of a company to generate values from the assets. Seventh, to have a holistic financial view of a company, an investor can measure the total enterprise value (TEV). In this case, on average, *Shariah*-compliant stocks have about RM2.6 billion (median = RM489 million). Lie and Lie (2002) argue that TEV is a better approach in conducting relative company valuation.

5.4 Return Characteristic Evidence about *Shariah*-compliant Stocks

Table 5-4 illustrates one-quarter and one-year buy-and-hold[17] rolling returns for complete portfolio of *Shariah*-compliant stocks together with the percentile of stock price returns over respective weighting schemes. The weighting schemes are discussed in great details in Subsection 2.5.2. Like Mazouz et al. (2016), *Shariah*-compliant stocks show a co-movement when the stocks included or excluded from the *Shariah*-compliant list where return increases in the following quarter (year) or decreases if otherwise.

Consistent with the previous studies, equally weighted portfolio tends to out-perform during stock market rally (Jacobs, et al., 2014); (DeMiguel, et al., 2009); and (Duchin & Levy, 2009). More so, during this study, the stock market has registered a long run rally after the Asian Financial crisis as shown in Figure 4-1. On the other hand, in Table 5-4, highest mean returns are delivered by equally weighted portfolios with annualised profit of 18.5 percent and 9.6 percent for quarterly rebalanced and yearly rebalanced portfolios respectively. Whereas, portfolio constructed based on a market capitalisation weighting scheme registered the lowest annualised returns in one-quarter and one-year rebalanced portfolios of 11.0 percent and 6.4 percent respectively.

An important highlight in Table 5-4 is the distribution of stock price returns by decile rank i.e. percentile partitions for all periods and weighting schemes. In 10^{th} percentile, the stocks show the lowest annualised stock price returns, whereas, 90^{th} percentile is the highest regardless the weighting schemes. In addition, the stocks with composite scores of 90^{+}–100 produce the highest stock price returns and otherwise for those with lower composite scores. With that, this illustrates on how the

[17] Buy-and-hold portfolio is the investment strategy where an investor purchase and keep the stocks during the lifetime of investment period which is the modest form of portfolio construction (see Subsection 2.5.1). Hence, this study uses buy-and-hold portfolio as the reference or benchmark portfolio when comparing with the other investment strategies.

investors can enhanced their investment returns by focusing on the *Shariah*-compliant stocks with higher composite scores and higher percentile of stock price returns in stocks selection process.

Therefore, any technique that can eradicate the left tail of the distribution of stock price returns in Table 5-4 will significantly enhance the investment performance of Shariah-compliant stock portfolio. Hence, this study offers a new stock scoring model (M_Score model) to separate between the out-performing from the under-performing *Shariah*-compliant stocks.

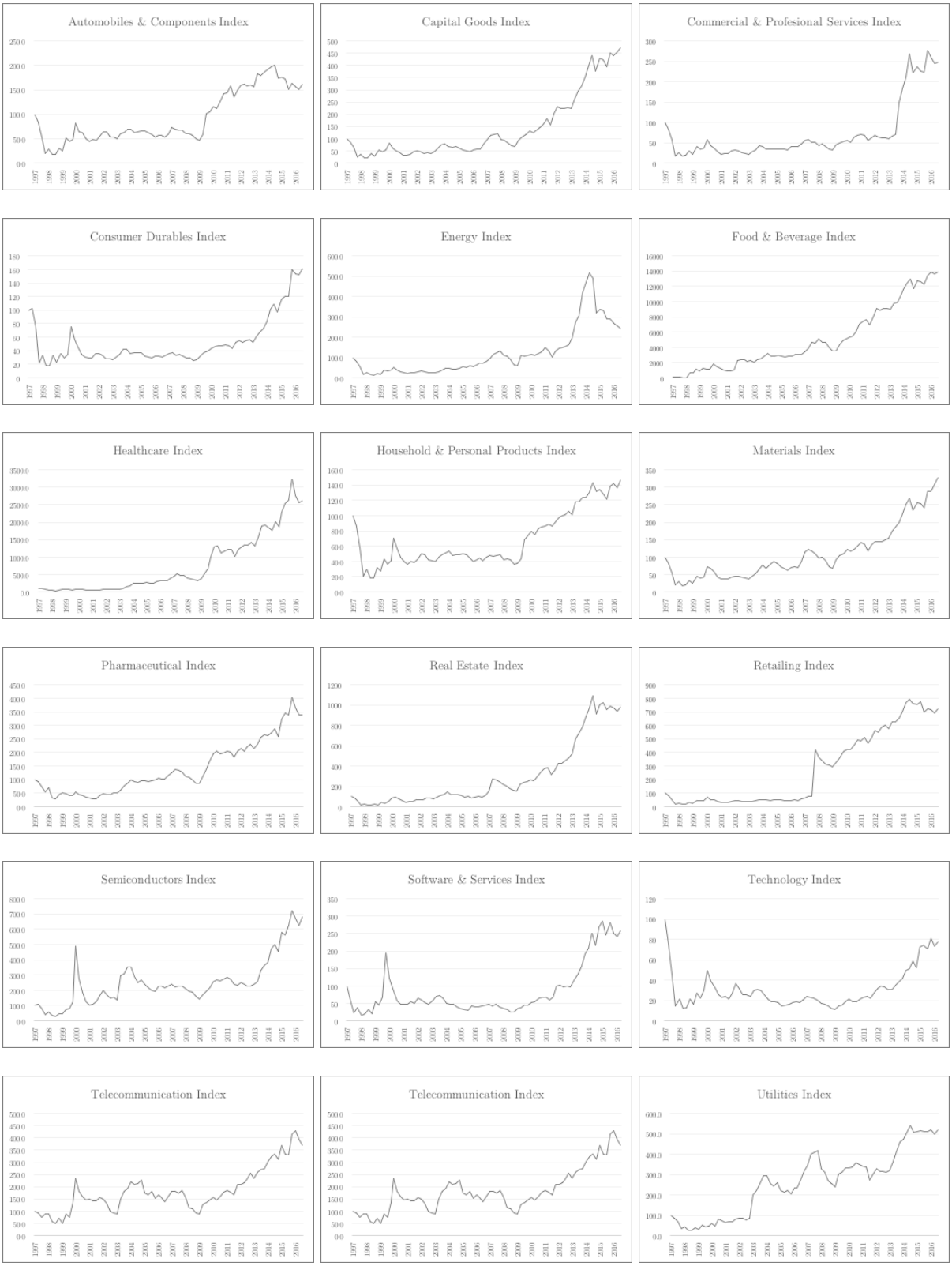
Table 5-4: Return Characteristics for *Shariah*-compliant Stocks

Rolling Returns	Mean	10th Percentile	25th Percentile	Median	75th Percentile	90th Percentile
One-Quarter						
Equal Weighted	0.185	-0.299	-0.099	0.119	0.639	1.140
Price Weighted	0.112	-0.382	-0.162	0.070	0.332	0.626
Market Cap Weighted	0.110	-0.385	-0.192	0.069	0.296	0.598
One-Year						
Equal Weighted	0.096	-0.157	-0.054	0.095	0.334	0.651
Price Weighted	0.075	-0.218	-0.092	0.076	0.221	0.430
Market Cap Weighted	0.064	-0.233	-0.095	0.068	0.217	0.423

On the other hand, Figure 5-1 below presents the industries performance of 18 industry groups as classified by GICS® from 1997 to 2016 that signifies the total sector return (TSR), please refer to Equation 4-3 in Subsection 4.6.1.1 for more details.

Generally, most of the industries had experienced a long stock market rally since post Asian Financial Crisis in which ended in early-2000, although there are several major financial economic events in between the period of this study as presented in Figure 4-1. Since then, the *Shariah*-compliant stocks, on average, had quadrupled the returns. Unlike other industries, the healthcare; and food and beverage industries were showing less sensitive to any financial economic events. These stocks behaviour during major financial economic events are important in developing the new stock scoring model for robustness checks.

Figure 5-1: Stock Portfolio Returns by Industry Sectors



5.5 Relationship between Stock Price Returns and Financial Indicators

The Spearman correlations analysis in Table 5-5 presents a combination of two relationship studies between one-quarter and one-year stock price returns respectively with seven financial indicators and composite score of the M_Score model for *Shariah*-compliant stocks. This study is for the period from June 1997 to September 2016, being observed on 636 public listed companies representing an aggregate of 18 industries.

Unsurprisingly, the M_Score model has a significant positive correlation with both one-quarter and one-year future stock price returns with 0.323 and 0.208 respectively. Interestingly, the five strongest individual explanatory variables are TSR, OCF, ROE, ROA and TOA have significant positive correlation of 0.679, 0.668, 0.660, 0.649 and 0.769 respectively of which representing each of the *musharakah* parameter. Hence, the results strongly suggest that the M_Score model demands all the *musharakah* parameters to be existent with at least one financial indicator representing each *musharakah* parameter (industry performance, management style, profitability ratio and capital growth) to generate robust and intuitive results.

Table 5-5: Correlation between Stock Price Returns, Financial Indicators and M_Score

	TSR	BVA	OCF	ROE	ROA	TOA	TEV	*M_SCORE*
ONE-QTR	0.544	0.034	0.016	0.097	0.093	0.048	0.761	0.323
ONE-YEAR	0.320	0.036	0.001	0.124	0.125	0.108	0.350	0.208
TSR	1.000	0.018	-0.007	0.047	0.050	0.063	0.389	0.679
BVA		1.000	0.041	-0.020	0.032	0.115	0.053	0.134
OCF			1.000	0.016	0.003	0.046	-0.010	0.668
ROE				1.000	0.965	0.097	0.066	0.660
ROA					1.000	0.096	0.043	0.649
TOA						1.000	0.016	0.769
TEV							1.000	0.193
M_SCORE								1.000

On the other hand, one-quarter and one-year stock price returns show a strong positive correlation with total sector return (TSR) and total enterprise value (TEV). However, the positive correlation is lower for one-year portfolio returns. The results suggest that the stock price returns are highly influenced by the TSR and TEV which are similar to Phylaktis and Xia (2006); and Lo and MacKinlay (1990) studies respectively.

Another important highlight is that the financial indicators are not correlated to each other except for ROE and ROA. These two indicators are expected to be highly correlated since they are representing the same *musharakah* parameters of profitability ratios. Hence, this led to the concern of collinearity issue which means that the ROA or ROE can be linearly predicted from the others with a substantial degree of precision. Instead of eliminating either of this financial indicator, this study maintains both indicators in the M_Score model formulation for two reasons. First, this study observed that there are rampant missing values in the raw dataset. By having two financial indicators to represent a single *musharakah* parameter in the M_Score model formulation, it will make the model more robust and flexible in handling the missing values. Second, the present of highly correlated indicators within the same *musharakah* parameter will not mathematically affect the composite score of the model formulation. This happens because computation of composite score is by averaging the individual score of all financial indicators as shown in illustrations below based on the formulation in Equation 4-1:

$$M\_Score = E[M] = \sum_{k=1}^{7} m_k$$

In Scenario A, assuming all the individual score is 50, the composite score will be 50. On the hand, in Scenario B, assuming all the individual score is 50 except for ROA which is missing value, the composite score will be 50 as well. Therefore, collinearity issue within the same *musharakah* parameters in this study does not arise.

5.6 Cross Sectional Variation in Stock Price Returns

One source of observed pattern for stock price returns could be different risk characteristics across financial indicators of the *musharakah* parameters. Hence, this study is expecting an addition of variable (financial indicator) that will further improve the model performance in terms of its *F*-test. With that, Table 5-6 below addresses this issue by controlling some of these correlated variables in cross sectional regression.

To explicitly control on some of these correlated financial indicators, this study measures the following cross-sectional regression within the *Shariah*-compliant stocks:

$$Return_i = \alpha + \beta_1 TSR + \beta_2 BVA_i + \beta_3 \mathrm{OCF}_i + \beta_2 \mathrm{ROE}_i + \beta_2 \mathrm{ROA}_i + \beta_2 TOA_i + \beta_2 TEV_i + \varepsilon$$

where $Return$ is the quarterly or yearly rebalanced returns, β is the coefficient for respective fundamental financial indicator; ε is the error term of returns that are not explained by the financial descriptors; and i is the *Shariah*-compliant stock referred. Thereafter, this study runs a regression analysis by accumulating the financial indicators as per *musharakah* parameters in each step. There are four steps in this cross-sectional variation study.

The results of coefficients on TSR indicate that after controlling for BVA, OCF, ROE, ROA, TOA and TEV differences, a one-point improvement in TSR score (industry performance parameter) is linked with about 3.0 percent increase in the one-quarter stock price returns earned subsequent to the portfolio formation. Whereas, controlling the rest of the indicators' differences for management style parameter (BVA and OCF), profitability ratio (ROE and ROA) and capital growth (TOA and TEV) are linked with about 0.1 percent to 8.9 percent changes in stock price returns in the following period. These illustrations are based on the result shown below in (4) of Table 5-6.

In the pooled regressions presented in Table 5-6, for every controlled variable(s) – financial indicators, the regression models maintain their statistical significance at 1 percent level for individual

financial indicators and overall model performance (see F results at the bottom of Table 5-6). Having said that, the TSR and OCF are less responsive to the model as in (2) and (3) respectively. However, when all financial indicators are added up, the model increases its predictive power. This illustrates that the model is again demands all of the *musharakah* parameters with at least one representative from financial indicators to be present as it explains the stock price returns.

Moreover, the adjusted R-squared has increased and the error term has decreased as the model adding new variables (financial indicators) as shown in the regression models – (2), (3) and (4). These indicate that the M_Score model improves its predictive power after considering all the financial indicators that representing the *musharakah* parameters.

Table 5-6: Cross Sectional Regression of Financial Indicators

	Intercept	TSR	BVA	OCF	ROE	ROA	TOA	TEV	Adj. R^2
(1)	0.291	0.003							0.672
	(1.903)	(9.651)							
(2)	-1.322	0.000	0.015	0.008					0.771
	(-3.404)	(0.111)	(4.468)	(1.677)					
(3)	-0.278	-0.001	0.010	0.000	-0.113	0.279			0.920
	(-0.989)	(-2.040)	(4.118)	(-0.089)	(-4.136)	(5.404)			
(4)	-1.734	-0.001	0.008	0.003	-0.089	0.195	-0.001	0.009	0.983
	(-9.878)	(-4.380)	(7.791)	(2.327)	(-6.981)	(7.837)	(-2.071)	(11.461)	

(1) The coefficients and (*t*-statistic) from pooled regressions of controlled variables between stock returns with total stock returns (TSR), where F = 93.134 and ε = 0.615.
(2) The coefficients and (*t*-statistic) from pooled regressions of controlled variables between stock returns with TSR, book value (BVA) and operating cash flow (OCF), where F = 51.563 and ε = 0.513.
(3) The coefficients and (*t*-statistic) from pooled regressions of controlled variables between stock returns with TSR, BVA, OCF, return on equity (ROE) and return on assets (ROA), where F = 104.729 and ε = 0.303.
(4) The coefficients and (*t*-statistic) from pooled regressions of controlled variables between stock returns with TSR, BVA, OCF, ROE, ROA, total assets (TOA) and total enterprise value (TEV), where F = 376.116 and ε = 0.139.

Hence, the predicted stock price returns of *Shariah*-compliant stock, i, can be written as per the following equation:

$$Return_i = -1.734 - 0.001\ \mathrm{TSR}_i + 0.008\ \mathrm{BVA}_i + 0.003\ \mathrm{OCF}_i - 0.089\ \mathrm{ROE}_i + 0.195\ \mathrm{ROA}_i - 0.001\ \mathrm{TOA}_i + 0.009\ \mathrm{TEV}_i + 0.139$$

5.7 Distribution of Stock Price Returns by Composite Scores

In addition to exploring the relationship between the stock price returns and financial indicators as well as cross sectional variation in stock price returns, this study further investigates the distribution of stock price returns given the respective composite scores. It basically tabulates the composite scores of the M_Score model against the stock price returns using a decile rank table. The first objective is to establish the understanding that composite scores have a monotonic positive relationship with the stock price returns. In other word, higher composite score should suggest higher expected stock price returns and otherwise when a stock produces lower composite score. Secondly, the composite scores and percentage of positive stock price returns should experience the same relationship as well where the latter provides forecasting accuracy rate.

The Table 5-7 below presents the decile rank table of composite scores of M_Score model against stock price returns of *Shariah*-compliant stocks. The decile rank table are divided into 10th, 25th, 50th (median), 75th and 90th percentiles as well as mean and percentage positive columns. At the same time the row of composite scores are grouped into 0–10, 10^{+}–20, 20^{+}–30, 30^{+}–40, 40^{+}–50, 50^{+}–60, 60^{+}–70, 70^{+}–80, 80^{+}–90 and 90^{+}–100 scores. In addition, low score and high score are presenting the composite scores between 0 to 50 and more than 50 to 100 scores respectively. Moreover, the 'High–All' is a subtraction of the stock price returns for high score and all firm score. The same approach is done for 'High – Low' where the stock price returns of a high score minus a low score. Thereafter, the composite scores and percentile decile rank are examined for significance and correlation tests. Hence, the panel A presents annualised returns of one-quarter rebalanced

portfolio and the panel B presents one-year results for period during 1997 to 2016. However, the discussions and subsequent analysis will focus on one-quarter annualised returns for clarity.

In Table 5-7, this study observes that majority of the composite scores for *M_Score* model is gathered between 20 and 70, demonstrating that the *Shariah*-compliant stocks commonly have conflicting performance signals. However, there are 17,819 observations in Panel A that categorised as high score stocks, i.e. composite scores of more than 50. At the same time, 16,931 observations are categorised as low score stocks i.e. composite scores of less than or equal to 50. Hence, this study uses these decile rank and composite scores grouping to test the ability of the new stock scoring model to distinguish between future winners (out-perform) and losers (under-perform).

The most remarkable result in Table 5-7 is the fairly monotonic positive relationship between composite scores of the M_Score model and subsequent stock price returns particularly over one-quarter period. As shown in panel A, the high score stocks significantly out-perform the overall Shariah-compliant stocks universe with mean returns of 1.334 as compared to -0.831 for *Shariah*-compliant stocks with low scores. The relative mean returns of 0.251 is significant at 1 percent level using both empirically derived distribution of potential relative stock price returns and a parametric *t*-statistic. Similarly, the high score stocks are significantly out-performing the low score stocks by mean returns of 2.165.

Additionally, the distribution of stock price returns has improved above the mean return across the various portfolios of high composite scores. As mentioned in the research aim and objectives, this study is designed to shift the entire distribution of stock price returns earned by the investor in the Shariah-compliant stocks. Consistent with the first research objective, the results in Table 5-7 displays that the stock price returns for mean, 10^{th} percentile, 25^{th} percentile, median, 75^{th} percentile and 90^{th} percentile of high score stocks are significantly higher than the corresponding returns of both low score stocks and the entire *Shariah*-compliant stocks using statistical significance test.

Moreover, the composite scores are positively and highly correlated the stock price returns in all percentile portfolios.

Although the Panel B shows a similar pattern of results with Panel A, the overall stock price returns of one-year deliver slightly lower gains (0.215) as compared to one-quarter results (0.251) across the percentile portfolios. Moreover, the same arrays in Panel B are shown for the correlation studies between composite scores and stock price returns which is lower than Panel A where the R-squared is 0.848 for the former and 0.925 for the latter. Nonetheless, one-year stock price returns are still statistically significant and positively correlated even at lower rates.

Table 5-7: Stock Price Returns by Composite Scores

Panel A: One-Quarter Rolling Returns by Composite Scores								
	Mean	10th	25th	Median	75th	90th	% Positive	*n*
All Firms	0.251	-0.798	-0.403	0.076	0.698	1.402	0.464	34,750
M_Score								
0–10	-2.306	-2.965	-2.770	-2.388	-1.988	-1.456	0.002	297
10^{+}–20	-1.171	-1.800	-1.548	-1.196	-0.804	-0.501	0.018	473
20^{+}–30	-0.417	-1.354	-0.982	-0.534	-0.067	0.329	0.240	2,146
30^{+}–40	-0.259	-1.079	-0.688	-0.295	0.073	0.473	0.283	5,521
40^{+}–50	-0.002	-0.763	-0.393	-0.066	0.272	0.757	0.426	8,494
50^{+}–60	0.213	-0.576	-0.219	0.084	0.481	1.061	0.567	8,882
60^{+}–70	0.399	-0.536	-0.170	0.221	0.771	1.443	0.634	5,650
70^{+}–80	0.685	-0.491	-0.078	0.392	1.172	2.106	0.663	2,148
80^{+}–90	1.988	0.234	0.811	1.710	2.788	3.942	0.898	839
90^{+}–100	3.382	1.350	2.008	2.834	4.283	5.864	0.913	300
Low Score	-0.831	-1.592	-1.276	-0.896	-0.503	-0.079	0.194	16,931
High Score	1.334	-0.004	0.471	1.048	1.899	2.883	0.735	17,819
High – All	1.082	0.794	0.873	0.972	1.201	1.481	0.271	
High – Low	2.165	1.588	1.746	1.944	2.402	2.962	0.541	
p-Value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	
R^2	0.925	0.910	0.910	0.915	0.919	0.919	0.970	

Note: * Statistically significant at 1 percent level.

