Which algorithm model is better to make profits? ——A comparison of the Trend-Following model and the Multi-Factor model

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Abstract:

This study compares two algorithmic trading models—the Trend-Following Model and the Multi-Factor Model, to see which is better at making profits in stock trading. The research combines a mixed methodology: secondary research (literature review) establishes foundational knowledge, while primary research involves (1) collecting historical price data for Tesla (TSLA) and Microsoft (MSFT) from the Trading View platform, and (2) testing the Trend-Following Model (using MACD and ATR indicators) against the Multi-Factor Model (using PE ratio, PB ratio, and RSI) to evaluate profits, risks, and trading frequency. Results show the Multi-Factor Model outperforms for low-volatility stocks (e.g., MSFT), while the Trend-Following Model suits high-volatility stocks (e.g., TSLA). The conclusion highlights that there is no absolute "winner," as performance depends on market intervention, volatility, and stock-specific factors.

Keywords: Trend-Following Model, Multi-Factor Model, Profitability, Risk Analysis, Volatility, Quantitative Trading

1. Introduction

In recent years, algorithms have been commonly used to predict future trends, enabling people to make wiser decisions. Algorithms are also commonly used in the stock market to predict the future price of the shares and then optimise the trading strategies. Around the world, financial institutions are turning to algorithms and artificial intelligence to optimise trade execution, identify market patterns, and manage risk.

According to a research report published by the research company LCH in 2017, the top 20 hedge funds in the United States, including Bridgewater Fund and Soros Fund, all use quantitative trading to automatically trade the funds. According to Morningstar, robo-advisors managed nearly $390 billion in assets as of July 2017, up from close to nothing seven years earlier. In recent years, with the upgrading of technology, this data has directly increased, and more and more financial institutions around the

world use quantitative trading to achieve stock trading. The integration of algorithms with traditional finance is becoming the mainstream development direction in the future. Currently, some of the most commonly used algorithmic models in the stock market are driven by advancements in machine learning, data science, and traditional quantitative finance approaches.

The Trend-Following models and the Multi-Factor models are being widely used in the stock market to select the shares and predict future prices, which are the two I selected as the study object. For example, LDM is a traditional financial stock with a large market value, which uses a Multi-Factor model, while TSLA, as an emerging industry, is highly volatile and easily affected by market changes, which uses a Trend-Following model. These two stocks are very representative and will appear as experimental objects in the following. Therefore, this study aims to clarify the following research questions: (1) Which model—Trend-Following or Multi-Factor—exhibits better performance in making profits? (2) How do market conditions influence the performance of these models? (3) For the present, what are the existing technical defects and risks, and how will the future research direction develop?

To answer these questions, the study will evaluate and collate the responses through personal experiments and a review of previous literature and research.

The stock market is an important financing channel for enterprises, which raise funds for expanding production, research, and development by issuing shares. It is also a platform for investors to allocate assets and gain income. Stock prices are comprehensively affected by many factors, such as corporate performance, macroeconomic environment, policies and regulations, and investor sentiment, and reflect corporate value and market expectations in fluctuations. Such fluctuations are changeable and difficult to predict. Studying the Trend-Following model and Multi-Factor model can optimise the construction of investment to improve market and individual investment efficiency, and the assessment of risks and the grasp of opportunities will be more accurately managed.

2. Literature Review

2.1 The trend movement in the American Stock Market in the past five years (2019-2024)

(Figure 1 The change in the United States Stock Market Index from 2019.Jan to 2024.Dec) (Trading Economics)

From 2019 to 2024, the US stock market experienced a special trend. At first, it was volatile. Later, it moved up strongly. Specifically, from 2019 to 2022, the US market experienced a significant decline as a result of the impact of the COVID-19 pandemic, which caused a global economic downturn. (The Federal Reserve System) However, it subsequently rebounded rapidly in response to the large-scale stimulus policies, including monetary policy and fiscal policy implemented by the US government and the Federal Reserve. (Bullard,2020)

In the period from 2023 to 2024, the US stock market had a strong showing. The S&P 500 rose by over 24% in 2023. And it kept going up, increasing by 10.2% in the first quarter of 2024. (The Federal Reserve System) This information comes from the Federal Reserve System. The period from 2019 to 2024 is characterised by a prolonged bull market. During this time, the Trend-Following model did well in catching the continuous upward trend. However, the Multi-Factor model was fully influenced by the data update and analysis cycle, so sometimes it is slower

to respond to the rapid market changes compared to the Trend-Following model, but it has also made a lot of profits for the American stock market.

2.2 Explanation of the key market variable

2.2.1 Volatility

Volatility is a statistical measure of the dispersion of returns for a given security or market index. It is often measured from either the standard deviation or the variance between those returns. In most cases, the higher the volatility, the riskier the security. (Hayes, 2024)

Tesla is a well-known player in electric vehicles and energy innovation. At the same time, Nvidia is a leader in technological innovation in areas such as the semiconductor industry and artificial intelligence, and they can be seen as representative of highly volatile technology companies. The two companies are similar in that they are both high-tech enterprises that rely mainly on technological innovation. Their business models are constantly being modified as new technologies emerge. In addition, the market acceptance of its products remains uncertain, resulting in significant fluctuations in its company performance. As a result, this has led to substantial fluctuations in financial indicators such as stock prices(Markets Insider, 2024)

2.2.2 Different market conditions

2.2.2.1 Bull Market

The bull market is the market in which stock prices continue to rise, and investors actively buy stocks with the general expectation that stock prices will rise further.(Robert & Rosenbaum,2010)

