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Enhancing Performance for Fama-French Model Based on New Factors: Evidence from Multiple Industries

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Abstract: As a matter of fact, in the current complex and volatile financial markets, the traditional Fama-French five-factor model shows some limitations in explaining stock returns. With this in mind, this study introduces new technical indicators (e.g., MACD, RSI, and CCI), to improve the model's performance as well as analyze the performance of the technology, energy, healthcare, financial, construction, and commodities sectors. To be specific, this research uses data collection, model construction, hypothesis testing, and statistical analysis to improve the model's explanatory power and predictive accuracy. According to the analysis, the finding proves the new factors' effectiveness and provides investors with a more accurate asset pricing tool. The research in this paper emphasizes the importance of innovation and improvement of traditional asset pricing models in the changing financial market environment. At the same time, it discusses the implications of the findings for investment strategies and market efficiency and suggests possible directions for future research.

Keywords: Fama-French five-factor model, technical indicators, industry analysis, model combination.

1. Introduction

There has been a significant evolution in asset pricing models since their inception. The models play essential roles in finance for understanding asset pricing and predicting stock returns. The Capital Asset Pricing Model (CAPM) is the foundational and fundamental asset pricing framework, and Sharpe, Lintner, and Mossin developed it. CAPM introduces systematic risk, which is measured by beta, and CAPM posits a linear relationship between the expected return of an asset and its beta with the market portfolio. However, some things could be improved in CAPM, especially its inability to explain size and value factors in the market [1]. Later, that led to other models being developed. Initially, the Fama-French Model (FF3) was developed by Eugene Fama and Kenneth French in 1992, and the three-factor model includes the market risk factor (Beta), size factor (SMB-Small minus Big), and value factor (HML-High minus Low). The model is an extension of the CAPM and has addressed the limitations of CAPM, which only involves market risk. In 2015, Fama and French extended the model to a five-factor model (FF5), which has two additional factors. One is the profitability factor (RMW-Robust et al.), which measures the returns of firms with solid profitability compared to firms with weak profitability. Another is the investment factor (CMA-Conservative et al.), which compares the returns of firms with high and low investments and captures the tendency with conservative or

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aggressive investment strategies [2]. These two additional factors contribute significantly to asset pricing.

More recently, the Fama-French Model with other additional factors (FFN) has been developed and emerged. The researchers have done continuous searches on more comprehensive models and added different factors, such as liquidity, momentums, market volatility, and tail risk, to underline the limitations of the existing asset pricing models and provide more accurate representations for the market. In 2020, one research used a quantile regression approach and added nominal interest rate, the Carhart risk factor for momentum and momentum reversal, and the traded liquidity factor to the extension of the Fama-French five-factor model. To consider the economic cycle, a robustness check splits the whole sample period into three sub-sample periods (pre-crisis, crisis, and post-crisis). As expected, this extension of the Fama and French model has the highest explanatory power in the highest and the lowest quantiles, showing a U-shaped pattern. In addition, the proposed model better explains the changes in European companies' returns in extreme stages of the economy [3]. Thus, the modifications indicate that the ongoing exploration of new factors highlights the complexity of financial markets and the continuous efforts to improve asset pricing models.

This research aims to explore more factors, such as MACD, RSI, and CCI technical indicators affecting the Fama-French Model and contribute to the ongoing development of asset pricing models. The new findings deepen understanding of asset pricing mechanisms and provide investors with more accurate decision support, especially in industries with severe market volatility and information asymmetry. This exploration undoubtedly contributes to financial engineering and brings new insights to asset management practice. In the next chapter, data collection and technical indicators are introduced. In Sec. 3, the research will analyze the application of MACD, RSI, and CCI in the technology, energy, financial, healthcare, construction, and commodities industries. Sec. 4 will show the methods, results, and discussion about new-factored model performance, comparison, implications, limitations, and prospects. In the end, there will be conclusions about the research meanings and expectations for the future.