Table 5: Stock Price Returns by Composite Scores (continued)

Panel B: One-Year Rolling Returns by Composite Scores								
	Mean	10th	25th	Median	75th	90th	% Positive	*n*
All Firms	0.215	-0.370	-0.175	0.095	0.437	0.873	0.497	34,596
M_Score								
0–10	-0.570	-0.753	-0.695	-0.604	-0.482	-0.349	0.025	289
10^{+}–20	-0.235	-0.614	-0.516	-0.301	-0.051	0.210	0.231	470
20^{+}–30	-0.078	-0.604	-0.393	-0.146	0.089	0.429	0.331	2,129
30^{+}–40	-0.018	-0.481	-0.278	-0.082	0.127	0.466	0.392	5,506
40^{+}–50	0.090	-0.370	-0.187	0.008	0.227	0.599	0.512	8,465
50^{+}–60	0.197	-0.315	-0.123	0.084	0.371	0.787	0.602	8,841
60^{+}–70	0.269	-0.291	-0.105	0.126	0.451	0.951	0.638	5,637
70^{+}–80	0.280	-0.324	-0.117	0.105	0.483	1.013	0.601	2,134
80^{+}–90	0.628	-0.239	0.046	0.423	0.886	1.553	0.746	828
90^{+}–100	1.582	0.287	0.619	1.339	2.269	3.076	0.893	297
Low Score	-0.162	-0.564	-0.414	-0.225	-0.018	0.271	0.298	16,859
High Score	0.591	-0.176	0.064	0.416	0.892	1.476	0.696	17,737
High – All	0.377	0.194	0.239	0.320	0.455	0.603	0.199	
High – Low	0.753	0.388	0.478	0.641	0.910	1.205	0.398	
p-Value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	
R^2	0.848	0.787	0.844	0.833	0.849	0.835	0.916	

Note: * Statistically significant at 1 percent level.

Overall, the new stock scoring model clearly shows that the M_Score model can distinguish between eventual out-performing and under-performing *Shariah*-compliant stocks. Another important observation is that the M_Score model responds better in a shorter period of one-quarter as compared to a longer period of one-year with higher stock price returns. In other word, the new stock scoring model is responding better to the recent information as compared to the longer observation periods.

5.8 Conclusion

This empirical chapter analyses the descriptive statistics of the dataset used in this study as the evidences about the *Shariah*-compliant stocks. Moreover, this study illustrates the rationale and justifications to develop a new stock scoring model in separating the out-performing from the under-performing stocks. In addition, this study examines the relationship between the newly developed stock scoring model and the stock price returns.

Hence, with the filtering criteria established as stated in Chapter 4, this study deduces the *Shariah*-compliant stocks to 636 companies. Within these companies, after considering the missing values in which are not substituted with any replacement values in order to maintain its originality, there are 34,750 and 34,596 observations for one-quarter and one-year dataset respectively. In addition, there are 18 industry groups to represent these 636 *Shariah*-compliant stocks. Although there are 24 industry groups as categorised by GICS®, the remaining industries do not have meaningful representation, or they are non-ordinary stocks such listed funds. Like many other studies, this study reconfirms that *Shariah*-compliant stocks comprises mainly a low leverage stocks as compared to the conventional peers. In addition, the *Shariah*-compliant stocks constitute profitable companies over a long-term period although some restrictions are imposed on them. Besides that, *Shariah*-compliant stocks do not discriminate between company size, value orientations or trading volume.

Among all, this empirical chapter rationalised the need to separate between out-performing from under-performing *Shariah*-compliant stocks to enhance its portfolio returns, regardless the investment strategies being employed. Subsequently, this study has conducted three statistical tests on the relationship between the M_Score model and the stock price returns.

Firstly, the M_Score model has shown a significant positive correlation to both one-quarter and one-year future rolling returns. Interestingly, the four strongest individual explanatory variables are TSR, OCF, ROE, ROA and TOA with a significant positive correlation of which representing each

of four *musharakah* parameters. Another important highlight is that the financial indicators are not correlated to each other except for ROE and ROA. These two indicators are expected to be highly correlated since they are representing the same *musharakah* parameters i.e. profitability ratios. Hence, this led to the concern of collinearity issue which means that the ROE or ROA can be linearly predicted from the other financial indicators with a substantial degree of precision. Instead of eliminating one of them, the M_Score model maintains both ROE and ROA values since they will not jeopardise the model predictive power as proved by the mathematical illustration in Section 5.4.

Secondly, the pooled regressions have evidenced that for every controlled financial indicator, the regression models maintain their statistical significance for individual financial indicator and overall model performance. Moreover, the M_Score model improves its predictive power when the financial indicators are progressively added into the model.

Thirdly, this study presents the stock price returns to composite scores of financial indicators that represent the *musharakah* parameters to measure the statistical significance and correlation between the M_Score model and the stock price returns. In addition, forecasting accuracy ratio has also been presented to validate the persistency of the new stock scoring model. In this study, the results have shown a monotonic positive relationship between the M_Score and subsequent annualised stock price returns over one-quarter and one-year periods. Moreover, the M_Score is statistically significant with all the distributions of the stock price returns in the decile table and has highly positive correlation for both one-quarter and one-year future stock price returns.

With that, this empirical chapter has addressed the first research question on how does the M_Score explains the distribution of the stock price returns. Hence, the results have demonstrated that the new stock scoring model, M_Score model, is fairly monotonic positive relationship and highly correlated between composite scores and stock price returns. Moreover, all musharakah parameters with at least one financial indicator represented is required to generate better results. These results

are coherent with the conceptual framework as discussed in earlier chapters of the four *musharakah* parameters namely industry performance, management style, profitability ratios and capital growth explain stock price returns.

Chapter Six

Examining the Robustness and Intuitiveness of Stock Scoring Model

6.1 Introduction

In Chapter 5, this study has demonstrated the evidences about unique characteristics of *Shariah*-compliant stocks. In addition, the empirical results have exhibited that the M_Score model and the stock price returns have a fairly monotonic positive relationship and highly correlated. Nonetheless, having statistical relationship studies alone are not sufficient. A good stock scoring model needs to address the temporal issue in maintaining its robustness. Another main concern is whether the excess of the stock price returns earned are contributed by other factors like company size, stock orientation, trading volume, stock price or leverage position. Hence, the objectives of this empirical chapter are to observe the model performance in any economic cycle and to address the concerns of these stock specific characteristics effects on the abnormal of the stock price returns. Subsequently, this study wants to put in the practicality of using the M_Score model in various stock portfolio strategies that are commonly used by the investors.

The remaining chapter in Section 6.2 addresses the robustness concern on temporal issue that the model may only perform in a single period by partitioning the *Shariah*-compliant stocks into several periods. Each period represents the major financial economic events in which it has seven major events. In addition, the concern on ad hoc variables selection is addressed through understanding the relationship between the stock returns, the financial indicators and the M_Score model. This is to ensure the variables selected have a meaningful economic and financial explanations. Thus, this

study observes the stock price returns to financial economic events happened during this study, from 1997 to 2016.

On the other hand, many studies have suggested that small companies effect contributes to the abnormal stock returns. However, the small companies under-perform the large companies during the declining of stock market although both of them register negative returns, while value stocks tend to out-perform during a long-term stock market rally. Whereas, penny stocks tend to attract more investors, but it may not necessarily translate to positive returns. Besides that, high leverage stocks may be in favour during the economic expansion. Hence, Section 6.3 presents the stock returns conditional on a company size. Similar approaches are presented for partitions on stock orientation, trading volume, stock price and leverage position in Section 6.4, Section 6.5, Section 6.6 and Section 6.7 respectively.

Following that, this study examines the outcome of the profitability when applied into actual portfolio strategies. Hence, Section 6.8 illustrates the results of the model applications on annualised mean raw and risk adjusted returns of 81 portfolio strategies for quarterly rebalanced portfolio into a single matrix or heatmap. The raw returns refer to gains without considering the risk consumes in such stock trades and otherwise for risk adjusted returns. Whereas, the portfolio strategies are based on market capitalizations (small capitalisation, medium capitalisation and large capitalisation); weighting schemes (equal weighted, stock price weighted and market value weighted); stock orientations (value style, blend style and growth style); and trade positions (buy-and-hold, long-only and long-short). The conclusion is enclosed in Section 6.9.

6.2 Stock Price Returns to Financial Economic Events

There were seven major financial economic events within 1997 to 2016 that impacting the KLCI, a benchmark stock index for Bursa Securities Malaysia. Table 6-1 below summarised the financial economic events. First, Asian Financial Crisis started in February 1997 to September 1998 with the

index dropped by 79% and rebounded by 286% increase. Second, Dotcom Bubble started in February 2000 to April 2001 with the index dropped by 45% and rebounded by 46% increase. Third, SARS started in April 2002 to March 2003 with the index dropped by 23% and rebounded by 145% increase. Fourth, Global Financial Crisis started in January 2008 to October 2008 with the index dropped by 40% and rebounded by 92% increase. Fifth, European Debt Crisis started in July 2011 to September 2011 with the index dropped by 17% and rebounded by 38% increase. Sixth, Oil Glut started in September 2014 to December 2014 with a dropped by 10% and rebounded by 11% increase. Lastly, China Slowdown started in April 2015 till August 2015 with the index dropped by 16% and rebounded by 5% increase as at September 2016.

Table 6-1: Rise and Fall of Kuala Lumpur Composite Index

Economic Event	Drawdown Period	% Change	Rebound Period	% Change
1. Second Board Super bull	-	-	March 1995 to 28 February 1997	51%
2. Asian Financial Crisis	28 February 1997 to 1 September 1998	-79%	1 September 1998 to 18 February 2000	286%
3. Dotcom Bubble	18 February 2000 to 9 April 2001	-45%	9 April 2001 to 23 April 2002	46%
4. SARS	23 April 2002 to 11 March 2003	-23%	11 March 2003 to 11 January 2008	145%
5. Global Financial Crisis	11 January 2008 to 29 Oct 2008	-40%	29 October 2008 to 8 July 2011	92%
6. European Debt Crisis	8 July 2011 to 26 September 2011	-17%	26 September 2011 to 29 September 2014	38%
7. Oil Glut	29 September 2014 to 16 December 2014	-10%	16 December 2014 to 24 April 2015	11%
8. China Slowdown	24 April 2015 to 21 August 2015	-16%	21 August 2015 to 30 September 2016	5%

Source: Bursa Securities Malaysia.

Table 6-2 below presents the mean and median stock returns for all companies and their statistical significance and correlation with the *Shariah*-compliant stocks. The stocks are divided into those with high composite scores, low composite scores and high minus low composite scores. It also observes the drawdown period and rebound period in any particular financial economic events.

During the Asian Financial Crisis which is directly related to the Malaysian stock market, the new stock scoring model shows a statistically significance at 1 percent level and highly correlated in both periods (drawdown and rebound). The same scenario shows for one-quarter and one-year rebalanced portfolio.

Similar results are shown during Dotcom Bubble though statistically significance at 5 percent while maintaining the high correlation as per Asian Financial Crisis. It is important to highlight that technology related industries have impacted the most. Hence, consolidating the results may not provide clearer picture for individual industrial. This provides a strong rationale for having an industry performance variable in the M_Score model.

The subsequent financial economic events though statistically significant, have a lower correlation. For instance, the SARS although a serious pandemic globally but a severe impact is only on Hong Kong stock market. Whereas, the Global Financial Crisis was centred in the United States in which predominantly involving financial services and real estate industries directly. Having said that, the spill over is the liquidity drain in the financial system as well as ability for global banks to raise capital. While in European Debt Crisis, the issues are surrounding the several governments in managing their balance sheet. Those countries like Portugal, Ireland, Italy, Greece and Spain have stretch sovereign debts to gross domestic product (GDP).

As for the Oil Glut, though Malaysia is depending on oil and gas industry, there are limited numbers of stocks to influence the overall stock market performance. For example, in this study oil and gas

industry has a share of 4 percent (or RM74 billion) only in total stock market, please refer to Energy Industry in Table 5-2 for more details.

Lastly, China Slowdown also has a significant impact on Bursa Securities Malaysia performance but with lower correlation although Malaysia-China is among the top trading partner. Nevertheless, not many listed companies on Bursa Securities Malaysia has a direct relationship with China businesses.

Therefore, as expected, the new stock scoring model maintains its predictive power in all financial economic events though those events occurred outside the Southeast Asia region have lower correlations with domestic stock market performance. The findings have similar pattern with Zainal, Yusof and Jusoff (2009) study on Malaysian stock market. Hence, there will be no concern on the temporal issue in the M_Score model since it responds well to any given periods.

Table 6-2: Relationship of Stock Price Returns to Financial Economic Events

Panel A: Relationship of One-Quarter Rolling Returns to Financial Economic Events

Event	Drawdown Period						Rebound Period					
	All Firms	High Score	Low Score	High – Low	*p*-Value	R^2	All Firms	High Score	Low Score	High – Low	*p*-Value	R^2
Asian Financial Crisis												
Mean	-0.151	0.258	-0.367	0.646	0.006*	0.855	0.304	0.506	-0.161	0.620	0.002*	0.942
Median	-0.119	0.305	-0.340	0.670	0.006*	0.856	0.369	0.586	-0.123	0.665	0.002*	0.917
Dotcom Bubble												
Mean	0.066	0.238	-0.158	0.414	0.013**	0.744	0.039	0.145	-0.086	0.234	0.020*	0.736
Median	0.111	0.283	-0.105	0.411	0.013**	0.728	0.090	0.215	-0.056	0.275	0.020*	0.710
SARS												
Mean	0.058	0.147	-0.059	0.186	0.020**	0.729	0.027	0.073	-0.024	0.092	0.012**	0.382
Median	0.111	0.210	-0.017	0.208	0.020**	0.715	0.077	0.131	0.021	0.105	0.012**	0.371
Global Financial Crisis												
Mean	-0.056	-0.012	-0.094	0.080	0.018**	0.322	0.042	0.088	-0.002	0.092	0.014**	0.404
Median	-0.014	0.031	-0.052	0.081	0.018**	0.265	0.099	0.156	0.052	0.104	0.014**	0.398
European Debt Crisis												
Mean	0.041	0.092	-0.009	0.101	0.019**	0.334	0.068	0.091	0.048	0.044	0.014**	0.131
Median	0.088	0.143	0.036	0.106	0.020**	0.405	0.116	0.148	0.093	0.057	0.014**	0.135
Oil Glut												
Mean	0.030	0.053	0.004	0.049	0.018**	0.203	0.035	0.057	0.008	0.049	0.017**	0.214
Median	0.074	0.105	0.045	0.061	0.018**	0.143	0.082	0.106	0.055	0.052	0.017**	0.189
China Slowdown												
Mean	0.054	0.076	0.020	0.049	0.023**	0.215	-	-	-	-	-	-
Median	0.092	0.121	0.045	0.067	0.022**	0.238	-	-	-	-	-	-

Panel B: One-Year Rolling Returns to Financial Economic Events

Event	Drawdown Period						Rebound Period					
	All Firms	High Score	Low Score	High – Low	*p*-Value	R^2	All Firms	High Score	Low Score	High – Low	*p*-Value	R^2
Asian Financial Crisis												
Mean	-0.064	0.546	-0.444	1.017	0.006*	0.716	0.695	0.856	0.375	0.457	0.008*	0.603
Median	0.007	0.635	-0.382	1.043	0.006*	0.684	0.900	1.102	0.503	0.581	0.009*	0.595
Dotcom Bubble												
Mean	-0.023	0.074	-0.162	0.228	0.016**	0.308	0.144	0.155	0.110	0.032	0.026**	0.037
Median	0.090	0.153	0.013	0.135	0.018**	0.263	0.232	0.262	0.179	0.066	0.026**	0.241
SARS												
Mean	0.259	0.329	0.138	0.145	0.027**	0.439	0.056	0.101	-0.003	0.091	0.012**	0.331
Median	0.390	0.464	0.274	0.149	0.028**	0.430	0.183	0.235	0.117	0.096	0.012**	0.266
Global Financial Crisis												
Mean	0.088	0.134	0.027	0.098	0.019**	0.063	0.248	0.324	0.170	0.149	0.014**	0.396
Median	0.209	0.263	0.144	0.113	0.021**	0.073	0.396	0.514	0.284	0.221	0.017**	0.323
European Debt Crisis												
Mean	0.166	0.164	0.170	0.013	0.021**	0.326	0.238	0.281	0.206	0.083	0.015**	0.213
Median	0.237	0.243	0.240	0.022	0.022**	0.300	0.369	0.422	0.339	0.092	0.017**	0.192
Oil Glut												
Mean	0.071	0.095	0.046	0.049	0.020**	0.236	0.078	0.099	0.052	0.048	0.018**	0.191
Median	0.144	0.180	0.110	0.070	0.020**	0.238	0.159	0.191	0.129	0.064	0.018**	0.198
China Slowdown												
Mean	0.098	0.127	0.041	0.056	0.023**	0.289	-	-	-	-	-	-
Median	0.142	0.179	0.069	0.078	0.023**	0.290	-	-	-	-	-	-

Note: * Statistically significant at 1 percent level and ** Statistically significant at 5 percent level

6.3 Stock Price Returns Conditional on Company Size Partitions

For company size analysis, this study ranks the one-quarter returns into a decile table based on the composite score in each observation. They are 34,750 company-observations during the period, June 1997 to September 2016. The M_Score model computes composite score of momentum signals into the three size portfolios. This study defines the company size as the company's market capitalisation at the end of each quarter. The size portfolios are assigned based on the percentile of each company's market capitalisation. Small companies are those within 33.3 percentile or less, followed by medium companies and large companies. These companies are those sitting within 33.3 to 66.6 percentile and more than 66.6 percentile respectively. Table 6-3 presents one-quarter returns based on these size categories.

Given the financial characteristics of the *Shariah*-compliant stocks, enormous companies (32,133) are concentrated in the bottom third of market capitalisation (92.4 percent). While 1,496 (4.3 percent) and 1,275 (3.3 percent) are assigned to the middle and top size portfolio respectively. Applying the M_Score model within each size partition, the biggest winner from fundamental momentum analysis are also small companies. The mean stock returns for small companies are 0.071 which is 19 basis points[18] more than the large companies (0.052).

At the same time the decile rank between composite scores with mean and median stock returns for all size portfolios is statistically significant at 1 percent level. On top of that, the high score minus the low score registered positive mean returns (0.244) for small companies. Besides that, the relationship between composite scores with mean and median returns for all company size portfolios

[18] One basis point is equivalent to 0.01% or 1/100th of a percent or 0.0001 in decimal form.

remain positively correlated. This is consistent with Schwert (1983) works on a relationship study between company size and stock price returns.

Table 6-3: Returns Conditional on Company Size

	Large Companies			Medium Companies			Small Companies		
	Mean	Median	n	Mean	Median	n	Mean	Median	n
All Firms	0.052	0.037	32,133	0.070	0.060	1,496	0.071	0.068	1,275
M_Score[a]									
0–10	-0.597	-0.594	268	-0.434	-0.434	14	-0.467	-0.467	15
10^{+}–20	-0.279	-0.284	453	-0.353	-0.352	19	-0.326	-0.326	19
20^{+}–30	-0.104	-0.122	2,021	-0.090	-0.100	71	-0.127	-0.123	54
30^{+}–40	-0.064	-0.076	5,170	-0.038	-0.051	193	-0.068	-0.070	158
40^{+}–50	-0.001	-0.021	7,749	0.010	-0.004	390	0.000	0.002	355
50^{+}–60	0.048	0.018	8,037	0.048	0.033	477	0.073	0.057	368
60^{+}–70	0.085	0.055	5,226	0.125	0.091	208	0.124	0.094	216
70^{+}–80	0.198	0.172	2,026	0.194	0.161	77	0.237	0.241	45
80^{+}–90	0.488	0.477	813	0.448	0.438	32	0.602	0.610	33
90^{+}–100	0.749	0.749	370	0.814	0.814	15	0.659	0.659	12
Low Score[b]	-0.209	-0.219	15,661	-0.181	-0.188	687	-0.197	-0.197	601
High Score[c]	0.314	0.294	16,472	0.326	0.307	809	0.339	0.332	674
High–All[d]	0.261	0.257		0.253	0.248		0.268	0.265	
High–Low[e]	0.523	0.513		0.507	0.495		0.536	0.529	
p-Value[f]	0.001	0.001		0.000	0.000		0.001	0.001	
R-squared[g]	0.717	0.721		0.761	0.741		0.806	0.785	

a. M_Score has the same meaning with composite score where it illustrates the results of aggregate changes in the seven financial indicators that representing *musharakah* parameters.
b. Low Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of 50 and below in which considered as under-performing companies.
c. High Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of more than 50 considered as out-performing companies.
d. High–All is the aggregate stock price returns of High Score minus All Firms where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
e. High–Low is the aggregate stock price returns of High Score minus Low Score where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
f. p-value for the mean and percentiles are from two-sample t–tests of signed rank where a low p-value of less than 0.01 suggests that the distribution of stock price returns provides enough evidence that this study can reject the null hypothesis for the M_Score and presumes statistically significant in this Wilcoxon test of stock price returns.
g. R-squared is the correlation study measures of dependency between two sets of variables in the Spearman product moment correlation coefficient where a correlation close to 1 suggests that the composite M_Score or individual financial indicators scores is highly correlated with stock price returns and close to 0 is highly uncorrelated.

6.4 Stock Price Returns Conditional on Stock Orientation Partitions

Similar to partition by company size, this study ranks the one-quarter returns into decile table based on the momentum signals in each observation. They are 79 quarter periods for investment horizon 1997 to 2016 with 34,750 company-observations. The M_Score model computes composite score of momentum signals into three portfolios – value style, blend style and growth style. Stock orientation is the investment style which defines value style stocks as stocks with relatively have lower price to book value. Whereas, growth style stocks work the opposite. The stock orientation portfolios are assigned based on the percentile of each company's price to book value (PBV). Those stocks in the top third of PBV are considered as growth style stocks. While the bottom third are classified as value style stocks and the rest will be blend style stocks. These value style, blend style and growth style stocks are presented in Table 6-4.

