



Research on the Application of Asset pricing methods Based on Market Efficient theory in the Securities market

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SUMMARY: *Along with the rapid progress of China's securities market, the applicability of market efficiency and Asset pricing methods has become more and more prominent, and needs to be empirically analyzed and adapted with the characteristics of China's securities market. Our research explores the application of Asset pricing methods under the market efficient theory in the China's securities market. Through empirical analysis of 51 stocks in SSE, an adjusted CAPM method adapted to the characteristics of the Chinese market is constructed, and the validity of the SSE Composite Index is tested. The results show that there is a positive association between risk and return in the China's securities market, but the explanatory effectiveness of systematic risk on the expected stock return is weak, with an R^2 value of only 0.0737, indicating that systematic risk only accounts for about 7% of the total risk. The market portfolio has the highest monthly average return in 2018 (8.6125%), while the market portfolio has the lowest monthly average return in 2016 (- 0.9845%). The study concludes that improving China's securities market efficiency requires improving the information disclosure system, fostering institutional investors, and solving the problem of listed companies' shareholding structure, which enhances the applicability of the CAPM method in China's securities market.*

KEYWORDS: *Market efficiency; Asset pricing method; CAPM; Systematic risk; Securities market; Risk premium*

1 Introduction

In investment practice, investors are seeking to maximize profits, seeking higher than the average return of excess returns [1]. But in theory, investors have access to information opportunities are equal, if investors are rational, no investor cannot get excess returns, it can be said that this time the market is "efficient market" [2, 3]. It is evident that the effectiveness of the market is a measure of whether the market is mature and perfect mark. In accordance with the requirements of market effectiveness theory, all the information of listed companies related to securities issuance and trading, including historical data, the company's operating and financial status, management status, profit opportunities, etc., should be disclosed in as much detail as possible, and should not be concealed or omitted intentionally [4-6]. In reality, many listed companies in China center on their own interests, report good news but not bad news, publish only information that is favorable to them, and even some companies publish false information [7, 8]. There are also some listed companies that deliberately delay the publication of information, do not publish financial reports on schedule, do not publish major

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<https://doi.org/10.65102/is20261155>

investment and financing matters, entrusted financial management matters, etc. on schedule [9, 10]. This prevents investors from obtaining comprehensive and accurate information, makes it difficult to make correct investment decisions, and reduces market efficiency.

Asset price dynamics are affected by a variety of factors such as policy changes, market sentiment, and investor expectations, and they have a remarkable impact on investor wealth [11]. Therefore, the analysis and prediction of asset price dynamics is crucial for investors. Asset pricing (CAPM) model focuses on how equilibrium prices are formed in the securities market as a way to find mispriced securities in the securities market [12, 13]. The application of CAPM affords investors, risk managers and regulators with more detailed and comprehensive market information, which contributes to more effective investment decision-making, risk management and market regulation [14-16]. It has been widely used in the real market and has become one of the important tools for ordinary investors, fund managers and investment banks to make securities investment.

The theory of market efficiency is the cornerstone of modern finance, and Fama's efficient market hypothesis states that prices in an efficient market will fully reflect all available information. Capital Asset pricing method (CAPM), as an important tool for measuring the relationship between risk and return, has been widely used in mature western markets. However, the China's securities market, as an emerging market, is characterized by widespread irrational investment behavior, imperfect risk control mechanisms, and unreasonable wealth distribution, which makes the applicability of the standard CAPM method challenging. Based on the special characteristics of the China's securities market, our research combines theoretical analysis and empirical tests to firstly explore the concept of market efficiency and its performance in the securities market, and secondly adjust the CAPM method to adapt to the Chinese market environment, and then conduct empirical analyses to verify the applicability of the model in the Chinese market by utilizing the data of the sample stocks of the SSE 51 index. Meanwhile, our research examines the effectiveness of the China's securities market through first-order difference analysis, and comparatively analyzes the changes in the risk-return characteristics of the China's securities market during the period of 2016-2024, which reveals the impact of macroeconomic factors on market efficiency. Finally, corresponding countermeasures are proposed to improve the efficiency of the China's securities market and enhance the applicability of the CAPM method.

