

Analysis of Capital Asset Pricing Model in Chinese Stock Market

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Abstract: The Capital Asset Pricing Model (CAPM) is a key financial tool used to estimate the relationship between asset return and risk, helping investors make investment decisions, business valuation and risk management. The importance of CAPM is reflected in its ability to help investors understand market risk, build an optimized portfolio, estimate the cost of capital, evaluate investment performance, and test market efficiency. However, it is important to keep in mind that CAPM has its assumptions and limitations, and other factors should be considered in making decisions. This paper mainly studies the application and future development of capital asset pricing model in Chinese stock market through a literature review analysis. The conclusion of this paper is that the capital asset pricing model is widely used in China's stock market, which has a profound impact on the development of China's stock market, and many different types of models have been derived to deal with the risks that may appear in different fields.

Keywords: CAPM, Chinese stock market, market risk

1. Introduction

The Capital Asset Pricing Model (CAPM) is a frequently utilized asset pricing model, and researchers have extensively explored empirical studies related to CAPM. For example, Fama and MacBeth (1973) used the market data of New York Stock Exchange before 1969 to test the CAPM model, and the final test results showed that there was a positive correlation between the average stock return rate and risk, and the intercept was approximately equal to the risk-free return rate, which was consistent with the CAPM model [1]. This model has a profound influence on western financial theory and is one of the most important theoretical cornerstones of modern finance [2]. Because of its simple form and operability, CAPM has been widely used in many problems such as stock return forecast and investment risk analysis [3].

Overall, CAPM provides investors with a theoretical framework to help them better understand and manage risk and make more informed investment decisions. It also plays an important role in areas such as corporate valuation, portfolio management and financial research. However, it should be noted that CAPM also has its limitations, especially when there are market anomalies and irrational behaviors in the actual market, investors should consider other factors. China's capital market is gaining increasing influence in the world. However, there is little research on the development of CAPM model in Chinese stock market. In this context, utilizing the traditional CAPM model in China's stock market can partially bridge the gap in asset pricing research, holding

crucial theoretical significance. In addition, it can analyze and study the shortcomings of CAPM model in the current application of China's stock market, put forward targeted policy suggestions, and provide ideas for the reform and development of China's stock market in the future.

2. Capital Asset Pricing Model and Development

The Capital Asset Pricing Model (CAPM) is a pivotal concept in modern financial theory, especially significant to the stock market. It exerts influence on various aspects of stock market operations and investor decision-making. CAPM plays a crucial role in helping investors comprehend the correlation between risk and the anticipated return of diverse stocks. By calculating the β coefficient of a stock, investors can judge the degree of market risk of a stock and build a portfolio that matches the risk and returns accordingly. CAPM provides a theoretical framework for stock pricing. It states that the expected return of a stock should be proportional to the market risk it takes. This helps investors assess whether stocks are overvalued or undervalued. By quantifying market risk (systemic risk), CAPM enables investors to better understand and manage the risks in their portfolios. It also provides a theoretical basis for risk hedging and risk diversification. Companies use CAPM to estimate the cost of equity capital, which is critical for determining the minimum acceptable rate of return for projects, capital budgeting, and business valuation. CAPM is based on the efficient markets hypothesis, which states that all relevant information is already reflected in stock prices. Therefore, it is also used to assess the degree of efficiency of the market. Fund managers and investors use CAPM to assess their investment performance, that is, whether actual returns exceed the risk-adjusted returns expected under CAPM. Although CAPM has its theoretical limitations, such as a single measure of market risk and a high reliance on market efficiency, it is still an important tool for understanding and analyzing the stock market. Investors and financial analysts often combine CAPM with other methods, such as arbitrage pricing theory (APT) and historical data analysis, to make more comprehensive stock market analysis and investment decisions. This paper mainly studies the application and future development of capital asset pricing model in Chinese stock market through a literature review analysis.

3. The Application of Capital Asset Pricing Model in Chinese Stock Market

Capital Asset Pricing Model (CAPM), as one of the classic models in the financial field, is still developing and evolving in China's stock market. Among them, multi-factor models have emerged on the basis of CAPM, such as Fama-French three-factor model and Carhart four-factor model. In the future, researchers may introduce more factors to consider various risk factors more comprehensively, such as market risk, size factor, value factor, momentum factor, quality factor, etc.