Table 6-4 shows that the *Shariah*-compliant stocks are skewed to the value style with 31,212 (89.1 percent). While 2,523 (7.7 percent) and 1,169 (3.2 percent) are assigned to the growth style and blend style portfolios respectively. In the momentum signals for each stock orientation partition, the mean returns of value style stocks are the highest (0.059) followed by blend style stocks (0.051) and growth style stocks (0.045) respectively. This demonstrates that the growth style stocks enjoy greater returns during the long-term market rally between 1997 to 2016.

Besides that, the decile rank between composite scores with mean and median stock returns for value style, blend style and growth style portfolios are statistically significant at 1 percent level. Moreover, the portfolio mean returns for value stocks generates positive returns for difference between high score and all stocks; and high score and low score with 0.269 and 0.538 respectively. In line with Asness et al. (2013) research, the relationship between composite scores with mean and median returns for all portfolios (growth style, blend style and value style) remain positively correlated for all cases.

Table 6-4: Returns Conditional on Stock Orientation

	Growth Style			Blend Style			Value Style		
	Mean	Median	n	Mean	Median	n	Mean	Median	n
All Firms	0.045	0.039	2,523	0.051	0.044	1,169	0.059	0.044	31,212
M_Score[a]									
0–10	-0.583	-0.583	19	-0.535	-0.535	10	-0.583	-0.580	268
10^{+}–20	-0.226	-0.221	32	-0.289	-0.264	15	-0.299	-0.304	444
20^{+}–30	-0.150	-0.145	127	-0.158	-0.156	44	-0.106	-0.123	1,975
30^{+}–40	-0.052	-0.062	389	-0.094	-0.101	178	-0.066	-0.080	4,954
40^{+}–50	-0.011	-0.024	647	0.007	-0.015	306	0.004	-0.015	7,541
50^{+}–60	0.046	0.032	727	0.105	0.083	323	0.050	0.020	7,832
60^{+}–70	0.086	0.069	369	0.095	0.075	202	0.093	0.061	5,079
70^{+}–80	0.188	0.169	123	0.249	0.211	58	0.200	0.174	1,967
80^{+}–90	0.529	0.527	63	0.518	0.527	24	0.495	0.486	791
90^{+}–100	0.622	0.622	27	0.715	0.715	9	0.803	0.803	361
Low Score[b]	-0.204	-0.207	1,214	-0.214	-0.214	553	-0.210	-0.220	15,182
High Score[c]	0.294	0.284	1,309	0.336	0.322	616	0.328	0.309	16,030
High–All[d]	0.249	0.245		0.275	0.268		0.269	0.264	
High–Low[e]	0.499	0.491		0.550	0.536		0.538	0.529	
p-Value[f]	0.000	0.000		0.000	0.000		0.001	0.001	
R-squared[g]	0.803	0.803		0.773	0.759		0.711	0.717	

a. M_Score has the same meaning with composite score where it illustrates the results of aggregate changes in the seven financial indicators that representing *musharakah* parameters.
b. Low Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of 50 and below in which considered as under-performing companies.
c. High Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of more than 50 considered as out-performing companies.
d. High–All is the aggregate stock price returns of High Score minus All Firms where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
e. High–Low is the aggregate stock price returns of High Score minus Low Score where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
f. p-value for the mean and percentiles are from two-sample t–tests of signed rank where a low p-value of less than 0.01 suggests that the distribution of stock price returns provides enough evidence that this study can reject the null hypothesis for the M_Score and presumes statistically significant in this Wilcoxon test of stock price returns.
g. R-squared is the correlation study measures of dependency between two sets of variables in the Spearman product moment correlation coefficient where a correlation close to 1 suggests that the composite M_Score or individual financial indicators scores is highly correlated with stock price returns and close to 0 is highly uncorrelated.

6.5 Stock Price Returns Conditional on Trading Volume Partitions

In trading volume analysis, this study ranks the one-quarter returns into decile table based on the composite score in each observation. Similar to earlier partition examinations, there are 34,750 company-observations during the during 1997 to 2016. The M_Score model computes composite score of momentum signals into three trading volume portfolios. Trading volume is the transacted value of ordinary shares exchanging hands in the particular quarter. The trading volume portfolios are assigned based on the percentile of each company's value of trading volume. Low volume stocks are those within 33.3 percentile or less, followed by medium volume and high volume stocks. These medium and high volume stocks are those assigned within 33.3 to 66.6 percentile and more than 66.6 percentile respectively. Table 6-5 presents one-quarter returns based on these trading volume categories.

For the financial characteristics of *Shariah*-compliant stocks, a bulk of the companies (31,139) are concentrated in the bottom third of trading volume – low (85.9 percent). While 1,975 (7.5 percent) and 1,790 (6.6 percent) are assigned to the middle and top trading volume portfolios respectively. Interestingly, regardless the value of trading volume, the mean returns are similar across the portfolios. Hence, the mean (median) returns has a weak difference of about ±0.008 for low and high trading volume stocks.

The decile rank between composite scores with mean and median stock returns for low volume portfolio is statistically significant at 1 percent level. On the other hand, the shift in mean and median returns of high volume is still statistically significant although marginally higher than low volume. Beyond that, the difference between high score and low score registered positive mean returns, 0.545 and 0.537 for high and low volume portfolios respectively. Besides that, the relationship between composite scores with mean and median returns for all trading volume portfolios remain positively correlated in which similar to Jagannathan and Korajczyk (2017) works.

Table 6-5: Returns Conditional on Trading Volume

	High Volume			Medium Volume			Low Volume		
	Mean	Median	n	Mean	Median	n	Mean	Median	n
All Firms	0.051	0.040	1,790	0.057	0.057	1,975	0.059	0.044	31,139
M_Score[a]									
0–10	-0.605	-0.605	12	-0.588	-0.470	9	-0.571	-0.569	276
10^{+}–20	-0.303	-0.302	29	-0.331	-0.316	20	-0.301	-0.306	442
20^{+}–30	-0.119	-0.120	110	-0.149	-0.154	128	-0.113	-0.131	1,908
30^{+}–40	-0.086	-0.099	257	-0.078	-0.100	342	-0.058	-0.072	4,922
40^{+}–50	0.004	-0.016	455	-0.005	-0.022	475	-0.003	-0.021	7,564
50^{+}–60	0.039	0.016	434	0.056	0.020	491	0.048	0.020	7,957
60^{+}–70	0.099	0.081	320	0.106	0.078	323	0.102	0.066	5,007
70^{+}–80	0.153	0.123	123	0.307	0.171	134	0.204	0.178	1,891
80^{+}–90	0.410	0.407	39	0.570	0.545	37	0.522	0.514	802
90^{+}–100	0.916	0.916	11	0.980	0.817	16	0.760	0.760	370
Low Score[b]	-0.222	-0.228	863	-0.230	-0.213	974	-0.209	-0.220	15,112
High Score[c]	0.323	0.309	927	0.404	0.326	1,001	0.327	0.308	16,027
High–All[d]	0.272	0.268		0.317	0.269		0.268	0.264	
High–Low[e]	0.545	0.537		0.634	0.539		0.537	0.528	
p-Value[f]	0.006	0.006		0.000	0.000		0.001	0.001	
R-squared[g]	0.698	0.695		0.720	0.727		0.718	0.706	

a. M_Score has the same meaning with composite score where it illustrates the results of aggregate changes in the seven financial indicators that representing *musharakah* parameters.
b. Low Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of 50 and below in which considered as under-performing companies.
c. High Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of more than 50 considered as out-performing companies.
d. High–All is the aggregate stock price returns of High Score minus All Firms where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
e. High–Low is the aggregate stock price returns of High Score minus Low Score where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
f. p-value for the mean and percentiles are from two-sample t–tests of signed rank where a low p-value of less than 0.01 suggests that the distribution of stock price returns provides enough evidence that this study can reject the null hypothesis for the M_Score and presumes statistically significant in this Wilcoxon test of stock price returns.
g. R-squared is the correlation study measures of dependency between two sets of variables in the Spearman product moment correlation coefficient where a correlation close to 1 suggests that the composite M_Score or individual financial indicators scores is highly correlated with stock price returns and close to 0 is highly uncorrelated.

6.6 Stock Price Returns Conditional on Stock Price Partitions

This study ranks the one-quarter returns into decile table based on the momentum signals in each observation. They are 34,750 company-observations, the same with earlier studies, for the period of June 1997 to September 2016. The M_Score model computes composite score of momentum signals into three stock price portfolios – low, medium and high price. This study defines the stock price as the last done transaction at the end of each quarter. The stock price portfolios are assigned based on the percentile of each company's stock price. Small price is those within 33.3 percentile or less, followed by medium price and large price. These companies are those sitting within 33.3 to 66.6 percentile and more than 66.6 percentile respectively. Table 6-6 presents one-quarter returns based on these size categories.

The financial characteristics of *Shariah*-compliant stocks based on stock price are concentrated in the bottom one-third of stock price range, 13,199 (37.1 percent). While 11,415 (33.0 percent) and 10,252 (29.9 percent) are assigned to the middle and top size portfolio respectively. Applying the M_Score within each stock price partition, the highest returns are the small price portfolio with 0.063. The mean (median) differences between high and low scores for small price stocks are 0.532 (0.520) which is 0.036 (0.054) lower than the large price stocks 0.496 (0.466).

With that, the decile rank between composite scores with mean and median stock returns for all stock price portfolios is statistically significant at 1 percent level. In addition, the high score minus low score registered positive mean returns for small price stocks. Besides that, the relationship between composite scores with mean and median returns for all stock price portfolios remain positively correlated. Having said that, although the M_Score model and the stocks returns by stock price remain significant, they have shown a marginal difference distribution for number of observations. As Willenbrock (2011) said, stock price does not essentially represent stock returns.

Table 6-6: Returns Conditional on Stock Price

	Large Price			Medium Price			Small Price		
	Mean	Median	n	Mean	Median	n	Mean	Median	n
All Firms	0.039	0.019	10,252	0.055	0.041	11,415	0.063	0.052	13,199
M_Score[a]									
0–10	-0.672	-0.616	56	-0.609	-0.618	102	-0.515	-0.513	139
10^{+}–20	-0.232	-0.236	139	-0.289	-0.298	164	-0.344	-0.344	186
20^{+}–30	-0.070	-0.112	707	-0.147	-0.146	739	-0.100	-0.106	700
30^{+}–40	-0.070	-0.083	1,719	-0.071	-0.082	1,797	-0.057	-0.070	1,997
40^{+}–50	0.002	-0.023	2,384	0.000	-0.022	2,766	0.000	-0.008	3,332
50^{+}–60	0.043	0.010	2,482	0.052	0.025	2,801	0.055	0.031	3,595
60^{+}–70	0.072	0.031	1,706	0.099	0.074	1,856	0.118	0.084	2,082
70^{+}–80	0.143	0.110	733	0.214	0.183	731	0.269	0.245	678
80^{+}–90	0.509	0.501	238	0.531	0.517	320	0.467	0.465	320
90^{+}–100	0.668	0.606	88	0.765	0.773	139	0.733	0.733	170
Low Score[b]	-0.209	-0.214	5,005	-0.223	-0.233	5,568	-0.203	-0.208	6,354
High Score[c]	0.287	0.252	5,247	0.333	0.314	5,847	0.328	0.312	6,845
High–All[d]	0.248	0.233		0.278	0.274		0.266	0.260	
High–Low[e]	0.496	0.466		0.556	0.548		0.532	0.520	
p-Value[f]	0.001	0.001		0.002	0.002		0.000	0.000	
R-squared[g]	0.624	0.642		0.722	0.723		0.781	0.759	

a. M_Score has the same meaning with composite score where it illustrates the results of aggregate changes in the seven financial indicators that representing *musharakah* parameters.

b. Low Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of 50 and below in which considered as under-performing companies.

c. High Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of more than 50 considered as out-performing companies.

d. High–All is the aggregate stock price returns of High Score minus All Firms where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.

e. High–Low is the aggregate stock price returns of High Score minus Low Score where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.

f. p-value for the mean and percentiles are from two-sample t–tests of signed rank where a low p-value of less than 0.01 suggests that the distribution of stock price returns provides enough evidence that this study can reject the null hypothesis for the M_Score and presumes statistically significant in this Wilcoxon test of stock price returns.

g. R-squared is the correlation study measures of dependency between two sets of variables in the Spearman product moment correlation coefficient where a correlation close to 1 suggests that the composite M_Score or individual financial indicators scores is highly correlated with stock price returns and close to 0 is highly uncorrelated.

6.7 Stock Price Returns Conditional on Leverage Partitions

Table 6-7 ranks the one-quarter returns into decile table based on the composite score in each observation. The observations are the same as the other studies conducted earlier. Thereafter, this study categorised the stock returns into low leverage, medium leverage and high leverage stocks. This study defines the leverage ratio debt-to-equity ratio (total liabilities by its stockholders' equity) at the end of each quarter. The leverage portfolios are assigned based on the percentile of each company's debt-to-equity ratio. Low leverage stocks are those within 33.3 percentile or less, followed by medium leverage stocks, 33.3 to 66.6 percentile and high leverage stocks, more than 33.3 percentile. Table below presents one-quarter returns based on these leverage categories.

Although the *Shariah*-compliant stocks are predominantly consisting of low leverage stocks. However, in this study, the partition is based on the highest and lowest leverage ratio of *Shariah*-compliant stocks of the study population. Hence, it is quite interesting to see that the stocks are slanted to the high leverage partition. High leverage partition has 31,212 company-observations, whereas, medium leverage and low leverage have 1,169 and 2,523 company-observations respectively. With that, the mean (median) differences between high score and low score for the three partitions are 0.499 (0.491), 0.550 (0.536), and 0.538 (0.529) for low leverage, medium leverage and high leverage respectively. Therefore, this study observed that the mean and median returns for the three partitions are not much different.

Having said that, the decile rank between composite scores with mean and median stock returns for all leverage portfolios is statistically significant at 1 percent level. Additionally, the relationship between the M_Score with mean and median returns for the three leverage partitions remain positively correlated just like Setiawan and Oktariza (2013) discovered in his study on Indonesian stock market. Hence, there is no leverage effect on the excess returns earned using momentum strategy.

Table 6-7: Returns Conditional on Leverage

	Low Leverage			Medium Leverage			High Leverage		
	Mean	Median	n	Mean	Median	n	Mean	Median	n
All Firms	0.045	0.039	2,523	0.051	0.054	1,169	0.059	0.044	31,212
M_Score[a]									
0–10	-0.583	-0.583	19	-0.535	-0.535	10	-0.583	-0.580	268
10^{+}–20	-0.226	-0.221	32	-0.289	-0.264	15	-0.299	-0.304	444
20^{+}–30	-0.150	-0.145	127	-0.158	-0.156	44	-0.106	-0.123	1,975
30^{+}–40	-0.052	-0.062	389	-0.094	-0.101	178	-0.066	-0.080	4,954
40^{+}–50	-0.011	-0.024	647	0.007	-0.015	306	0.004	-0.015	7,541
50^{+}–60	0.046	0.032	727	0.105	0.083	323	0.050	0.020	7,832
60^{+}–70	0.086	0.069	369	0.095	0.075	202	0.093	0.061	5,079
70^{+}–80	0.188	0.169	123	0.249	0.211	58	0.200	0.174	1,967
80^{+}–90	0.529	0.527	63	0.518	0.527	24	0.495	0.486	791
90^{+}–100	0.622	0.622	27	0.715	0.715	9	0.803	0.803	361
Low Score[b]	-0.204	-0.207	1,214	-0.214	-0.214	553	-0.210	-0.220	15,182
High Score[c]	0.294	0.284	1,309	0.336	0.322	616	0.328	0.309	16,030
High–All[d]	0.249	0.245		0.275	0.268		0.269	0.264	
High–Low[e]	0.499	0.491		0.550	0.536		0.538	0.529	
p-Value[f]	0.000	0.000		0.000	0.000		0.001	0.001	
R-squared[g]	0.803	0.803		0.773	0.759		0.711	0.717	

a. M_Score has the same meaning with composite score where it illustrates the results of aggregate changes in the seven financial indicators that representing *musharakah* parameters.
b. Low Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of 50 and below in which considered as under-performing companies.
c. High Score comprises aggregate stock price returns of *Shariah*-compliant stocks with composite scores of more than 50 considered as out-performing companies.
d. High–All is the aggregate stock price returns of High Score minus All Firms where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
e. High–Low is the aggregate stock price returns of High Score minus Low Score where a positive net stock price returns will suggest that the M_Score model has accurately assigned a composite score to respective *Shariah*-compliant stock.
f. p-value for the mean and percentiles are from two-sample t–tests of signed rank where a low p-value of less than 0.01 suggests that the distribution of stock price returns provides enough evidence that this study can reject the null hypothesis for the M_Score and presumes statistically significant in this Wilcoxon test of stock price returns.
g. R-squared is the correlation study measures of dependency between two sets of variables in the Spearman product moment correlation coefficient where a correlation close to 1 suggests that the composite M_Score or individual financial indicators scores is highly correlated with stock price returns and close to 0 is highly uncorrelated.

6.8 Return and Risk Analysis on Stock Portfolio Strategies

This section extends the previous analysis of stock price returns using the multiple portfolio strategies. Hence, the multiple portfolio strategies have combined four unique features like stock orientations, weighting schemes, market capitalisations and trade positions into a single stock portfolio that normally constructed by institutional investors. With that, this study addresses the need to turn the M_Score model into a profitable tool in real life setting of stock portfolio construction and management.

There are 81 permutations of portfolio strategies using those four key features. Each feature has three sub features. For instance, in styles or stock orientation there are value style, blend style and growth style portfolio strategies; in weighting schemes there are equal weighted, stock price weighted and market value portfolio strategies; in market capitalisation there are small cap, mid capitalisation and large capitalisation portfolio strategies; and in trade position there are buy-and-hold, long-only and long-short portfolio strategies.

Value portfolio is defined as *Shariah*-compliant stocks assigned into bottom one-third of the price to book value (PBV) percentile range. Whereas, the top one-third of the PBV is assigned to growth style portfolio and between value style and growth style portfolios is the blend portfolio. The bottom and top one-third percentile are segregated based using the lowest and highest PBV range.

Equal weighted portfolio is defined as and when the *Shariah*-compliant stocks in the portfolio are having the same holding representation. For instance, regardless their size, the holding of five *Shariah*-compliant stocks in a portfolio will be 20 percent each stock to make it equally weighted portfolio. On the other hand, stock price weighted portfolio is constructed when each *Shariah*-compliant stock allocated based on the value of the stock price. In other word, *Shariah*-compliant stock with higher price will have a higher allocation in a portfolio. Similarly, market cap weighted portfolio allocated the *Shariah*-compliant stocks holding based on their respective market value.

Small cap portfolio is defined as those *Shariah*-compliant stocks belong to the lower than 33.3 percentile of the market capitalisation. Those *Shariah*-compliant stocks with higher than 66.6 percentile are assigned to large capitalisation portfolio. While, in between 33.3 and 66.6 percentiles, the *Shariah*-compliant stocks are categorised into mid capitalisation portfolio. Normally, small cap portfolio has the most *Shariah*-compliant stocks in term of number but not value as compared to large capitalisation portfolio.

Buy-and-hold portfolio in this study is defined as an investment strategy of purchasing *Shariah*-compliant stocks and keep it until at the end of an intended period. A quote from legendary investor, Warrant Buffet once said '*Buy, hold and don't watch too closely*'. On the other hand, long-only portfolio is the investment strategy that purchases *Shariah*-compliant stocks when buying signal triggers and disposed it in the following quarter. The long-only strategy will wait till the next buying signal triggers. As for the long-short portfolio, the investment strategy optimises the trading decision regardless the stock market direction. In this case, a selling signal from the M_Score will prompt a short selling of a *Shariah*-compliant stock – sell the *Shariah*-compliant stock first and buy back it later in the following quarter. Whereas, when buying signal prompts, the long-short strategy will follow the techniques as long-only strategy. In other word, long-short portfolio takes advantage on the stock market cyclicals regardless their direction. However, the strategy come with huge risk, but higher returns are awaiting definitely.

Calculation of pseudo portfolio returns are based on the aggregate returns of individual stock in the respective portfolio. The investment horizon is depending upon the purchase and disposal period in which rely on the investment of portfolio strategy used. Hence, the raw return is computed by stock price at disposal period less stock price at purchase period, thereafter, divided by stock price at purchase period. Instead of using raw return as a measure for portfolio performance analysis, this study incorporate risk adjusted return. It examines the stock returns for a given unit of risk. The risk is standard deviation of stock returns during the investment holding period.

For better understanding of portfolio strategies performance, this study selected the buy-and-hold portfolio as the benchmark or reference. It is used for relative performance analysis. To recap, the results tabulated beginning Chapter 5 are based on this reference portfolio i.e. buy-and-hold. The rationales are two prongs. First, the portfolio is easy to implement where an investor can construct a portfolio just by following the index weightage. Second, the buy-and-hold strategy is deemed to be recognised as a passive investing versus active investing like long-only and long-short strategy.