2. Data and Technical Indicators

In the research, the data collection and preprocessing phase is crucial and aims to ensure that all analyses are based on accurate and reliable data sets. The data sources, mainly technical indicators (MACD, RSI, CCI) and traditional Fama-French factor data, are taken from widely recognized financial markets databases such as Yahoo Finance, Quandl, or other specialized financial API interfaces, ensuring the timeliness and comprehensiveness of the data. Limited data collection has been done for the last ten years to ensure consistency and completeness. It covers representative companies from the technology, energy, healthcare, financial, construction, and commodity industries. Data preprocessing involves a rigorous series of steps designed to eliminate noise and inconsistencies that can affect the model's performance. First, the raw data is regularly downloaded via automated scripts and initially collated using Python's Pandas library, including date alignment, removal of duplicate records, etc. Then, for outlier processing, one uses the Z-score method to identify and remove extreme values that deviate from the mean value of the variable in which they are located by three standard deviations to reduce their adverse impact on statistical analysis.

The missing value-filling strategy is customized according to the characteristics of the indicators; for time series data such as technical indicators, linear interpolation or backward filling method is applied to maintain the continuity of the data series. For cross-section data, consider using industry average or nearest neighbor value filling. To visually demonstrate the improvement of data quality before and after cleaning, a line chart is embedded in this study (seen from Fig. 1), which clearly shows the smoothness difference of a typical company's stock price before and after cleaning, and directly reflects the effectiveness of preprocessing.

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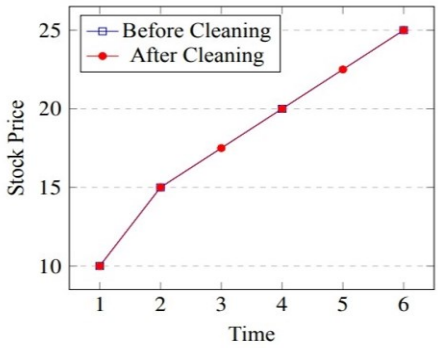

Figure 1: The impact of data cleaning (Photo/Picture credit: Original).

Data preprocessing also includes standardization, which involves scaling all numerical indicators to the same scale and using Z-score standardization so that the mean value of each indicator is 0 and the standard deviation is 1. Standardization eliminates the impact of dimension and facilitates the fair comparison and comprehensive analysis of multi-factor models. The above comprehensive data processing process ensures that the data set used is pure and suitable for subsequent panel data analysis, providing a solid foundation for building and verifying the enhanced Fama-French model.

This research mainly chooses three technical indicators for analysts in different industries and the Fama-French model. Firstly, the MACD indicator judges the strength and change of a trend by calculating the difference between two moving averages of different speeds. When a fast line crosses a slow line, it tends to be seen as a buy or sell signal. The advantage is that it can reflect price trends more smoothly, helping investors to catch shifts in long-term trends. However, the MACD has certain limitations, such as the possibility of generating false signals during periods of high market volatility [4]: MACD = EMA (short-term) – EMA (long-term); Signal = EMA (MACD); Histogram = MACD – Signal, used to capture shifts in price momentum. Secondly, the RSI indicator, on the other hand, focuses on the strength of price rises and falls, identifying the overbought and oversold state of the market by calculating the ratio of the rises and falls over a period. When the RSI exceeds 70, the market is considered overbought, and a correction may be imminent. When the RSI is below 30, the market is considered oversold and may be about to rebound. The RSI indicator has the advantage of being a timely indicator of the market's short-term changes in strength and weakness, but in a one-sided trend market, its signals can appear too early [4]: RSI = 100 − [100/(1+ AVGgain / AVGloss)]. AVGgain and AVGloss are averages of positive and negative returns, respectively, and they are used to identify overbought or oversold market conditions. Thirdly, the CCI indicator measures price deviation, identifying market extremes by calculating how much the price has deviated from the average. It is susceptible to abnormal price movements and reversals and can provide valuable signals in the early stages of market trends. However, its high sensitivity makes it susceptible to short-term noise disruptions [4]: CCI = (T P−MA)/(0.015×Mean Deviation), TP is the typical price; MA is the moving average, and Mean Deviation is the average Deviation and is used to detect the Deviation from the regular price and indicate the trend reversal.

