Proceedings of the 2nd International Conference on Business and Policy Studies
DOI: 10.54254/2754-1169/15/20230911

Comparative Empirical Evidence of a Three-factor Model and a Five-factor Model Based on Anomalous Studies

Zhiling Guo[1, †] and Jiayi Zhao[2, a, *, †]

[1] *College of International Education, Hubei Engineering University, Xiaogan, Hubei, 432100, China*
[2] *College of Business, Xi'an University of Finance and Economics, Xi'an, Shaanxi, 710100, China*
a. Jia_yiZhao@xaufe.edu.cn
**corresponding author*
[†]*These authors contribute equally*

Abstract: The Fama-French three-factor model explains the magnitude of stock market returns by constructing three variable factors. The five-factor model adds two more factors to the three-factor model to provide a more accurate explanation of stock re-turns. These two factors have been widely used in the industry for decades since their inception. As China's securities industry has developed late, research on the stock industry has been more oriented towards empirical studies of the three-factor and five-factor models, and less research has been conducted on many financial anomalies that cannot be explained by traditional financial theory. This paper systematically describes the origins of factor anomaly research and five-factor anomaly research on the A-share market from 1997 to 2020, constructs new factors, compares and summarizes them with the old ones, and concludes that the three-factor anomaly model and five-factor anomaly model are not yet able to adequately explain A-share stocks and have larger errors when conducting empirical evidence; in contrast, the CPAM anomaly model can better conduct anomaly research, and the resulting In contrast, the CPAM is more suitable for the empirical study of anomalies and can pro-vide investors with more effective investment strategies and recommendations.

Keywords: three-factor model, five-factor model, anomaly study, asset pricing, yield

1. Introduction

The Fama French model was introduced in the late 20th century and has been widely used to explain stock returns based on asset pricing models and various extended forms of multifactor models for empirical testing [1] The Fama French model has been widely used since the end of the 20th century for empirical testing of stock returns based on asset pricing models and various extensions of multi-factor models. This type of model uses the rational person assumption and the information available to the capital market is asymmetric, which can lead to information discrepancies that can affect the final results [2]. The five-factor theory proposed by Fama in 2015, with the addition of the profitability and momentum factors, can explain many of the irrational pricing factors.

The focus of this paper is to uncover pricing factors that cannot be explained by rational factors and to test the empirical evidence by constructing new factors to determine that stock returns are more susceptible to the earnings factor and the profit-to-asset ratio factor, for which the profit-to-asset ratio

DOI: 10.54254/2754-1169/15/20230911

has a greater impact on A-share stock returns. The disparity factor has less impact on the return of A-share stocks, while the frictional class of factors constructed through the disparity factor is more likely to affect stock trading volume [3]. Meanwhile, the five-factor model was reconstructed by introducing cash flow indicators and gross margin indicators on the basis of the three factors to construct the earnings forecasting indicators of listed companies in circulation. By constructing different anomalous factors, the return, yield, and stock trading volume of A-share stocks can be detected and predicted. It can better address the errors caused by the inability of the Fama-French model to ignore information differences and investor behavior.

Asset pricing is a hot topic in academic debates, and the relationship between the risk taken by investors and the expected return on capital has received much attention. In the course of this research, a number of theoretical models emerged. 1952 saw the introduction of Modern Portfolio Theory (MPT) by Markowitz, which used mean-variance analysis to determine optimal portfolios and is considered to be the birth of standard financial theory. 1964 saw the introduction of the Capital Asset Pricing Model (CAPM) by Sharpe et al. based on portfolio theory and capital market theory. The three-factor model is a study by FAMA and FRENCH in 1992 on the factors that determine the difference of stock returns in the US stock market and found that the beta of the stock market could not explain and differentiate the difference in stock returns, while the market capitalization, book-to-market ratio and P/E ratio of listed companies could explain the difference in stock returns, and in 1993 pointed out that a three-factor model could be developed to explain the magnitude of stock market returns in the US and other countries. The five-factor study was proposed by Fama in 2015 and was constructed to complement and refine the three-factor model.0

The heterogeneous factor is based on the multifactor model by identifying variables that are correlated with A-share stock returns, verifying whether the variable correlations can explain existing asset pricing models, and determining whether they can provide an explanatory account of cross-sectional returns with the stock market. In total, over 200 anomalous factors have now been mined in the academic research field, making a significant contribution to quantitative trading. The anomalies remain unsatisfactory in the field of empirical research, and excessive research on anomalies does not reduce the size of the error and increase the accuracy of the model. The uncertainty and unpredictability of the stock market have increased due to investor overconfidence and conservatism, herding effects in the market, and information asymmetry in the financial markets [3]. Overall, the study of the anomalous factors still led to a significant reduction in A-share stock market return errors.