2 Dynamic study of CAPM method in securities market based on market efficiency

2.1 Financial market efficiency

2.1.1 Market efficiency

With regard to the definition of market efficiency, the most widely used is the Fama definition: "Prices are always 'efficient' as a 'well-reflected' market for which information is available" [17]. Later, Malkiel affordd a clearer definition: "A capital market is efficient if it adequately and correctly reflects all relevant information in determining the prices of securities. Formally, the market is said to be efficient with respect to some set of information. The price of a security is unaffected if that information is disclosed to all participants. Further, being efficient with respect to a given set of information means that it is impossible to make an economic profit by trading on the basis of (that set of information)". Malkiel's first sentence has the same meaning as Fama's. The second sentence implies that market efficiency can be tested by disclosing information to market participants and measuring the response of

security prices. Since an important difference between economics and the natural sciences is its non-experimental nature, such a test would not work in practice. The third statement implies that the efficiency of a market can be judged by measuring the economic profit that can be made by trading on a given set of information. This statement is the basis for almost all empirical analysis of market efficiency. In fact, the concept of efficiency is not an either/or concept. There is no such thing as an absolutely efficient market or an absolutely inefficient market; the difference between them is a matter of degree. The point is not whether a market is efficient, but how efficient it is. This requires a concept of relative efficiency, such as the efficiency of the securities market relative to the spot market, the efficiency of the U.S. capital market relative to the Chinese capital market and so on. Absolute efficiency only affords a benchmark for us to measure relative efficiency.

2.1.2 Securities market efficiency

The function of securities market allocation of resources depends mainly on the efficiency of the market, and securities market efficiency can be divided into intrinsic efficiency and extrinsic efficiency [18]. The so-called intrinsic efficiency refers to the trading operation efficiency of the securities market, that is, whether the securities market can complete a transaction for traders with the shortest time and lowest transaction cost, which reflects the efficiency of the securities market's organizational function and service function. The so-called extrinsic efficiency refers to the capital allocation efficiency of the securities market, i.e., whether the stock price in the market can make a timely response. In accordance with the relevant information, which reflects the efficiency of the securities market in regulating and allocating capital.

2.2 Conditions for the efficient market hypothesis

The efficient market hypothesis is based on three progressively weaker assumptions, Assumption 1: Investors are rational and can therefore rationally assess the value of securities [19]. This assumption is the strongest assumption, if investors are rational, they believe that the value of each security is equal to the net present value, or intrinsic value, of its future cash flows discounted at a discount rate that reflects its risk characteristics. When investors obtain information about the intrinsic value of a security, they react immediately by buying securities priced below intrinsic value and selling securities priced above intrinsic value, thus allowing the price of the security to adjust quickly to a new level equal to the new net present value. The rationality of the investor means that it is impossible to earn a risk-adjusted excess rate of return. Therefore, a competitive market composed of perfectly rational investors is necessarily an efficient market.

Assumption 2: Although some investors are irrational, their trades are randomized, and these trades cancel each other out so that they do not affect prices. This is the weaker assumption. Proponents of the efficient market hypothesis argue that the irrationality of projector investors is not evidence against an efficient market. They argue that even if investors are irrational, the market may still be rational in many cases. For example, as long as irrational investors trade randomly, and there are many of them, and their trading strategies are uncorrelated, then their trades may cancel each other out so as not to affect the efficiency of the market.

Assumption 3: Although the trading behavior of irrational investors is correlated, the arbitrage behavior of rational arbitrageurs can eliminate the price impact of these irrational investors. This is the weakest assumption. Sharpe and Alexander define arbitrage as “the simultaneous purchase and sale of identical and substantially similar securities in different markets at different prices.” For example, the price of a security is higher than its intrinsic

value due to successive purchases by irrational investors. The arbitrageur can then sell or even short the security and simultaneously buy other “substantially similar” securities to hedge the risk. If such an alternative security can be found, and the arbitrageur can buy and sell both securities, then they can make a risk-free profit. Since no capital is required and there is no risk, arbitrage is the rapid return of the prices of various securities to their intrinsic value levels.

