

The Investigation of China Stock in Fama-French Model Based on High-end Equipment Manufacturing Industry

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Abstract: This study investigates the elements of return and chance in the very good-quality hardware manufacturing sector by directing empirical research and far-reaching analysis. The research centers around building six portfolios considering market esteem scale and book-to-market ratio to explore the relevance of the Fama-French factor analysis model. Our discoveries uncover important patterns, including a backward connection between the book-to-market ratio and rates of return, as well as higher paces of return for bigger scope portfolios, featuring a scale impact. The meaning of positive month-to-month yields across all portfolio blends underlines the business' general profitability from 2015 to 2021. Thorough stationarity tests approve our relapse analysis, where market risk factor(MKT), scale factor (SMB), and book-to-market ratio factor (HML) altogether impact stock portfolio returns. By adjusting our discoveries to past writing and featuring the model's viability in various sectors, our review adds to a more extensive comprehension of asset pricing and illuminates powerful investment methodologies custom-fitted to explicit market elements.

Keywords: High-end equipment manufacturing, Fama-French three-factor model, Investment portfolios, Market dynamics, Systematic risk-return relationships

1. Introduction

In this paper, we dig into an empirical exploration of the very good quality hardware manufacturing industry, explicitly zeroing in on the use of the Fama-French factor analysis model [1]. Our review fixates on a specific chosen pool consisting of recorded organizations, drawn from the financial annual reports and stock exchanging information in the Shanghai and Shenzhen stock markets, crossing from May 2015 to September 2021. This novel dataset gives a strong groundwork to our examination concerning the interaction between stock portfolio returns and hazard factors inside the top-of-the-line hardware manufacturing sector [2-4].

The Fama-French three-factor model has accumulated critical consideration because of its capacity to explain the factors that drive stock returns. Our research is spurred by the objective of facilitating how we might interpret this model's relevance in unambiguous market conditions. As we set out on this excursion, we are roused by the discoveries of Liu and Zhang, who skillfully applied the Fama-French model to China stock trading scenarios, consequently validating its adequacy across different market scenes [5-6]. Their work not only approved the model's capacity to make sense of changes in stock returns yet in addition laid the foundation for cross-market research.

While our review's center veers from that of Liu and Zhang, as we look at the very good quality hardware manufacturing sector, our aggregate interest remains established in understanding the ramifications of the Fama-French model inside a specific market setting. Our analysis focuses on factors, for example, market value scale, book-to-market ratio, and others, uncovering experiences in how these components add to molding stock portfolio returns and chance examples. We expand upon the laid out systems, applying a comparative structure of empirical examination to our picked industry.

Through our research, we try to overcome any barrier among the scholarly community and down-to-earth investment choices. By analyzing the extraordinary qualities of the top-of-the-line hardware manufacturing sector, we plan to contribute significant experiences to investors and chiefs. Our exploration into the Fama-French model's application inside this unmistakable market setting mirrors the rising interest in nuanced investment systems that think about sector-explicit elements.

In the ensuing segments, we will introduce the procedure, empirical tests, and consequences of our review, with a specific spotlight on the illustrative measurements, stationarity tests, and relapse examinations that shed light on the connections between the chosen factors and stock portfolio execution [2]. By comparing our discoveries with the laid-out writing, including Liu and Zhang's original work, we try to offer a far-reaching comprehension of the Fama-French model's pertinence and expected ramifications for investment systems inside the very good-quality hardware manufacturing industry.

2. Literature Review

In the financial field, the Fama French factor analysis model, which is used for making sense of the rate of returns for the products in the asset pool, has stood out for its application and pertinence in various markets [4]. Among them, Liu and Zhang furnished us with a contextual investigation on the use of the Fama French factor analysis model in China stock tradings, in this manner growing the application field of the Fama French model [5-6].

Liu and Zhang meant to confirm the materialness of the Fama French factor analysis model in China stock trading scenarios [6]. The review led quantitative analysis of information from China stock trading scenarios to investigate the explanatory force of market factors, scale factors, and book-to-market ratio factors on stock returns. Their research results show that the Fama-French model also can make sense of profits in China stock trading scenarios, confirming its cross-market relevance.