Based on three models, namely the three-factor model, the five-factor model, and the CPAM model, the article empirically validates the A- share market by introducing different heterogeneous factors and concludes that the CPAM model for heterogeneous research can better explain the A-share market stocks. The three-factor and five-factor models can also be explained, but their negative effects are more pronounced.

The remainder of the paper is organized as follows: Section 2 introduces and describes common models; Section 3 constructs a sample and mention some formula; Section 4 analyses the data and test the dissimilarity factors of each model; Section5 compare three-factor models and five-factor models; Section 6 summaries and concludes the study; Section 7 make an offer about the shortcoming of the research and predicts the foreground of the search.

2. Method

2.1. Common Models of Asset Pricing

2.1.1. CAPM Model

DOI: 10.54254/2754-1169/15/20230911

Sharp, Lint, and Black developed the CAPM on the basis of Markowitz's efficient market portfolio theory, making the fundamental premise that a security's anticipated return is linearly proportional to its beta. The Capital Asset Pricing Model (CAPM), which is based on the following equation and assumes that investors are rational and financial markets are completely efficient, represents the anticipated return of a single investment. The formula is as follows:

$$R_i - R_f = \alpha + \beta * (R_m - R_f) + e \quad (1)$$

Where Ri - Rf is the portfolio excess return, β is the risk factor, Rm - Rf is the market risk premium, α is the intercept distance and eit is the residual term. The CAPM model uses a single risk factor to explain portfolio and stock returns, i.e. overall market returns. However, in reality, complex financial markets, using systematic market risk alone to estimate asset returns is not very accurate, as the assumptions of the CAPM often do not hold. As a result, asset pricing researchers have subsequently added some risk factors to the CAPM to estimate the expected return on capital. So, based on the above, a model that is more adapted to markets with systematic risk should be developed.

2.1.2. Fama-French Three-factor Model

Fama and French introduced the three-factor model with the following equation in 1993 after adding a market capitalization component and a balance sheet size factor to the CAPM model in light of the fact that size and balance sheet are significant predictors of stock returns.

$$E(R_i) - R_f = \alpha + E(R_m - R_f) + SiE(SMB) + HiE(HML) + eit \quad (2)$$

Where HML is the market capitalization ratio factor, which indicates the difference in returns between equity portfolios with high and low market capitalization ratios, Ri is the portfolio return factor, and SMB is the size factor indicating the difference in returns between large and small portfolios. Rf stands for risk-free returns, Rm for market returns, E(Ri-Rf) for excess returns on a portfolio, and E(Rm-Rf) for the market risk premium. The transition term in the model should be zero if the excess return of the asset can be fully explained by the market factor, the market capitalization factor, and the market capitalization index component. Since its introduction in the equity markets of several nations, including the US and China, many experts have employed the Fama-French three-factor model and have empirically proven its validity. FF [4], FF [5], FF [6], FF [7], Gaunt [8], Yang Jianwei and Jiang Fu [9], and Meng Qingshun [10] are some authors who have written about this empirical rule. However, many subsequent studies have found that α is significantly non-zero in some portfolios, indicating that the three-factor model is flawed, such as the existence of bookable surplus anomalies, net issue anomalies, and momentum anomalies, most notably earnings anomalies and investment anomalies. Although the three-factor model has been very successful in explaining the returns of equity portfolios, its explanatory power is weak for certain portfolios. As a result, the three-factor model's explanatory power needs to be increased. For instance, Chen Zhanhui used a sample of monthly A-share returns from 1994 to 2001 to test the regression of the three-factor model. The factor model has a decent level of explanatory capacity, but it falls significantly short when it comes to explaining inertia and reversal occurrences. Fama and French discovered that the intercept term was significantly non-zero even in the traditional study which led to the development of the three-factor model. As a result, the three-factor model was significantly less effective at explaining the inertia and reversal phenomena for both the smallest portfolio and the largest interest rate portfolio. They were forced to acknowledge that the Fama-French model was unable to offer a reasonable explanation.