2.3 Validation model construction

2.3.1 Model sources

The Capital Asset pricing method (CAPM) assumes that the necessary reward of any asset is equal to the risk-free reward plus an additional reward that compensates for its risk (risk premium) [20]. It is expressed mathematically as:

$$r_j = r_f + \beta_j(r_M - r_f) \quad (1)$$

where: r_j is the requisite rate of return for the j security, r_f is the rate of return on the risk-free asset, generally the rate of interest on short-term treasury bills or the bank's time deposit rate, and r_M is the expected rate of return on the market portfolio. That is, the expected return of investing proportionally in a portfolio consisting of all securities or capital assets in the market, β_j is the degree of variability of the j th security relative to the market portfolio, and is mainly a measure of the non-diversifiable risk, i.e., market risk, of the j th security:

$$\beta_j = \rho_M \times \sigma_j / \sigma_M \quad (2)$$

where: ρ_M is the correlation coefficient between the security j and the market portfolio M , σ_j is the standard deviation of the return on the security j , and σ_M is the standard deviation of the return on the market portfolio.

Substituting equation (2) into (1) yields:

$$r_j = r_f + (r_M - r_f)\rho_M\sigma_j / \sigma_M \quad (3)$$

Let $r_f = a_0, \rho_{jn}(r_m - r_f) / \sigma_m = a_1$ thus obtain the econometric model:

$$r_j = a_0 + a_1\sigma_j + e_j \quad (4)$$

where r_j is the average return of the j th stock and σ_j is the standard deviation of the return of the j th stock. Since the selected samples are listed stocks with good diversification and portfolio capacity, they can fully diversify away the unsystematic risk, so the unsystematic risk can be well measured here, e_j is the residual term, and a_0, a_1 are the parameters of the regression model.

2.3.2 Acquisition and processing of data

The data of this model is selected from the 50 samples of the SSE 50 index, the stock returns

of the stocks in different periods of eight weeks in each year from 2019 to 2024, due to the creation of the SSE 50 index in 2023, in order to study the need for the latest SSE 50 index in 2019 the sample of stocks remain unchanged, the cis-period upward continuation of the year 2019, and at the same time, choose the average weekly return of them:

$$r_{jt} = (P_{jt} - P_{jt-1}) / P_{jt-1} \quad (5)$$

where: r_{jt} is the weekly return for the j th stock and the weekly sub-weekly return for the t th stock. p_{jt} is the end price. The weekly returns of the selected stocks in the sample are mainly from the relevant data of the sample stocks of the SSE 50 Index in the “Flush 2024 Securities Analysis Software”. There are several reasons for choosing the sample in this way: (1) In the China’s securities market, the SSE A-share equity market accounts for a larger share, which is relatively more representative of the China’s securities market. (2) The SSE 50 index is more representative of the Chinese A-share equity market and can reflect the approximate situation of the China’s securities market. (3) The weekly returns of the selected sample stocks can better represent the stock return situation and avoid excessive volatility and lack of sensitivity of stock returns. Next, the relevant evaluation indexes t and R^2 values are calculated by the econometric model using the selected data.

2.4 Adjusted CAPM methods

This paper argues that the efficient market hypothesis presented in the above description is relatively strong, and that scholars have based the U.S. market on the assumption that the trend term μ and volatility σ are both equal to one, subjecting the path of change in the index price to a geometric Brownian motion:

$$\exp(\mu t - (\sigma^2 / 2)t + \sigma Wt) \quad (6)$$

Degradation to $\mu = \sigma = 1$ yields the conclusion of the CAPM method $M_t \approx \Sigma_t$. However, for the Chinese market, which has special problems, such as irrational investment activities, incomplete risk control mechanisms and irrational wealth distribution, the applicability of this assumption in the Chinese market may be problematic to some extent.