3. Application of MACD, RSI, and CCI

3.1. Technology Industry

The study uses the cross-signals of the MACD indicator to identify buy and sell timing, a calculation based on the difference between the fast and slow index moving averages and their signal lines, to capture the trend shifts and momentum characteristics of stocks in the technology sector. Fig. 2 shows the MACD trend of a representative stock in the technical sector, where the blue line represents the

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MACD line, the red dashed line represents the signal line, and the green triangle marks the necessary golden cross (buy signal) and death cross (sell signal). By observing the relative position changes of the MACD line and the signal line, one can visually see several essential buying and selling timing, which is of great value for investors to grasp the rhythm of the market and optimize their trading strategies. Table 1 reveals the effect of the MACD indicator in the technical sector: the win rate of the trading strategy based on the gold cross signal is 68.4.

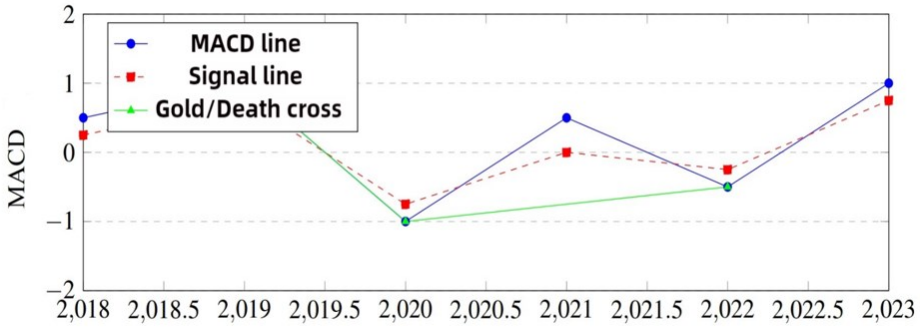

Figure 2: The MACD trend for technology industry (Photo/Picture credit: Original).

Table 1: Return statistics for MACD in the technical industry

Statistical indicators	Victim (%)	Average Return
Gold cross	68.4	4.3
Death cross	72.1	-2.8
Overall	70.2	1.2

To sum up, the MACD indicator plays an essential role in the technical industry, not only effectively indicating the timing of buying and selling but also optimizing the investment decision process to a certain extent, increasing the flexibility and response speed of the strategy. However, it is worth noting that reliance on any single technical indicator alone may face limitations; therefore, in practical application, MACD should be combined with other economic fundamental analysis, market sentiment indicators, and additional technical analysis tools to achieve a more comprehensive and accurate asset allocation effect [5].

Next, the paper uses a scatter plot (seen from Fig. 3) to show the relationship between RSI and stock prices in the technology sector. The plot reveals the distribution pattern between the RSI index value and the stock price, where the RSI value is close to the oversold area (usually below 30), which may indicate a buying time. Conversely, when the RSI is close to the overbought area (usually above 70), it may show a selling signal. This visual display helps investors identify potential reversal points to make more sound trading decisions. The bar chart in Fig. 4 clearly shows the dynamics of CCI in different stages of the market: In the upward trend, CCI usually remains positive and may reach a higher level. Hence, the trend indicates strong market momentum. On the contrary, in a downtrend, CCI turns negative and reflects market weakness. During sideways periods, the CCI is less volatile, and that helps investors identify phases where the market lacks a clear direction. These insights provide the basis for investors to judge the market state according to the CCI indicator and adjust their investment strategies accordingly.

In summary, analyzing scatter charts and bar charts confirms the validity and practicability of RSI and CCI indicators in the technology industry. RSI and CCI provide powerful tools for investors to identify the timing of buying and selling. These two technical indicators can help investors catch

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market turning points and provide operational guidance in different market environments, thus enhancing the accuracy and timeliness of investment decisions [5].

