



# Customer Risk Management and CAPM Model Application

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**Abstract:** Purpose: The purpose of this paper is to discuss the combined application of customer risk management and CAPM model, specifically including the definition, classification and assessment methods of customer risk, as well as the basic principles, formulas and assumptions of CAPM model. The paper will also analyse the application and improvement of the CAPM model in domestic and international capital markets, as well as risk management practices based on the CAPM model. Methods: A review and analysis of relevant literature. Results: Effective customer risk management can help financial institutions and investors to identify, assess and control potential risks, so as to achieve effective asset allocation and risk-return optimization. Conclusion: The combined application of customer risk management and CAPM model can help investors and financial institutions better assess and manage risks and formulate reasonable investment strategies. However, since some basic assumptions of the CAPM model are difficult to be fully established in the actual market, future research and practice should focus on improving and expanding the CAPM model to better adapt to market changes and investor needs.

**Keywords:** customer risk management, CAPM model, capital market, risk assessment, risk management

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## 1. Introduction

With the increasing complexity and globalization of financial markets, customer risk management has become an important issue for financial institutions and investors. The purpose of this paper is to discuss the combined application of customer risk management and CAPM model, specifically including the definition, classification and assessment methods of customer risk, as well as the basic principles, formulas and assumptions of CAPM model. In addition, this paper will analyse the application and improvement of CAPM model in domestic and international capital markets, as well as the risk management practice based on CAPM model.

## 2. Fundamentals of customer risk management and CAPM model

### 2.1 Fundamentals of customer risk management

The fundamentals of customer risk management include the definition, classification, assessment methods and tools of customer risk. Customer risk can be defined as the potential financial loss due to uncertainty in customer behaviour. It can be categorized according to different factors, such as credit risk, market risk, operational risk, etc.

### 2.2 Fundamentals of the CAPM model

The CAPM model is a financial model used to estimate the expected return on an asset, which describes the relationship between the return on the asset and the market return. The formula of the CAPM model is  $E(R_i) = R_f + \beta_i \cdot (E(R_m) - R_f)$ , where  $E(R_i)$  is the expected rate of return on the asset  $i$ ,  $R_f$  is the Risk-free rate of return, usually represented by the yield of short-term treasury bonds,  $E(R_m)$  is the expected rate of return of the market, and  $\beta_i$  is the beta coefficient of the asset  $i$ , which represents the systematic risk of the asset  $i$  with respect to the market. The basic assumptions of the CAPM model are that the market is efficient, that all investors are rational, and that the return of the asset is affected only by systematic risk. According to this model, the expected return on an asset is determined by the risk-free rate of return and the asset's sensitivity to market risk.

## 3. Application and improvement of CAPM model in domestic capital market

### 3.1 Dynamic CAPM model based on machine learning

The application and improvement of CAPM model in domestic capital market has been one of the important topics of research. The dynamic CAPM model based on machine learning is an improvement of the traditional CAPM model. The model [1] improves the accuracy of the CAPM model in predicting asset returns by introducing machine learning algorithms. Machine learning algorithms can handle large amounts of data and are able to automatically learn complex relationships

between data to better capture the dynamics of asset returns. In this model, the beta coefficient is no longer a static parameter, but a dynamic parameter that changes over time. The model uses machine learning algorithms to predict the trend of the beta coefficient, thus improving the model's ability to predict asset returns. In addition, the model takes into account changes in the market environment and improves the accuracy of the model by introducing factors such as market sentiment. The dynamic CAPM model based on machine learning is not only able to better capture the risk factors of the market, but also provides more accurate asset pricing, which helps investors to better manage risk and asset allocation.

### **3.2 Empirical analysis based on size premium**

In the domestic capital market, the application and improvement of the CAPM model also includes empirical analyses based on the size premium[2]. Size premium refers to the excess return of small-capitalization stocks relative to large-capitalization stocks. In the traditional CAPM model, the expected return of an asset depends only on market risk and ignores other factors that may affect the return of an asset, such as the size premium. The empirical analysis based on size premium improves the CAPM model by introducing a size factor to measure the size premium risk of an asset. In this model, the expected return of an asset depends not only on market risk but also on the size premium risk of the asset. This improvement helps to better explain the phenomenon of high returns of small-cap stocks and provide more accurate asset pricing. This empirical analysis finds that the size premium exists in the domestic capital market and has a significant impact on asset returns by analyzing data from the Chinese capital market. The empirical analysis based on the size premium not only enriches the application of CAPM model, but also provides investors with more comprehensive risk and return assessment tools.