DOI: 10.54254/2754-1169/15/20230911

2.1.3. Fama-French Five-factor Model

In order to properly define the excess return of a portfolio, Fama and French added an earnings element and an investment factor to the three-factor model in 2015. This resulted in the five-factor model that was later proposed in 2015 [11]. The five-factor model was constructed as follows the five-factor model was constructed as follows:

$$E(R_i) - R_f = \alpha + E(R_m - R_f) + SiE(SMB) + HiE(HML) + CiE(CMA) + RiE(RMW) + eit \quad (3)$$

The expected excess return of the portfolio is shown on the left-hand side of the equation, where RMW stands for the earnings factor, which reflects the difference in returns between a portfolio that is more and less profitable, and CMA for the investment factor, which reflects the difference in returns between a portfolio that is conservative and one that is aggressive. According to Fama & French, the profits component has a better explanatory power than the book-to-market ratio factor and its significance is not lessened by the lower size of the firm. The Fama-French five-factor model has greater explanatory power than the Fama-French three-factor model, according to the results of QiLin's regression test on the Chinese stock market from 1997 to 2015. According to Du Weiwang and Xiao Shuguang, there is an inverted "U"-shaped link between the book-to-market ratio and monthly return rate in the Chinese stock market, and the profit factor and investment factor are more important. The present value of future cash flows from a company's assets determines its worth theoretically, and empirically, highly profitable companies typically have greater equity returns whereas highly invested companies typically have lower equity returns.

The five-factor model's theory is derived from the dividend discount model, as opposed to other model derivations.

$$Mt = \sum_{\tau}^{\infty} E(d_{t+\tau})/(1+r)^{\tau} \quad (4)$$

According to the dividend discounting model, a portfolio's return is equal to the discounted value of future cash flows. Where r is the discount rate or expected rate of return, E (dt+ τ) is the expected dividend at t+ τ, and Mt is the market value of the portfolio at time t. The projected dividend is calculated using the company's ownership interest Yt+ τ minus the book-to-market ratio dBt+ τ.

$$d_{t+\tau} = Y_{t+\tau} - dB_{t+\tau} \quad (5)$$

Bring (5) into (4)

$$Mt = \sum_{\tau}^{\infty} E(Y_{t+\tau} - dB_{t+\tau})/(1+r)^{\tau} \quad (6)$$

Also, divide (6) by BT to obtain the net market capitalization ratio (M/B).

$$\frac{M_t}{B_t} = \frac{\sum_{\tau}^{\infty} E(Y_{t+\tau} - dB_{t+\tau})/(1+r)^{\tau}}{B_t} \quad (7)$$

The relationship between the expected rate of return and the book-to-market ratio (B/M), the earnings factor, and the investment factor is represented by the formula. The following conclusions can be drawn: (1) Other things being equal, the higher the market capitalization Mt at time t, i.e. the lower the book-to-market ratio (B/M), The anticipated rate of return is lower, and the firm's cost of capital is lower; (2) Other things being equal, the higher the firm's expected earnings (Yt+τ), indicating the higher the firm's future dividends, the higher the expected rate of return (r) must be; (3) Other things being equal, the more the firm The greater the investment, the greater the dBt+τ, the smaller the expected rate of return (r). This leads us to the conclusion that the book-to-market ratio, the earnings factor, and the investment factor are all positively correlated with a firm's expected return (r). The relationship between investment and expected earnings is established by assuming that the current book value is rising while future earnings are constant, which is clearly not in line with our intuition.

DOI: 10.54254/2754-1169/15/20230911

Second, to create the Fama-French six-factor model, Fama-five-component model includes a velocity component. Because he lacked a theoretical foundation in momentum, Fama was hesitant to include a velocity factor in the model. However, there is strong empirical support for the establishment of a velocity factor and compelling evidence that the Fama-Franca five-factor model is insufficient to account for the velocity influence.

2.2. Factor Construction and Data Analysis

2.2.1. Factor Construction

The following criteria form the basis of the three-factor framework: 2*3 grouping, with listed companies divided into H (high), M (medium), and L (low) based on the year-end book-to-market ratio, every financial reporting for 30%, 40%, and 30% of the total. Limited market size (S) and huge market size (B), each accounting for 50% of the total. The SMB factor and HML factor are determined as follows.

$$\text{SMB} = \frac{1}{3}(SL + SM + SH) - \frac{1}{3}(BL + BM + BH) \tag{8}$$

$$\text{HML} = \frac{1}{2}(\text{SH} + \text{BH}) - \frac{1}{2}(SL + BL) \tag{9}$$