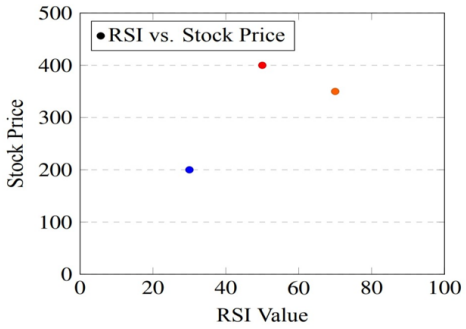

Figure 3: The stock price as a function of RSI for technology industry (Photo/Picture credit: Original).

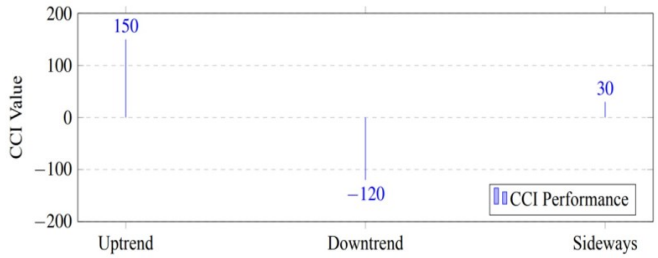

Figure 4: CCI under different trends for technology industry (Photo/Picture credit: Original).

3.2. Energy Industry

In the energy industry, a highly volatile market deeply influenced by global political and economic factors, the evaluation of MACD is particularly critical. A comprehensive empirical analysis framework is designed to explore further the role of MACD in predicting market movements and assisting investment decisions. A line chart in Fig. 5 visually compares the energy sector stock price index and the buy/sell signal from the MACD indicator. The red dotted line marks represent the intersection of the MACD indicator, indicating potential buy/sell timing. In most cases, the MACD signal is more accurate in indicating market turning points, especially on the eve of market trend reversals, providing investors with valuable trading signals.

The bar chart in Fig. 6 shows the distribution of energy stocks' investment returns under different RSI thresholds. Within the energy sector, energy stocks have, on average, achieved higher investment returns when the RSI indicator is below 30(oversold territory), suggesting that there may be contrarian opportunities for investors when the market is overly pessimistic [6].

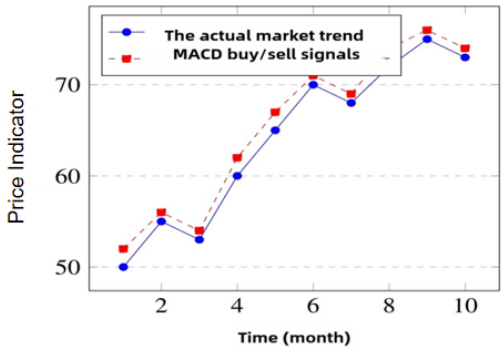

Figure 5: The MACD signal and price trend for energy industry (Photo/Picture credit: Original).

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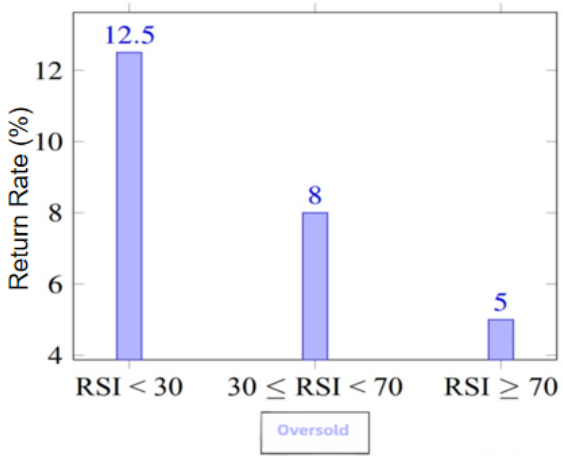

Figure 6: The return rate of different RSI for energy industry (Photo/Picture credit: Original).