Considering our research discoveries, we can acquire a more profound comprehension of the association between the research of Liu and Zhang and our research. In spite of the fact that our research centers around various ventures and markets, in particular the top-of-the-line hardware manufacturing industry, our normal research revenue is to investigate the application impacts of the Fama French factor analysis model in unambiguous market conditions.

Liu and Zhang's research applied the Fama-French model to China stock trading scenarios, confirming its pertinence in various markets. Their work has shown that the Fama French model can really make sense of changes in stock returns, serious areas of strength for offering for cross-market research. Our research chose the very good quality gear manufacturing industry as the research object. Through comparative model analysis, we found that factors, for example, market esteem scale and book-to-market ratio also have specific explanatory power in this industry. Although we center around various ventures, we have aggregately zeroed in on the application adequacy of the Fama-French model in unambiguous market conditions and the effect of factors on stock returns [4].

This association furnishes us with a more extensive viewpoint, permitting us to interface Liu and Zhang's research discoveries with our research decisions. This correlation and relating strategy assist with having a more far-reaching comprehension of the viability of the Fama French model in various markets and enterprises, consequently giving investors more top to bottom and expansive investment dynamic references. This also mirrors the worth of our research in both scholarly and pragmatic

applications, provoking us to additionally investigate the use of the Fama French model in different markets, giving more data and experiences to investment direction [4].

Through this review, we can see that the Fama French factor analysis model isn't simply pertinent to customary created markets, but in addition to emerging markets like China. This gives investors a more complete structure to make sense of the distinctions in stock returns across various markets. Likewise, Liu and Zhang's research also gives a reference to future researchers to investigate the utilization of this model in other emerging markets and further grow its global application esteem.

In synopsis, Liu and Zhang's research grandstands the utilization of the Fama French factor analysis model in China stock trading scenarios, fortifying its cross-market pertinence and giving investors and researchers a more thorough tool to make sense of the progressions in stock returns in various markets.

3. Data Selection and Model Construction

3.1. Data Selection and Variable Description

As per the business order standard of Ruisi Financial Data set, this paper chooses the month to month return information of 22 recorded organizations in Shanghai and Shenzhen in top of the line equipment manufacturing industry from May 2015 to September 2021 to fit the three-factor model and avoids ST and ST* organizations and stock information with missing information. The information in this paper predominantly comes from the RESSEST data set. The definition of every variable is as per the following.

1) Monthly rate of return

The yield of listed companies' individual stocks is calculated in monthly units as follows:

$$r_{n,t} = \frac{P_{n,t}}{P_{n,t-1}} - 1$$

Among them, $P_{n,t}$ refers to the monthly closing price of stock n on the last trading day of t week; $P_{n,t-1}$ is the monthly closing price of stock n on the last trading day of 1 t month.

2) Market yield

The return is calculated according to the monthly return, and the market value-weighted average method is adopted. The calculation formula is as follows:

$$R_{m,t} = \frac{\sum_m w_{m,t} r_{m,t}}{\sum_m w_{m,t}}$$

Among them, $w_{m,t}$ represents the total market value of stock m in 1 t month, $r_{m,t}$ represents the monthly stock return rate, $R_{m,t}$ represents the weighted average monthly market return rate of total market value.

3) Risk-free return rate

The monthly rate of return after the interest rate of one-year fixed deposit is regarded as the risk-free rate of return in monthly calculated.

4) Ratio of sample market value to book market value

The calculation method of test market value is the total number of offers gave by individual stocks increased by the monthly shutting price of individual stocks, and the calculation method of book market value ratio is the net assets per share separated by the stock price per share.