2.2.2.2 Bear Market

A bear market is the opposite of a bull market, whose price has been declining for a long time. Even if occasional rebounds occur, each wave is lower than the other. In such conditions, the vast majority of people are losing money, making the market hard to estimate. (Robert & Rosenbaum,2010)

2.2.2.3 Consolidation

In technical analysis, consolidation refers to an asset oscillating between a well-defined pattern of trading levels. Consolidation is often explained as market indecision, a state in which stock prices adjust within a relatively small range after a period of rising or falling. It can be seen as the market gathering strength in preparation for the next trend. The consolidation ends when the asset price is above or below the trading pattern. (Chen,2021)

2.3 How does quantitative trading work in predicting stock prices?

Quantitative trading is an investment approach. It com-

bines mathematical models, statistical analysis, and computer programs. Its purpose is to look into the changes in stock prices and trading volumes in the stock market to help investors make decisions. (Sharma, 2024) It first came about in the early 1900s from statistical and data analysis. With the rapid development of computer technology and the emergence of modern financial theories, in recent years, it has expanded into emerging markets like multimodal data processing and cryptocurrencies due to the deep integration of big data and machine learning. (Quantified Trading, 2024) The Trend-Following model and the Multi-Factor model are key models in this area. The Trend-Following model depends on the idea that prices keep going over time. The Multi-Factor model makes more assumptions based on many different kinds of factors. (Chakole & Kurhekar,2021) (Wang,2023) The main idea of this study is to compare these two models and evaluate their market adaptability, which is of great significance for predicting future stock prices.

2.4 Theoretical and Practical Applications of the Two Algorithmic Models

2.4.1 Trend-Following Model:

The Trend-Following is a model based on the movement of the market price trend. It assumes that the market price will experience a continuous upward or downward trend over a specific time interval instead of behaving randomly or unpredictably. Through capturing and analysing this movement to earn more profit. (Rulle, 2017) A bull market can be seen as the best scenario for the Trend-Following model. The main characteristic of the bull market is that stock prices continue to rise, which allows the Trend-Following model to capture this trend easily with the indicator. When the short-term moving average crosses the long-term one, a buying signal is sent. (Zakamulin,2017) The ARK Innovation ETF, with a yield of 152.82% (Yahoo Finance) and an investment strategy partly based on Trend-Following, focusing on companies with "disruptive" innovations, accurately captured the rising trend of growth stocks since late March 2020 and obtained high returns. (Monocle Accounting Research,2021) In a volatile market, the Trend-Following model has obvious limitations: there is no clear upward or downward trend, and the price fluctuations are frequent, resulting in frequent false signals, and it is difficult to capture the trend profit and affect the income performance. (Zakamulin, 2017)

2.4.2 Multi-Factor Model:

The Multi-Factor model is a financial algorithm model that understands the movement of the stock price, risk evaluation, and Portfolio construction by quantifying factors and explaining asset intervention. (Chen,2020) The Multi-Factor model can be classified into three categories,

which are the Macroeconomic model, the Fundamental model, and the Statistical model. The macroeconomic model uses GDP, inflation rate, interest rate, and exchange rate as its variables. The fundamental model emphasises the company itself, so the variables are selected as earnings indicators, valuation indicators, balance sheet position, dividend policy, etc. Statistical models prefer something that has no clear economic implications but can influence the stock yield through data correlation and data analysis. (Chen,2020) However, it does have a drawback in that the model relies too heavily on data dependence. It might lose the chance of getting the best opportunity to reach the maximum right away because it has to wait until the company makes a report later. For example, at the start of a bull market, when market feelings make some stock prices go up fast, the Multi-Factor model needs to wait for the company's financial statements and other data updates. It needs to check if the fundamental factors truly back the stock price rise; for this reason, it may pass up some initial profit-making opportunities that lead to losses. (Gu et al., 2019)(Caruso & Gordon,2023)

2.5 Model comparison and research gaps

Nowadays, most of the current research mainly pays attention to the basic principles and performance of the two models. The performance of Trend-Following models and Multi-Factor models is different. But can assume that in a certain situation, there might be some connection between Multi-Factor models and Trend-Following models. This is different from the usual idea that the two have nothing to do with each other.

The rapid response of the ensemble Trend-Following model and the aid of the Multi-Factor model as an accurate reference will increase the efficiency and return on investment. It gives a new way of thinking and a new angle for further research on the relationship between them and for building new portfolios. Maybe in the future, using the two models together will become the main research focus. (Rabener, 2022)

3. Methodology

3.1 Overview

This dissertation aims to compare the predictive capabilities of the Trend-Following model and the Multi-Factor in the context of TSLA and MSFT stocks due to the knowledge that the two models' performance depends on their volatility. This dissertation will combine primary and secondary research methods. Firstly, through secondary research, background research was conducted on which indicators formed and were used by the Trend-Following and Multi-Factor to send signals. Secondly, the author also

uses primary research. The author would use the "Trading View" to see the performance of the two models.

3.2 Literature research

The author mainly uses Google Scholar and some other online libraries and has learned a lot of professional financial knowledge and quantitative trading knowledge through "Investopedia", a financial website. The author mainly searched the literature by searching the keywords "Trend Following model", "Multi-Factor model" and "quantitative trading". The authors designed the following experiments by reading a large amount of literature, understanding the identity of the authors of the literature and the year of publication, and the degree of perfection of the previously designed research methods. Additionally, these documents will serve as the theoretical basis for predecessors to support the experimental framework and conclusion.