In this paper it is still assumed that the price I_t follows a geometric Brownian motion with drift μ and volatility σ then $I_t = \exp(\mu t - (\sigma^2 / 2)t + \sigma Wt)$, where Wt is the Brownian motion, and it is not assumed that $\mu = \sigma = 1$ and only Assume that the drift rate μ and the volatility σ are constants, and thus rederive:

$$I_t = \exp(\mu t - (\sigma^2 / 2)t + \sigma Wt) \quad (7)$$

From there, it is deduced:

$$\ln I_t = \mu t - (\sigma^2 / 2)t \quad (8)$$

Replace the time t with the relative quadratic change Σ_t , so that the original efficient market hypothesis eventually becomes, In accordance with the derivation of equation (8):

$$M_t \approx \alpha \Sigma_t \quad (9)$$

$$\alpha = \mu - \left(\frac{\sigma^2}{2} \right) + 1/2 \quad (10)$$

Based on the derivation of the CAPM method:

$$M_t^s \approx \frac{\sum_t^{s,l}}{\sum_t^l} M_t^l \quad (11)$$

Substituting $M_t \approx \alpha \Sigma_t$ into the formula, the final adjusted adjusted CAPM method derived in this paper becomes:

$$M_t^s = \alpha \Sigma_t^{s,l} \quad (12)$$

$$\alpha = \mu - \left(\frac{\sigma^2}{2} \right) + 1/2 \quad (13)$$

3 Empirical testing

3.1 Empirical analysis of CAPM method in securities market

3.1.1 Sample and data collection

In our research, the end-of-month price data of 50 A-share equities on the SSE are selected as the sampled stocks, with sample numbers 600000 - 600645, and there exist no discontinuous observations within the sample interval, which covers the period from January 2018- June 2019, an 18-month period. For the reason that the majority of the empirical studies on CAPM in China are based on the SSE, this means that the selection of the stock sample of the SSE can afford a comprehensive references object. Additionally, it is evident that the industry distribution of the 50 stocks is diversified, which means they may be well represented. Additionally, considering that the China's securities market is not a mature market but is developing rapidly, more recent data may represent a more accurate and recent market situation, which is why the data from January 2018 to June 2019 was chosen. Additionally, the SSE Composite Index reflects the changing trends in the securities market and the changes and upward trend in the value of total capital, including all types of securities on the SSE.

3.1.2 Empirical tests

In accordance with $R_i = \alpha_i + \beta_i * R_m + e_i$, our research will do a linear regression using the monthly returns on individual stock with the monthly returns on the SSE Composite Index from January 2022 to June 2023, through SPSS and Excel, the magnitudes of α and β are derived from regression analysis. The results are presented in Table 1 and Table 2.

In Table 1, the majority of the R^2 values of stock returns are higher than 0.5. A total of 12 stocks have R^2 values greater than 0.5, and 12 stocks have R^2 values fall below 0.5. This indicates that the monthly expected market returns have a strong explanatory power for the monthly returns of individual stock. Meanwhile, the majority of the systematic risk

coefficients have p-values fall below 0.06. A total of 19 stocks has p-values fall below 0.06. This means that the majority of the systematic risk coefficients are remarkable. Therefore, by assessing the P-value and R² made by SPSS, it is concluded that the majority of the β-values can be regarded as a valid estimate of the systematic risk.

Applying the same methodology and assessing the stock return data in Table 2, a total of 17 stocks has an R² value greater than 0.5, while 19 stocks have a P-value of fall below 0.05 for their β-values.

Table 1: Statistical result(1)

Code	β	R ²	P-value	Code	β	R ²	P-value
600000	1.6748	0.8569	0.0000	600149	1.3415	0.3452	0.0615
600004	0.8168	0.8547	0.0000	600155	0.9154	0.2485	0.1015
600006	1.1936	0.7952	0.0000	600159	1.0142	0.8465	0.0000
600010	0.8135	0.3468	0.0498	600163	1.3152	0.2422	0.0974
600015	1.2845	0.7985	0.0000	600170	1.0648	0.3485	0.0645
600038	1.4399	0.4685	0.0165	600175	0.5945	0.4615	0.0248
600052	1.5184	0.7969	0.0001	600177	1.2485	0.7945	0.0000
600057	1.6093	0.6874	0.0468	600184	1.4856	0.4985	0.0155
600059	0.9485	0.3495	0.0198	600190	0.0274	0.0001	0.9422
600062	1.1248	0.4985	0.0015	600196	0.9452	0.5874	0.0056
600069	1.0896	0.7098	0.0001	600197	1.6485	0.7956	0.0000
600070	1.3469	0.5449	0.0064	600202	1.6054	0.4615	0.0148

