CHAPTER I :INTRODUCTION

1.1 Background of Study

The analysis of stock trading strategies has been a subject among interest of many, particularly among investors, as the ability to identify and select the right stocks at the right time can potentially yield substantial returns. Even with the rise of modern approach such as algorithmic trading and Machine Learning to determine buy or sell decisions, traditional approaches of Fundamental Analysis (FA) and Technical Analysis (TA) remain a popular choice among investors (Janková & Dostál, 2019).

FA focuses on evaluating stocks based on intrinsic value of the stock based on various factors (Almeida and Vieira, 2023) such as Dividend Discount Model (DDM) (Kleriawan and Dwiyono, 2021) and financial statement analysis (Jackson, 2022). This intrinsic value helps determine whether the current market price is overvalued, when intrinsic value is lower than the current price and vice versa for undervalued stocks (Mandelbrot, 1963; Yu, 2023). TA focuses on statistical insights derived from historical trading activity, such as price trends and patterns (Inani et al., 2024). Rather than assessing a company's intrinsic value, TA examines historical data and uses charts and other tools to identify patterns that can predict future market behaviour (Lo et al., 2004). Traders utilise TA to make informed decisions on entry and exit points for trades, aiming to capitalise on short-term market fluctuations.

The Relative Strength Index (RSI) is a widely used TA tool, introduced by J. Welles Wilder Jr. in his 1978 book "New Concepts in Technical Trading Systems". RSI measures the speed and change of price movements, helping traders to identify potential

overbought or oversold conditions in the market and provide indicators of timing to buy or to sell. This concept is commonly referred to as a Momentum Oscillator (Wilder, 1978). Despite its popularity, the traditional RSI has limitations, particularly in its ability to account for corporate actions. While RSI captures price momentum through changes in closing price, it does not distinguish between genuine shifts in market sentiment and structural price changes caused by events such as stock splits or right issues. As a result, the indicator may misinterpret these technical adjustments as a market-driven losses or gains, leading to distorted trading signals. This misinterpretation highlights the core motivation of this study, which is to improve the accuracy of RSI readings by accounting for the effects of corporate actions.

While the RSI has demonstrated its usefulness as a trading tool, ongoing research aims to further enhance its precision and reliability. For instance, Rodríguez-González et al. (2011) revisited the RSI formula by incorporating the element of Machine Learning techniques to improve its predictive capabilities. In a separate study, Sahin and Ozbayoglu (2014) proposed a Trend-Normalised RSI (TN-RSI) to address the indicator's limitations in trending market conditions. However, there remains a research gap concerning the RSI's performance during corporate actions such as stock splits or consolidations, which can potentially distort the indicator's readings.

This study aims to address these limitations by introducing an alternative approach to measure the RSI. The proposed methodology incorporates market capitalisation instead of closing price, potentially providing a more comprehensive view of a company's financial performance. By accounting for changes in market capitalisation, this innovative RSI calculation method may offer a more holistic view of a company's performance and market sentiment, potentially leading to a more informed investment decision.

1.2 Problem Statement

This study aims to address the limited studies on the impact of corporate actions on traditional RSI. It is motivated by a critical limitation of the traditional RSI, which solely focuses on closing prices. During corporate actions, this narrow focus causes the RSI to conflate genuine market sentiment with theoretical price adjustments (change in nominal price), potentially leading to misinterpretation of market conditions. The traditional RSI will capture any changes of prices, without considering whether the change originates from supply and demand influence, or corporate actions. As an illustration scenario, as shown as in Figure 1.1, a RM1 stock experiences a stock split of two-for-one (get one new share for every one old share held). Theoretically, the market capitalisation remains the same as the number of shares double, whilst the share price drops to RM0.50. By using the traditional RSI, the indicator will calculate this situation as a price loss (current price is lower than previous period's price), even without any intervention of market demand and supply yet.