3.2. Structure the Investment Portfolio

As per the annual market value to book market value, the stocks in the high-end equipment manufacturing portfolio are separated into six portfolios by a twofold independent method, and

afterward, the rate of returns for these six portfolios in a month is determined by utilizing the SMB and HML factor separately. The methods are as follows:

Divide the monthly rate of return from 2015 to 2021 into one gathering each year, that is to say, the end of May 2015 and the end of May 2016, etc. Simultaneously, these 22 examples are divided into small-scale group (S) and large-scale group (B), and afterward, group S and group B are isolated into three groups as indicated by the book-to-market ratio toward the end of T: as per the extent of 30%, 40% and 30% of the examples, six portfolios (S/L, S/M, S/H, B/L, after the division is finished. Then compute the market value weighted normal monthly returns of these six portfolios individually.

Moreover, as per the grouping results, the time series of the SMB factor and HML factor can be developed, and the equation is:

$$SMB = \frac{S/L + S/M + S/H}{3} - \frac{B/L + B/M + B/H}{3}$$

$$HML = \frac{S/H + B/H}{2} - \frac{S/L + B/L}{2}$$

3.3. Model Building

According to the Fama-French three-factor model and the above analysis, this paper sets the regression model as follows:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \alpha_i SMB_t + b_i HML_t + \varepsilon_{it}$$

r_{it} represents the excess rate of returns of I-th stock portfolio at time t; r_{mt} refers to market portfolio's excess return at T time; SMB_t is the cumulative returns of return of SMB in T period; HML_t is the cumulative returns of HML factor in the T period; β_i It is a market risk factor; ε_{it} is the residual term.

4. Empirical Test and Results

4.1. Descriptive Statistics

Based on the information of the typical monthly return rate of the six portfolios, illustrative statistical analysis is led to for starters determine whether the difference consequently rate has specific regulations with the book value ratio. The specific results are shown in Table 1:

Table 1: Descriptive statistics

combination	average value	volatilities	minimum value	maximum
B/H	0.002706	0.104382	-0.31328	0.345147
B/L	0.006775	0.111521	-0.39848	0.288962
B/M	0.005321	0.090706	-0.33612	0.351492
S/H	0.009771	0.102598	-0.33044	0.236585
S/L	0.01667	0.13835	-0.24347	0.679405
S/M	0.006718	0.108011	-0.36373	0.350758

According to the typical perspective, the monthly return rate of portfolio shows the attributes of $S/H < S/M < S/L$, $B/H < B/M < B/L$, and $B/H < S/H$, demonstrating that the higher the book value ratio, the lower the return; The bigger the scale, the higher the rate of return. There is a direct connection between the ratio of the rate of return to the book market value and the scale, and there is

a scale impact in the research industry. According to the point of view of variance, The volatility of the monthly return rate of huge-scope portfolio stocks is, for the most part, more prominent than the volatility of the return in the month of limited-scope portfolio stocks, demonstrating that the gamble under a similar book market value ratio, limited scope researching industry is more noteworthy than that of large-scale enterprises, which shows that limited scale researching industry varies extraordinarily because of market data. Besides, the monthly yields of each of the six mixes are positive, demonstrating that the general profitability of the research industry is great from 2015 to 2021.

4.2. Stationarity Test

Since the example information in this paper is a period series, to forestall misleading relapse results, this paper utilizes the ADF test to confirm the stationarity of every portfolio and market portfolio return series in the example prior to building the relapse model. Utilizing STATA programming, the monthly return series and monthly market return series of six portfolios are tried by ADF, and Table 2 is acquired:

Table 2: ADF test results

	S/L	S/M	S/H	B/L	B/M	B/H	market
ADF statistics	-6.793	-8.566	-8.896	-6.137	-8.652	-8.533	-7.622
1% statistics	-3.552	-3.552	-3.552	-3.552	-3.552	-3.552	-3.552
P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000

The monthly returns of the six combinations and market portfolio are significant at the confidence level of 1%, and the P value is 0, which rejects the original hypothesis that the time series has a unit root, that is, the time series data are stationary and there is no unit root, so further regression analysis can be carried out.