3.3 Experimental Platform

Trading View is an online financial analysis platform, which provides many kinds of data charts, including candle charts, line charts, area charts and so on, to help authors conduct market analysis and experiments. There are also many indicators available in Trading View, and Pine Script also allows the author to create custom indicators. Therefore, the author can realize the Trend-Following model and the Multi-Factor through Trading View and carry out a data back-test.

3.4 Experiment design

3.4.1 Aim

The author wanted to find out which model is more appropriate for the actual stock price in this forecast by comparing specific data.

3.4.2 Data Collection and Preparation

The author would use the "Trading View" platform to collect the historical data of TSLA and MSFT stocks. The data is selected for 1 year, and key information such as the opening price, closing price, highest price, lowest price and trading volume of two stocks in 2024 is used and extracted. In addition, for accurate experimental results, the data will be subjected to rigorous data checking and cleaning methods, and the data will be cross-checked with data published by multiple reliable financial institutions to ensure its accuracy and completeness. Abnormal values or incorrect data will be removed to provide a reliable basis for subsequent analysis.

3.4.3 Detailed Methodology

3.4.3.1 Selection of Indicators for each model

3.4.3.1.1 Trend-Following Model

MACD (Moving Average Convergence Divergence)

MACD is a technical analysis tool based on moving averages used to measure trends and momentum changes in stock prices. It consists of two lines, the MACD line and the Signal line, and a bar chart. The MACD line is obtained by calculating the difference between the fast-moving average and the slow-moving average. The signal line is the moving average of the MACD line, which usually follows 9 days. When the MACD line crosses the signal line from the bottom up, it is considered a buying signal, indicating that the stock price may rise. Conversely, when the MACD line crosses the signal line from the top down, it is seen as a selling signal, indicating that the stock price may decline. The bar chart represents the difference between the MACD line and the signal line and is used to visually show the strength and change of the price trend. If the bar chart is above the zero axis and getting longer, the upward momentum is increasing. If it is below the zero axis and getting longer, it means that the falling momentum is increasing. (Murphy,1999)

ATR (Average True Range)

ATR is a measure of market volatility that reflects how much stock prices have moved over a certain period. ATR can help investors understand the volatility of the market, to determine the position of stop loss and stop profit. In addition, ATR can also be used to measure the risk of a trading system, and a higher ATR value may mean that the trading system is facing greater risk. (Murphy,1999)

3.4.3.1.2 Multi-Factor Model

PE Ratio (Price-Earning Ratio)

The price-earnings ratio is the ratio of stock price to earnings per share. It is one of the common indicators to measure the level of stock valuation. It reflects the price investors are willing to pay for each unit of earnings of a company. A low PE ratio may indicate that the stock is undervalued, and there may be a buying opportunity. Conversely, a higher PE ratio may indicate that the stock is overvalued, possibly sending a sell signal. (Vested team, 2023)

PB Ratio (Price-Book Ratio)

The price-to-book ratio is the ratio between the stock price and the net asset value per share. It is used to measure the net asset value of the stock relative to the stock market price and is another important indicator to evaluate the value of stock investment. A lower PB ratio may mean that the stock is trading at a discount to its net asset value, while a higher PB ratio may indicate that the market has higher expectations for the company's future growth prospects. PB ratios are used in combination with other factors to assess the investment attractiveness of a stock. (Vested team,2023)

RSI (Relative Strength Index)

RSI is a technical analysis indicator used to measure the relative strength of a stock's price, which determines the buying and selling power of the market by comparing the rise and fall of a stock's price over time. The value of RSI ranges from 0 to 100. It is generally believed that when the RSI value exceeds 70, the market is overbought, and the stock price may be corrected, which is a sell signal. When the RSI value is below 30, the market is oversold, and the stock price may rebound, which is a buy signal. (Murphy,1999)

3.4.3.2 Experiment Procedure

Signal generation based on the selected indicator

Trend-Following Model:

For the two stocks, TSLA and MSFT, the reference analysis was performed by using Trading View to build MACD and ATR. A trading signal is generated based on the cross between the MACD line and the signal line, and the value of the ATR, confirming the stop-loss and stop-profit strategy.

Multi-Factor Model:

Collect and sort out the PE ratio and PB ratio of TSLA and MSFT this year and construct RSI indicators through the Trading View platform for reference. PE ratios, PB ratios and RSI values need to be standardized to ensure their comparability. Assign a weight to each factor based on industry research, analysis of historical data, and an understanding of the relative importance of each factor. A composite score is calculated for each stock over each period by multiplying and summing the normalized factor values with their respective weights. If the composite score exceeds the predetermined upper threshold, a buying signal is generated; If it falls below the lower threshold, a selling signal is generated.

Back-testing:

Create a simulated trading environment using the trading signals generated by the two models. Assume initial funds for each stock and then execute trading decisions based on signals while taking into account factors such as transaction costs, which are estimated based on typical brokerage fees and market bid-ask spreads. Finally, calculate the number of shares bought or sold based on available funds and the stock price at the time of the signal.

3.4.3.3 Matters Needing Attention

- Ensure that the TSLA and MSFT stock history data obtained from the "Trading View" platform is complete and accurate.
- The use of indicators should be accurate because it would have a significant impact.
- Due to the complex and changeable characteristics of the stock market, it is necessary to test the differential performance of the model in different market environments.
- Ensure abidance by laws, regulations and terms of use when obtaining and using historical data of TSLA and MSFT stocks.

3.4.3.4 Data Treatments and Analysis

For the experiment data, most of the data would be shown in the lines and graphs, meanwhile, the text would also be applied to analyze the data.