Table 6-8 tabulates the mean returns of 81 portfolio strategies using the M_Score model as the investment analysis tool. The portfolio strategies derived from the permutation of four core features as explained earlier. Descriptive statistics – the highest concentration of *Shariah*-compliant stock is in value portfolio for all trading position portfolios: buy-and-hold, long-only and long-short. This is consistent with results in Table 6-4 where *Shariah*-compliant stock in Malaysia comprises mainly of value stocks. Detailed analysis is discussed in Subsection 6.8.1 and 6.8.2.

Table 6-8: Stock Price Returns to Portfolio Strategies

Panel A–1: Portfolio Returns of Buy-and-hold Strategy to Small Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return[a]	Risk[b]	RaR[c]	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.110	0.183	0.666	0.314	0.524	1.816	0.301	0.567	1.635
Price Weighted	0.121	0.163	0.969	0.269	0.489	1.673	0.250	0.504	1.493
Market Weighted	0.121	0.148	1.005	0.257	0.472	1.674	0.220	0.473	1.356
One-Year									
Equal Weighted	0.127	0.407	0.345	0.269	0.813	1.157	0.254	0.927	0.987
Price Weighted	0.141	0.368	0.494	0.206	0.715	0.806	0.182	0.779	0.683
Market Weighted	0.137	0.351	0.511	0.179	0.620	0.757	0.136	0.649	0.577

Panel A–2: Portfolio Returns of Buy-and-hold Strategy to Medium Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.056	0.297	0.164	0.189	0.415	0.932	0.228	0.388	1.238
Price Weighted	0.057	0.300	0.194	0.176	0.415	0.861	0.201	0.391	1.062
Market Weighted	0.065	0.301	0.192	0.164	0.413	0.771	0.192	0.390	1.019
One-Year									
Equal Weighted	0.061	0.597	0.078	0.161	0.661	0.603	0.192	0.641	0.759
Price Weighted	0.062	0.605	0.092	0.140	0.704	0.386	0.155	0.587	0.596
Market Weighted	0.067	0.594	0.089	0.129	0.660	0.345	0.142	0.650	0.419

[a] Portfolio returns of *Shariah*-compliant stocks.
[b] Standard deviation of the stock price returns.
[c] Risk adjusted returns, where simple ratio of stock price returns over standard deviation.

Panel A–3: Portfolio Returns of Buy-and-hold Strategy to Large Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.048	0.356	0.081	0.189	0.442	0.985	0.238	0.581	1.333
Price Weighted	0.048	0.373	0.068	0.119	0.466	0.589	0.197	0.592	1.064
Market Weighted	0.041	0.341	0.065	0.156	0.447	0.735	0.189	0.565	1.047
One-Year									
Equal Weighted	0.028	0.624	0.004	0.140	0.707	0.581	0.178	0.821	0.871
Price Weighted	0.020	0.625	-0.005	0.057	0.703	0.219	0.115	0.770	0.546
Market Weighted	0.022	0.584	-0.001	0.093	0.674	0.315	0.110	0.762	0.459

Panel B–1: Portfolio Returns of Long-only Strategy to Small Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.151	0.163	0.875	0.532	0.548	2.918	0.533	0.566	2.801
Price Weighted	0.122	0.155	0.939	0.435	0.521	2.512	0.425	0.540	2.272
Market Weighted	0.142	0.138	1.035	0.409	0.476	2.606	0.372	0.474	2.247
One-Year									
Equal Weighted	0.104	0.376	0.265	0.362	0.876	1.680	0.345	0.914	1.613
Price Weighted	0.097	0.307	0.324	0.237	0.730	1.100	0.216	0.758	1.029
Market Weighted	0.103	0.346	0.349	0.194	0.649	0.910	0.160	0.650	0.805

Panel B–2: Portfolio Returns of Long-only Strategy to Medium Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.108	0.248	0.303	0.330	0.414	1.583	0.412	0.397	2.173
Price Weighted	0.124	0.239	0.343	0.288	0.411	1.276	0.359	0.387	1.897
Market Weighted	0.114	0.248	0.312	0.282	0.426	1.242	0.348	0.398	1.779
One-Year									
Equal Weighted	0.057	0.461	0.075	0.199	0.680	0.843	0.261	0.656	1.121
Price Weighted	0.060	0.458	0.082	0.150	0.674	0.514	0.184	0.621	0.708
Market Weighted	0.057	0.438	0.076	0.137	0.694	0.423	0.162	0.645	0.559

Panel B–3: Portfolio Returns of Long-only Strategy to Large Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.076	0.302	0.183	0.363	0.478	1.648	0.454	0.583	2.341
Price Weighted	0.090	0.305	0.217	0.331	0.488	1.427	0.390	0.573	1.952
Market Weighted	0.078	0.299	0.178	0.305	0.460	1.385	0.366	0.595	1.751
One-Year									
Equal Weighted	0.021	0.510	0.014	0.205	0.699	0.978	0.271	0.811	1.356
Price Weighted	0.025	0.537	0.020	0.119	0.570	0.512	0.168	0.747	0.795
Market Weighted	0.023	0.515	0.014	0.117	0.703	0.392	0.147	0.856	0.515

Panel C–1: Portfolio Returns of Long-short Strategy to Small Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.206	0.144	1.187	0.834	0.534	4.590	0.839	0.548	4.470
Price Weighted	0.138	0.119	0.957	0.663	0.494	3.951	0.656	0.515	3.621
Market Weighted	0.170	0.128	1.134	0.621	0.480	3.853	0.579	0.494	3.331
One-Year									
Equal Weighted	0.097	0.368	0.226	0.525	0.837	2.666	0.517	0.921	2.531
Price Weighted	0.067	0.325	0.181	0.307	0.767	1.427	0.297	0.786	1.462
Market Weighted	0.086	0.351	0.217	0.239	0.683	1.170	0.213	0.692	1.076

Panel C–2: Portfolio Returns of Long-short Strategy to Medium Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.156	0.193	0.548	0.499	0.388	2.457	0.651	0.361	3.505
Price Weighted	0.192	0.195	0.639	0.433	0.370	2.129	0.546	0.358	2.968
Market Weighted	0.157	0.186	0.548	0.420	0.389	2.029	0.530	0.357	2.875
One-Year									
Equal Weighted	0.066	0.442	0.109	0.278	0.665	1.223	0.380	0.610	1.813
Price Weighted	0.081	0.431	0.131	0.195	0.661	0.728	0.250	0.591	1.027
Market Weighted	0.066	0.421	0.112	0.172	0.696	0.538	0.214	0.596	0.871

Panel C–3: Portfolio Returns of Long-short Strategy to Large Capitalisation Stocks

	Growth Style			Blend Style			Value Style		
	Return	Risk	RaR	Return	Risk	RaR	Return	Risk	RaR
One-Quarter									
Equal Weighted	0.117	0.297	0.370	0.571	0.421	2.780	0.736	0.561	3.838
Price Weighted	0.153	0.287	0.484	0.463	0.364	2.131	0.627	0.541	3.240
Market Weighted	0.124	0.294	0.391	0.471	0.419	2.161	0.584	0.557	2.967
One-Year									
Equal Weighted	0.045	0.523	0.074	0.312	0.654	1.547	0.426	0.774	2.223
Price Weighted	0.054	0.519	0.090	0.187	0.527	0.849	0.265	0.724	1.258
Market Weighted	0.049	0.530	0.079	0.166	0.640	0.686	0.213	0.769	0.914

6.8.1 Raw Stocks Price Returns of Portfolio Strategies

Figure 6-1 summarised the annualised mean raw returns of 81 portfolio strategies for quarterly rebalanced portfolio into a single matrix or heatmap. The raw returns refer to gains without considering the risk consumes in such stock trade. Whereas, the portfolio strategies based on market capitalisations (small capitalisation, medium capitalisation and large capitalisation); weighting schemes (equal weighted, stock price weighted and market value weighted); stock orientations (value style, blend style and growth style); and trade positions (buy-and-hold, long-only and long-short). The darker colour should present higher mean returns, in percentage and otherwise for lighter colour.

In general, active portfolio strategies like long-only and long-short portfolios perform better than the reference portfolio strategy i.e. buy-and-hold. However, the mean raw returns between long-only and long-short portfolios show that the latter is superior. This is true for long-short portfolio with any weighting schemes and company sizes. Within the long-short strategy, the equal weighting portfolio and small capitalisation portfolio generate the highest mean raw returns (84 percent) while their peers (market value weighted and stock price weighted; and large capitalisation and medium capitalisation) are relatively generating lower mean raw returns. Having said that, those subscribe to passive investing with large capitalisation and value style stocks that are allocated based on market value registers the lowest mean raw returns (4 percent).

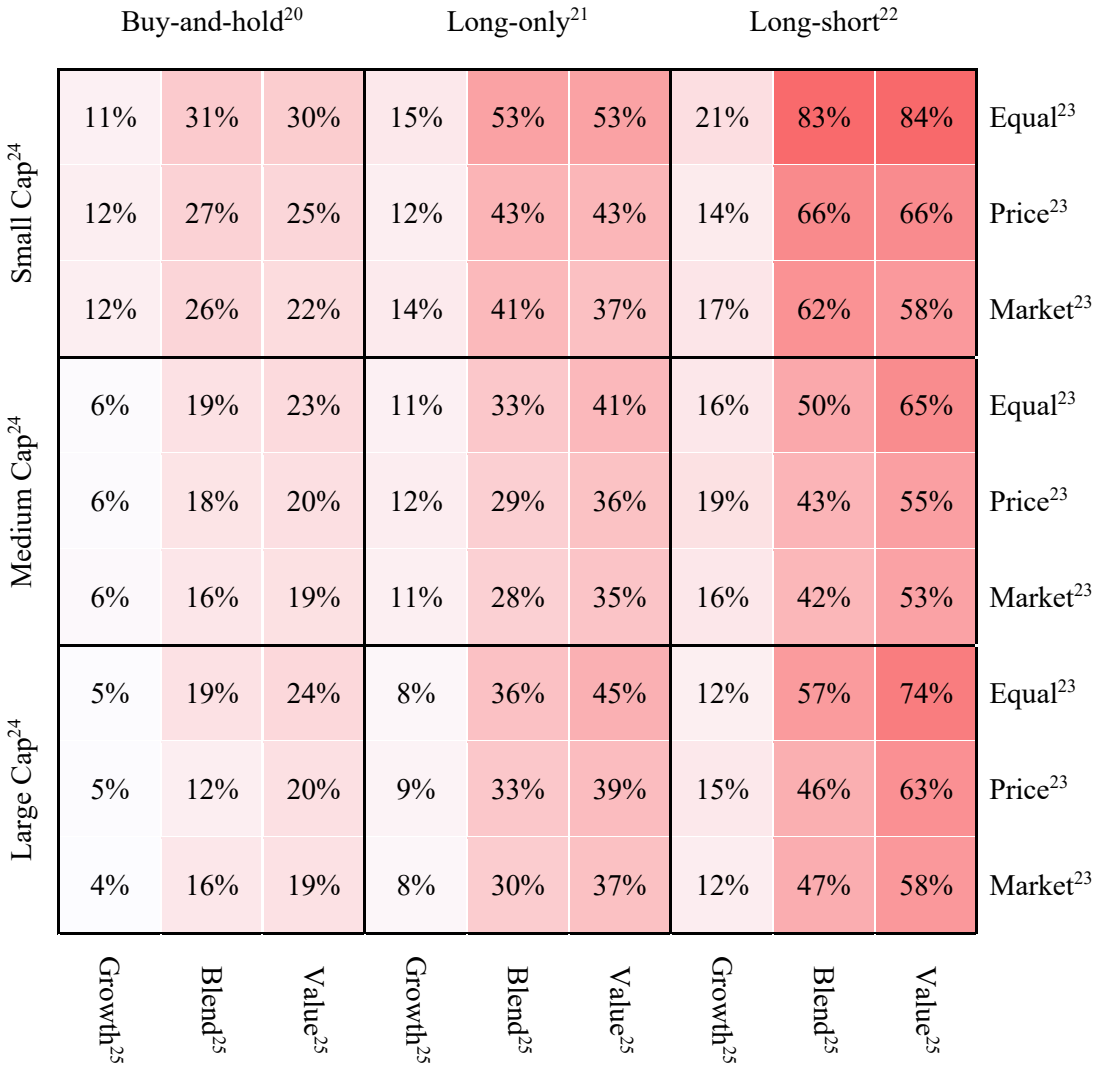
On the other hand, growth style portfolio produces decent mean raw returns across the vertical investment strategies versus the blend style and growth style portfolios. Value style portfolios, as in large capitalisation with equally weighted portfolio, has increasing mean raw returns of 5 percent, 8 percent and 12 percent for buy-and-hold, long-only and long-short strategy respectively. The same patterns are observed in the other horizontal portfolios.

Having said that, smaller company portfolios have out-performed over time. All small capitalisation portfolios have returned almost double as much as large capitalisation portfolios over the last 19 years across weighting schemes. Since June 1997, the best performing small capitalisation portfolio has returned 84 percent, including dividends, compared with 74 percent for the best large capitalisation portfolio, as shown in Figure 6-1. Hence, investors might be prepared to pay more for small capitalisation stocks that have the potential for faster earnings growth.

Having said that, marginal excess returns are seen between each bottom left corner in the all nine quadrants (nine individual portfolios or boxes are combined to form a quadrant). Similar observations are seen in the portfolio allocated by stock price weight and market value weight. Hence, a portfolio comprises value style or blend style stocks and stock price weight or market value weight are not generating some significant excess returns (Kandel & Stambaugh, 1995).

Next important question, “Are the mean raw returns produced adequate to compensate the level of risk consumes?” The following Subsection 6.8.2 examines this concern.

Figure 6-1: Raw Stocks Price Returns of Portfolio Strategies[19]



[19] The top and bottom labels represent the trading positions and stock orientations respectively. Whereas, the left and right labels represent the market capitalisations and weighting schemes respectively.

[20] Purchase a stock regardless the short-term outlook and keep it until end of the investment period or during portfolio rebalancing.

[21] Purchase a stock when there is positive trade signal or positive outlook only and keep it until end of the investment period or during portfolio rebalancing.

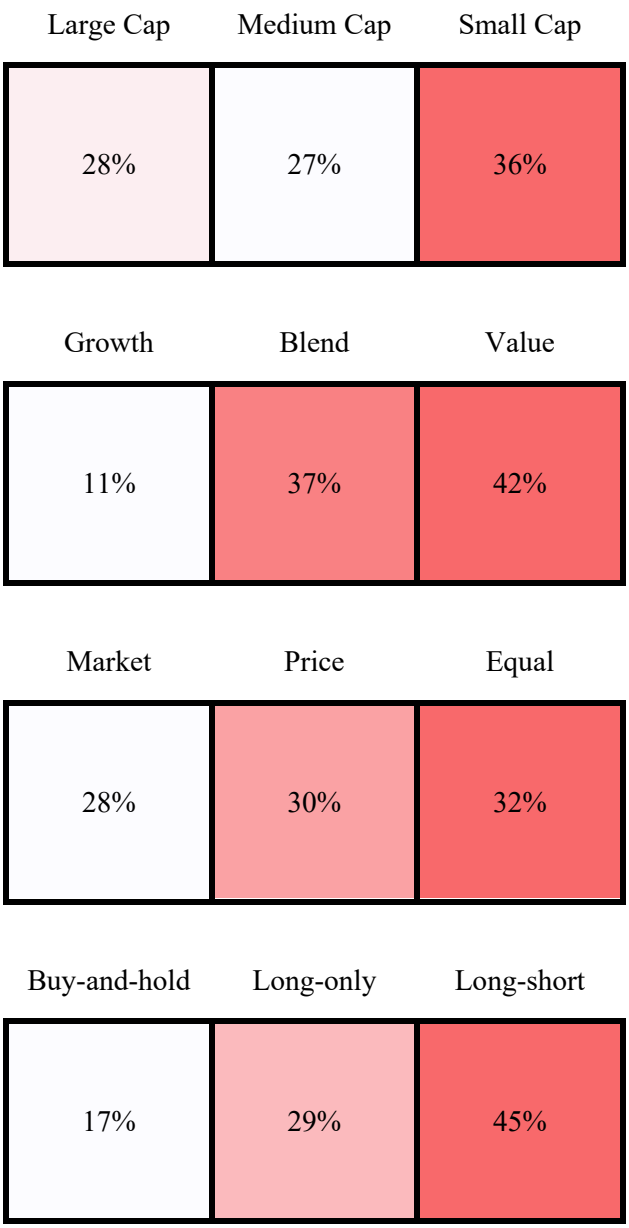
[22] Purchase a stock when there is positive trade signal and sell when otherwise.

[23] Stock portfolio construction based on equal weighting, stock price weighting or market value weighting.

[24] Large market capitalisation, medium capitalisation and small capitalisation of a stock.

[25] Growth, blend or value investment styles or stock orientations based on the price-to-book ratio.

Raw Stock Price Returns of Portfolio Strategies – Specific Characteristics[26]



[26] *Shariah*-compliant stocks are aggregated into a specific characteristic – by market capitalisation, stock orientation, weighting scheme and trading position.

6.8.2 Risk Adjusted Returns of Portfolio Strategies

A holistic view of portfolio performance metrics is designed to reveal how much risk is taken to achieve a return by incorporating volatility, sensitivity to overall market moves and other measures. On the other hand, some might subscribe to absolute returns approach where what they receive is the ultimate investment goal regardless the risk embedded. In this study, the risk adjusted returns are measured by dividing the mean raw returns with its standard deviation over the investment period, 1997 to 2016 which translates to risk adjusted return ratio. The higher the ratio means a good risk taking and vice versa if the ratio is lower.

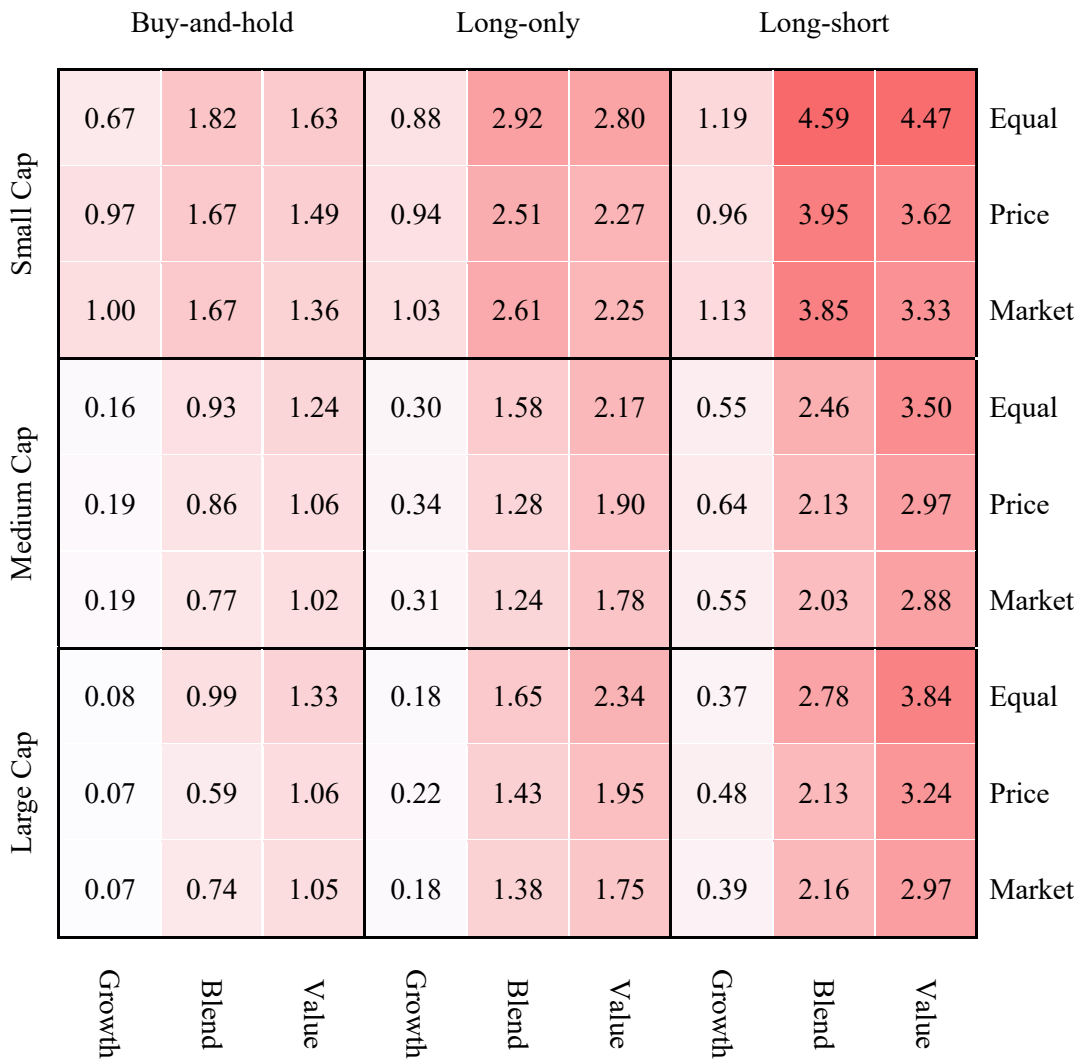
To simplify the grouping of portfolio strategies, this study establishes a benchmark or reference portfolio which has been defined earlier. Whereas, the positive momentum portfolio is defined as a long-only strategy comprises value style, blend style and growth style stocks. The 'positive' refers to the restriction that long-only portfolio can only buy-long when trade signal is 'buy' or positive. Whereas, neutral momentum portfolio includes value style, blend style and growth style stocks in the long-short strategy. The strategy allows the portfolio to trade regardless the trade signal, where, 'buy' will indicate buy-long and 'sell' will indicate sell-short the *Shariah*-compliant stock.