## **4. Research results of foreign scholars on CAPM model**

In the research of foreign scholars on CAPM model, some researchers apply CAPM model in the field of inventory and transport management. Specifically, Qian H et al [3] proposed an economic model predictive control method based on inventory and transport management, which considered stochastic demand and used the CAPM model to assess the risks and benefits of inventory and transport management. In this study, the CAPM model was used to assess the expected returns and risks of inventory and transport management. The expected benefits of inventory and transport management can be achieved by reducing inventory costs and transport costs, while the risks mainly come from the uncertainty of demand. The application of CAPM model has also been studied by foreign scholars in relation to liquidity risk management in emerging economies. Rolando Gonzales-Martínez[4], whose research focuses on the financial markets of emerging economies, proposes a model based on Parametric Value-at-Risk (VaR), which is calibrated indirectly through the methodology for estimation and applied to liquidity risk management in the Bolivian financial system. In the study, the CAPM model is used to assess the risk premium of an asset and thus determine the expected return of the asset. By combining the CAPM model and the VaR model, the researcher can more accurately estimate the maximum potential loss of an asset at a given confidence level, thus assessing the liquidity risk of the asset. The results of the study show that the model has good applicability in the financial markets of emerging economies and can provide financial institutions with an effective liquidity risk management tool. Through this method, financial institutions can better manage liquidity risk, reduce potential losses, and improve the stability and efficiency of the financial market.

The application of CAPM model is also involved in the research of foreign scholars on discriminatory pricing based on customer risk. The research of Amaral C et al[5] focuses on discriminatory pricing through indirect lending through retail networks, and they tested the impact of discriminatory pricing based on customer risk on the loan market through empirical research. CAPM model is used to assess the risk premium of different customer groups, so as to determine the different customers' expected returns of different customers. By combining customers' credit scores and other risk factors, researchers can quantify the risk of different customer groups and thus develop differentiated pricing strategies. The results show that discriminatory pricing based on customer risk can effectively improve the efficiency and stability of the loan market. Through this approach, financial institutions can better manage credit risk, reduce potential losses, and improve the competitiveness of the loan market[6]. This study is of great practical significance for understanding the operating mechanism of the loan market and formulating rational pricing strategies.

## **5. Combined Application of Customer Risk Management and CAPM Model**

The combined application of customer risk management and CAPM model is mainly reflected in the two aspects of using CAPM model to assess customer's investment risk and risk management by combining the characteristics of domestic economy and customer's investment. The use of CAPM model to assess clients' investment risk is to measure the systematic risk of an asset relative to the market by calculating its beta coefficient. the CAPM model assumes that the expected return

of an asset mainly depends on the market risk, and by calculating the beta coefficient of an asset, an investor can understand the degree of risk of the asset and make investment decisions accordingly.

## 6. Conclusion

Customer risk management and CAPM model application is one of the important topics in the financial field. By combining customer risk management with CAPM model, investors and financial institutions can better assess and manage risks, formulate reasonable investment strategies, and achieve effective allocation of assets and optimization of risk and return. Although the CAPM model has been widely used in theory and practice, it has also been subject to some criticisms, mainly because its basic assumptions are difficult to be fully established in the actual market. Therefore, future research and practice should focus on improving and expanding the CAPM model to better adapt to market changes and investor needs. With the increasing globalization and complexity of financial markets, the importance of customer risk management is also increasing. Therefore, future research and practice should focus on how to better combine the characteristics of the international market and the actual situation of the domestic market to develop more comprehensive and effective risk management strategies.

## References

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- [1] Jun Feng, Chuanpu Xu, Zhaoxin Shen, et al. Research and application of comprehensive risk management system based on AHP model analysis[C]. National electric power industry enterprise modernization management innovation 5 years classic case collection.
- [2] Cui Jin, Yin Xia, Xiu Qiu Ju. Improvement study of CAPM model in China's capital market-an empirical analysis based on size premium[J]. *China Asset Appraisal*. 2020; (5):8.
- [3] Qian H , Guo H , Sun B ,et al. Integrated inventory and transportation management with stochastic demands: A scenario-based economic model predictive control approach[J]. *Expert Systems with Application*. 2022; (Sep.): 202.
- [4] Yanbin Gao. Research on the relationship between expected stock return and risk based on CAPM model - a sample of small and medium-sized board market stocks[J]. *Productivity Research*. 2018; (1):5
- [5] Amaral C , Kolsarici C , Nediak M .The impact of discriminatory pricing based on customer risk: an empirical investigation using indirect lending through retail networks[J]. *European Journal of Marketing*. 2023; 57(13):56-86.
- [6] Guohao Zou, Xuyao Wang. Value estimation of Laofengxiang based on CAPM model[J]. *Modern Business*. 2018; (23):4.