Should we include price changes due to intervention of market demand and supply on the same day as the new price above, assuming the closing price of the day is RM0.60 (increase by RM0.10 from the new price after the stock split). Basic calculation to determine price win is when Closing Price today is higher than Closing Price yesterday (Opening Price today if effective listing date of corporate actions) and vice versa for price loss. Traditional RSI approach remains calculating this situation as a price loss of RM0.40 (RM0.60 minus RM1.00). Whereas, in technicality, this should be considered as price win of RM0.10 (RM0.60 – RM0.50).

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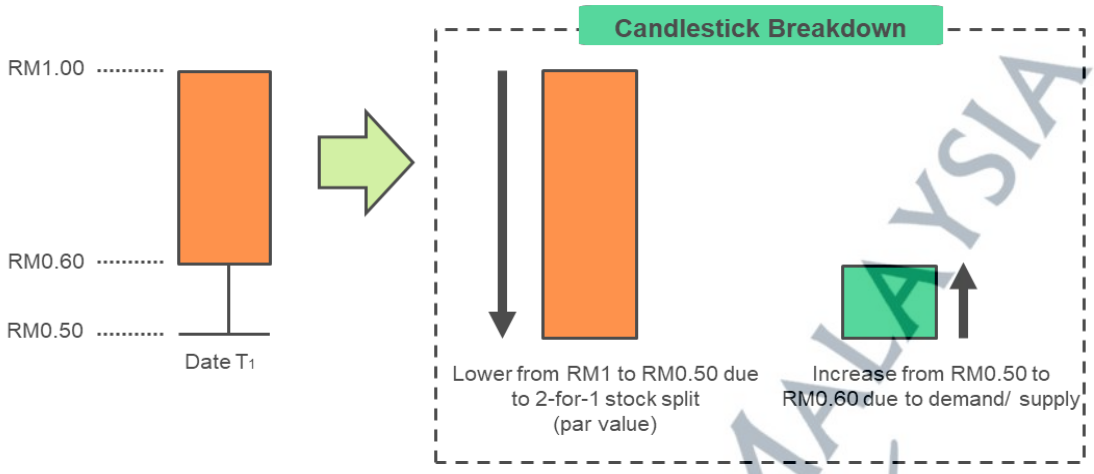

Figure 1.1: Illustration of Price Misclassification by Traditional RSI During a Stock Split

Traditional RSI faces limitations in signal accuracy due to its reliance on price differences, which can be distorted by corporate actions. These events may cause the RSI to misinterpret price changes as losses, despite potential improvements in profitability, thereby reducing the reliability of its overbought or oversold signals.

Nevertheless, this is not the only limitation of RSI. There are several other studies highlighting some of RSI's drawbacks. Țăran-Moroşan (2011) highlighted the importance of trading volume as a part of RSI's buy and sell signal, which led him to develop volume-adjusted RSI (RSI_M). Apart from that, Rodríguez-González et al. (2011) used neural networks to their Chartist Analysis System for Trading (CAST) by changing settings like time period and market behaviour indicators for better RSI predictions. In addition, traditional RSI has problem in providing inaccurate signals in trending market and thus Trend-Normalised RSI (TN-RSI) was introduced by Sahin and Ozbayoglu (2014). Lastly, despite RSI can be used widely across many scenarios,

it has limited profitability contribution in currency pairing and thus Adjusted RSI (AdjRSI) was developed by Gurrib and Kamalov (2019).

In summary, while RSI remains popular, its traditional form presents structural weaknesses when corporate actions are involved. This misinterpretation of price shifts due to events like stock splits or right issues suggests the need for an alternative formulation. This study responds to that gap by proposing a new RSI variant that uses market capitalisation, along with closing price to deliver more accurate momentum signals.

1.3 Research Questions

There are research questions in this study which must be answered:

- How can the RSI be enhanced by incorporating market capitalisation, instead of closing price?
- How can we effectively assess the profitability and consistency of trading signals produced by the proposed RSI, traditional RSI and other enhanced RSI variants?
- How does the newly introduced RSI compare with traditional RSI and other enhanced RSI variants, in terms of overall trading performance?