Figure 6-2 shows that the long-short strategy with small capitalisation value stocks that are equally weighted maintain its highest returns for both risk adjusted returns and raw returns. Where, the highest risk adjusted returns ratio of 4.59 is about 64 times than the lowest ratio, 0.07 for buy-and-hold strategy with large capitalisation and growth style stocks that allocated based on market value. In this case, the risk adjusted returns are read as portfolio returns of 4.59 percent for a unit of risk. In addition, as a portfolio, long-only strategy produces relatively higher risk adjusted returns (between 0.18 to 2.80) as compared to reference portfolio (0.07 to 1.63). Notwithstanding, buy-and-hold strategy which is passive investing approach has lower operating cost as compared to active investing, normally (Arnott, et al., 2005).

Not all risk taking in the portfolios are compensated with higher rewards. For instance, the returns for value style and blend style stocks of small capitalisation portfolios are not well compensated for the risk taken (refer to Table 6-8 and Figure 6-2 for details). However, it is better to invest in value style stocks instead for the similar risk adjusted returns since thee value style stocks are known to be less volatile generally.

In summary, active investing such as positive momentum portfolio and neutral momentum portfolio have superior returns performance as compared to passive investing like buy-and-hold strategy. Between the two active investing strategies, neutral momentum portfolio is the best performing strategy in most cases. To optimise the portfolio returns, an investor might consider slicing the neutral momentum portfolio into a small capitalisation value style stocks that are equally weighted in a portfolio. This will result to the highest stock portfolio returns.

Figure 6-2: Risk Adjusted Returns of Portfolio Strategies[27]



[27] Ibid. p. 198.

Risk Adjusted Returns of Portfolio Strategies – Specific Characteristics[28]

[28] Ibid. p. 199.

6.9 Conclusion

This study has shown that the new stock scoring model also known as the M_Score model is robust and intuitive by addressing three main areas. First, the concern of temporal issue and how the model respond towards major financial economic events. Second, the concern of whether the excess returns earned using the model is contributed by other specific characteristics like company size, stock orientation, trading volume, stock price or leverage position instead of the model itself. Third, the practicality of the model when applies on various portfolio strategies commonly used by institutional and sophisticated investors.

As expected, the M_Score model maintains its predictive power in all financial economic events though those events outside the Southeast Asia region have lower correlation with domestic stock market performances. So, there will be no concern on a temporal issue in the model since it responds well to any given periods. Moreover, the concern of data snooping does not arise since this study has used seven time horizons based on the major financial economic events.

Additionally, in assessing the small company effect, this study has evidenced that the composite scores of the M_Score model and the decile rank of stock returns are statistically significant across company size portfolios i.e. small, medium and large companies. Besides that, the relationship between composite scores with mean and median returns for all company size portfolios remain positively correlated.

Moreover, the value and growth styles anomaly have not produced excess on the stock price returns in the portfolios. Besides that, the decile rank between composite scores with mean and median stock returns for value style, blend style and growth style portfolios have shown a positive monotonic relationship. Moreover, the portfolio returns for growth stocks have been generating positive returns for difference between high score and all stocks; and high score and low score. Similar to the company size partitions, the relationship between composite scores with mean and

median returns for all portfolios i.e. value style, blend style and growth style have remained positively correlated for all cases.

For trading volume effect, the relationship between composite scores with mean and median stock returns for low and medium volume portfolios have maintain their significant level. Nevertheless, the shift in mean and median returns of high volume has proved that it is still relevant although it is marginally significant. In addition, the relationship between composite scores with mean and median returns for all trading volume portfolios i.e. low volume, medium volume and high volume remain positively correlated albeit lower for high trading volume portfolio.

The portfolios constructed based on the M_Score model have not shown the excess returns derived from the stock price effect. Furthermore, the relationship between composite scores with mean and median returns for all stock price portfolios have remained positively correlated. Having said that, although the M_Score model and the stocks returns by all stock price partitions i.e. low stock price, medium stock price and high stock price remain significant, they have shown mixed results for number of observations and mean (median) returns as the two are inversely correlated.

The leverage characteristic effect on the excess return has been examined. The decile ranking between composite scores with mean and median stock returns for all leverage portfolios have evidenced a significant association. Additionally, the relationship between the M_Score model with mean and median returns for the three leverage partitions i.e. low leverage, medium leverage and high leverage remain positively correlated. Hence, there is no leverage effect on the excess returns earned using momentum strategy.

In general, active investing such as positive momentum portfolio i.e. long-only portfolio and neutral momentum portfolio i.e. long-short portfolio has superior returns performance as compared to passive investing like buy-and-hold portfolio. Between the two active investing strategies, neutral momentum portfolio is the best performing strategy in most cases. To optimise the portfolio returns,

an investor can consider slicing the neutral momentum portfolio into small capitalisation with growth style stocks that are equally weighted in constructing a stock portfolio. This will generate the highest investment returns of 84 percent per annum imbedded with the highest risk adjusted returns of 4.47 which is the best results.

Chapter Seven

Conclusion

7.1 Introduction

This study aims to develop a new stock scoring model using a quantitative approach of fundamental analysis that based on *musharakah* parameters in determining the direction or momentum of the *Shariah*-compliant stock prices. The momentum strategy that generates trade signal is then used to separate the out-performing from the under-performing stocks. The previous two empirical chapters provide empirical evidences for the M_Score model to be used as an alternative investment analysis tool for investors enhancing their stock portfolio returns.

The rest of this chapter provides a summary of the research findings followed by critical reflections on the main research findings and theoretical considerations. This chapter also analyses the research implications which helped to identify the key recommendations. On the other hand, this chapter underlines the research limitations and motivations for a wider scope of future research. Finally, this chapter brings the research journey to its conclusion.

7.2 Summary of the Research Findings

They are several main findings in this study. First, like many other researches, this study reconfirms that *Shariah*-compliant stocks comprise mainly a low leverage stocks as compared to the conventional peers. In addition, the *Shariah*-compliant stocks constitute profitable companies over a long-term period although some restrictions have been imposed on them. Besides that, *Shariah*-compliant stocks do not discriminate between company size; stock orientations i.e. value, blend and

growth styles; trading volume i.e. liquidity positions; stock price i.e. low stock price, medium stock price and high stock price; or leverage positions i.e. capital structure.

Second, interestingly, the five strongest individual explanatory variables are TSR, OCF, ROE, ROA and TOA with a significant positive correlation of which representing each *musharakah* parameter. Another important highlight is that the financial indicators are not correlated to each other except for ROE and ROA. These two indicators are expected to be highly correlated since they are representing the same *musharakah* parameters i.e. profitability ratios. Hence, this led to the concern of collinearity issue which means that the ROE or ROA can be linearly predicted from the other financial indicators with a substantial degree of precision. Instead of eliminating one of them, the M_Score model maintains both ROE and ROA values since they will not jeopardise the model predictive power. These results are coherent with the conceptual framework as discussed in earlier chapter where the four *musharakah* parameters namely industry performance, management style, profitability ratios and capital growth explain the excess of stock price returns.

Third, the pooled regressions have evidenced that for every controlled financial indicator, the regression models maintain their statistical significance for individual financial indicators and overall model performance. Moreover, the M_Score model improves its predictive power when the financial indicators are progressively added into the model.

Fourth, the results shown that a monotonic positive relationship between M_Score model and subsequent annualised returns over one-quarter and one-year periods. Moreover, the model is statistically significant with all the distributions of stock price returns in the decile table and has highly positive correlation for both one-quarter and one-year future stock price returns. On the other hand, the trade signals have proven that the M_Score model's reliability in enhancing the stock portfolio returns.

Fifth, the M_Score model maintains its predictive power in every financial economic event though those events outside the Southeast Asia region have lower correlation with domestic stock market performance. So, there will be no concern on the temporal issue in the model since it responds well to any given stock market cycles. Subsequently, the model has shown a significant positive correlation to both one-quarter and one-year returns during volatile stock market cycles.

Sixth, smaller company portfolios have out-performed over time. All small capitalisation portfolios have returned almost double as much as large capitalisation portfolios over the last 19 years across weighting schemes. Since June 1997, the best performing small capitalisation portfolio has returned 84 percent, including dividends, compared with 4 percent for the least performing large capitalisation portfolio. Hence, investors might be prepared to pay more for small capitalisation stocks that have a potential for faster earnings growth. Having said that, marginal excess returns are seen between the portfolio allocated by stock price or market value weighted with value style or blend style stocks.

Seventh, active portfolio strategies like long-only and long-short portfolios have performed better than the reference portfolio i.e. buy-and-hold for both mean returns of raw and risk adjusted returns. Moreover, the mean returns between long-only and long-short portfolios show that the latter is superior. This is true for long-short portfolio with any weighting schemes and company sizes. Within the long-short strategy, the equal weighting portfolio and small capitalisation portfolio generate the highest mean returns. While their peers, market value weighted and stock price weighted portfolios with large capitalisation and medium capitalisation stocks are generating lower mean returns. Having said that, those subscribe to passive investing with large capitalisation and growth style stocks that are allocated based on market value registers the lowest mean returns.

On top of the encouraging findings, there are several advantages of the M_Score model. For instance; (1) The model works throughout the study period although there are missing values; (2) The model requires two period data only for model implementation that is not data intensive, yet

producing a robust and intuitive results; (3) The model is easy to implement mathematically; (4) The model is able to handle outliers without the need for replacement values; (5) Unlike many others, the model caters for new IPO or newly listed company; (6) The model suitable for any types of investors regardless their believe and level of sophistication; and (7) The model can evolve into smart beta strategy which is the in trending now.

7.3 Critical Reflections on the Research Findings and Theoretical Considerations

Investors need a robust investment analysis tool to predict the magnitude of stock price returns in managing a profitable *Shariah*-compliant stock portfolio. A robust investment analysis tool must be responsive to every financial economic event; can withstand stock specific characteristics; should be flexible to a given dataset; and can assimilate with various stock portfolio strategies.

Having said that, relying on the out-performance of *Shariah*-compliant stocks as a portfolio per se during the entire investment horizon is not sufficient since the financial economic events may not be in favour during certain stock market cycles (Ashraf & Mohammad, 2014). In some instances, the *Shariah*-compliant stocks are not performing well during the stock market recovery period after the major financial market crashes in marketplaces like Malaysia (Mansor & Bhatti, 2011), Saudi Arabia (Merdad, et al., 2010), European (Alam & Rajjaque, 2010) and United States (Al-Khazali, et al., 2014).

Therefore, by separating the out-performing from under-performing stocks, investors will have a quality underlying the out-performing stocks to enhance the portfolio returns (Piotroski, 2000). Likewise, some are relying on a several stocks to contribute to the overall portfolio performance (Goetzmann & Kumar, 2008). For that, investors need a robust and intuitive stock scoring model to forecast stock returns and separate the quality stocks. Nevertheless, this study does not conduct comparative study with other similar models given the diverse methodology used.

This study has developed a quantitative model with time series analysis to evaluate stocks, strictly by using financial indicators of a company that based on *musharakah* parameters. At the same time, this study assumes that selection of the financial indicators to represent the respective *musharakah* parameters are on the premise of industry experience and market practice. This assumption helps this study to develop a quantifiable and objective stock scoring model. The new stock scoring model provides investors with an option to objectively rank the stock based on the aggregate signals of financial indicators in selecting the out-performing stocks while disregarding the under-performing stocks. The selection of the stocks can be measured within the same industry or market universe. Although other fundamental analysis or technical analysis can provide similar assistance, there is no conceptual explanation for variables or factors selected (Roll & Ross, 1980). The alternative to fundamental analysis for forecasting stock price returns in this study is conceptually driven by the principle of *musharakah*. In addition, Dania and Malhotra (2013) suggest that the principle based investing, such as *Shariah* investing, works better with fundamental analysis.

The principle of *musharakah* of which the basis used in determining the *Shariah*-compliant status of a stock (Al-Zuhayli, 2003) can indicate the momentum of a stock price returns. This is where the four *musharakah* parameters namely industry performance, management style, profitability ratios and capital growth observed for stock price discovery. Each of the parameter is represented with measurable financial indicators that is deduced from the previous empirical studies. Therefore, the direction of momentum of the stock price returns is implied by the aggregate changes of all the seven financial indicators illustrated by the mathematical notation $E[M]$, where M are △Total Sector Return; △Net Asset Value; △Operating Cash Flow; △Return on Equity; △Return on Assets; △Total Assets; and △Total Enterprise Value.

7.4 Research Implications and Recommendations

This study has contributed in several ways from the theoretical side, empirical side and methodological side. On theoretical side; (i) This study has evidenced conceptually and empirically that the *musharakah* parameters, in which represented by seven financial indicators, explains the stock price returns. The financial indicators are Total Sector Return; Net Asset Value; Operating Cash Flow; Return on Equity; Return on Assets; Total Assets; and Total Enterprise Value. (ii) Although past performance is no guarantee of future returns, historical data remains the ideal tool to forecast the stock prices as in the case of the M_Score model. (iii) In contrast to EMH theory, the M_Score model shows that the stock market is inefficient and therefore, stock price returns are predictable.

As for the empirical side; (iv) The M_Score model captures most of the financial information and helps process the recent information better as evidenced by one-quarter against one-year results. (v) When the M_Score model is applied to various portfolio strategies, the model shown that the active investing is better than passive investing. The former is represented by a buy-and-hold strategy, whereas, passive investing is represented by a long-only and long-short strategies. (vi) Unlike some asset pricing models, the M_Score model does not discriminate stock specific characteristics like stocks liquidity i.e. trading volume; company size; value or growth style orientation; stock price; and leverage position.

On methodological side; (vii) Many other models that use the momentum strategy, typically measure a single variable such as historical stock prices or historical trading volume. However, this study shows that the quarter results from financial statements used to measure momentum of stock price returns is an effective method to indicate trading signals. Additionally, using multiple financial indicators, this study has addressed the concern of biasness. Moreover, the M_Score model does not require a long historical data as information between two periods are sufficient to produce robust results. Besides that, the model is able to handle any missing values without replacement

interference and can also withstand any outlier effects. Subsequently, this study has introduced the acceleration rate of degree of freedom in the model equation to increase the sensitivity of the model towards any changes in variables.

7.5 Limitations and Future Research

Having said that, some of the financial information are only available on quarterly basis. Since this study applies a time series analysis, it works better with higher frequency of dataset like daily information. The limitation is that the financial statements used are only available on quarterly basis at best except for stock prices and market value of which can be retrieved on a daily basis. Higher frequency of dataset will make the scoring model processes the recent data effectively. Thus, making recent financial statements more reflective and help the scoring model to respond better. Furthermore, quarterly releasing of financial statements may mean a company's fundamentals have significantly changed. Hence, the quarterly results mean the investment decisions has been lagged in timing. This consequence leads to a lack of opportunity to react quickly on exiting the stock investment. Although a quarterly data can be perceived out-of-date due to losing the recent information, it has some advantages in terms of trading transaction which relates to expenses and data acquisition related costs.

In spite of the rising awareness of Islamic finance generally and *Shariah* investing particularly, there are limited theoretical and empirical research that studies the financial applications based on the principle of *musharakah*. Having said that, numerous attempts have been applied for determining *Shariah*-compliant status of the securities like stock and Islamic bond or sukuk, construction of financial index and valuation of project financing as well as asset pricing. However, application using the principle of *musharakah* in forecasting stock price returns is very new. Thus, this study has shown new theoretical, empirical and methodological evidences. First, the *musharakah* parameters represented by the financial indicators can explain the stock price returns. Second, the M_Score model based on the *musharakah* parameters can separate out-performing and under-

performing stocks. Hence, the M_Score model is likely to assist those investing in *Shariah*-compliant stocks to make an informed investment decision by using the model as an alternative investment analysis tool to forecast stock price returns and to construct profitable stock portfolio.

There are potential extensions for this study in the future research. For instance, the principle of *musharakah* which requires observations on the four essential parameters should open a new approach to stock analysis in identifying the out-performance and under-performance of listed *Shariah*-compliant stocks. With that, there are three potential research interests can be explored. First, since this study discovered that the M_Score model has evidenced better results by processing the recent information, a new study can solve this by data interpolation technique. The technique is required as most of the data (except for TSR) are only publicly available on a quarterly basis at best. Hence, those quarterly data required has to be transformed into monthly, weekly or daily data in complementing the TSR for an improved result. Second, expanding the model application to factor investing, in which it gets the most attention from the institutional investors currently. Basically, factor investing is an investment strategy in which stocks are chosen based on their attributes that associate to higher returns. In this case, the financial indicators can be the attributes when selecting the stocks to invest. Third, the new study can solve the limitation of the model where it does not measure the future value but rather the stock price direction. This can be potentially done by extending the use of the composite score itself as the measurement of future stock value. For instance, a composite score of 60 may indicate that future stock price will increase by 10 percent i.e. 60 over base score of 50. Hence, an empirical research needs to establish this hypothesis.

7.6 Epilogue

This study aims to develop a new stock scoring model known as M_Score model using fundamental analysis with quantitative approach based on the *musharakah* parameters in determining the direction or momentum of *Shariah*-compliant stock prices. In doing so, this study explores a statistical relationship between the M_Score model and the stock price returns as well as examines

robustness and intuitiveness of the M_Score model against financial economic events, company size, stock orientation i.e. value, blend and growth styles; trading volume i.e. stock liquidity; stock price i.e. penny stock and blue chip stocks; and leverage position i.e. capital structure. This study observes 636 public listed companies in Bursa Malaysia Securities during the period from June 1997 to September 2016.

In meeting the research aim and objectives, this study deliberates an extensive discussion on theories and empirical works of asset pricing model by eminent scholars in Chapter 2. As an extension to the previous discussions, Chapter 3 establishes conceptual framework of M_Score model in accordance with the *Shariah* principle of *musharakah* where it tabulates four essential parameters. Following the conceptual framework on M_Score model, Chapter 4 provides the systematic and scientific research process and the empirical model to be examined. For this, Chapter 5 validates the relationship between M_Score model with financial indicators that represents the *musharakah* parameters, while Chapter 6 examines the robustness and intuitiveness of the M_Score model as well as analyses the profitability when implementing the M_Score model on various portfolio strategies.

Finally, the newly developed M_Score model has evidenced that the *musharakah* parameters through the seven financial indicators – TSR, BAV, OCF, ROE, ROA, TOA and TEV – explain the price returns for the *Shariah*-compliant stocks. Therefore, investors can use the M_Score model to make an informed investment decision. They also can use the model as an alternative investment analysis tool in forecasting the stock price returns; determining the market timing; and more importantly, constructing the profitable stock portfolio. With that, this study confirms that the research aim and objectives have been properly addressed in a systematic and scientific methods, which brings this study to an end at this juncture.