The mean-variance theory typically employs volatility as a measure of asset risk, asserting that high volatility should be offset by high returns. In contrast, the Capital Asset Pricing Model (CAPM) classifies asset risks into systemic and non-systemic (idiosyncratic or heterogeneous) categories. Non-systemic risks can be mitigated through diversification, while non-diversifiable systemic risks necessitate high returns as compensation. In essence, CAPM breaks down the total risk described by the mean-variance model into systematic and non-systematic components, contending that non-systematic risk should not warrant high returns. In the stock market, many stocks often move in tandem with market fluctuations. Each stock is exposed to inherent market risk, and most stocks are not immune to market downturns, making this risk non-diversifiable or systemic. CAPM quantifies this risk using beta and deems it deserving of compensation through high returns. Another type of risk, non-systemic risk, is not universally faced by all stocks. Through diversification across different companies, investors can offset this non-systemic risk, which should not necessitate high

returns as compensation. In recent years, Chinese scholars have also tested the effectiveness of CAPM model in China's stock market. Gu Rongbao and Liu Yuhua conducted an empirical test to assess the suitability of the Capital Asset Pricing Model (CAPM) in China's securities market, specifically focusing on the Shenzhen stock. Their findings revealed that the systemic risk of the Shenzhen stock has a limited impact on stock pricing. Moreover, the relationship between systemic risk and average stock return does not follow a linear pattern as suggested by CAPM. Other risk factors also play a significant role in stock pricing. Non-systemic risk exhibits strong explanatory power, indicating that stock returns are influenced by both systemic and non-systemic risk. The average return shows a negative linear correlation with non-systemic risk, and similarly, it is negatively linear correlated with systematic risk. The presence of substantial speculation in the market further contributes to the conclusion that the CAPM model is not applicable in China's Shenzhen stock market. Jin Yunhui and Liu Lin conducted a separate empirical test on the applicability of CAPM in China's securities market. They concluded that the "mean-variance" of the market composite index remains valid irrespective of the presence of risk-free assets. However, stock returns do not exhibit a linear relationship with beta, except for factors beyond beta. They attribute this partly to the immaturity of China's stock market and the prevalence of speculation. Additionally, they highlight some prerequisite problems in domestic CAPM model research, citing arbitrary interval selection and the ineffective elimination of transaction intervals generated by the market as contributing factors.

4. Future Development Direction of Capital Asset Pricing Model in Chinese Stock Market

The field of financial engineering is constantly evolving, and new financial instruments and trading strategies are constantly emerging. CAPM may need to consider the impact of these new tools and strategies on asset pricing. With the development of big data and machine learning technologies, CAPM can benefit from broader data sets and advanced analytical methods [4]. This can improve the predictive power and complexity of the model. The application of machine learning and big data will greatly help the development of CAPM model in the future. At the same time, the future should take into account the impact of globalization. Global financial markets are increasingly interconnected, and future CAPM may need to take better account of the impact of globalization on asset pricing, including multinational corporations and the co-mobility of different markets [5]. Investors have different risk preferences and investment goals, and future CAPM may focus more on how to customize investment strategies to meet the needs of individual investors, so that risk management and investment strategies can be customized. In conclusion, CAPM remains important as a theoretical framework, but it needs to constantly adapt to changing financial markets and research needs [6]. Future directions could include more sophisticated modeling, more comprehensive risk factors, the application of new data and technologies, and better consideration of investor behavior and sustainability factors. The investment sector will continue to provide opportunities and challenges for CAPM's growth.

5. Conclusion

This paper mainly discusses the application and development form of CAPM model in China's stock market. Capital Asset Pricing Model is an important model of stock risk and return in financial theory. It helps investors to understand the relationship between stock risk and expected return, evaluate stock market risk through β coefficient, and guide the construction of an investment portfolio. CAPM believes that the stock return should be proportional to its market risk, which is helpful in judging whether the stock pricing is reasonable. In the Chinese stock market, CAPM is evolving to introduce more risk factors and complexity modeling. Future developments may include

integrating behavioral finance, considering ESG factors, and applying big data and machine learning techniques. With globalization and financial engineering, CAPM needs to constantly adapt to new market conditions and investor needs. Despite its limitations, CAPM is still an important tool for understanding the stock market. This paper does not deeply study the influence and effectiveness of CAPM model on China's stock market. In the future, more specific studies will be made on these aspects.

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