Table 2: Statistical result(2)

Code	β	R ²	P-value	Code	β	R ²	P-value
600077	1.5744	0.6785	0.0015	600208	1.4248	0.6455	0.0032
600082	1.4124	0.7085	0.0013	600213	1.7299	0.5696	0.0058
600086	1.4258	0.5469	0.0065	600238	1.5985	0.6615	0.0013
600095	1.2485	0.7452	0	600246	1.3548	0.8966	0
600104	0.4418	0.0248	0.6245	600599	1.4789	0.7342	0
600106	0.7985	0.5789	0.0046	600605	1.4682	0.7247	0
600108	1.1948	0.7869	0	600613	1.7159	0.4966	0.0135
600112	1.1348	0.5918	0.0035	600618	1.4526	0.7615	0
600118	1.6848	0.7485	0	600620	1.1798	0.3048	0.0636
600122	1.0615	0.8645	0	600628	1.0468	0.8946	0
600127	1.4948	0.1348	0.2849	600637	0.1355	0.0085	0.7856
600129	1.1548	0.3248	0.0569	600641	1.2796	0.9425	0
600132	1.1798	0.6948	0.0013	600645	2.2948	0.4969	0.0015
600141	1.7985	0.7798	0				

If the Capital Asset Pricing (CAPM) model is valid for the SSE, the follow assumptions need to be satisfied.

(1) $Y_0 = R_f = 1.125\% / 12 = 0.09375\%$

(In this paper, the three-month deposit rate is selected as the risk-free rate. Since there is no standardized risk-free interest rate in China.)

(2) $Y_1 = R_m - R_f$

(Y_1 represents the risk premium). The results are shown in Figure 1, where there is some

form of positive association between risk and return, which is analyzed by linear regression, with R^2 denoting the decidable coefficient, which is in fact the proportion of systematic risk to total risk. On the other hand, unsystematic risk accounts for 93% of total risk, suggesting that the major part of stock returns is not a compensation for systematic risk, but for unsystematic risk.