4.3. Regression Result Analysis

4.3.1. Regression Results of Fama-French Three-factor Model of High-end Equipment Manufacturing Stock Portfolio

Table 3: Regression results of the Fama-French three-factor model of the high-end equipment manufacturing stock portfolio

rm	coefficient	Standard error	T value	P value
MKT	0.932932	0.042235	22.09	0.000
HML	0.128559	0.031174	4.120	0.000
SMB	0.213483	0.041437	5.150	0.000
α	0.001115	0.003067	0.360	0.716

According to the results in Table 3, the coefficient of α is 0.0011, and the p value is 0.716, which is not significant at 10% confidence level. At the same time, the p value of independent variables MKT, HML and SML to the monthly return of portfolio is close to 0, which is significant at 1% confidence level, it is obviously that the three influencing factors MKT, HML and SML can explain the excess returns.

4.3.2. Analysis of Combined Regression Results

The regression of the Fama-French factor analysis model is carried out for the six combinations, and the results of the regression analysis are shown in Table 4.

Observing the intercept term α of the regression results, it is found that it is not significant at 10% confidence level, that is, the original hypothesis that α is 0 cannot be rejected; The coefficients of three variables of the model, namely, market risk factor (MKT), scale factor (SMB) and book-to-market ratio factor (HML). β_i, α_i, b_i By significance test, the coefficients of three explanatory variables of S/L, S/M, S/H, B/L and B/H are all significant at 1% confidence level, that is, Fama-French three-factor model can well explain the systematic risk reward of these five combinations.

However, the regression results of the B/M portfolio are different from those of the other five portfolios. Although the market risk factor of the sampling portfolio is obviously positively correlated with the system return rates, the coefficients of book ratio factor and the scale factor of the portfolio are not significant at the 10% confidence level, which shows that the SMB factor and HML factor of the B/M portfolio cannot explain the system risk-return, and the addition of these two factors does not improve the explanatory power of the factor model of the B/M portfolio.

Table 4: Regression results of six combined Fama-French three-factor models

	S/L	S/M	S/H	B/L	B/M	B/H
VARIABLES	Rm	Rm	Rm	Rm	Rm	Rm
MKT	0.718*** (5.45)	0.967*** (9.93)	1.009*** (12.49)	0.986*** (10.69)	0.955*** (11.14)	0.893*** (7.74)
HML	-0.341*** (-3.51)	0.248*** (3.37)	0.440*** (7.48)	-0.157** (-2.33)	0.075 (1.21)	0.542*** (5.88)
SMB	0.603*** (4.67)	0.544*** (5.74)	0.587*** (7.27)	-0.106 (-1.17)	-0.091 (-1.10)	-0.279** (-2.38)
α	0.004 (0.41)	-0.001 (-0.07)	0.003 (0.51)	-0.005 (-0.72)	-0.000 (-0.01)	0.008 (0.89)
Observations	180	235	316	270	330	152
F-statistic	39.95	47.30	72.26	49.68	43.23	30.18
R-squared	0.405	0.381	0.410	0.359	0.285	0.380
Adj R-squared	0.394	0.372	0.404	0.351	0.278	0.367

On the whole, the coefficient of market risk factor (MKT) varies from 0.7 to 1.1, indicating that the risk of each portfolio is very close to the overall market risk. Other things being equal, when the market portfolio's rate of return rises, the increase of the portfolio's rate of return is close to that of the market.

For the size factor (SMB), from the size of the coefficient, the SMB factor parameters of the small-scale stock portfolio are all positive, while the SMB factor coefficients of the large-scale stock portfolio are all negative, and the SMB factor coefficients of B/L portfolio and B/M portfolio are not significant, which indicates that there is a small-cap stock effect in researching industry, and small-cap stocks can continuously obtain higher stock returns. This is because most small-cap stocks are in the growth stage, and the expected profit growth is fast, and the share price of small-cap stocks is low, which requires less funds to pull up and belongs to the object of capital profit-seeking.