4. Result

4.1 Background Information

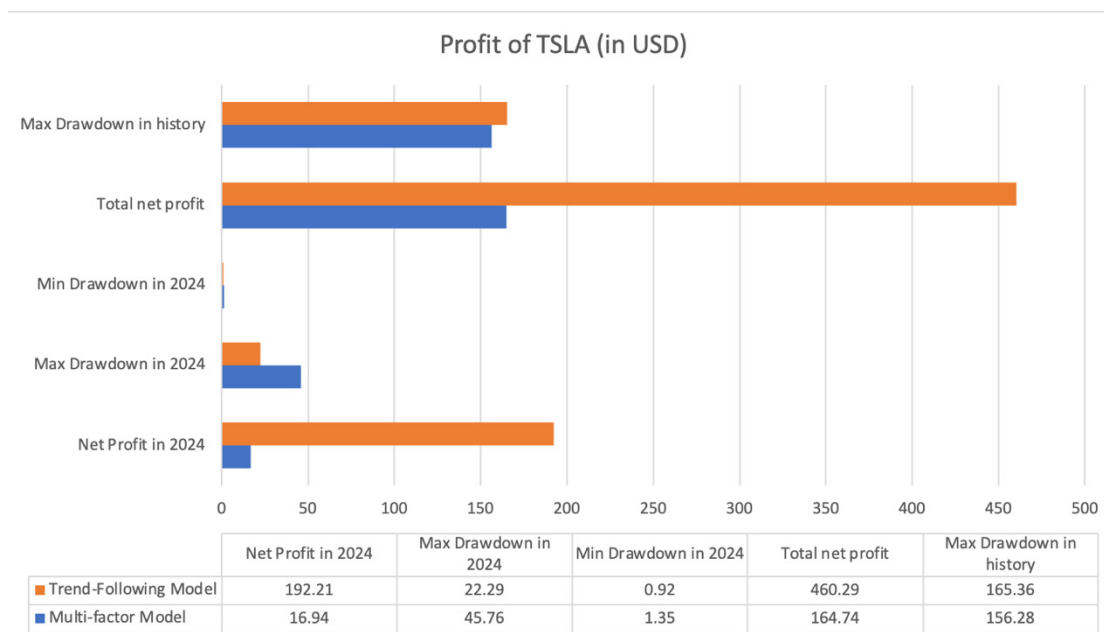**Table 1: The basic background information of TSLA and MSFT from Trading View**

	Price	Market Capitalization	Price-Earnings Ratio(PE ratio)	Price-Book Ratio (PB ratio)	Volatility
TSLA	415.11 USD	1.33T USD	113.72	12.44	92.05%
MSFT	446.20USD	3.32T USD	36.83	7.78	1.19%

TSLA is known as the leading enterprise in the new energy industry, which has high volatility and a frequently trending stock price due to changes in the industry sentiment. It is often seen as an emerging industry and a representative of growth and high-volatility companies. MSFT performs well in several areas, including cloud computing, software, and many other areas. Its products and business are diversified, and the stock price is relatively stable, which is representative of maturity and low volatility. Additionally, the Trend-Following is a model based on the movement of the market price trend. It assumes that the market price will experience a continuous upward or downward trend over a specific time interval instead of behaving randomly or unpredictably. Through capturing and analyzing this movement to earn more profit. It would perform well in the bull market, but maybe some problems occur in the consolidation.

4.2 Experimental Results of TSLA

4.2.1 Net profit and Drawdowns

|	Net Profit in 2024	Max Drawdown in 2024	Min Drawdown in 2024	Total net profit	Max Drawdown in history
Trend-Following Model	192.21	22.29	0.92	460.29	165.36
Multi-factor Model	16.94	45.76	1.35	164.74	156.28

(Table 2: The information on net profit and max drawdown of TSLA generated by the two models)

In terms of net profit in 2024 and the total net profit of TSLA, the Trend-Following Model outperforms the Multi-Factor Model with 192.21$ compared to 16.94$ and 460.29$ compared to 164.74$. This shows that the Trend-Following Model predicts the future stock price of TSLA better than the Multi-Factor Model in both 2024 and past total profits, to earn more profits.

Additionally, in terms of max drawdown in 2024, the Trend-Following has performed well again, which is 22.29$ against 45.76$. However, the max drawdown in the history the Multi-Factor Model (156.28$) performs much better than the Trend-Following Model (165.36$). According to the performance of the profit of the Trend-Following Model mentioned above, for TSLA, the

Trend-Following Model have higher profit potential, but at the same time may bear relatively high risks.