The earnings factor (RMW) and the expenditure element (CMA) are ranked and grouped, respectively, in the five-factor model, which is built on the foundation of a three-factor model. In particular, the aggressive, intermediate, and conservative groups of sample stocks are used to create the asset element (CMA). The conservative group return minus the aggressive group return is the CMA factor return. Six groups are produced by 2 x 3: BA, BN, BC, SA, SN, and SC. As shown below, the CMA factor is computed:

$$\text{CMA} = \frac{1}{2}(BC + SC) - \frac{1}{2}(BA + SA) \tag{10}$$

The profitability factor (RMW) is constructed by dividing the size group into high profitability group (robust), middle group, and low profitability group (weekly) based on the ROE (return on equity) indicator. 2 x 3 gives six groups, namely BR, BN, BW, SR, SN and SW. The formula for calculating the RMW factor is as follows.

$$RMW = \frac{1}{2}(BR + SR) - \frac{1}{2}(BW + SW) \tag{11}$$

2.2.2. Data Analysis

The following five methods are commonly used when testing multifactor models.

(1)The ability to interpret visions (Anomaly alphas under a model)

Common anomalies in the A-share stock market, they can be grouped into 13 categories, as shown in Table 1.

Table 1: List of anomalies.

hetero-morphism	name	initial data
Mktcap	market value	Total market value in the t-1 year
Ep	P / E to the bottom	Earnings in t-1 quarter / t-Total market value in 1 quarter

DOI: 10.54254/2754-1169/15/20230911

Table 1:(continued).

Hm	Book market value ratio	Book value of t-1 year / t-1 year total market value
Ep	Cash flow market value ratio	Cash flow t-Q 1 / t-Total Q 1 market value
Roe	Return on Shareholder equity	Total earnings t-1 / t-1
Inv	invest	Total assets growth rate in t-1 year
Op	income	Earnings for t-1 quarter / t-equity excluding preferred stock in 1 quarter
Vol	Monthly income standard deviation	Standard d over the past 20 days
Max	The maximum monthly income	The maximum daily yield value in the past 20 days
Rev	Month reversal	The cumulative yield over the past 20 days
12mt	12 Month turnover rate	Mean value of daily turnover rates over the past 250 days
Abt	Monthly turnover rate	Mean values of turnover rates over the past 20 days
Illiquidity	Monthly non-liquidity	Average yield / trading volume over the past 20 days

As Fama & French [11] can know that the A-share market is more susceptible to profitability class factors, and the GEM and SMB are more susceptible to trading frictions, after the impact of the anomaly factor on monthly individual stock returns, the study found that regardless of Shanghai A-share or Shenzhen A-share, the three profitability class factors, profit-to-asset ratio (PA), return on net assets (ROE), and capital turnover ratio (CT) The percentage of significant coefficients for all factors is higher than other factors, with profit-asset ratio accounting for the highest percentage, indicating that among the profitability category factors, the profit-asset ratio is most likely to have a significant impact on A-share market stocks. According to the GEM and SMB trading frictions, significant coefficients accounted for trading volume are only prone to have a significant impact on SMB stocks, but not on GEM [3].

(2)GRS test

The GRS test assumes that the model can fully explain the portfolio returns with the original hypothesis H0: $\alpha i = 0$. If the GRS statistic is smaller, it indicates that the model is a better fit. For example, the results of the GRS test are shown in Table 2 below, using only 25 Size-BM portfolios comparing the five-factor and three-factor explanations as an example[12] :

Table 2 GRS test results.(Note: *** indicates 1% level relevance.)

The 25-Group Size-BM combinations	GRS	A|α|
MKT SMB HML (3-factor model)	2.115^{***}	0.185
MKT SMB HML RMWO	2.112^{***}	0.185
MKT SMB HML CMA	1.967^{***}	0.182
MKT SMB HML RMWO CMA (Five-factor model)	1.958^{***}	0.182

DOI: 10.54254/2754-1169/15/20230911

The Fama-French five-factor model provides a stronger 's obvious for the A-share markets than the three-factor model, according to the GRS test results, proving that the five-factor model is more useful in these markets than the three-factor model.

(3)Factor smoothness and correlation tests

The purpose of testing factor smoothness is to avoid time trends leading to an overestimation of the correlation of the factors, which could be affected by time if the factors are not smooth. The ADF test is a unit root test, meaning that it will be impacted by a trend if the time-series data contains an order of integration. They may be influenced by the time-series data and overstate the association between the two if both time series have unit roots. according to Table 3:

Table 3: Results of the five-factor ADF test.