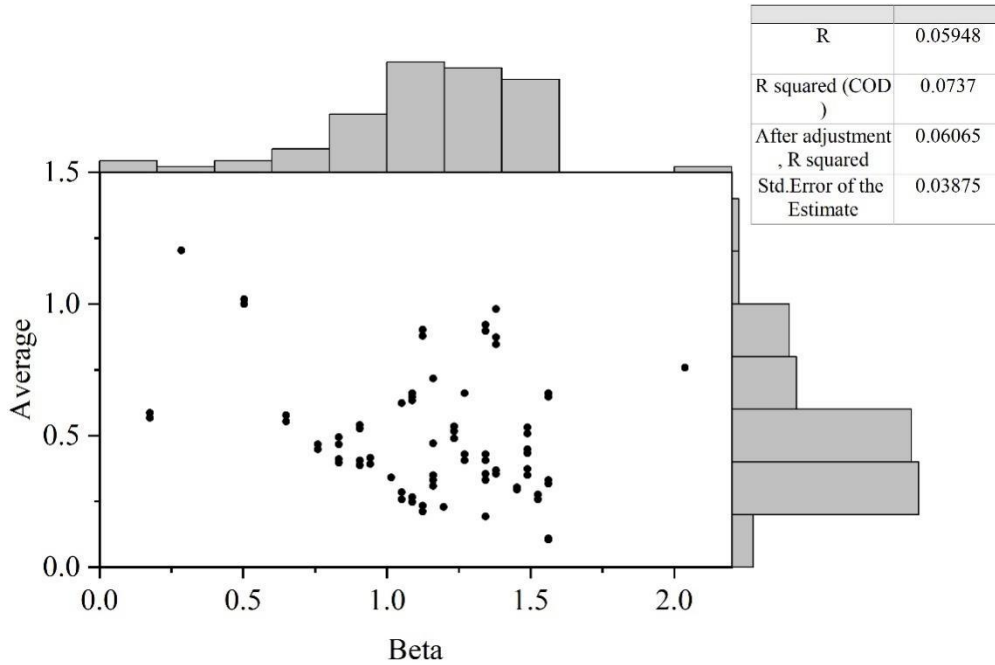


Figure 1: Regression

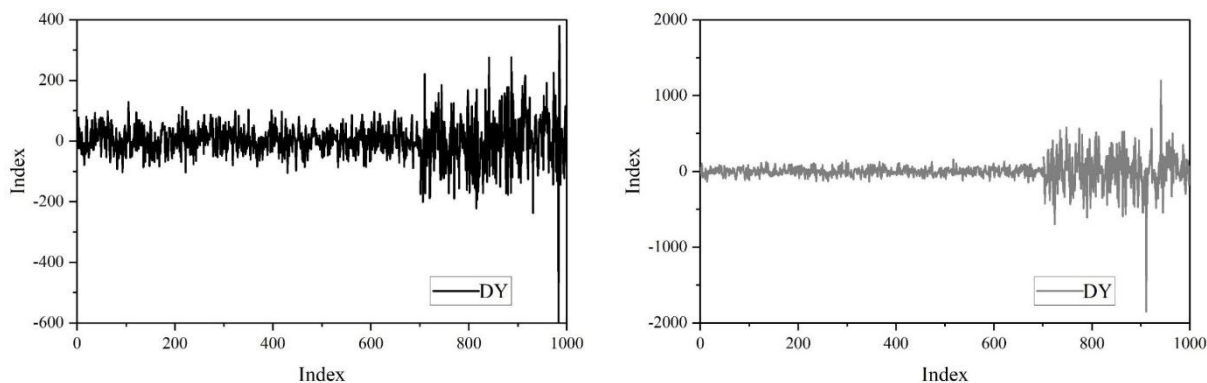
3.2 Securities market effectiveness test

3.2.1 First-order difference

In the study of capital market effectiveness, In accordance with Fama's theory, the weakly efficient market is the basis for the existence of the other two efficient markets, and the stock prices in the weakly efficient market have adequately reflected the historical information and show the characteristics of random walk. Therefore, to test whether the market is weakly efficient is to test whether the stock price conforms to the random walk model. In accordance with the characteristics of the random walk, if the first-order difference $\{C_t\}$ is a stationary process, then $\{\Delta C_t = C_t - C_{t-1}\}$ is a stationary process, then $\{C_t\}$ conforms to the random walk process. Therefore, assume that the random wandering model is: $C_t = \alpha + \phi t + \rho \times C_{t-1} + \xi_t$.

Establish the original hypotheses $H_0: \rho = 1$ and $H_1: \rho \neq 1$.

Figure 2 shows the first-order differential of the securities market, Figure (a) shows the SSE Composite Index and Figure (b) shows the Shenzhen Component Index. Assessing the images of the index returns of the Shanghai and Shenzhen markets, it can be initially seen that the indexes of Shanghai and Shenzhen are a smooth process, with the first 2/3 of the SSE Composite Index fluctuating around $[-120, 120]$ and the second 1/3 fluctuating between $[-300, 300]$. The latter 1/3 of the Shenzhen Component Index fluctuates with increased volatility between ± 800 .



(a) The first-order difference of the Shanghai Composite Index

(b) The first-order difference of the Shenzhen Component Index

Figure 2: First-order difference

3.2.2 Comparative analysis

With the exception of the interbank lending rate and the CRB stock index, the selection of macro variables such as inflation to test the efficiency of the securities market is not remarkable. However, due to the use of monthly data, some important events or unusual market fluctuations occur only occasionally or in the short term, and their impacts are overwhelmed by the large sample in the measurement process. It is also possible that the same event persists over a relatively long sample period (1 year or even longer). So it is necessary to do event analysis to reveal the impact of some real factors on the securities market. Measuring inremarkable does not necessarily negate the impact of macro variables on securities market efficiency. Table 3 shows the actual portfolios, optimal monthly risk-returns of China's securities market (2016-2024).

Five characteristic years are selected to try the analysis. The average monthly return of the market portfolio is negative in three years, 2016, 2019 and 2023. 2018 has the highest average monthly return (8.6125%). 2023 and 2024 have more complex macroeconomic situations, with fluctuations in aggregate demand highlighting the impact of the global financial and economic crisis, while 2024 has the lowest number of negative returns (only 1 month) and the lowest number of negative returns (only 1 month). The number of months was also minimal (only 1 month).