4.2.2 Per cent Profitable
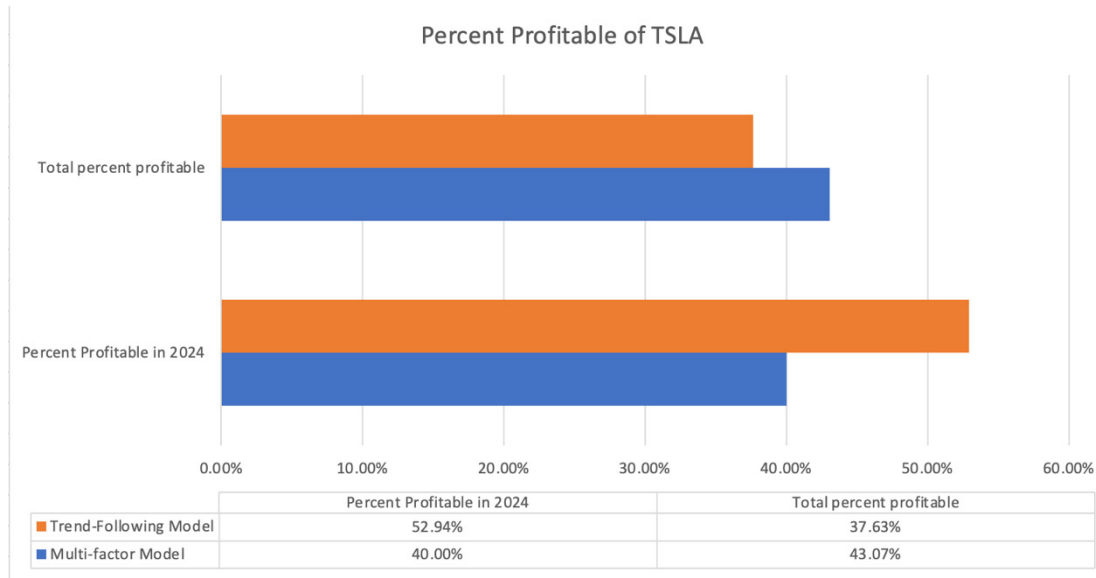
(Table 3: The information of percent profitable of TSLA generated by two models)

The Trend-Following Model's percent profitable in 2024(52.94%) is higher than that of the Multi-Factor Model (40.00%), which is directly proportional to the above conclusion of the net profit in 2024. However, the total percent profitable in the past is not show the same result as the 2024 one. The percent profitable of the Multi-Factor Model (43.07%) is higher than that of the Trend-Following Model (37.63%), which may be related to the higher drawdown risk of the Trend-Following Model, which is mentioned above.
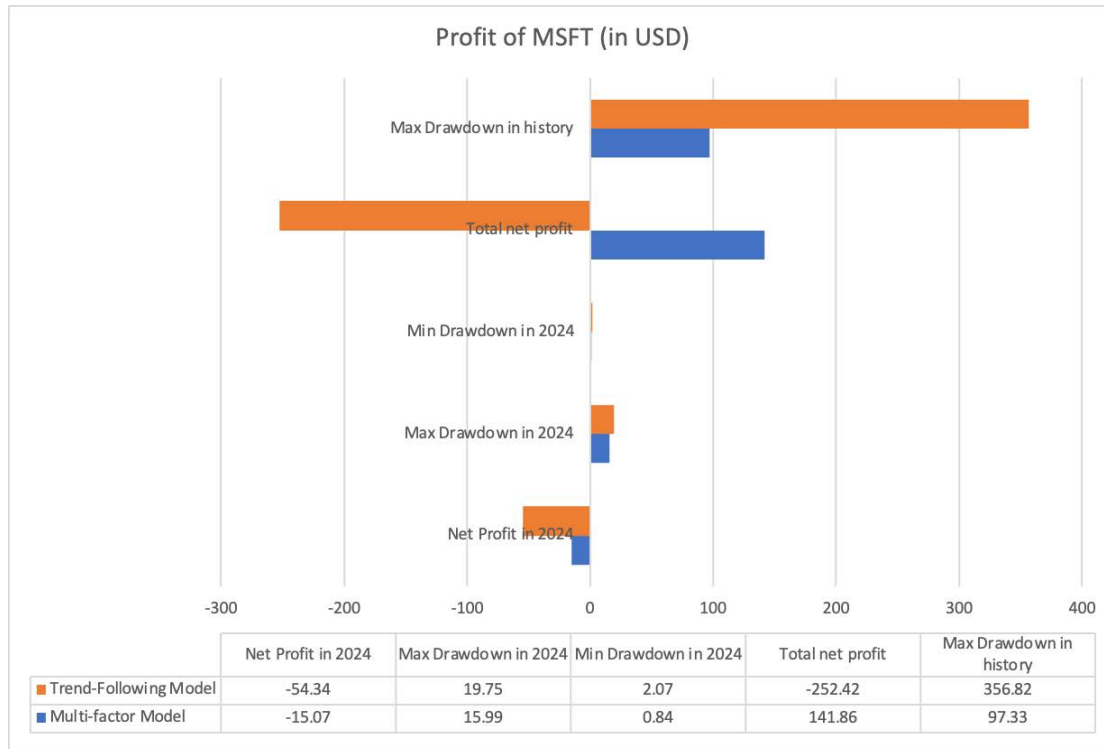
4.2.3 Closed Trades
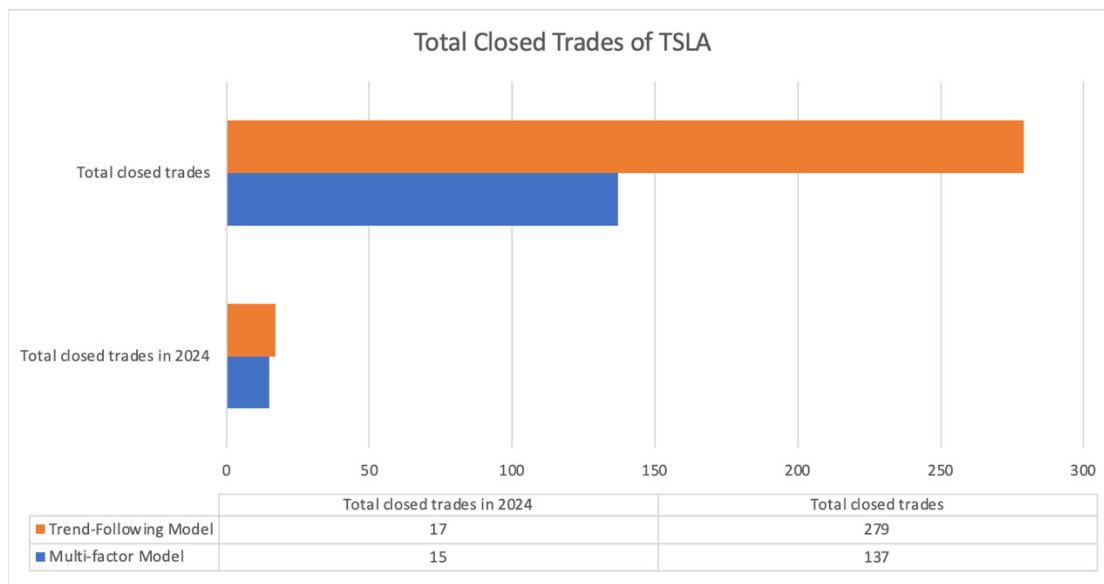
(Table 4: The information of closed trades of TSLA generated by two models)