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Appendices

Appendix I: List of Global Industry Classification Standard

Code	Sector	Subcode	Industry Groups
10	Energy	1010	Energy
15	Materials	1510	Materials
20	Industrials	2010	Capital Goods
		2020	Commercial & Professional Services
		2030	Transportation
25	Consumer Discretionary	2510	Automobiles & Components
		2520	Consumer Durables & Apparel
		2530	Hotels Restaurants & Leisure
		2540	Media
		2550	Retailing
30	Consumer Staples	3010	Food & Staples Retailing
		3020	Food, Beverage & Tobacco
		3030	Household & Personal Products
35	Health Care	3510	Health Care Equipment & Services
		3520	Pharmaceuticals & Biotechnology
40	Financials	4010	Banks
		4020	Diversified Financials
		4030	Insurance
		4040	Real Estate
45	Information Technology	4510	Software & Services
		4520	Technology Hardware & Equipment
		4530	Semiconductors & Semiconductor Equipment
50	Telecommunication Services	5010	Telecommunication Services
55	Utilities	5510	Utilities

Source: MSCI and Standard & Poor's

Appendix II: List of Stock Universe

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
ABM MK Equity	0.47	0.91	136.66	0.02	2.99	1.89	8.19	134.30
APM MK Equity	5.10	0.98	647.16	11.68	13.24	9.53	306.69	495.49
DRB MK Equity	2.24	0.58	4,995.19	-92.08	6.87	1.64	551.26	4,258.07
EPMB MK Equity	1.56	-0.20	257.12	-0.30	6.07	2.70	50.58	289.52
GPA MK Equity	0.12	-0.31	96.71	-0.97	-2.11	-1.53	17.92	73.29
MTYE MK Equity	2.02	0.85	102.68	1.60	5.25	4.79	8.70	44.76
NHF MK Equity	3.26	0.94	209.45	2.11	11.08	8.49	71.29	179.74
PECCA MK Equity	3.26	0.94	209.45	2.11	11.08	8.49	71.29	179.74
SAPU MK Equity	1.74	0.88	92.96	0.75	6.58	3.04	86.75	113.84
SMIS MK Equity	0.67	0.10	71.71	0.19	2.42	1.82	6.34	13.95
ABM MK Equity	8.27	0.92	4,666.89	25.33	11.95	5.57	1,658.18	7,461.80
WAT MK Equity	0.48	-0.24	50.98	0.73	-0.74	-0.41	1.14	15.78
GFHB MK Equity	1.51	-0.35	69.66	-0.95	-17.56	-13.61	14.04	63.71
AZR MK Equity	0.79	0.59	209.13	-18.97	5.33	1.44	57.00	403.94
AJY MK Equity	0.48	0.87	230.89	3.11	9.95	6.40	50.65	158.06
ANZO MK Equity	0.54	-0.27	17.24	-1.02	-24.91	-7.50	12.93	54.00
APBB MK Equity	1.42	0.76	144.93	2.26	9.44	6.41	42.10	76.12
ARK MK Equity	3.13	-0.30	-29.01	-1.24	1.15	141.90	3,381.28	15.47
ASTI MK Equity	0.57	0.96	173.12	2.98	12.87	7.83	71.77	181.22
ATSY MK Equity	0.12	-0.37	28.13	-0.27	-8.56	-3.83	11.59	36.01
AWCF MK Equity	1.30	-0.26	85.27	1.71	8.28	4.54	23.52	73.42
BHB MK Equity	0.99	-0.84	505.43	-9.12	9.27	5.37	154.27	755.87
GFHB MK Equity	1.60	0.51	248.37	-14.11	6.90	3.12	22.49	224.67
BMHB MK Equity	0.98	0.85	94.97	4.67	33.07	15.24	152.96	455.74
BOKG MK Equity	0.44	-0.66	74.06	-1.80	7.00	2.87	12.25	151.14
BHIC MK Equity	3.35	-0.24	295.39	-7.16	0.07	9.89	235.30	1,134.35
BSLC MK Equity	0.42	-0.57	76.20	0.15	1.73	0.97	5.31	47.31
CBP MK Equity	1.28	0.98	374.71	11.17	25.95	16.16	398.63	681.46
CHIN MK Equity	0.57	0.96	173.12	2.98	12.87	7.83	71.77	181.22
CWH MK Equity	1.52	0.79	356.12	5.85	9.04	5.48	130.01	465.67
CHR MK Equity	0.57	0.56	156.89	0.16	8.16	2.87	23.37	224.44
CIH MK Equity	5.97	0.87	124.31	-3.89	37.09	20.22	5,442.91	253.48
CME MK Equity	0.09	-0.26	43.26	-0.74	0.82	-0.06	8.18	40.99
CNAC MK Equity	0.71	-0.12	30.81	0.02	-6.00	-3.98	4.03	30.41
COCO MK Equity	1.98	0.74	598.09	-11.78	25.49	13.29	457.75	774.92
CBH MK Equity	1.39	0.21	261.10	-12.10	10.78	4.64	74.20	360.50
DSTN MK Equity	0.75	-0.34	97.82	-5.07	0.16	1.88	56.99	238.85
DLG MK Equity	0.76	0.96	693.17	15.87	20.20	12.47	361.03	3,033.17
DKLS MK Equity	1.68	0.19	254.83	2.60	6.90	4.41	34.03	115.23

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
DKSH MK Equity	2.41	0.88	245.50	4.60	16.16	3.24	149.19	518.42
DOL MK Equity	0.68	-0.75	77.87	-3.52	1.53	0.82	0.21	184.46
DUFU MK Equity	0.40	-0.12	86.80	0.93	5.88	3.59	29.32	80.18
ECON MK Equity	1.12	0.84	196.32	1.69	27.29	16.22	423.55	552.02
EITA MK Equity	1.21	0.94	108.99	1.23	13.47	8.73	60.26	120.70
EKO MK Equity	1.16	0.49	425.00	-24.86	5.71	3.22	56.48	654.77
EKOW MK Equity	0.49	-0.62	130.29	-0.18	-0.22	-0.31	15.53	91.78
FBC MK Equity	0.62	0.23	128.77	-1.42	10.57	5.37	33.96	90.42
FFB MK Equity	2.15	0.91	277.71	17.71	17.97	6.11	207.42	317.73
FIT MK Equity	0.41	0.79	170.48	-5.91	12.50	7.16	65.60	189.09
AQRS MK Equity	1.14	0.01	275.67	-20.04	11.17	4.42	118.51	568.35
GADG MK Equity	1.61	0.07	241.85	1.87	8.52	4.19	109.20	207.37
GAM MK Equity	4.27	0.92	3,263.97	-12.57	12.20	6.79	654.03	6,883.80
GKEN MK Equity	0.77	0.79	168.17	11.70	13.86	7.33	88.57	177.44
GHB MK Equity	0.73	-0.29	44.99	-0.37	0.85	0.83	2.10	22.58
HO MK Equity	1.14	-0.05	77.84	0.11	-16.50	-2.48	169.27	201.23
HWG MK Equity	1.54	-0.18	63.12	-4.70	-19.24	-4.03	52.53	194.96
HSL MK Equity	1.26	0.88	295.31	5.21	16.09	10.41	197.87	890.39
HLI MK Equity	5.41	0.82	1,543.45	63.17	9.28	4.07	450.37	2,660.19
IUB MK Equity	1.05	-0.23	27.64	-0.59	-6.65	-4.15	5.14	39.45
IJM MK Equity	2.93	0.89	4,768.53	-73.40	7.09	3.27	755.46	7,803.92
IJGB MK Equity	0.62	0.88	270.88	3.82	9.28	5.01	117.93	307.94
IKEN MK Equity	0.58	0.54	417.88	-2.55	2.55	4.61	5.79	191.09
IP MK Equity	1.41	0.11	147.85	0.97	3.63	1.36	7.37	141.81
IREKA MK Equity	1.49	0.13	189.79	-7.10	0.65	0.23	18.38	317.70
IWCB MK Equity	0.79	0.35	504.07	-6.15	0.85	0.56	12.33	535.35
KEIN MK Equity	0.56	0.72	83.21	1.63	6.43	3.32	12.54	72.67
KGRB MK Equity	0.37	0.51	50.10	-0.53	11.63	6.43	17.14	63.60
KPG MK Equity	1.91	-0.18	85.86	-0.97	-7.01	-4.55	79.40	93.72
KHI MK Equity	2.05	0.61	430.75	-0.94	4.45	3.86	37.33	164.28
KICB MK Equity	1.60	0.60	303.50	-5.33	16.85	7.19	154.92	457.03
KKB MK Equity	1.41	0.84	194.03	5.31	14.46	11.50	172.96	273.85
KNUS MK Equity	1.72	0.47	191.85	-1.13	6.53	4.55	53.84	110.75
KOBAY MK Equity	1.33	0.15	119.52	0.33	3.64	2.59	13.40	65.93
KPS MK Equity	0.83	-0.18	164.80	-0.02	4.47	3.02	21.32	101.30
FIMA MK Equity	1.27	0.88	485.10	13.67	14.60	6.89	217.20	418.48
H&L MK Equity	1.41	0.19	57.56	0.67	3.89	3.18	5.17	24.15
KJB MK Equity	0.64	-0.08	98.90	0.43	-0.93	-0.32	7.05	121.01
KUPS MK Equity	2.01	0.39	899.38	-0.57	4.04	1.63	128.61	1,323.38
LDB MK Equity	2.52	-0.48	113.56	-1.08	3.61	1.97	8.33	318.74
LFE MK Equity	0.46	-0.39	29.85	-2.42	-26.52	-6.41	103.73	60.42
POS MK Equity	3.82	0.32	1,330.93	-9.82	-0.46	-0.69	62.36	286.41

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
LNGR MK Equity	0.37	0.30	41.33	1.05	10.12	8.13	11.01	40.90
LUXC MK Equity	1.04	0.86	133.10	4.63	17.81	9.90	94.97	173.84
MRC MK Equity	1.48	0.11	1,161.34	-57.79	1.09	0.26	128.16	3,189.30
MB MK Equity	0.68	0.68	75.29	-0.15	4.20	1.17	12.60	59.12
MEHB MK Equity	1.07	0.32	148.27	0.02	8.76	4.67	21.95	99.40
MEB MK Equity	0.58	-0.32	38.64	1.24	16.25	4.45	6.09	21.03
MHB MK Equity	0.62	0.88	270.88	3.82	9.28	5.01	117.93	307.94
MMC MK Equity	2.55	0.59	6,923.00	21.11	9.53	3.59	682.95	16,228.03
MMSV MK Equity	0.31	0.72	24.46	0.28	5.33	3.80	18.50	37.14
ACP MK Equity	1.67	-0.52	259.52	-2.35	-14.22	-3.67	119.04	288.47
MBL MK Equity	1.06	0.72	74.42	1.06	12.57	10.17	33.87	69.34
MDJ MK Equity	2.04	0.32	642.77	11.40	16.14	10.62	550.31	888.00
MUHI MK Equity	1.55	0.75	581.32	8.58	8.28	1.76	120.09	1,334.55
PNSR MK Equity	2.54	-0.10	67.79	1.61	5.76	3.05	33.71	78.56
PSK MK Equity	0.22	-0.39	30.61	-1.28	-0.02	-0.08	2.73	61.44
PENT MK Equity	0.82	-0.26	82.89	-0.64	0.15	1.63	41.02	117.19
PESONA MK Equity	0.74	-0.37	63.93	-2.92	-14.87	-4.37	65.30	118.87
PEST MK Equity	0.96	0.94	139.88	-13.41	26.29	13.54	119.64	726.73
PINT MK Equity	2.21	0.97	207.23	4.76	13.62	11.23	150.05	165.78
PJD MK Equity	1.33	0.94	818.99	-29.18	5.81	3.52	239.59	597.41
PJSB MK Equity	0.54	-0.38	32.46	-0.44	-13.53	-5.04	27.20	33.49
PLB MK Equity	1.42	0.50	111.99	-1.44	2.74	1.25	34.99	156.76
PLS MK Equity	0.81	0.67	148.38	-13.24	-1.51	-1.12	29.46	265.50
PGF MK Equity	0.52	-0.16	100.28	0.10	-0.79	0.04	17.11	66.22
PSIP MK Equity	11.62	-0.29	139.57	-3.18	5.01	1.59	5.06	178.75
PRTA MK Equity	2.11	0.94	371.74	0.87	10.40	5.62	174.83	347.29
RATG MK Equity	0.11	-0.63	33.39	-0.67	-15.40	-21.95	243.94	44.58
RAYA MK Equity	0.18	-0.18	12.14	-0.41	-16.27	-8.16	6.37	24.61
RESI MK Equity	0.35	0.24	85.37	0.09	4.95	2.80	9.69	86.46
SEQB MK Equity	3.76	0.69	194.39	5.91	8.76	6.13	105.28	194.47
SANI MK Equity	1.45	-0.61	47.39	-2.84	-16.83	-4.53	10.54	46.27
SRCB MK Equity	1.36	0.76	195.69	-7.71	8.31	3.37	38.80	509.63
SCIB MK Equity	0.98	-0.25	63.20	-0.65	-4.71	-2.86	8.85	65.63
SCW MK Equity	0.51	0.40	44.54	-0.15	-0.37	0.38	4.66	40.72
SCHG MK Equity	0.25	0.38	59.93	1.39	10.63	7.71	21.01	99.47
STB MK Equity	0.86	0.45	144.25	-11.03	3.11	1.89	29.57	106.43
SIME MK Equity	10.12	0.59	26,066.51	208.37	11.40	6.30	8,379.24	59,599.30
SKBS MK Equity	0.75	-0.28	70.50	-0.79	0.10	0.06	2.14	46.22
SKP MK Equity	0.45	0.90	157.43	0.89	15.81	10.53	137.60	274.43
STL MK Equity	0.11	-0.58	68.45	-1.69	-1.73	-1.15	6.39	50.18
STC MK Equity	1.30	0.92	166.78	-0.19	17.07	10.56	100.30	176.42
SCT MK Equity	0.18	-0.08	38.44	0.31	-0.90	-0.65	4.17	26.37

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
SLON MK Equity	0.98	0.72	60.28	1.28	8.67	6.84	26.70	57.52
SYC MK Equity	0.92	-0.18	65.81	-2.25	3.98	-7.38	561.31	152.22
TOB MK Equity	0.66	0.34	156.33	-0.30	7.41	4.97	42.89	106.62
TECF MK Equity	0.22	-0.25	29.13	0.48	0.93	0.83	13.26	30.79
THR MK Equity	2.99	0.57	273.02	8.64	11.99	8.80	41.37	249.93
TRC MK Equity	0.58	0.09	260.15	0.17	6.41	3.84	47.80	189.21
TRIV MK Equity	0.30	-0.68	69.28	-0.39	10.45	8.83	140.48	233.51
TSRC MK Equity	1.24	-0.64	144.68	-4.95	-0.72	-0.45	17.22	110.17
UEME MK Equity	1.73	0.89	489.22	21.82	27.33	8.05	550.10	966.30
UMS MK Equity	1.97	0.96	106.14	0.47	8.63	7.51	25.61	52.54
UMSN MK Equity	0.68	0.85	57.58	0.86	8.50	6.35	16.81	40.77
UGB MK Equity	1.17	0.92	166.90	-0.54	10.37	6.72	46.82	166.88
UULI MK Equity	1.75	0.79	147.42	1.97	10.61	8.19	68.51	168.32
WCTHG MK Equity	2.30	0.57	1,234.51	-37.91	14.48	4.66	259.84	1,990.34
WELL MK Equity	1.59	0.95	78.24	4.57	27.55	23.31	198.58	295.64
WHIT MK Equity	2.44	0.93	513.94	8.86	10.23	6.65	147.97	490.91
WEC MK Equity	0.79	-0.16	65.45	0.45	-2.09	-1.78	1.71	33.90
WHB MK Equity	0.95	-0.37	40.20	-0.20	-0.56	-0.21	2.13	26.01
YGCB MK Equity	3.34	-0.41	85.06	-1.21	-4.19	0.17	14.99	79.71
YFG MK Equity	0.18	-0.27	40.15	-2.04	-16.65	-3.70	35.63	112.61
YLAI MK Equity	1.77	0.79	188.65	2.69	8.38	7.10	27.06	107.90
YLI MK Equity	1.73	-0.38	156.36	0.89	5.31	4.87	45.19	147.42
ZEC MK Equity	1.01	-0.42	135.45	-8.20	-0.74	0.25	11.35	236.90
ZELN MK Equity	1.11	-0.24	427.61	-21.36	-7.48	-2.17	239.37	581.22
AHBH MK Equity	0.63	-0.21	16.93	-0.38	-9.57	-2.92	13.01	23.52
AF MK Equity	3.44	0.88	255.86	10.18	17.99	14.73	186.84	427.59
BHSI MK Equity	0.31	0.95	65.91	-1.16	9.18	7.98	20.85	73.39
CIC MK Equity	1.34	-0.11	56.42	-0.12	-0.80	-0.89	9.01	36.23
CWAH MK Equity	0.80	0.07	45.74	0.54	-1.06	-0.38	6.10	67.55
CFM MK Equity	0.97	0.32	48.42	0.35	2.43	1.43	1.93	48.41
CYP MK Equity	2.12	0.40	218.89	-15.57	17.40	5.94	91.97	551.18
DR MK Equity	1.07	0.53	268.80	0.17	-4.54	-0.93	27.60	371.18
EUHO MK Equity	0.20	0.20	65.49	-0.65	3.61	2.37	6.35	62.29
FMB MK Equity	2.14	0.86	339.92	11.26	16.36	12.13	267.63	266.06
AHBH MK Equity	0.20	-0.26	175.41	2.18	5.90	3.18	28.42	223.01
HHH MK Equity	0.13	-0.45	49.35	-1.79	-0.11	-0.07	1.59	63.82
IDJ MK Equity	0.23	0.34	19.99	-1.12	-4.13	-2.56	4.17	28.83
JADI MK Equity	0.13	-0.35	107.74	-0.21	6.58	5.18	20.03	110.93
JAG MK Equity	0.14	0.05	28.03	-0.66	-15.77	-14.24	7.78	52.75
KOMA MK Equity	0.55	-0.10	112.77	0.23	-2.54	-1.32	17.03	99.21
MTB MK Equity	0.16	0.44	24.65	-0.51	-10.16	-6.96	4.76	20.16
PELI MK Equity	1.90	-0.04	533.06	-73.01	5.25	1.79	128.41	811.09

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
PICB MK Equity	0.30	-0.03	102.02	1.13	10.67	7.66	52.34	151.77
TAFI MK Equity	0.45	0.32	55.28	-0.10	3.78	3.29	4.88	11.40
TEXC MK Equity	0.56	0.54	46.09	0.15	12.41	11.17	23.14	81.41
MTI MK Equity	1.84	0.98	163.08	6.05	12.02	9.15	135.13	154.17
ZHCB MK Equity	2.91	0.36	388.26	11.82	22.57	19.58	326.92	726.74
LHI MK Equity	1.04	0.92	110.06	3.44	10.43	7.46	79.54	93.12
LATI MK Equity	2.43	0.91	237.35	5.63	11.99	6.42	120.44	234.64
SYF MK Equity	0.42	0.32	115.55	-3.39	-3.02	1.24	72.16	194.04
PHR MK Equity	0.61	0.95	139.43	1.77	9.89	5.37	49.64	118.13
HMCB MK Equity	0.65	0.96	82.01	4.02	22.76	18.05	135.14	115.09
PROL MK Equity	0.50	0.94	65.22	1.06	7.60	5.16	69.55	68.69
SIGN MK Equity	0.72	0.92	106.31	1.76	15.46	10.14	97.73	122.55
JAYC MK Equity	1.04	0.84	120.38	2.09	12.26	8.29	82.40	107.90
MTI MK Equity	1.20	0.80	218.07	3.82	5.83	3.53	27.69	120.47
PRG MK Equity	0.42	0.82	78.37	-3.71	6.98	4.71	8.04	74.55
PKH MK Equity	0.53	0.72	314.77	-1.95	9.22	5.12	77.67	323.77
YTB MK Equity	0.95	-0.04	49.56	-0.74	-11.82	-4.18	15.24	57.09
EG MK Equity	1.26	0.09	102.98	-3.40	6.88	3.23	20.06	129.20
YEN MK Equity	0.44	0.14	61.58	0.03	-7.86	-4.07	20.43	54.84
SWS MK Equity	0.50	0.72	63.64	0.07	-0.22	0.00	9.00	85.37
SKOU MK Equity	0.46	0.61	67.09	0.18	2.24	1.74	9.05	60.86
ATEC MK Equity	1.37	0.79	139.43	2.33	7.52	5.12	17.06	99.86
DGEM MK Equity	1.23	0.32	161.76	0.46	9.94	6.48	44.65	146.80
SNHB MK Equity	0.72	0.06	146.77	4.23	-1.30	-0.38	5.70	95.93
KHIN MK Equity	2.05	0.86	79.46	0.26	9.59	4.75	21.75	78.39
VOIR MK Equity	0.60	-0.03	79.10	0.39	4.90	2.74	14.52	96.87
OCP MK Equity	0.19	0.92	42.47	0.59	11.91	7.59	27.17	48.59
SHH MK Equity	1.09	0.40	71.67	1.62	3.33	2.62	15.08	40.82
ABB MK Equity	2.00	0.51	122.56	0.90	6.55	4.40	36.80	147.76
SPRG MK Equity	0.52	0.15	43.45	-0.26	-5.98	-4.18	7.69	44.91
FFHB MK Equity	0.53	0.27	19.15	-0.11	-6.35	4.14	18.33	46.92
CAM MK Equity	0.26	0.64	85.85	0.39	4.42	3.25	7.54	69.46
NHR MK Equity	0.33	0.52	57.90	0.61	5.27	3.81	4.95	57.72
MILUX MK Equity	1.61	0.06	59.65	-0.40	-1.87	-1.07	11.01	64.76
CTH MK Equity	0.60	0.38	100.22	0.47	10.24	7.52	30.94	44.79
LSKG MK Equity	0.16	0.54	28.77	-0.02	2.19	1.48	5.75	44.81
DPS MK Equity	0.30	-0.49	116.51	-21.29	3.29	2.48	6.44	83.71
MCL MK Equity	2.05	0.17	112.29	-2.11	4.72	3.10	14.35	77.83
CHB MK Equity	0.50	0.08	71.59	-0.20	1.13	0.69	9.09	38.82
EURO MK Equity	1.20	0.76	53.99	0.96	4.10	3.53	9.19	14.86
PU MK Equity	0.77	0.04	61.51	0.68	-4.62	-2.89	16.41	48.22
NCHB MK Equity	0.68	-0.47	26.86	-0.57	-8.57	-2.97	19.58	48.10