Statistic	rmrf	SMB	HML	CMA	RMW
t-Statistic	-10.4254	-11.6942	-11.1701	-13.8155	-12.9484
Prob.*	0.0000	0.0000	0.0000	0.0000	0.0000

From the test results, we can see that we can reject the original hypothesis of the existence of unit roots for the five factors regardless of whether the significance is 1% or 5%, which indicates that the time series of the factors are smooth, so we can further test the factors for correlation [13].

Table 4: Five-factor correlation coefficients.

	CMA	SMB	HML	RMRF	RMW
CMA	1	0.2006	0.102	-0.0743	-0.1897
SMB	0.2006	1	0.1361	-0.00467	-0.1042
HML	0.102	0.1361	1	0.017	-0.1434
RMRF	-0.0743	-0.0467	0.017	1	-0.0114
RMW	-0.1897	-0.1042	-0.1434	-0.0113	1

According to the correlation coefficient table test of the five factors, there is a strong correlation between the asset factor and both the size factor and the earnings factor. There is also a positive correlation between the asset factor and the book-to-market ratio factor and a negative correlation with the earnings factor.

(4)Fama-Macbeth regression

For the construction of the Fama-Macbeth model, the regression of individual stock returns on the anomaly factor is first done for each type of stock market, and the significance test is performed for each influence coefficient to determine whether it is significant in the linear model based on the P-value. After Python processing, the impact coefficient, intercept, coefficient of determination R2, and P-value of each impact coefficient are obtained for each individual stock regarding the anomaly factor. According to the second step of the Fama-Macbeth regression, the risk premium of the anomaly factor at each moment is obtained, and the risk premium is averaged over time for each category of the stock market as the average risk premium of each anomaly factor for each category of the stock market [3].

DOI: 10.54254/2754-1169/15/20230911

Table 5: Percentage of anomaly factor in each share.

	Shanghai A shares ratio	Shenzhen A-shares ratio	Small and medium-sized board proportion	Growth Enterprise Market proportion
Trade friction factor	9	10	13	19
Growth class factors	10	12	5	5
Financial liquidity factor	4	6	3	6
Momentum class factor	9	8	7	12
Profit factor	15	17	7	7
Value class factor	11	12	4	4

As evidenced by the information in Table 5, large listed companies, such as those operating in the A- share market, are influenced by profit-based factors such as return on net assets, return on assets, and capital turnover due to their long operating life and larger asset holdings. In addition, when investors buy A-shares, they seem to pay particular attention to those figures that reflect a company's profitability; smaller companies such as GEM and SMB have shorter operating periods and insufficient assets, which makes them more sensitive to trading constraints such as systemic risk and specific volatility, and this explains why we pay more attention to risk profiles and trading constraints when investing in SMB and GEM stocks.

2.2.3. Comparison of the Fama-French Three-factor Model and the Five-factor Model

From the results of the GRS test in Table 2, it can be seen that the five-factor model is a little more explanatory than the three-factor model in the Chinese A-share market. Comparing the three-factor formula: E(Ri)-Rf = α + E(Rm-Rf) + SiE(SMB) + HiE(HML) + eit with the five-factor formula: E(Ri)-Rf = α + E(Rm-Rf) + SiE(SMB) + HiE(HML) + CiE(CMA) + RiE(RMW) + eit it can be broadly considered that the five-factor model is based on the three-factor model with the addition of the RMW factor, which represents the premium of strongly profitable firms to weakly profitable firms, and the CMA factor, which represents the premium of conservatively invested firms to aggressively invested firms, α representing the portion of portfolio returns that cannot be explained by traditional asset price factors. When the aberration factor is added to the study if the true return of the aberration premium portfolio is significant and the corresponding α is not, this indicates that the aberration can be explained by standard asset pricing factors, and conversely if the true return of the aberration premium portfolio is not significant and α is, this indicates that the aberration is exaggerated by the asset pricing model. These results suggest that α more severe α inflation occurs when using the three-factor model for the disparity test than when using the five-factor model. Thus, the source of α inflation is in the traditional three-factor (RMRF, SMB, HML) rather than the earnings factor (RMW) and the investment factor (CMA). And after a series of model regressions, it can be argued that the market capitalization factor is the main reason for the inflation in the asset pricing model regressions for this aberration [1]. Although the true premium of the anomaly is not significant. However, the use of the latest Fama-French five-factor pricing model results in a significant α premium for all the anomalies. Secondly, more severe α inflation occurs when using the Fama-French three-factor model than when using the five-factor model. Therefore, it can be concluded that both the most used three-factor model and the latest proposed five-factor model have a negative effect in testing for anomalies and therefore testing for anomaly premiums suggests using the classical CAPM model to obtain reasonable results.