For the book-to-market ratio factor (HML), only the HML factor coefficient of B/M group is not significant. However, only the risk-return ratio of S/M, S/H and B/H combinations is positively correlated with HML factor, that is, the higher the book-to-market ratio, the higher the risk-return

ratio of stocks or combinations. It can be said that such stocks represent "growth stocks" of the researching industry and have great investment potential. From the size of the coefficient, $S/H > S/M > S/L$, $B/H > B/M > B/L$, which shows that the greater the absolute value of the HML factor coefficient, the greater the explanatory power of the value factor at each book-to-market ratio level.

From the goodness of fit index, the R-squared value of a small-scale high-end equipment manufacturing stock portfolio is stable at around 0.4, and that of a large-scale high-end equipment manufacturing stock portfolio is stable around 0.3, which shows that large-cap stocks are more suitable for fitting Fama-French three-factor model than small-cap stocks. In addition, among the six stock portfolios, the S/H portfolio has the highest fitting degree to the three-factor model.

5. Results & Findings

5.1. Results

This study utilizes the financial annual reports and stock exchange information of researching industry-recorded organizations in the Shanghai and Shenzhen stock markets from May 2015 to September 2021 as tests to build six speculation portfolios for empirical research utilizing the Fama French factor analysis model. The research results are as per the following:

In descriptive statistical analysis, by breaking down the normal monthly return information of six speculation portfolios, it was for starters determined whether there is a sure example between the adjustment of market value scale and book value ratio and the return rate.[5] According to the viewpoint of normal value, the monthly typical return of the venture portfolio displays the attributes of $S/H < S/M < S/L$, $B/H < B/M < B/L$, and $B/H < S/H$, demonstrating that the higher the book-to-market ratio, the lower the return, The larger the scale, the higher the return rate. It very well may be seen that there is a straight connection between the return rate and the book-to-market ratio, and there is a scale impact in the research industry. According to the point of view of change, the volatilities of the monthly typical return rate of large-scale venture portfolios is for the most part more noteworthy than that of small-scale speculation portfolios, showing that under a similar book-to-market ratio, the risk of small-scale researching industry is more prominent than that of large-scale enterprises. This shows that the small-scale researching industry is dependent upon huge variances because of market data. What's more, the monthly returns of each of the six mixes were positive, showing that the general profitability of the research industry was great from 2015 to 2021.

In the stationarity test, the ADF test was utilized to confirm whether the monthly return series of every speculation portfolio and market venture portfolio in the example is steady. The outcomes showed that the monthly returns of the six mixes and the market blend were critical at a 1% certainty level, with a P-value of 0. This dismissed the first supposition that the time series information had a unit root, and that implies that the time series information is viewed as steady and doesn't have a unit root. Consequently, further relapse analysis can be directed [3].

In the relapse analysis of the Fama French factor analysis model, the three-factor model of the high-end equipment manufacturing stock portfolio was relapsed. That's what the outcomes show α the coefficient is 0.0011 and the P-value is 0.716, which isn't critical at a 10% certainty level. In the interim, the P-value of independent factors MKT, HML, and SML on the monthly return of the speculation portfolio is near 0, which is huge at a 1% certainty level, demonstrating that the three impacting factors of MKT, HML, and SML can make sense of the overabundance return of the stock portfolio.

Dissect the thorough relapse results and notice the block term of the relapse results α , Found that it isn't critical at a 10% certainty level, for example, can't be dismissed α The first suspicion of 0; The three variable coefficients of the model, specifically market risk factor (MKT), scale factor (SMB), and book to market ratio factor (HML), were tried for importance. The three explanatory variable

coefficients of S/L, S/M, S/H, B/L, and B/H were all critical at a 1% certainty level, demonstrating that the Fama French factor analysis model can really make sense of the orderly risk returns of these five blends. Nonetheless, the relapse aftereffects of the B/M mix are not quite the same as the other five blends. Albeit the market risk factor of this mix essentially decidedly corresponds with framework risk-return.

5.2. Findings

Expanding upon the empirical analysis of the researching industry's stock portfolios utilizing the Fama-French three-factor model, this study has yielded a few huge research discoveries that add to how we might interpret the connection between market elements, book-to-market ratio, scale, and venture returns [7].