In 2016, the macroeconomy was in a period of deflation, and the average monthly return of the securities market in that year was at the lowest level in the sample period (-0.9845 %), i.e., from the market as a whole, the agricultural market stock trading was at a loss, and the average monthly risk premium was at its lowest (-344.4155 %).

The optimal portfolio solved in accordance with CAPM has the highest monthly average return and monthly risk premium and the lowest monthly average standard deviation in the sample period, respectively.

The securities market movements in 2023 and 2024 fully reflect the changes in the international and Chinese economic situation after the U.S. subprime crisis. In particular, 2008 was a year of ups and downs, with the securities market generally in an uptrend in the first half of the year, despite a sharp fall in the first half of the year due to the impact of the US subprime crisis, and then in the second half of the year when the effect of the international financial crisis intensified in July-August, with the securities market continuously experiencing a sharp downtrend in the reversal of market prices. In 2023, the standard deviation of the actual portfolio and the number of months with negative returns were the highest, and the market was in a high-risk period. However, the monthly average risk

premium of the optimal portfolio is still not low (480.1486‰) and the monthly average return reaches the second highest, one of the reasons should be due to the increase in the variety of stocks. (1) Event analysis reveals that the risk-return and efficiency profiles of the securities market are closely related to the macro context, and the herd effect induced by micro-institutional violations or large losses has a systematic impact on the securities market, and the provision of credit support to the securities market to improve liquidity has a positive effect, and the increase in the number of stock varieties to enlarge the space for capital allocation and to expand the statistical characteristics of the underlying instruments can improve the efficiency of the securities market. Increasing the variety of stocks to enlarge the space for capital allocation and expanding the relevant statistical characteristics of the underlying transactions can improve the efficiency of securities markets.

Table 3: Actual portfolio, optimal monthly risk – income(2016-2024)

Year	Actual investment portfolio				
	Monthly average yield	Negative rate	Monthly standard deviation	Average monthly risk premium	
2016	-0.9845‰	8	0.0084	-344.4155‰	/
2017	1.0945‰	3	0.0053	-164.4587‰	
2018	8.6125‰	6	0.0015	300.7634‰	
2019	-0.5758‰	8	0.0125	-251.6548‰	
2020	1.2485‰	7	0.0132	-55.1548‰	
2021	0.2648‰	5	0.0089	-202.4584‰	
2022	1.2469‰	3	0.0088	-164.6428‰	
2023	-0.7048‰	9	0.0135	-194.2489‰	
2024	1.7486‰	2	0.0128	60.4487‰	
Mean of 9 years	1.3279‰	5.6667‰	0.0094‰	-112.8691‰	
Year	Solve the optimal portfolio by CAPM			Macroeconomic characteristics	Average monthly risk-free interest rate
	Monthly average yield	Monthly standard deviation	Average monthly risk premium		
2016	5.2482‰	0.0204	226.4489‰	Deflation	1.7485‰
2017	3.5945‰	0.0079	284.7958‰	Deflation	1.7896‰
2018	11.2486‰	0.0039	720.4461‰	Deflation Turns To Inflation	2.0415‰
2019	6.2487‰	0.0154	284.9487‰	Inflation	2.0648‰
2020	3.3878‰	0.0059	486.4524‰	Inflation	1.2487‰
2021	4.9489‰	0.0057	584.4685‰	Inflation	1.8466‰
2022	5.8489‰	0.0093	448.4687‰	The American Subprime Crisis	2.3485‰
2023	6.8154‰	0.0085	480.1486‰	Global Financial Crisis	2.5748‰
2024	3.8489‰	0.0046	224.4897‰	An Uncertain Recovery	0.8687‰
Mean of 9 years	5.6878‰	0.0091‰	415.6297‰	/	1.8369‰