DOI: 10.54254/2754-1169/15/20230911

2.3. Development Prospects

Fama-Macbeth regressions are mainly used to forecast stock returns or to investigate the factors influencing stock returns. Fama-Macbeth regressions have been used mainly to predict stock returns or to investigate the influence of stock returns. The existing literature on financial aberrations has been more qualitative in nature or has examined the impact of a particular type of financial aberration on the stock market, and fewer have used Fama-Macbeth regressions to analyze aberrations. Through empirical testing, we believe that the study of the aberrant factors should be based on the CAPM model, and the selection of the aberrant factors should be extended to enrich the aberrant research on the types of factors.

3. Conclusion

This paper summarizes the research methods of the anomalous factors that have been widely used in recent years, predicated on the CPAM model and the Fama French model, because the majority of studies in China this year have focused on the empirical research of the three-factor model and the five-factor model without further research and error reduction in the research process, and because there is relatively little empirical research on the anomalies. Six variables are provided for comparison: momentum, transaction friction, growth, financial liquidity, earnings, and value. The heteroscedasticity research was shown to produce a substantial premium when the three-factor model and the five-factor model were used, increasing the model's inaccuracy. Additionally, testing the model has a negative impact on both models, with the three-factor model producing a larger premium than the five-factor model for both models. The CPAM model is highly advised for usage in heterogeneous factor studies since it produces more accurate findings with fewer error.

The weakness of this paper is that it only examines and summarizes the anomalies of the CPAM model, the three-factor model and the five-factor model, concluding that the anomalies of the CPAM model are more effective, without examining the specific anomalies. It is hoped that future research will be able to derive the specific anomalies and the extent to which they affect the original mode.

References

[1] *Xu Bu. The impact of pricing factor selection on stock market anomaly tests [J]. Jianghan Forum, 2017 (9): 30-36.*

[2] *Xie YJ,Pricing anomalies in Chinese capital markets based on a five-factor model - Empirical evidence from liquidity firms[J]. Journal of Business and Economic Research, 2019(11):164-168.*

[3] *Hu Jingkai. An empirical analysis of the impact of financial anomaly factors on the Chinese stock market [D]. Beijing: University of Foreign Trade, 2019.*

[4] *Fama, E. and Kenneth R. French.Common risk factors in the returns on stocks and bonds [J]. Journal of Financial Economics, 1993, 33:3-56.*

[5] *Banz R.W..There latio nship betw een return and market value of common stocks [J]. Journal of Financial Ecomomics, 1981 (9):3-18.*

[6] *Stattma n D.Book values and stock returns [J] .The Chicago MBA :A Journal of Selected Papers, 1980 ,(4):25 - 45 .*

[7] *Bhandari, Laxmi Chand. Debt/ Equity ratio and expected common stock returns: Empirica l ev idence[J] .Journal of Finance , 1988 ,(43):507-528 .*

[8] *Gaunt C ... Size and book to market effects and the Fama French three factor asset pricing model:evidence from the Australian Stock Market[J] .Accounting and Finance , 2004, (44):27-44.*

[9] *Yang Jianwei, Jiang Fu. An empirical study of cross-sectional expected returns in the Chinese stock market [J]. Journal of Shanghai Jiaotong University, 2004, (3):326 -329.*

[10] *Meng Q.S. The FF three-factor model for the Shanghai stock market [J]. Journal of Beihua University (Social Science Edition), 2004, (3):79 -81.*

[11] *Fama E F, French K R. A five-factor asset pricing model [J]. Journal of Financial Economics, 2015, 116(1):1-22.*

[12] *Fu Xiaoqian, Qiu Feng, Zhang Qian. An empirical study based on the effectiveness of capital asset pricing in China's Shanghai and Shenzhen A-share markets[J]. Hebei Enterprise, 2022(7):10-12.*

DOI: 10.54254/2754-1169/15/20230911

[13] Li J. A comparative study of the Fama-French five-factor and three-factor - with A-share agriculture, forestry, animal husbandry and fishery [D]. Beijing: Foreign Affairs Institute, 2021.