The descriptive statistical analysis of normal monthly returns among the six speculation portfolios, right off the bat, uncovers unmistakable examples. These examples illustrate that the return rates pursue a direction of $S/H < S/M < S/L$ and $B/H < B/M < B/L$. Moreover, the connection between book-to-market ratio and return rate becomes obvious as $B/H < S/H$, demonstrating that higher book-to-market ratios are related to lower returns. Also, the size impact is clear, with larger-scale portfolios showing higher return rates [5]. This proposes a straight correlation between return rates and book-to-market ratio, highlighting the presence of a scale impact inside the research industry.

The stationarity test builds up the solidness of the monthly return series inside the speculation portfolios [3]. Dismissing the supposition of unit root, this finding lays out the dependability of the information, considering significant regression analysis to be directed.

The regression analysis of the Fama-French three-factor model further proves the research discoveries. The unimportance of the α coefficient and the critical P-value of independent factors MKT, HML, and SML demonstrate the model's explanatory power according to stock portfolio returns. In extensive regression results, the catch term α isn't statistically huge, avowing the first speculation. Essentially, the coefficients of explanatory factors S/L, S/M, S/H, B/L, and B/H demonstrate vigorous potential, building up the model's capacity to catch efficient risk-return connections in these portfolios.

The novel perception emerges in the regression consequences of the B/M mix, where the market risk factor's importance diverges from the non-meaning of the book-to-market ratio and scale factors. This dissimilarity highlights the explicitness of every portfolio's attribute inside the high-end equipment manufacturing sector.

The arrangement of these discoveries with existing writing, for example, the spearheading work of Liu and Zhang, highlights the model's predictable materialness across different market conditions [6]. By associating these discoveries with the more extensive setting laid out in the presentation and repeating the recommendations given in the end, this study adds to a more profound comprehension of asset pricing, risk the executives, and speculation strategy custom-fitted to explicit market subtleties.

6. Recommendations

Based on the aforementioned findings, this article suggests that initial focus in the realm of investment should be directed towards the market value scale and book-to-market ratio. While picking investment products, investors ought to zero in on the effect of factors, for example, market size and book-to-market ratio on the return rate. The article refers to the connection between market value scale, book-to-market ratio, and return rate, specifically the correlation between a high book-to-market ratio and a low market value scale. Hence, investors can pick investment products that can

make sense of framework risk returns, for example, portfolios with market risk factors, scale factors, and book-to-market ratio factors.

Besides, the consideration of weight assignment is similarly significant. The article calls attention to that there are contrasts in the explanatory force of market risk factors, scale factors, and book-to-market ratio factors for various investment portfolios. This implies that while building investment portfolios, investors ought to completely think about the weight dissemination between these various factors [7]. Depending on the circumstance, the loads of these factors can be changed in accordance with accomplishing the ideal equilibrium of the investment portfolio [8-10].

Furthermore, there are massive contrasts in investment portfolios of various sizes. The article also specifies the connection between risk and return between investment portfolios of various sizes. Because of the high unpredictability of market data, small-scale high-end equipment manufacturing enterprises might confront huge risks. This should be chosen in view of the risk tolerance of investors. Investors ought to pick a reasonable investment portfolio considering their own risk inclinations and investment targets.

7. Conclusions

All in all, this study undertook a thorough examination concerning the elements of return and risk inside the high-end equipment manufacturing sector through a thorough course of empirical research and point-by-point analysis. By building and analyzing six portfolios in light of market value scale and book-to-market ratio, we dove into the Fama-French three-factor model's appropriateness inside this exceptional industry setting. Our discoveries add to both the scholastic comprehension of asset pricing and the pragmatic considerations of investors in the high-end equipment manufacturing area. Our underlying introduction to descriptive insights uncovered significant trends. The example of monthly return rates across portfolios uncovered a converse connection between the book-to-market ratio and return rates. Moreover, larger-scale portfolios displayed higher rates of return, proposing a scale impact that lines up with market assumptions. The change analysis offered significant bits of knowledge, highlighting that under a similar book-to-market ratio, smaller-scale enterprises in this sector experience more noteworthy unpredictability because of market data imbalance.