Combined with the data of 2024 and historical data, the frequency of price prediction and the number of closed trades in the Trend-Following Model(17&279) are greater than those in the Multi-Factor Model(15&137). Based on the performance of the Trend-Following Model predicted for TSLA in 2024 which is mentioned above, this higher frequency of trading and signals can lead to better earnings results.

4.3 Experimental Results of MSFT

4.3.1 Net profit and Drawdowns

Profit of MSFT (in USD)

	Net Profit in 2024	Max Drawdown in 2024	Min Drawdown in 2024	Total net profit	Max Drawdown in history
Trend-Following Model	-54.34	19.75	2.07	-252.42	356.82
Multi-factor Model	-15.07	15.99	0.84	141.86	97.33

(Table 5: The information of net profit and max drawdown of MSFT generated by two models)

The result of MSFT is different from the results of TSLA, which show negative data. It can be clearly seen that the Multi-Factor Model has a greater advantage than the Trend-Following Model in both the data of 2024 and the historical total profit. In 2024 the Multi-Factor generated -15.07$ net profit and in history there are 141.86$ total net profit. The Trend-Following model has generated significant losses in both the short (-54.34$) and long-term (-252.42$) forecast for MSFT.

In terms of maximum drawdown, the maximum drawdown of the Multi-Factor Model (15.99$ & 97.33$) is lower than that of the Trend-Following Model (19.75$ & 356.82$) in 2024 and historical data, which indicates that the Multi-Factor Model can better predict and manage the risk of MSFT.

4.3.2 Percent Profitable

Percent Profitable of MSFT

	Percent Profitable in 2024	Total percent profitable
Trend-Following Model	35.00%	35.09%
Multi-factor Model	38.46%	47.12%
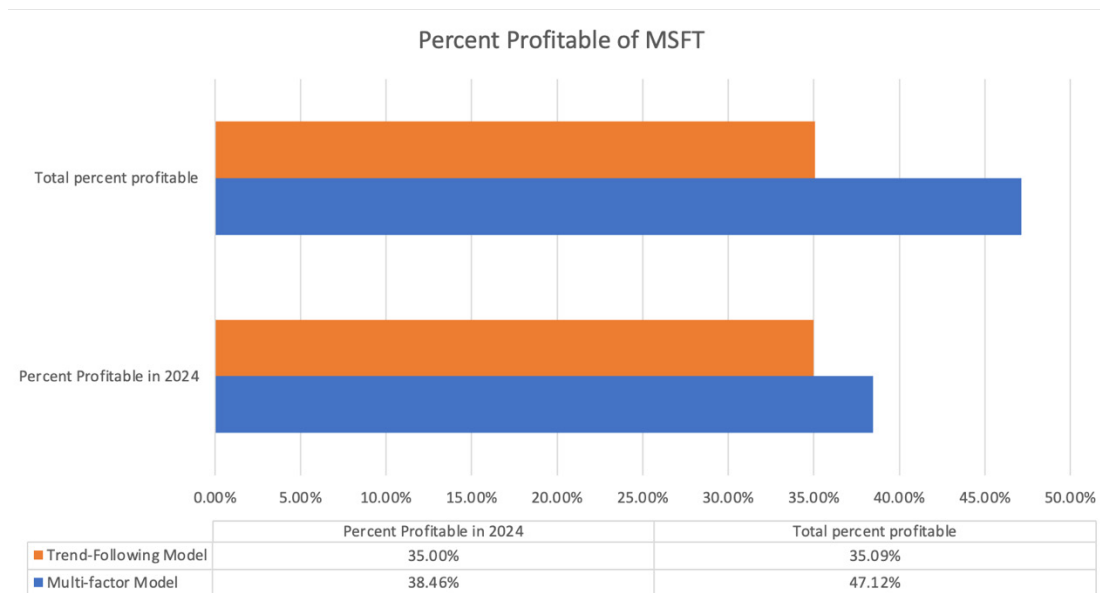
(Table 6: The information of percent profitable of MSFT generated by two models)

Both over the long term and in 2024, the Multi-Factor Model has a higher probability of generating profitable trades than Trend-Following. In 2024, the percent profitable of theTrend-Following Model is 35.00%, which is lower than 38.46% of the Multi-Factor Model. In the long-term, the percent profitable of theTrend-Following Model is 35.09%, which is also lower than 47.12% of Multi-Factor Model.