1.4 Research Aims and Objectives

The study aims to explore the potential of market capitalisation as an innovative approach on RSI. Hence, the specific objectives of this study are listed below:

- To introduce a new RSI variant that incorporates market capitalisation instead of closing price as alternative input

- To assess the profitability and consistency of trading signals generated by RSI variants
- To compare the newly introduced RSI model against traditional RSI and other enhanced RSI in terms of trading performance

1.5 Importance of the Study

Incorporating market capitalisation into the RSI formula is crucial for several important reasons. Primarily, the traditional RSI and the RSI incorporating market capitalisation elements might yield distinct price gain and price loss readings. These readings are critical variables in determining the RSI percentage and their accuracy is important for making informed buy or sell decisions. The discrepancies between different RSI approaches reflect the importance of selecting the most appropriate method for calculating RSI in the context of investment analysis. Moreover, this study acknowledges the need for separating changes in stock's nominal value and market sentiment impact on stock prices.

In addition, there is limited empirical research comparing the performance of traditional RSI against its enhanced variants. Although RSI remains a popular tool among traders and researchers, it is often used primarily as a benchmark for Machine Learning algorithms or as a foundation for developing more sophisticated formulas, rather than being compared directly with other enhanced RSI versions. The introduction of an alternative RSI variant incorporating market capitalisation as a variable presents an opportunity for a comparative study. Such research could provide valuable insights into the potential advantages of this new approach relative to existing RSI formulations.

This study on the evolution of the RSI offers significant value to technical traders (chartists), financial analysts and academic researchers by providing enhanced

tools for technical analysis and market trend identification. Financial technology developers can also benefit greatly from the research, which gives them the tools to construct more advanced trading platforms and algorithms. Additionally, regulatory bodies and policymakers may find this information useful in understanding the progression of market analysis techniques, potentially informing future guidelines in financial markets.

The incorporation of market capitalisation-based element into the RSI calculation represents a step forward in the technical analysis arena. This innovative approach aims to provide a more comprehensive and better evaluation of investment opportunities. By integrating this factor, this enhanced RSI methodology offers a more sophisticated tool for assessing market momentum and identifying potential overbought or oversold conditions. Furthermore, in the dynamic financial landscape, this improved method may be able to capture complex market dynamics better, which could result in a generation of trading strategies and risk management techniques that are more successful.

1.6 Scope of the Study

This research on an innovative approach by incorporating market capitalisation, driven by corporate actions, encompasses an analysis of historical stock data from the Bursa Malaysia Main Market. The study spans a decade, from July 2014 to June 2024, providing a substantial timeframe for examination with the sample size of 20 selected stocks. Within this period, the research focuses on specific corporate actions that can affect stock prices without being directly related to market supply and demand. Example of events that fall within this category are stock splits and reverse split (or may be referred as stock consolidation) (Duffy et al., 2023), right issues (Au Yong et al., 2021),

bonus issues, share buybacks (Chin et al., 2023), new share issuance and Employee Stock Ownership Plans (ESOS). These events have some immediate influence on the market prices (due to the change in market capitalisation), even without market demand and supply (sentiment) impact. Nevertheless, events such as dividend announcements and Mergers and Acquisitions are excluded as these are related to market sentiments that drive the price movements. Plus, this study assumes all transactions are without transaction costs and taxes.

1.7 Organisation of the Study

This study is structured into five chapters, each designed to address a specific component of the research. The first chapter introduces the study by presenting the background, problem statement, research objectives, research questions, significance, and scope of the research undertaken. The second chapter provides a comprehensive literature review that critically discusses theoretical foundations and prior empirical studies related to the RSI, highlighting its limitations, enhancements and the integration of market capitalisation and corporate actions into technical analysis. The third chapter outlines the research methodology, detailing the overall research design, data collection strategies, the formulation of the proposed RSI model incorporating market capitalisation and the analytical approaches used to assess the performance of each model. The fourth chapter presents the results and discussion, offering a thorough analysis of the empirical findings based on key performance metrics across four RSI-based models. This chapter also provides detailed observations, comparative evaluations and critical interpretations in relation to the study's objectives and existing literature. The final chapter concludes the thesis by summarising the key findings,

highlighting the academic and practical contributions, acknowledging the limitations of the study and proposing recommendations for future research.

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