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
KPB MK Equity	0.49	-0.18	39.73	-0.25	-6.97	-6.28	7.23	21.38
PCCS MK Equity	1.15	-0.14	120.06	-1.00	-0.57	-0.12	14.91	125.44
EMI MK Equity	0.75	0.10	34.50	1.03	0.43	0.64	7.35	56.51
KSTR MK Equity	0.21	-0.66	383.03	2.84	-8.17	-6.50	269.15	11.81
SAND MK Equity	0.77	-0.04	34.91	-0.39	-10.66	-6.56	13.15	35.28
AMTK MK Equity	0.60	-0.21	31.76	-1.07	-12.50	-5.38	18.61	29.73
MSH MK Equity	0.32	-0.93	696.69	10.97	15.71	12.26	593.01	-89.95
AMRB MK Equity	0.94	0.18	516.51	-14.33	12.47	4.25	108.65	1,100.94
BARAKAH MK Eq	0.62	0.92	299.15	1.53	15.18	7.35	221.37	870.20
CARIP MK Equity	0.71	0.96	158.37	-3.78				167.36
DEHB MK Equity	2.14	0.91	579.58	15.33	19.44	14.47	620.18	1,460.13
DLUM MK Equity	1.25	0.98	224.36	4.19	18.45	9.20	155.50	350.80
EATECH MK Equity	0.92	-0.39	301.34	-43.48	17.03	5.87	177.72	954.69
HDL MK Equity	0.51	-0.39	92.44	-0.79	7.01	4.03	22.34	85.43
HHR MK Equity	0.40	-0.21	71.25	-1.10	13.81	7.95	40.82	144.81
ICON MK Equity	0.70	0.97	901.85	-15.81	-18.54	-10.25	369.21	1,420.76
PETD MK Equity	18.58	0.89	3,571.31	159.38	16.08	8.44	2,364.28	9,928.65
AMRB MK Equity	0.72	-0.29	437.32	0.10	-6.24	-3.01	57.59	374.80
MMHE MK Equity	3.72	-0.50	2,492.86	-39.51	7.21	3.44	183.63	4,886.45
PPT MK Equity	0.67	0.57	443.27	-15.23	7.39	3.22	117.14	948.25
PENB MK Equity	1.75	0.40	367.77	-4.16	6.32	3.05	53.79	530.90
KNMG MK Equity	1.56	-0.21	1,392.89	-8.07	15.79	6.37	103.30	2,353.60
REB MK Equity	0.64	-0.35						
SAKP MK Equity	2.92	0.64	10,458.13	-73.58	7.24	2.73	2,843.49	29,252.82
SES MK Equity	0.93	0.36	744.22	9.95	-0.45	-1.21	171.49	944.87
SGB MK Equity	0.71	-0.55	840.26	-16.34	8.01	2.67	341.49	1,716.15
SIB MK Equity	0.60	0.41	157.30	-6.33	-12.89	-0.05	37.23	1,216.19
SONA MK Equity	0.45	0.51						
SMTC MK Equity	0.51	0.36	199.32	-18.48	-20.47	-0.42	113.24	518.20
TOFF MK Equity	1.30	-0.17	208.42	-16.69	1.95	-0.91	24.62	395.89
RH MK Equity	0.68	-0.23	295.76	-40.66	-9.71	-2.42	88.43	606.43
UMWOG MK Equity	2.29	0.96	2,994.33	-28.16	-0.92	-0.08	312.27	6,569.79
UZMA MK Equity	1.46	0.98	139.67	-11.91	11.10	5.03	91.95	418.56
WSC MK Equity	3.46	-0.12	702.71	1.74	11.13	0.26	308.84	1,606.38
YNS MK Equity	0.79	0.90	416.15	-44.93	16.15	5.98	292.98	1,096.05
AJI MK Equity	5.72	0.88	186.90	7.44	10.20	8.60	96.11	163.01
APOF MK Equity	6.01	0.96	200.43	4.63	11.85	10.57	119.04	201.52
AAB MK Equity	0.21	0.67	169.37	-0.22	-4.34	-2.48	28.97	162.60
BIOO MK Equity	0.13	-0.16	26.88	-1.07	-42.15	-16.31	45.22	61.08
BLDP MK Equity	6.25	0.95	528.53	-0.19	8.98	4.85	108.50	562.23
BORN MK Equity	0.65	0.75	75.61	-2.58	2.10	1.46	10.86	248.13
BPLANT MK Equity	1.60	0.83	2,227.38	3.54	4.06	2.71	79.28	2,860.33

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
CABC MK Equity	0.63	0.60	120.74	-25.31	5.14	1.92	1,261.41	192.05
CCK MK Equity	0.40	0.92	124.38	0.71	9.70	7.12	35.86	117.09
CWG MK Equity	1.65	-0.20	340.50	-3.57	6.17	4.58	24.77	270.27
AJI MK Equity	1.63	0.89	141.56	1.94	12.40	10.00	79.66	223.67
DBE MK Equity	0.17	-0.64	49.42	-2.79	-20.62	-6.27	17.78	95.26
DTL MK Equity	2.35	-0.39	505.54	4.13	3.38	2.77	373.21	587.91
DLM MK Equity	34.90	0.96	163.37	20.96	34.87	19.32	814.23	1,143.89
EKA MK Equity	0.48	-0.83	55.47	-3.27	-37.10	-5.04	55.79	143.67
FEH MK Equity	7.98	0.94	832.84	18.92	10.55	8.38	163.17	752.10
FARM MK Equity	1.23	-0.41	97.71	-1.12	-0.51	-0.15	17.17	237.67
FGV MK Equity	3.48	-0.80	7,914.36	23.34	8.20	2.73	879.26	14,428.44
FNH MK Equity	17.16	0.96	1,301.03	34.68	16.82	9.28	949.07	3,784.93
GENP MK Equity	6.90	0.95	2,372.09	24.09	10.56	8.97	843.65	3,981.70
GLBH MK Equity	1.44	-0.16	306.88	-1.40	2.60	2.15	65.35	285.41
GOCB MK Equity	0.24	-0.48	18.66	-0.53	-13.09	-6.12	8.89	34.01
GREE MK Equity	0.27	0.87	44.83	0.92	13.57	11.26	28.89	55.86
HAPL MK Equity	3.23	0.77	1,819.23	29.01	7.70	6.72	263.61	1,951.78
HARN MK Equity	1.22	-0.10	241.67	0.58	6.61	4.25	33.19	228.81
HSI MK Equity	0.85	0.92	138.45	8.03	16.13	11.86	204.47	333.32
HWA MK Equity	4.55	-0.33	18.80	-0.02	-8.94	-2.98	1.05	46.06
IJMP MK Equity	3.03	0.85	1,008.81	-6.14	9.85	7.20	273.89	1,979.80
INNO MK Equity	0.91	-0.28	130.33	-4.37	15.35	8.47	28.37	173.95
IOI MK Equity	4.01	0.88	7,357.76	226.80	17.54	8.93	4,917.15	25,111.40
KFB MK Equity	1.20	0.79	104.01	0.29	15.00	11.99	84.05	194.65
KHEE MK Equity	1.16	-0.44	80.67	-1.99	3.00	1.81	5.01	76.06
KIML MK Equity	2.95	0.97	404.54	18.45	10.83	7.72	224.59	469.26
KHP MK Equity	0.36	0.35	488.08	-1.84	6.88	4.48	79.35	520.56
KLK MK Equity	18.97	0.95	5,793.20	115.25	12.83	8.93	3,519.04	14,563.37
KFM MK Equity	1.04	-0.63	26.77	0.29	-14.95	-7.96	11.92	39.62
KWAN MK Equity	2.16	0.47	771.04	8.47	5.03	2.33	89.58	1,023.31
LAY MK Equity	2.21	0.69	115.62	-1.50	5.03	1.52	26.78	211.21
LBB MK Equity	1.48	-0.72	252.45	-4.24	7.67	3.33	31.25	314.02
LTKM MK Equity	1.14	0.89	118.34	1.89	11.59	8.78	81.57	92.33
MHC MK Equity	0.80	0.91	405.84	-1.15	7.49	5.80	21.30	346.24
MSM MK Equity	5.47	0.91	1,837.04	40.58	13.47	10.75	952.47	3,284.29
NSOP MK Equity	6.05	0.89	384.07	4.64	5.72	4.46	20.20	272.55
NESZ MK Equity	73.49	0.98	589.59	91.17	57.99	20.16	3,207.71	9,187.28
NPC MK Equity	2.27	0.87	239.12	-2.91	11.10	6.72	91.93	364.69
OCM MK Equity	1.43	-0.44	224.52	1.16	2.14	1.16	8.87	155.34
OTB MK Equity	1.80	0.55	301.84	11.82	15.98	12.37	259.14	616.70
OFIH MK Equity	0.82	0.78	114.39	1.06	10.25	8.19	54.51	125.86
PPB MK Equity	0.54	-0.49	167.72	-0.22	-5.12	-1.76	5.98	201.17

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
PWRT MK Equity	1.93	0.89	206.52	4.06	11.56	8.77	81.94	326.37
PEP MK Equity	15.25	0.89	10,170.65	71.55	14.12	11.02	653.48	11,052.84
PW MK Equity	0.44	0.78	147.05	1.15	3.28	1.66	11.15	138.31
QLG MK Equity	1.77	0.98	567.05	6.71	20.44	8.28	417.60	2,032.93
REX MK Equity	1.83	-0.44	121.38	0.02	1.51	1.10	3.57	70.44
RSAW MK Equity	0.62	0.56	515.28	3.88	14.20	4.82	124.94	1,041.65
RRE MK Equity	4.10	0.96	164.13	2.57	6.26	5.95	18.71	140.37
SOP MK Equity	3.11	0.90	922.37	-7.35	14.25	7.78	571.44	1,668.66
SPLB MK Equity	2.93	0.33	535.61	5.22	9.22	6.97	112.44	631.97
SAUD MK Equity	0.34	0.54	50.72	-2.22	-1.78	-0.72	3.78	65.83
SHL MK Equity	1.43	-0.42	65.66	-56.84	1.35	1.61	1,684.73	101.00
SPZ MK Equity	1.18	0.93	135.82	2.35	7.05	4.66	51.42	159.98
TMK MK Equity	1.63	0.40	420.24	7.53	13.10	9.08	234.86	599.59
TGN MK Equity	0.93	0.08	61.34	-1.11	-2.77	-1.15	22.19	54.92
TSCB MK Equity	0.79	0.80	119.63	1.51	22.70	11.98	175.26	252.23
THP MK Equity	1.83	0.65	875.36	-2.47	17.71	8.70	233.41	1,597.53
TARE MK Equity	0.78	0.68	140.65	3.06	11.83	7.65	59.15	314.60
TSH MK Equity	1.11	0.97	849.97	-14.93	11.08	5.22	202.31	2,135.35
UMR MK Equity	6.38	0.92	877.22	10.55	7.61	7.06	116.54	749.18
UPL MK Equity	27.45	0.98	1,359.12	54.39	14.04	12.28	648.72	2,388.46
XLH MK Equity	1.02	-0.67	98.48	0.13	-2.49	-1.72	33.26	84.29
YEE MK Equity	1.09	0.87	247.92	5.10	7.47	3.62	41.82	277.97
TOPG MK Equity	2.40	0.94	901.60	20.33	20.75	12.76	832.08	2,642.80
ADV MK Equity	2.83	0.88	133.69	-0.49	22.39	11.81	39.22	239.93
CPG MK Equity	0.28	0.87	56.43	-4.44	7.54	2.78	12.84	158.16
HART MK Equity	2.87	0.98	710.33	30.41	33.27	25.53	1,807.81	3,706.25
IHH MK Equity	4.98	0.93	20,152.55	34.38	4.08	2.65	1,307.93	45,136.17
KRI MK Equity	2.00	0.95	477.32	11.42	22.23	12.12	605.94	1,646.00
KPJ MK Equity	2.53	0.95	852.22	-27.82	13.02	5.67	303.48	2,610.08
LKLI MK Equity	0.27	-1.00	35.33					123.24
PHRM MK Equity	3.78	0.95	370.43	8.67	14.54	6.14	197.92	876.78
SUCB MK Equity	1.52	0.93	588.90	5.71	17.79	9.92	284.46	1,194.30
BIOA MK Equity	0.26	0.73	66.50		10.18	8.76	46.96	168.37
EKC MK Equity	3.71	0.68	78.59	2.22	13.30	11.12	30.13	167.50
NTPM MK Equity	0.74	0.95	239.42	3.77	18.78	11.57	223.60	581.85
ONC MK Equity	0.43	-0.19	32.49	-1.18	-13.09	-7.50	6.19	44.92
PAOS MK Equity	1.06	-0.28	99.47	0.61	3.76	2.68	11.18	113.57
RBRX MK Equity	1.48	0.62	155.39	0.72	6.56	3.78	45.83	207.40
ARNK MK Equity	0.60	0.86	64.91	0.77	9.83	4.84	27.15	94.11
APT MK Equity	3.70	0.87	41.65	0.69	5.79	4.99	5.73	18.17
ALC MK Equity	1.97	0.44	202.06	2.49	2.57	2.00	10.25	110.75
AMAL MK Equity	0.79	-0.30	96.96	1.08	-1.79	-1.01	14.06	103.45

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
ASPO MK Equity	0.13	0.55	21.94	-0.43	3.34	2.02	35.88	33.53
AGG MK Equity	4.58	-0.23	73.42	0.43	-5.58	-1.32	5.80	101.12
ATRE MK Equity	0.80	-0.19	73.70	1.43	-8.58	-5.95	17.48	72.01
BAK MK Equity	16.80	0.91	3,867.31	21.62	12.69	10.77	1,498.89	5,515.49
BIG MK Equity	0.94	-0.29	52.88	0.55	-2.06	-0.78	7.22	81.55
BPP MK Equity	1.07	0.87	131.25	3.33	11.35	8.78	48.81	95.10
ARNK MK Equity	1.98	0.87	1,740.41	23.46	8.94	5.79	594.26	1,962.01
CAN MK Equity	2.12	0.88	294.11	0.13	17.97	7.23	140.55	562.45
CCM MK Equity	3.32	-0.18	759.76	7.50	5.86	2.99	48.37	1,177.00
CBEE MK Equity	2.21	0.64	368.19	5.60	5.99	4.72	43.05	213.52
CSB MK Equity	1.61	0.93	85.83	2.39	12.93	11.35	39.12	100.70
CG MK Equity	3.44	-0.33	82.68	-4.93	-16.91	-6.60	126.14	192.24
CEP MK Equity	1.86	0.22	71.50	-0.11	8.47	3.30	25.66	130.04
CSCS MK Equity	1.75	0.66	713.72	17.02	7.15	5.90	155.69	312.72
CYLC MK Equity	0.82	0.93	70.20	1.16	6.11	4.54	11.84	56.02
CYM MK Equity	1.00	-0.54	121.44	0.42	-3.14	-2.99	24.44	68.26
DPP MK Equity	1.26	0.96	132.36	1.96	11.96	7.25	98.21	262.73
DAYA MK Equity	0.18	0.09	172.69	-15.69	5.39	4.41	46.75	278.10
DEN MK Equity	1.88	-0.27	34.11	0.78	-0.92	-0.08	5.99	63.88
DOME MK Equity	0.97	0.96	127.46	-0.58	11.90	6.81	38.88	157.27
EKSON MK Equity	1.69	0.02	299.12	5.66	9.61	6.87	101.57	164.18
EONM MK Equity	0.58	-0.15	125.34	-1.80	7.68	4.96	27.29	132.34
EVF MK Equity	0.90	0.32	692.34	0.50	10.16	6.26	140.24	747.99
GSCB MK Equity	0.57	0.60	48.73	0.18	2.16	1.33	19.09	40.26
GPB MK Equity	0.56	-0.21	71.93	0.33	-2.16	-1.34	27.67	55.51
HAL MK Equity	0.68	0.44	88.57	1.31	3.44	2.77	5.50	65.23
HAVE MK Equity	0.41	0.76	187.44	2.46	9.62	4.99	96.29	240.97
HTVB MK Equity	0.88	-0.41	629.10	6.12	7.90	3.85	156.89	744.97
HIL MK Equity	0.52	0.66	222.29	2.56	5.08	3.94	19.18	92.26
HHS MK Equity	0.38	0.05	51.62	-1.51	2.60	1.42	1.89	62.60
IRET MK Equity	0.48	-0.11	54.38	-2.41	-3.58	-2.18	10.87	65.53
JT MK Equity	1.58	0.41	1,175.37	-2.37	3.96	2.29	138.35	1,744.89
JMR MK Equity	0.56	0.86	101.02	-0.19	0.21	0.16	9.88	71.04
JOHO MK Equity	0.47	0.88	114.55	-1.04	8.19	5.76	80.77	104.36
KSSC MK Equity	0.52	0.52	66.48	-0.85	6.93	4.41	7.42	58.09
KANGER MK Equity	0.28	-0.24	75.32	-6.43	9.30	6.54	13.93	164.37
KARY MK Equity	0.17	0.80	52.42	0.06	10.04	7.77	15.72	50.90
KIA MK Equity	0.83	-0.36	53.05	1.17	-0.27	1.45	14.29	60.44
KYM MK Equity	0.99	-0.11	66.42	-1.20	-3.90	0.16	24.73	200.14
LMC MK Equity	10.10	0.91	3,145.74	81.36	7.11	5.27	674.73	4,993.81
LBA MK Equity	0.67	0.85	202.50	5.03	7.26	4.33	33.30	179.13
LDHB MK Equity	0.45	0.04	1,356.63	-7.51	-0.73	0.71	218.07	1,154.52

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
LLB MK Equity	1.28	-0.06	2,595.15	11.61	-1.47	-0.20	535.58	1,948.51
LSTI MK Equity	0.15	-0.37	73.15	-0.70	-33.19	-5.72	72.99	112.19
LYSA MK Equity	2.62	0.95	85.14	1.47	11.63	10.53	47.42	53.04
MSW MK Equity	0.93	0.09	439.06	-5.77	6.00	3.42	83.77	407.18
MPG MK Equity	0.92	-0.32	49.09	0.90	-0.34	0.32	8.82	48.53
MIG MK Equity	2.29	-0.39	525.61	-15.20	-2.42	2.09	124.71	571.53
MENT MK Equity	1.02	-0.23	58.10	-2.60	10.70	6.23	25.17	55.45
MER MK Equity	1.26	0.11	38.27	1.14	11.42	8.24	23.78	30.90
MIEC MK Equity	1.17	-0.33	325.50	-5.87	1.39	1.41	34.92	275.79
MINE MK Equity	0.16	-0.65	66.34	-1.59	-5.57	-2.17	11.70	80.63
MIN MK Equity	0.38	0.36	249.55	-0.73	4.47	2.29	41.86	141.72
MUD MK Equity	1.24	0.90	518.78	10.62	3.79	1.93	44.80	589.12
MSB MK Equity	0.67	-0.45	254.85	0.69	2.00	1.27	26.70	231.13
NWP MK Equity	0.41	-0.54	72.14	-0.22	-7.01	-6.34	30.81	115.30
NYL MK Equity	2.39	-0.44	249.98	4.10	5.61	2.23	48.07	290.99
OKAC MK Equity	0.60	0.81	87.87	0.84	6.79	5.18	36.17	68.40
OPB MK Equity	0.77	0.33	106.17	1.55	3.45	1.98	22.28	114.70
PARB MK Equity	0.35	-0.67	70.07	-3.93	-11.61	-4.31	32.51	145.31
PGHB MK Equity	0.85	0.59	313.06	5.14	16.98	9.15	187.54	465.38
PER MK Equity	5.70	0.88	261.48	12.56	17.74	12.41	183.86	329.26
TSH MK Equity	1.11	0.96	849.97	-14.93	11.08	5.22	202.31	2,135.35
PTB MK Equity	0.15	-0.30	27.60	0.17	2.63	1.39	1.69	32.40
PMBT MK Equity	0.90	0.79	97.85	-1.60	9.05	3.38	18.59	128.04
PRESS MK Equity	1.11	0.93	1,043.85	-84.34	16.19	5.54	451.41	2,521.98
PRST MK Equity	0.73	0.37	224.70	3.43	6.09	2.09	25.29	360.09
PP MK Equity	0.50	0.68	117.45	2.09	6.20	3.71	21.55	94.74
PWP MK Equity	0.64	-0.71	203.36	-0.91	4.27	2.05	49.11	248.68
QC MK Equity	1.64	-0.08	140.53	-2.34	0.35	0.44	6.54	125.32
RALC MK Equity	1.06	-0.16	37.32	0.12	-1.73	-0.52	4.14	48.04
SCGM MK Equity	1.36	0.90	64.72	-0.79	15.22	12.21	62.20	121.13
SCI MK Equity	2.21	0.93	480.51	3.82	12.60	6.86	496.17	750.77
SER MK Equity	0.17	0.42	14.25	-0.28	-10.60	-6.34	4.18	30.27
SIGA MK Equity	0.61	-0.62	95.77	-1.84	5.47	3.60	11.05	118.77
HUAAN MK Equity	1.63	-0.46	532.91	-7.65	-9.74	-3.68	173.13	431.16
SLPR MK Equity	0.94	0.78	83.96	2.23	12.95	9.44	63.19	178.75
SMI MK Equity	0.33	-0.34	162.62	3.06	-0.41	-0.85	7.44	51.70
SA MK Equity	3.67	0.95	399.97	6.35	5.72	4.60	93.61	252.06
STH MK Equity	2.59	0.24	512.63	2.61	6.97	4.90	159.83	558.01
TAH MK Equity	3.66	0.78	679.76	13.90	15.64	10.78	404.82	1,335.31
TC MK Equity	12.73	0.95	738.95	24.82	8.35	7.42	254.04	698.05
TEC MK Equity	0.21	0.72	64.50	2.25	39.34	30.85	74.17	77.87
TEKS MK Equity	0.63	0.82	132.12	-2.97	10.18	5.68	52.15	184.77