4.3.3 Closed Trades

Closed Trades of MSFT

	Total closed trades in 2024	Total closed trades
Trend-Following Model	20	758
Multi-factor Model	13	365

(Table 7: The information of closed trades of TSLA generated by two models)

Similar to the results of TSLA, the Trend-Following Model is more active in sending signals and closing trades than the Multi-Factor Model in both 2024 and past historical data. In 2024, the Trend-Following finished 20 closed trades, while the Multi-Factor only performed 13. Additionally, there are 758 closed trades overall performed by 758 which is nearly twice as the Multi-Factor Model (365). However, this has not translated into better profit results. However, high-frequency trading may often mean more service charges are paid. This problem exists in the Trend-Following example of MSFT, where losses accumulate despite frequent trading. These costs would be added up, based on typical broker fees and market buy and sell values. At this time, even if the Trend-Following Model really captures a small upward trend, due to the high upfront cost, a small profit cannot fill the previous vacancy, so it cannot be translated into better investment results.

5. Discussions

According to the above conclusions, we can see that both the Trend-Following Model and the Multi-Factor Model show different performances in predicting future stock price movement, and both have their advantages.

5.1 Profit, Max drawdown and Percent Profitable

In terms of profit, the Trend-Following Model is not suitable for MSFT and incurs a significant deficit. In contrast, the Multi-Factor Model outperforms the Trend-Following model in terms of profitability both in 2024 and in the long run. Therefore, the Multi-Factor Model shows a more accurate ability in predicting MSFT. For TSLA, the situation is totally different. The Trend-Following Model can predict the future stock price movement of TSLA stocks far more effectively than the Multi-Factor Model. Hence, the Trend-Following Model shows a more accurate predictive ability for TSLA. Regarding the percentage of profitable transactions, there is a slight divergence from the profit result, which may be associated with the maximum drawdown in history.

5.2 Closed Trades

Whether it is TSLA or MSFT, there is a significant difference in the number of closed trades between the two models. Specifically, the total number of closed trades in the Trend-Following Model is much higher than that in the Multi-Factor Model. Upon a close examination of the research data generated by the Trend-Following Model, it can be found that the end of one signal marks the beginning of another. The Trend-Following Model primarily relies on the MACD. This indicator sends a buying signal when the short-term moving average exceeds the long-term moving average and a selling signal when the long-term moving average exceeds the short-term moving average. As a result, the Trend-Following Model will continuously send trading signals throughout the year, indicating a high signal frequency. This explains why the total number of closed trades in the Trend-Following Model is high. In contrast, the Multi-Factor Model needs to take a variety of factors into account. In this study, the Multi-Factor Model references the PE ratio, PB ratio, and RSI. In reality, more indicators may be required before a signal can be issued. Therefore, the signal frequency of the Multi-Factor Model tends to be lower than that of the Trend-Following Model. A higher number of transactions in the Trend-Following Model may imply more trading opportunities and active trading strategies. However, this performance does not always translate into higher profitability, as proved by the performance of the Trend-Following Model for MSFT.

In addition, high-frequency trading may often mean more service charges are paid. This problem exists in the Trend-Following example of MSFT, where losses accumulate despite frequent trading. These costs would be added up, based on typical broker fees and market buy and sell values. At this time, even if the Trend-Following Model captures a small upward Trend, due to the high upfront cost, a small profit cannot fill the previous vacancy, so it cannot be translated into better investment results

5.3 Trend-Following Model

In addition to MACD, ATR plays a supporting role in the Trend-Following Model. It helps to set reasonable stop-loss and take-profit levels to determine the position size and control risks. However, MACD has a lagging characteristic. Especially when the market moves rapidly, this can lead to the delay of buy and sell signals, causing missed optimal entry or exit opportunities and resulting in losses.

Our two selected stocks, TSLA and MSFT, are both in the technology sector, yet there is a significant difference in volatility. TSLA is known for its highly volatile and frequently trending stock price. In 2024, many different kinds of factors influenced TSLA's stock price movement. For instance, the U.S. government's continuous promotion of clean energy policies led to positive market sentiment in the U.S. new-energy market. (International Energy Agency,2024) As a leader in new energy vehicles, TSLA benefited from this trend. With the government's encouragement and policy promotion, the market sentiment of new energy vehicles is excellent, and more people will choose to buy new energy cars, including TSLA, under the government's preferential encouragement policies, and more people are willing to invest in TSLA shares. This makes it easier for MACD and ATR to capture the upward trend of the stock price, providing them with an advantage in predicting stock prices and resulting in larger profitable trades.

In contrast, MSFT can be represented as low-volatility and more diversified products. MSFT's products have a wide coverage, which is not easily affected by a single policy. Consequently, its stock price is unlikely to experience a significant and sustained rise or fall. Therefore, the trend of MSFT is more long-term, and the formation of the trend is less obvious. As a result, this may lead to misjudgments by MACD and ATR, causing them to send out incorrect trading signals.

5.4 Multi-Factor Model

In this study, the PE ratio, PB ratio, and RSI are incorporated into the Multi-Factor model. These three indicators take into account financial ratios, market sentiment, and other factors to analyze stock prices. They respectively

represent the Macroeconomic model, the Fundamental model, and the Statistical model within the Multi-Factor Model, thus briefly simulating the operation of the Multi-Factor Model. However, in reality, the Multi-Factor Model may involve a large range of variable factors for reference.