Through analysis, it is found that CCI can also effectively identify overbought or oversold states, and CCI has reference value for capturing price reversal points. However, due to space limitations, this section must present its graphical analysis directly. However, its use in conjunction with RSI in strategy construction provides an additional basis for dynamic adjustment for portfolio management. Based on the above analysis, the application of RSI and CCI in the energy industry demonstrates their ability as auxiliary tools to identify market sentiment and seize investment opportunities. Monitoring these technical indicators provides empirical support for investors to optimize investment portfolios. Investors can better understand market dynamics, allowing them to develop more flexible and adaptable investment strategies in the energy sector and even other related markets [6].

3.3. Healthcare Industry

This section constructs a line chart to visualize the dynamics of these technical indicators over time and their potential indicative significance for healthcare stock performance (shown in Fig. 7). In the chart, the horizontal axis represents the time series, the vertical axis represents the numerical level of each indicator, and the three broken lines represent the trend of MACD, RSI, and CCI, respectively, with color differentiation to enhance recognition. Fig. 8 clearly reveals the trend of MACD, RSI, and CCI, which help observers pick up subtle changes in market sentiment over time. When the industry is undergoing significant events or policy adjustments, the correlation of these indicators may show investment opportunities or risks.

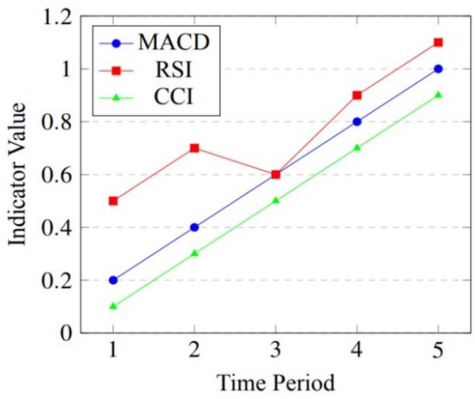

Figure 7: The evolution of MACD, RSI and CCI for Healthcare industry (Photo/Picture credit: Original).

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Next, the performance comparison of indicators under different market conditions is discussed in Table 2. It shows that during bullish phases in the healthcare sector, MACD values are typically higher, RSI is in overbought territory, and CCI is also showing strength. Conversely, these indicators tend to move oppositely in a bear market. When the MACD is negative, the RSI is near oversold territory, and the CCI declines significantly. During periods of consolidation, the indicators tend to converge toward neutral levels and reflect the lack of clear direction in the market [4, 7].

To sum up, through the comprehensive analysis of line charts and tables, the application of MACD, RSI, and CCI within the healthcare industry can not only reveal the transition of market state but also assist in identifying potential investment opportunities and enhance the applicability and forecast accuracy of the Fama-French model in this field.

Table 2: The performance comparison of indicators under different market conditions.

Market Condition	MACD	RSI	CCI
Bullish	0.85	70	150
Bearish	-0.6	30	-100
Consolidation	0.1	50	0

3.4. Financial Industry

Applying the MACD indicator in the financial industry has a specific value. It can signal investors about trend shifts and the timing of buying and selling through the intersection of fast and slow lines or changes in the bar charts. In the stock trading industry, the MACD indicator can help investors determine whether the upward or downward trend of the stock price is about to change so that investors can make corresponding investment decisions [8]. Secondly, the RSI indicator also plays a vital role in the financial sector. It measures how much prices have risen and fallen over a period to reflect overbought and oversold conditions in the market. When the RSI is above 70, it indicates that the market may be overbought, stock prices may be due for a correction; when it is below 30, it may be oversold, and stock prices may rebound. This is an essential indicator for short-term traders in the financial industry [8]. Thirdly, the CCI index can reflect the market's volatility more accurately. In the financial industry's futures and foreign exchange trading, the changing CCI indicator can help investors catch abnormal market fluctuations in time, so traders make risk prevention or profit by taking operations in advance.