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
TGI MK Equity	1.79	0.86	192.76	2.23	11.96	7.39	75.26	155.64
TWB MK Equity	1.44	-0.27	44.81	-0.24	-13.44	-6.98	28.20	89.89
TOMY MK Equity	0.87	0.91	80.61	1.06	12.60	7.42	75.61	116.45
TOYO MK Equity	1.34	-0.54	75.21	-0.45	3.76	2.11	3.36	85.22
UPA MK Equity	2.02	0.96	138.01	0.49	10.16	7.67	45.76	95.63
VCB MK Equity	0.40	0.66	66.60	0.11	-8.21	-4.63	12.15	70.25
WEI MK Equity	1.29	0.86	210.06	0.19	13.55	6.55	71.01	181.25
WTKH MK Equity	2.04	-0.21	977.08	15.59	6.16	4.54	129.69	767.18
WENG MK Equity	0.59	0.85	105.53	-1.64	4.04	2.33	7.69	148.40
YKGI MK Equity	0.59	-0.44	157.22	-2.96	-0.95	-0.36	21.20	346.89
APEX MK Equity	2.66	0.93		1.97	14.24	9.62		
CCMD MK Equity	2.64	0.94		6.67	19.62	17.29		
HOV MK Equity	0.30	0.54		0.68	5.87	3.78		
KTRI MK Equity	0.78	0.77		-2.16	8.77	6.34		
MGRC MK Equity	0.58	-0.42		-0.80	-15.59	-14.71		
YSP MK Equity	0.58	-0.42		-0.80	-15.59	-14.71		
KPJ MK Equity	2.53	0.95	852.22	-27.82	13.02	5.67	303.48	2,610.08
LKLI MK Equity	0.27	-1.00	35.33					123.24
PHRM MK Equity	3.78	0.92	370.43	8.67	14.54	6.14	197.92	876.78
SUCB MK Equity	1.52	0.94	588.90	5.71	17.79	9.92	284.46	1,194.30
KLCCSS MK Equity	5.55	0.96	9,448.82	165.69	11.02	5.27	1,104.97	9,973.95
IOIPG MK Equity	2.40	-0.13	12,800.88	-10.41	7.55	5.59	1,428.52	10,357.37
SPSB MK Equity	3.54	0.79	2,681.59	-5.45	11.40	6.46	622.89	5,142.36
SWB MK Equity	2.98	0.95	5,224.07	-22.12	17.37	7.35	1,936.72	7,544.89
UEMS MK Equity	1.79	-0.04	4,909.15	-51.96	7.59	4.39	506.14	8,919.86
UOAD MK Equity	2.27	0.83	2,422.41	5.62	15.50	12.21	1,421.04	2,224.67
MSGB MK Equity	0.96	0.94	1,219.69	-50.74	16.41	7.56	549.25	2,001.96
ECW MK Equity	0.56	0.65	557.99	-11.72	2.40	1.39	31.49	780.44
EAST MK Equity	1.51	0.69	899.90	-15.51	5.17	2.24	129.53	1,524.12
AXRB MK Equity	1.93	0.95	759.16	-22.83	12.85	8.32	173.13	1,422.67
KLCCSS MK Equity	37.81	-0.03	246.22	-27.15	13.44	9.62	50.58	593.98
MCH MK Equity	2.58	0.93	657.75	-7.55	42.90	27.44	1,820.59	1,226.22
TRCB MK Equity	1.11	0.57	1,208.30	-14.36	5.93	2.89	305.40	1,142.48
MKH MK Equity	1.64	0.93	608.32	0.22	9.02	5.77	189.06	634.93
KSL MK Equity	1.14	0.89	824.02	-3.00	16.75	12.57	870.27	742.75
AQAR MK Equity	1.77	0.93	635.94	-19.81	9.38	5.22	61.56	1,183.67
LBS MK Equity	4.46	-0.15	592.28	-10.85	10.66	4.06	342.00	718.61
SSR MK Equity	0.55	0.19	95.41	-1.07	0.03	-0.37	4.16	155.36
SHLC MK Equity	2.53	0.93	548.72	17.70	7.09	5.16	138.28	361.66
PLEN MK Equity	2.01	0.86	735.53	5.07	11.31	9.08	261.28	248.70
TTJ MK Equity	1.88	0.62	432.29	-27.29	18.42	8.48	213.11	717.88
TILB MK Equity	1.52	0.94	320.96	4.38	23.83	13.38	427.38	494.63

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
SALAM MK Equity	1.02	-0.55	582.70	11.41				887.21
PAR MK Equity	1.73	0.91	516.01	-12.98	10.62	6.59	98.91	415.03
IBHD MK Equity	0.52	0.44	256.83	-1.58	6.14	4.44	89.71	166.92
GLMC MK Equity	1.08	0.85	559.37	-1.99	10.24	5.18	173.73	610.96
IBRA MK Equity	0.52	0.80	179.22	-5.02	6.52	3.82	83.73	219.12
WING MK Equity	1.94	0.79	774.52	-4.91	4.83	3.44	124.28	521.90
THPS MK Equity	5.50	0.71	360.81	1.16	5.67	5.11	42.45	150.71
HYB MK Equity	0.97	0.97	253.71	0.50	13.93	8.53	299.01	294.11
OIB MK Equity	1.83	0.86	304.45	1.10	4.52	3.55	34.89	158.49
AM MK Equity	0.64	0.70	497.56	1.63	3.58	2.66	31.28	224.88
NHB MK Equity	3.62	0.19	753.91	-26.79	14.11	8.84	294.94	798.42
SNT MK Equity	0.90	0.77	283.94	-13.16	14.72	7.87	106.75	508.86
MKL MK Equity	1.46	-0.36	986.42	9.52	6.37	3.05	36.68	1,105.13
CCDO MK Equity	2.52	0.87	499.46	-3.52	8.58	6.11	274.91	379.90
CHH MK Equity	1.76	-0.30	768.66	4.76	0.69	0.48	35.07	943.34
MALT MK Equity	0.75	0.44	519.00	-12.35	4.45	2.54	55.79	381.36
ENRA MK Equity	1.48	0.07	177.23	-5.32	5.35	3.17	18.04	236.73
MEN MK Equity	1.72	0.01	187.87	-31.03	-3.22	-2.34	34.11	299.18
IVORY MK Equity	0.52	-0.56	318.36	-1.81	8.59	3.51	33.60	424.46
ECOF MK Equity	0.34	-0.28	343.27	-1.44	-7.27	-3.91	80.00	348.09
SYML MK Equity	1.15	0.13	533.32	-2.21	3.40	1.50	62.05	504.99
HCK MK Equity	1.18	0.80	60.50	-0.05	2.01	1.20	14.18	57.77
TALA MK Equity	0.23	-0.53	581.99	10.29	-8.70	-2.10	161.40	865.61
SBC MK Equity	0.67	0.70	264.73	-2.80	3.91	2.66	23.26	161.01
APH MK Equity	0.26	-0.20	322.45	0.24	8.71	4.21	640.79	297.41
KEN MK Equity	0.77	0.97	142.18	2.02	10.13	7.32	45.66	83.21
GOB MK Equity	0.66	-0.10	273.06	-0.62	3.43	1.14	71.64	268.03
GMUT MK Equity	0.36	0.92	240.00	0.27	5.49	4.21	28.80	130.31
CVB MK Equity	1.46	0.76	177.20	1.22	7.53	4.47	108.43	203.21
BERT MK Equity	1.01	-0.11	153.97	-3.18	3.53	2.53	11.79	115.15
EUPE MK Equity	0.72	0.15	229.27	-1.97	3.22	2.28	9.27	109.98
PSD MK Equity	0.65	-0.22	355.51	-4.62	1.04	0.73	8.62	166.58
LBIC MK Equity	1.15	0.51	74.88		11.35	7.52	51.12	68.43
PEG MK Equity	0.54	-0.30	329.91	-0.33	0.24	-0.22	4.40	124.92
TGB MK Equity	0.42	0.69	115.03	-3.31	1.89	0.71	5.83	111.79
TIG MK Equity	0.59	-0.08	74.49	-3.87	-7.45	-3.66	3.69	55.63
NIC MK Equity	0.37	-0.33	97.36	-0.99	-8.53	-6.22	11.41	86.75
MJPR MK Equity	0.97	-0.29	181.42	1.63	0.72	-4.96	8.64	105.95
ACME MK Equity	0.95	-0.59	56.39	0.79	1.15	0.42	6.42	108.33
MUH MK Equity	0.68	0.04	40.44	1.35	4.32	3.97	29.79	39.30
TANC MK Equity	0.29	-0.29	192.74	0.24	-10.46	-3.96	90.03	247.50
AEON MK Equity	1.83	0.94	939.08	18.99	13.92	7.26	596.08	1,997.88

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
AMW MK Equity	16.15	0.95	221.94	19.16	33.36	22.64	627.79	1,106.68
BAUTO MK Equity	2.24	0.53	437.68	52.41	48.56	28.49	1,948.13	2,150.43
BON MK Equity	0.50	0.91	218.64	4.52	15.85	9.10	147.17	391.09
CNI MK Equity	0.26	-0.94	97.86	-0.02	7.18	4.72	3.11	134.95
CGHB MK Equity	1.01	-0.42	162.63	0.06	-12.73	-8.76	15.77	169.58
CNCB MK Equity	21.00	0.76	339.69	9.88	10.10	6.61	92.28	347.44
FHB MK Equity	0.54	0.71	217.75	-1.17	9.64	6.58	70.66	156.44
KGMB MK Equity	0.61	-0.08	177.63	0.69	6.26	3.55	25.86	179.73
MBM MK Equity	3.29	0.88	990.36	3.51	12.97	9.01	120.03	898.99
AEON MK Equity	1.13	-0.41	56.78	0.16	2.80	1.51	14.64	43.17
PAD MK Equity	1.22	0.91	248.49	15.33	24.42	16.72	640.01	556.40
PKS MK Equity	3.37	0.16	2,452.59	11.99	26.40	5.82	802.03	3,434.72
SOLID MK Equity	1.27	0.40	104.57	-1.26	8.29	6.32	21.28	188.67
SOLID MK Equity	1.27	0.40	104.57	-1.26	8.29	6.32	21.28	188.67
STORE MK Equity	3.33	0.43	331.85	3.73	7.42	2.84	51.18	245.19
TGL MK Equity	1.32	0.44	52.29	1.24	18.27	7.29	27.48	65.41
YOCB MK Equity	0.94	0.80	132.37	1.47	14.64	11.74		114.58
DOGT MK Equity	0.29	0.25	179.45	-0.20	2.49	2.69	60.93	323.43
ELSR MK Equity	1.11	0.94	52.28	1.20	18.68	16.88	53.95	119.23
GENE MK Equity	2.04	-0.14	48.71	0.11	7.71	4.97	36.66	75.35
GTB MK Equity	3.38	0.90	219.06	6.39	15.49	11.94	196.03	499.44
JFTB MK Equity	0.37	0.94	23.42	-0.10	2.96	2.20	3.22	40.36
KESM MK Equity	2.74	0.80	208.98	2.62	8.33	5.29	98.38	82.47
KEYA MK Equity	0.21	-0.49	100.43	-1.32	-26.30	-23.10	148.52	129.69
MPI MK Equity	13.32	0.20	985.31	54.60	9.69	4.78	505.89	3,302.98
MQ MK Equity	0.31	-0.35	37.71	0.05	-5.44	-4.96	29.59	26.78
TURI MK Equity	0.80	-0.32	196.05	-1.18	-6.56	-4.90	22.81	131.65
DOGT MK Equity	2.34	0.40	827.73	13.34	6.20	3.97	321.31	1,373.14
VHB MK Equity	0.24	0.08	17.40	-0.29	0.16	-0.15	3.18	21.69
VITRO MK Equity	1.47	0.98	91.84	1.81	26.46	21.97	158.96	253.60
APP MK Equity	0.12		16.37	-0.29	-18.37	-15.76	30.73	18.70
ASD MK Equity	0.42		14.82	-0.80	-6.02	-3.62	4.79	33.81
CSHB MK Equity	0.44		126.01	0.55	11.70	8.56	42.64	231.14
CUSC MK Equity	0.24		49.01	-0.13	2.02	1.39	26.00	56.33
DNEX MK Equity	0.82		327.00	-2.00	5.45	1.36	88.99	1,400.25
DATA MK Equity	0.94		37.39	-1.08	-12.60	-6.82	11.15	68.34
DSON MK Equity	1.12		171.48	2.67	40.26	21.36	595.14	1,555.21
DGSB MK Equity	0.09		38.58	-1.44	-12.01	-8.12	21.86	57.15
EAHB MK Equity	0.12		76.28	-0.25	9.81	8.20	32.82	75.59
EDS MK Equity	0.66		41.39	2.71	-4.74	-2.98	12.28	23.34
APP MK Equity	0.22		92.62	-3.74	11.20	9.10	24.77	101.99
FSBM MK Equity	1.27		49.01	-0.93	-19.91	-11.37	31.81	52.57

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
GNB MK Equity	0.12		19.30	-0.33	-17.19	-15.10	36.93	26.70
GHLS MK Equity	0.48		96.03	-1.42	-1.24	-0.91	32.86	164.68
GFLO MK Equity	0.25		58.85	-0.02	13.46	8.29	25.95	78.06
IDC MK Equity	0.11		34.61	-1.36	-5.75	-4.01	3.35	34.55
IFCA MK Equity	0.29		47.77	0.79	2.70	2.17	57.35	96.60
INIX MK Equity	0.22		12.17	-0.41	-18.76	-16.91	33.09	16.77
JCB MK Equity	7.90		161.22	8.96	91.78	77.99	475.07	545.49
KAG MK Equity	0.09		23.48	-1.18	-16.56	-9.22	14.51	31.18
KAB MK Equity	0.23		28.61	0.14	13.98	7.58	22.15	42.42
MESI MK Equity	3.93		157.23	1.54	5.48	3.92	41.73	175.56
MEGB MK Equity	0.11		56.68	-2.15	-0.60	0.49	30.39	64.67
MICL MK Equity	0.71		34.22	1.21	12.22	9.49	11.09	55.20
MMAG MK Equity	0.12		39.49	-2.66	-10.97	-9.12	14.76	33.25
MPSB MK Equity	0.18		49.88	-0.57	-2.92	-2.78	6.28	50.00
MYEG MK Equity	0.62		133.26	4.88	29.14	23.12	316.91	1,287.01
NETX MK Equity	0.13		29.58	-0.05	-14.78	-11.68	28.97	34.37
NNCB MK Equity	0.10		114.79	-3.25	6.20	4.64	31.96	94.32
NOVM MK Equity	0.11		27.79	0.06	-11.19	-6.85	7.30	37.80
AEM MK Equity	0.40	-0.27	33.60	-1.03	-8.82	-3.76	5.54	56.48
CMT MK Equity	0.41	0.16	102.95	-0.63	0.16	0.07	12.04	116.45
CCHB MK Equity	0.17	0.01	13.57	-0.56	-14.41	-6.94	6.49	18.21
CYBT MK Equity	0.15	-0.06	6.20	-0.22	-8.69	-15.19	99.31	12.77
ECS MK Equity	1.37	0.97	191.46	5.35	15.76	8.50	80.68	148.40
GBLF MK Equity	0.06	-0.55	412.41	1.47	-8.94	-5.82	43.11	398.42
GRPB MK Equity	1.30	-0.43	245.40	-24.92	-25.56	-4.39	428.91	607.28
GUH MK Equity	0.84	0.79	380.60	4.69	4.65	3.87	44.69	136.97
INRI MK Equity	1.95	0.97	274.09	9.90	36.77	20.57	691.83	1,362.42
INDU MK Equity	0.70	-0.15	57.66	-0.89	-7.74	-5.44	30.17	33.55
AEM MK Equity	1.16	0.79	103.53	1.29	5.06	3.71	35.34	60.69
JCYH MK Equity	0.91	-0.16	1,077.38	34.59	12.40	8.69	725.32	1,574.71
JHMC MK Equity	0.32	0.41	27.02	-0.28	7.48	4.43	13.66	39.79
KONE MK Equity	0.29	0.08	46.07	0.26	7.55	5.05	32.12	103.51
MKRMB MK Equity	0.28	0.95	26.86	0.51	17.58	15.72	33.13	42.40
MLAB MK Equity	0.14	-0.39	509.70	-0.48	-21.23	-19.34	189.07	13.84
NVB MK Equity	1.02	-0.55	207.79	1.33	14.61	9.63	173.83	258.47
OMST MK Equity	0.77	0.24	223.47	-0.05	-2.55	-1.21	16.92	221.05
OHB MK Equity	1.05	0.84	85.36	2.39	14.06	8.01	40.29	69.92
PMB MK Equity	0.11	-0.08	22.75	0.12	-9.05	-5.42	7.39	17.35
PNE MK Equity	0.74	0.26	72.83	-0.22	-4.45	-3.42	5.22	52.45
SALUT MK Equity	1.18	1.00	154.98	13.43				367.72
SCP MK Equity	0.19	0.36	58.00	-0.05	-1.48	-0.73	8.25	63.83
SMTG MK Equity	0.14	-0.76	31.77	-1.83	-23.18	-22.82	25.95	29.39

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
SOLE MK Equity	0.17	0.87	22.71	0.09	8.92	6.86	10.08	27.86
UCHI MK Equity	2.78	0.51	174.02	12.65	30.60	25.75	238.29	492.01
VZH MK Equity	1.21	-0.12	27.41	-1.48	-29.52	-14.42	15.77	38.17
VSI MK Equity	0.63	0.85	407.63	7.30	11.39	4.70	153.49	575.05
WINT MK Equity	0.09	0.40	25.79	-0.96	-10.08	-27.07	354.13	31.35
NOVM MK Equity	0.11	0.12	27.79	0.06	-11.19	-6.85	7.30	37.80
AXIATA MK Equity	5.73	0.87	20,265.24	378.73	10.84	4.84	8,940.22	53,524.46
DIGI MK Equity	3.56	0.84	1,358.91	308.61	108.75	23.81	16,383.96	19,504.91
M3T MK Equity	0.53	-0.07	43.33	0.94	0.89	1.92	30.13	66.00
MAXIS MK Equity	7.81	0.89	6,402.95	572.65	31.40	11.22	12,200.98	52,921.99
OCK MK Equity	0.62	0.82	156.25	-9.37	14.34	6.98	64.79	397.51
RIB MK Equity	0.64	0.30	95.08	-1.29	7.36	4.46	38.97	206.42
SDNA MK Equity	0.40	-0.11	36.87	-0.13				61.95
T MK Equity	6.97	0.87	12,745.71	228.84	10.94	4.52	4,294.81	30,388.96
TDC MK Equity	6.30	0.81	2,703.36	4.06	-2.37	-1.30	721.74	2,290.15
XOX MK Equity	0.28	-0.78	22.51	-4.35	-19.15	-4.56	10.80	45.14
ALB MK Equity	2.42	0.90	84.78	2.58	11.71	5.18	19.76	110.98
BPH MK Equity	9.07	0.84	882.67	34.10	14.68	10.24	665.37	2,182.15
CLH MK Equity	0.65	0.94	173.17	-0.86	11.45	6.59	58.98	195.74
CLSB MK Equity	0.80	0.68	99.43	1.55	5.55	4.20	43.43	83.28
FMH MK Equity	1.19	0.94	121.74	-1.57	15.58	8.99	71.39	169.67
GDX MK Equity	0.59	0.95	71.85	1.91	14.75	9.81	87.17	629.49
GNC MK Equity	0.69	0.42	48.42	2.95	6.33	2.70	49.04	62.94
HALG MK Equity	0.54	0.88	226.51	2.65	9.07	5.07	89.26	250.09
KBES MK Equity	0.36	-0.16	67.99	-1.33	-3.15	-1.66	14.49	52.32
KTN MK Equity	0.22	0.11	84.09	1.99	-3.93	0.11	26.61	212.30
ALB MK Equity	6.16	0.90	650.94	58.94	16.84	4.55	338.42	2,565.25
MBC MK Equity	3.10	-0.26	1,635.52	1.47	16.44	12.54	1,629.48	2,064.53
MISC MK Equity	9.60	0.62	18,938.61	74.10	12.99	7.69	4,310.88	33,310.07
NAT MK Equity	1.69	0.03	64.44	0.16	2.54	2.24	9.11	41.26
PDZ MK Equity	0.14	0.03	91.12	-0.73	-6.27	-3.89	21.56	87.14
PRK MK Equity	1.88	0.66	508.15	2.20	6.56	4.26	144.79	246.76
POSM MK Equity	4.76	0.86	1,093.99	27.76	7.15	4.82	378.13	984.28
SHC MK Equity	1.35	-0.18	56.45	1.07	0.52	0.53	10.51	71.48
SHIN MK Equity	0.56	-0.51	1,270.47	-7.49	1.89	1.11	26.01	1,263.49
SURIA MK Equity	1.98	0.62	620.84	6.17	10.14	6.63	176.31	422.05
TASCO MK Equity	1.17	0.95	240.10	0.85	11.35	8.29	101.33	175.52
TNL MK Equity	0.67	0.89	266.12	-18.04	7.39	3.09	81.88	445.21
TRO MK Equity	0.75	-0.24	27.26	-0.04	-4.77	-1.77	1.97	34.74
WPRTS MK Equity	3.83	0.57	1,721.56	74.84	30.78	13.93	3,166.17	13,104.64
XINH MK Equity	1.08	-0.47	116.12	-0.79				204.33
EDN MK Equity	0.87	-0.47	287.83	0.48	1.38	0.42	13.41	339.42

	STP	TSR	BVA	OCF	ROE	ROA	TOA	TEV
GMB MK Equity	3.18	0.30	993.86	47.89	15.30	9.43	566.76	3,433.40
MLK MK Equity	1.66	0.40	5,703.36	14.80	8.57	1.52	1,006.12	21,957.14
MFCB MK Equity	1.51	0.89	532.69	11.41	12.69	6.31	218.30	430.59
PBAH MK Equity	1.49	0.48	637.90	-1.52	5.85	4.18	84.43	357.73
PTG MK Equity	17.94	0.82	7,923.83	271.97	13.88	10.43	7,242.32	24,229.11
PNH MK Equity	4.11	0.56	1,240.63	-12.49	13.40	2.75	282.59	3,035.12
RAHH MK Equity	1.00	0.73	610.94	87.16				1,940.91
SALC MK Equity	1.00	-0.30	450.90	-20.14	3.21	1.30	10.62	404.30
TNB MK Equity	8.90	0.80	25,948.52	105.18	10.72	3.65	12,778.78	63,686.05

Source: Bursa Malaysia Securities and Bloomberg Professional