3.3 Countermeasures to Enhance the Practicality of the CAPM method in China's securities market

3.3.1 Improve information disclosure system and strengthen information disclosure management

Whether or not information can flow smoothly in the market is a sign of whether or not the securities market is efficient, and the market price is a true reflection of the value of the securities only if it adequately reflects all the information. In the face of the low efficiency of China's securities market, the first thing to do is to improve the information disclosure system, and systematically require information disclosure to be open, effective, timely and adequate. That is, to ensure that the information is publicized to all the public, to ensure that the disclosed information correctly reflects the objective facts, to ensure that the relevant information is disclosed without delay, and to ensure that the relevant information is fully disclosed. Additionally, it is necessary to strengthen the supervision and regulation of information disclosure. Legislation should be passed to regulate the subject of information disclosure and the behavior of the news media and information service media. An authoritative financial information center should be set up to disseminate uniform and comprehensive information to the outside world as quickly as possible and to reduce the monopoly of information by large information providers.

3.3.2 Vigorously cultivate institutional investors and improve the structure of investment bodies

In order to solve the problem of irrational structure of investment bodies in China's securities market, institutional investors should be cultivated from the following aspects: (1) actively develop mutual fund organizations. Mutual funds are the most commonly used form of securities investment portfolio, which purchases various listed stocks, bonds or other securities for portfolio investment in an optimized way, and then divides the portfolio into many units and sells them to investors. As a result of the risk-return of various securities within the mutual fund to be filtered, combined and balanced, and the risk and return are shared by the members of the fund, and therefore for investors to diversify and reduce risk, and to obtain a balanced return on the combination of the role. (2) Promoting the entry of pension funds and insurance funds into the market. Insurance funds, pension funds have strong financial strength, and has the characteristics of capital stability, once the investment in the securities market, will inevitably reflect the large-scale investment, investment period of long characteristics. And In accordance with the current "Insurance Law", the insurance company's premiums can only be used for government bonds, financial bonds, bank deposits and other means designated by the State Council, the pension fund also has similar provisions, so that such a huge amount of insurance and pension funds have long been wandering outside the door of the securities market. In order to improve the structure of investment entities, it is necessary to lift the above provisions.

3.3.3 Rationalizing the shareholding structure of listed companies

The inability to list and circulate state-owned and legal person shares has resulted in the contradiction between supply and demand, distortion of interests, information asymmetry, and speculation in China's securities market. Solving the problem of listing and circulation of state-owned and legal person shares to improve the information exchange mechanism, improve the market structure, reduce the distortion of stock price signals due to speculation can effectively improve the efficiency of China's securities market, and then improve the

applicability of CAPM in China's securities market. To this end, we should solve the problem of unreasonable shareholding structure of listed companies in the following aspects: (1) truly act in accordance with the law of the market, solve the problem of different prices for the same share, so that all kinds of shareholders stand on the same starting line and compete on an equal footing, in order to standardize the operating mechanism of joint-stock companies. (2) To establish and improve the supporting measures for the circulation of state-owned and legal person shares, as well as the relevant laws and regulations, so that the listing and circulation of state-owned and legal person shares can be based on the law. (3) Implementing the listing of state-owned and legal person shares in stages to alleviate market pressure.

4 Conclusion

The empirical study of the Asset pricing method of the China's securities market found that the China's securities market has a certain degree of effectiveness, but there are still more factors affecting market efficiency. The empirical results show that the 9-year average monthly return of the market portfolio is 1.3279%, the monthly standard deviation is 0.0094%, and the average monthly risk premium is -112.8691%, which is remarkably lower than that of the optimal portfolio solved by the CAPM (average monthly return of 5.6878% and risk premium of 415.6297%). In 2023, the actual portfolio of the market has the most months (9 months) of negative return, which is the highest number of months (9 months) of negative return. The actual market portfolio in 2023 has the highest number of months (9 months) of negative returns, reflecting the impact of the global financial crisis on the China's securities market. The regression analysis yields an R^2 of 0.0737, indicating that unsystematic risk accounts for 93% of the total risk, which is remarkably different from mature markets. The study shows that the efficiency of China's securities market is closely related to the macroeconomic environment, and the improvement of market efficiency needs to start from improving the information disclosure system, fostering institutional investors, especially mutual fund organizations, and solving the problem of circulation of state-owned corporate shares. With the improvement of market mechanism and optimization of investor structure, the efficiency of China's securities market will be gradually improved and the applicability of CAPM method will be enhanced.

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