These technical indicators have shown some remarkable effects in the empirical analysis of the financial industry. For example, in analyzing bank stocks, the new factor technical indicators can predict the short-term fluctuations of stock prices more accurately, help investors buy and sell at the right time, and improve investment returns. These technical indicators can help insurance companies assess risk levels and investment values. The historical data analysis shows that when the MACD index gives a cash fork and the RSI is in a reasonable range, the stock price of insurance companies often performs better. In securities, the new factor technical indicators are helpful to analyze the trend of security stocks. When the CCI index breaks through a certain threshold, it indicates that the brokerage stock is about to usher in a wave of market [8]. However, market uncertainty and unexpected events may lead to deviations in the signals of technical indicators. Investors can not only rely on technical indicators to make decisions but also combine factors such as fundamental analysis and the macroeconomic environment to make comprehensive judgments.

3.5. Commodity Industry

The commodity industry has its unique characteristics and operation rules. First of all, the price fluctuations are significantly affected by the global macroeconomic situation. Changes in

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macroeconomic factors, such as economic growth, inflation, and monetary policy, will be directly reflected in the price trends of bulk commodities. In addition, it is pointed out that supply and demand play a crucial role in forming commodity prices. For example, the increase or decrease in global energy demand significantly impacts the price of energy commodities such as oil. Seasonal changes in agricultural production also affect agricultural commodities' supply and prices [9]. The MACD indicator helps investors capture changes in price trends. It often signals a turn in price trends when a fast line crosses a slow line. This indicator has some reference value in the commodity market for judging the long-term trend of metal commodities such as gold and copper [9]. The RSI index focuses on the market's overbought and oversold conditions. When commodity prices rise or fall sharply, the RSI indicator can provide timely warning signals to help investors avoid unthinkingly chasing gains and losses [4]. The CCI index is sensitive to identifying unusual price movements. When the commodity market is hit by unexpected events, such as oil supply disruption due to geopolitical conflicts, the CCI index can quickly reflect abnormal price movements and provide investors with a timely decision-making basis. The comprehensive application of these technical indicators can more accurately grasp the commodity industry's price trends and investment opportunities. However, it is essential to note that MACD, RSI, and CCI indicators must be more accurate, and market complexities and uncertainties remain. In practical application, it is also necessary to make a comprehensive and integrated judgment by combining factors such as fundamental analysis, macroeconomic data, and industry policies.

3.6. Construction Industry

Applying technical indicators like MACD, RSI, and CCI to the construction industry can help traders and investors analyze stock price trends and make informed decisions. The MACD indicator can help identify when a construction company's stock is entering a bullish or bearish phase, which may be influenced by factors such as infrastructure spending, economic cycles, or regulatory changes. A bullish crossover (MACD line crossing above the signal line) might indicate a good entry point, while a bearish crossover could suggest a time to exit. The divergence between the MACD and stock price could signal a potential reversal in the stock's trend, and the signal is valid in predicting changes in construction sector sentiment [4]. The RSI indicator above 70 might indicate that a construction stock is overbought and due for a correction, while an RSI below 30 could suggest it is oversold and potentially undervalued. The RSI indicator can confirm the strength of a trend. For example, during the solid bullish trend in construction stocks, the RSI might stay above 50 and still indicate continued strength even during the pullback. The RSI divergence from price can indicate a weakening trend, signaling probably reversals in construction stocks [4]. The CCI indicator can detect emerging trends in construction stocks, especially when prices deviate significantly from their historical average. A CCI above 100 may indicate overbought conditions and suggest a potential selling signal. When a CCI is below 100, it could indicate oversold conditions and signal a potential buying opportunity. The construction industry is often cyclical, with stocks experiencing periodic fluctuations. The CCI indicator helps identify these cycles and allows for better entry and exit point timing [4].