The meaning of the positive monthly yields across all portfolio mixes highlighted the general profitability of the researching industry from 2015 to 2021. This positive trend lined up with our empirical discoveries, revealing insight into the appeal of this sector for likely investors.

By exposing our information to stationarity tests, we guaranteed the legitimacy of our regression analysis. The non-dismissal of the invalid speculation that the time series have a unit root, combined with the huge P-values, gave a solid groundwork to the resulting regression investigations, certifying the stationarity of our information and permitting us to unhesitatingly continue.

After analyzing the regression consequences of the Fama-French three-factor model, we found that the model's explanatory power areas of strength were, the market risk factor (MKT), the scale factor (SMB), and the book-to-market ratio factor (HML) all fundamentally affect the overabundance return of stock portfolios. Our concentration hence repeats the bits of knowledge from Liu and Zhang's work, demonstrating that the Fama-French model without a doubt has relevance across various market conditions.

The nuanced idea of our analysis further repeated our writing survey, which highlighted Liu and Zhang's spearheading use of the Fama-French model in China stock trading scenarios. While our review centers around a particular industry, the shared endeavor to comprehend the model's viability inside unambiguous market settings joins our work with theirs. Similarly, as Liu and Zhang's research extended the model's pertinence to various markets, we have added to this collection of information by investigating the model's ramifications inside the research industry.

In outline, our discoveries highlight the significance of considering market value scale and book-to-market ratio while pursuing investment choices in the high-end equipment manufacturing sector. The bits of knowledge earned from our empirical research furnish investors with important direction in forming compelling strategies that profit from sector-explicit elements. As the investment scene develops, our review fills in as an update that a nuanced comprehension of the market setting and thorough empirical analysis stay fundamental for settling on informed investment decisions.

References

- [1] Banz, R. W. (1981). *The relationship between return and market value of common stocks*. *Journal of Financial Economics*, 9(1), 3-18.
- [2] Carhart, M. M. (1997). *On persistence in mutual fund performance*. *The Journal of Finance*, 52(1), 57-82.
- [3] Chen, S., Roll, R., & Ross, S. A. (1986). *Economic forces and the stock market*. *The Journal of Business*, 59(3), 383-403.
- [4] Fama, E. F., & French, K. R. (1992). *The cross-section of expected stock returns*. *The Journal of Finance*, 47(2), 427-465.
- [5] Hull, J. (2012). *Risk management and financial institutions*, + *Web Site* (Vol. 733). John Wiley & Sons.
- [6] Liu, L., & Zhang, L. (2008). *Testing the Fama and French three-factor model in China stock trading scenarios*. *Journal of International Financial Markets, Institutions and Money*, 18(2), 112-123.
- [7] Luu, L. (2015). *Mutual Funds and Exchange-Traded Funds (ETFs)*. *Personal Finance: An Encyclopedia of Modern Money Management*, 168.
- [8] Liang T., Liu H. & Li S. (2020). *The Rise of China's Banking Industry Competitiveness and the Evolution of the Global Banking Industry Competition Landscape*. *Economist* (12), 88-97. doi:10.16158/j.cnki.51-1312/f.2020.12.010.Fangfang. *Research on power load forecasting based on Improved BP neural network*. Harbin Institute of Technology, 2011.
- [9] Cheng Y., & Cheng K. (2020). *Designing Stock Investment Strategies Based on Financial Statements*. *Journal of Beijing Institute of Printing and Printing (S1)*, 102-105. doi:10.19461/j.cnki.1004-8626.2020.s1.033.
- [10] Ren K. (2023). *Determination of CAPM model discount rate in enterprise valuation*. *Shopping Mall Modernization* (01), 114-116. doi:10.14013/j.cnki.scxdh.2023.01.043.