Regarding MSFT, which is well-predicted by the Multi-Factor Model, it has a large amount of financial data that can be utilized by the Multi-Factor Model. Its income is stable, with a low probability of large fluctuations. As a result, the PB and PE ratios can be more effectively analyzed and applied, while the RSI mainly serves to gauge market sentiment towards MSFT. Due to the high stability and stable profit of MSFT, investors are more confident in predicting the future profit, and think that it would have a high probability of maintaining stability in the future. Therefore, the PE ratio can be more accurately reflected by the valuation of MSFT in the whole market. MSFT can also provide more financial reports, and its stable asset situation can enable PB to more accurately evaluate its investment value. On this basis, since MSFT has a wide range of products, high stability, and at present USA government may not introduce laws or other rules that seriously affect MSFT. In this case, the sentiment of the entire market for MSFT is also relatively stable, so RSI can obtain a more accurate value. So the Multi-Factor Model can issue more accurate signals and make better trading decisions in this context.

As for TSLA, the Multi-Factor Model also considers various factors. However, because it depends on a large volume of data, its response speed is not as rapid as that of the Trend-Following Model, resulting in the loss of some optimal entry and exit opportunities. Moreover, due to the high volatility of TSLA, many data points may fluctuate significantly in a short period. This necessitates repeated huge calculations by the Multi-Factor Model, causing the performance less effectively of highly-liquid stocks like TSLA compared to low – low-volatility stocks such as MSFT.

5.5 Results of Hypothesis

- Do trend models and multifactor models differ in making profits?
This problem was shown by the results of the experiment, which showed that the two models performed differently in making profits for Tesla and Microsoft.
- Is model performance influenced by the market?
It has been verified that, for example, TSLA in 2024 is affected by clean energy policies and experiences an increasing trend. The result showed that the Trend-Following model performs better. Additionally, MSFT's stock price did not move a lot, as a result, the Multi-Factor performed much better.
- Does the Trend-Following Model perform well in a

stock which is high volatility?
Partly verified, and it is shown by the example of TSLA. TSLA is the representative of high volatility companies which the Trend-Following Model showed a better performance. However, this result was only proved by TSLA, there may be some exceptions for other high-volatility companies in other areas.
- Does the Multi-Factor Model perform well in stocks which is low volatility?
Partly verified, and it is shown by the example of MSFT. MSFT is the representative of low volatility companies which the Multi-Factor Model showed a better performance. However, this result was only proved by MSFT, there may be some exceptions for other high volatility companies in other areas.
- Whether the model signal frequency affect the trading result?
It has been verified that the Trend-Following Model's high-frequency signal brings more profits on Tesla, but it does not translate into high profits on Microsoft; on the contrary, there are many losses.
- Is model performance affected by data dependencies and metrics characteristics?
It has been verified that the Multi-Factor model depends on data and performs poorly when the data fluctuates greatly. Trend-following model's indicators may have a lag.

6. Conclusions

This study is to compare the Trend-Following Model and the Multi-Factor Model to find which model can make more profits by taking shares of MSFT and TSLA as two examples. From the result of this study, there is no clear conclusion on this issue. The performance of two models may be influenced by various factors, including marking intervention, volatility and many other factors.

In this study, it is shown that the Multi-Factor Model is more suitable for MSFT with low volatility and diversified business, while the Trend-Following Model is more suitable for enterprises with high volatility, such as TSLA, which are more easily affected by market sentiment. Although this study has achieved the goal of comparing the ability of the two models to predict the stock price trend, there are some limitations, so the results are not perfect. For high-volatility assets such as TSLA in this case, short-term traders can preferentially adopt the Trend-Following models, but need to set strict stop loss mechanism to avoid lag risk; For low-volatility assets, such as MSFT, long-term investors can rely on the stability of the multifactor model while regularly updating the factor base to respond to structural changes in the industry.

In the future, if the Trend-Following Model and the Multi-Factor Model are integrated and more indicators are

used in the integration of the two models, then the accuracy and reliability of the model prediction are expected to be improved. For example, in the Multi-Factor Model, the trend signal can be integrated as another dynamic weight to adjust the trigger condition. In this case, the Multi-Factor may be sent signals more frequently. Through these expanded and deepened research, it is expected to provide investors with more accurate and effective stock price prediction tools, and promote scientific decision-making and development in the field of financial investment.

7. Evaluation

First, the data collection section mainly focuses on historical prices and 2024 transaction data for TSLA and MSFT, which have some limitations. There may be some bias or inaccuracies in the sources of the data, and the data may not include all relevant factors that could affect the price of the stock, such as insider trading information or non-public announcements. In order to improve the quality of the research in future studies, more reliable and comprehensive data sources can be referred to and used. This could include using more specialised financial databases that provide a wider range of data, including alternative sources such as stock-related social media sentiment analysis.

Secondly, in this study, the two models are simplified and compared under limited resources, which provides a clear framework for core logic verification. Although it does not cover the hybrid models being used in the market, this foundational work lays the foundation for subsequent expanded research. Additionally, the different performance of the model in different market conditions is not classified and discussed. Therefore, the conclusions reached in this study provide actionable insights for a specific market segment, the technology market, although broader generalities need to be further validated across different industries and macroeconomic cycles. In addition, only two technology stocks are selected in this study, so the conclusions of this study are not widely applicable in the whole market; more industries should be included in future research.

However, there are still some successes in this project. The design of this experiment is relatively good, and some basic experimental criteria, including scientific experimental criteria, are complied with. Moreover, this study is relatively innovative, and the comparative analysis of the two models fills the research gap, which can be used as a reference for investors when choosing strategies in investment. In addition, this experiment mainly considers the comparison of the volatility of two stocks and refers to the influence of different liquidity on the two models, so this research is innovative.

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