4. Empirical Analysis

Based on the Fama French five-factor model, the three technical indicators of MACD, RSI, and CCI are included as new factors. In terms of data processing, the data of each factor is collected and sorted out to ensure its accuracy and integrity. For the MACD indicator, focus on the intersection of its fast and slow lines and the changes in the bar chart to extract adequate market trend information. Not limited to this, the weight allocation of the various factors is also determined. This requires a comprehensive consideration of the performance of each factor in different market environments and

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the degree of impact on asset pricing. The predictive power and stability of the mode under different weight combinations can be assessed through back-testing of historical data and statistical analysis. Furthermore, the model's parameter settings are considered. For example, the appropriate overbought and oversold threshold must be determined for the RSI indicator to capture the overbuy or oversell signal in the market accurately. The CCI indicator's normal volatility range and the definition of its extreme value need to be determined. It is also necessary to optimize and adjust the model in the construction process. The optimal model structure is found by constantly experimenting with different combinations and parameter settings. At the same time, techniques such as cross-validation are introduced to ensure that the model has better generalization ability in different samples and periods [10]. In addition, a dynamic weight adjustment mechanism can also improve the model's adaptability. According to the market's real-time changes, the weight of each factor is dynamically adjusted to reflect the market's dynamic characteristics better. A variety of evaluation indicators, such as Mean Square Error (MSE), Sharpe Ratio (SR), coefficient of determination (R^2), Mean Absolute Error (MAE), and Root Mean Square Error (RMSE), etc., are compared with the traditional Fama French five-factor model as well as other related models to verify the superiority and validity of the new model [6]. The Table 3 lists in detail the changes in several core statistical indicators of each industry after the model adjustment. Comparing the values before and after the adjustment, R^2 has improved in all industries, and the model's explanatory power has increased. At the same time, the decrease of MAE and RMSE indicates that the prediction error is reduced, and the accuracy of the model prediction is substantially improved.

Table 3: The main statistical indicator variation after adjustment of the model.

Industry	R Improvement	MAE decrease	RMSE reduction
Technology	+5%	-3%	-4.5%
Energy	+6%	-4%	-5%
Healthcare	+4%	-2%	-2.5%
Finance	+7%	-5%	-6%
Architecture	+3%	-1%	-1.5%
Commodity	+5%	-2.5%	-3%

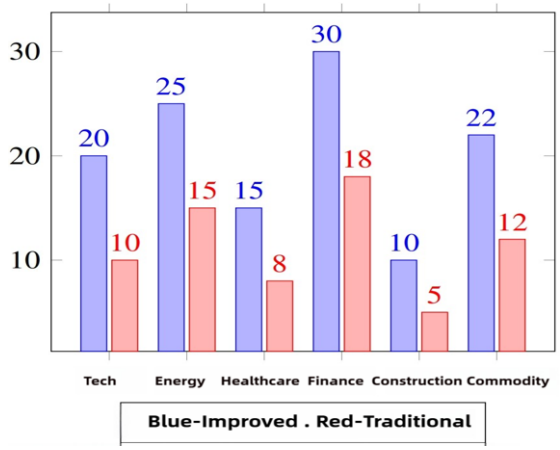

Figure 8: The improvements for different industry (Photo/Picture credit: Original).

Next, a bar chart in Fig. 8 is designed, visually showing the comparison of forecast accuracy in different industries before and after model improvement. The figure presents each industry as an independent column divided into two groups. One group represents the performance of the original Fama-French model without adding technical indicators, and the other group shows the model effect

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after incorporating MACD, RSI, and CCI indicators. The prediction accuracy of most industries has significantly improved after the model was upgraded based on the numerical changes on the Y-axis. Especially in the technology, energy, and financial industries, the growth of the column height is particularly prominent, which directly verifies the effectiveness of the new factor.

The new model performs differently in different market environments regarding risk-adjusted returns. During high market volatility, the model with the new indicators may demonstrate greater resilience to risk and result in relatively stable returns. In contrast, the traditional Fama-French five-factor model may need to perform better when dealing with extreme market conditions [11]. Subsequently, in terms of predicting asset prices, the new model includes more technical indicators that reflect the short-term dynamics of the market, so it may be keener on capturing the short-term movements of asset prices. This allows investors to adjust their investment strategies and quickly seize market opportunities [11]. Moreover, from the perspective of model stability analysis, the new model's performance may be more consistent across periods and asset classes. This means that the new model can maintain a relatively stable forecasting effect in the face of changes in market structure and investor behaviors and reduce the uncertainty of investment decisions. There are also some differences in the complexity and interpretability of the models. Traditional models are concise and straightforward but may not adequately explain some complex market phenomena. Although the model with additional new indicators has enhanced its explanatory power, it has also increased certain complexity, and it may need higher requirements for investors' understanding and application.

Overall, the new model has performed better than the traditional Fama-French five-factor model in some ways, but only in some aspects. In practical application, investors must choose and use appropriate models reasonably to achieve the best investment results according to their risk preferences, investment objectives, and market expectations. At the same time, continuous monitoring and improvement of the model are necessary to adapt to the ever-changing market environments and investment needs. However, there are some limitations to the research. A significant issue is the applicability of the model. The Fama-French five-factor model is built on data from the US market, while technical indicators such as MACD, RSI, and CCI are widely used in multiple markets worldwide. If the two types of tools in combination are applied to a specific market, such as China's A-share market, the differences in market structure, trading rules, and investor behaviors may affect the accuracy and explanatory power of the model [12]. Data processing and sample selection are also the key issues. Applying the Fama-French five-factor model and technical indicators for empirical research, sample selection, determination of period, and data cleaning and processing will significantly impact the results. For example, different sample periods may capture different states of the market, such as a bull or bear market, which will directly affect the performance and explanatory power of the model. In addition, the frequency of the data (daily data, monthly data, etc.) will also affect the analysis results, as data of different frequencies may reflect market dynamics on different timescales. The influence of external factors cannot be ignored either. The macroeconomic environment, policy changes, market sentiment, and other factors may impact stock returns, thus affecting the stability and forecasting ability of the model. Especially during a global economic or health crisis, market uncertainty increases significantly, and traditional financial models and technical indicators may struggle to capture rapid market changes [13].

Looking forward to the future, the following aspects can be studied. Firstly, the data sample should be expanded to cover more periods and markets in different regions to enhance the reliability and applicability of research conclusions. The second delves into combining and optimizing technical indicators to explore more effective ways of combining factors and enhancing the model's performance. The third combines other related economic theories and models, such as behavioral financial theory, to provide more theoretical support and innovative ideas for improving the model. The fourth is to pay attention to the development of emerging industries and markets, apply research

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results to more fields, and provide more targeted guidance for investment and development in different industries.

5. Conclusion

To sum up, through the empirical analysis of technology, energy, healthcare, finance, construction, and commodities industries, the role and impact of these new factor indicators in different industries are well understood. However, the research process could be smoother; there are some difficulties in data acquisition and processing and the adaptive adjustment of the model. Overall, this study provides a valuable reference for model optimization in the financial field. Introducing new factor indicators has enriched the application scenarios and the forecasting ability of the Fama French five-factor model to a certain extent. There is still much work that needs to be done. Firstly, the optimization of the model should not be stopped. On the other hand, the scope of research should be expanded, and industries should be included in the analysis to evaluate the effect of the new factor indicators more comprehensively. In addition, the combination with other relevant models can be explored to seek more accurate forecasting and analysis methods. At the technical level, continuous improvement of data processing and analysis capabilities and the use of more advanced algorithms and tools are crucial to improving the quality of research. At the same time, cooperation with the industry should be strengthened, and research results should be better applied to actual investment decisions to achieve a close combination of academic research and practice. In a word, this study is just a starting point. It will achieve more meaningful results in future studies and make more significant contributions to the development of the financial sector.

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