

Research on Financial Investment Development and Financial Market Risk Measurement Model under Financial Mode

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Abstract: Trading financial asset investment is a double-edged sword. From a management point of view, many companies holding transactional financial assets do enhance the liquidity of assets or increase the profitability of idle assets; but from a risk perspective, many companies also have increased trading assets. Based on the complex network theory, this paper uses qualitative and quantitative methods to study systemic financial risks, systemically important institutions and system vulnerability institutions. In qualitative research, this paper establishes a network model based on mutual information coefficient to study the relationship between network correlation, network structure and financial systemic risk. The innovation of this paper is to try to apply the CVaR model based on general distribution and GARCH family model to the risk measurement of China's financial market, and supplement it with qualitative analysis to measure and study the financial market risk in China. The empirical results show that China's financial market is vulnerable to unexpected news and shows the characteristics of the market with relatively large volatility. This puts higher requirements on the establishment of a more effective risk management system in China's financial market.

1. Introduction

This paper defines the investment strategy and financial risk prevention of transactional financial assets mainly through the analysis of the value of transactional financial assets, report management and risk financial indicators, including financial companies, non-financial investment holding companies, central enterprise finance companies, Various companies, including listed companies and social welfare funds, provide guidance on the investment in trading financial assets, and provide support for the design of relevant risk financial indicator systems and risk management, in order to guide the company.

Theories such as asset allocation are relatively frontier in foreign countries. In the past few decades, they have gradually deepened in two directions and obtained some valuable research results [1-3]. One direction is asset allocation application research. Applied research analyzes the phenomena and facts of the capital market and tries to rationally use the existing asset allocation decision model [4], and thus guides the actual investment business. The research in this area includes: research on the importance of asset allocation, revealing the impact of strategic asset allocation on fund returns from multiple perspectives; research on the returns and risk characteristics of large-scale assets, showing stock and bond risks from multiple perspectives The relationship between income and investment term; research on the stability problem of mean variance model [5-7], trying to solve the problem that the model is very sensitive to variable input such as expected rate of return and risk indicator, controlling the estimation error of the model; The research on the relationship between macro and state reveals the law of asset return rate changing with macroeconomic status, and provides an analysis of investors' adjustment of asset allocation according to changes in macroeconomic status. The other direction is asset allocation theory research. Foreign research on risk and management started earlier, and there are many researches on comprehensive risk management, sub-category risk management, risk management of different companies, and risk monitoring at the macro, micro and technical levels [8-10]. China's research on risk management began in the 1980s, and the development time is still short. Therefore, there are not many targeted studies on the risk management of trading financial assets and related financial

products or other investment products in China, but Part of the risk management theory, methods and risk management research of special companies is reflected in portfolio theory and applied research, risk value method (VAR) research [11], duration research [12], financial institution's asset/liability management[13].

So far, the practical application of CVaR risk measurement is mainly in the insurance industry in developed countries, and its application in China is still in its infancy. However, CVaR has attracted a lot of interest from the theoretical and practical circles by virtue of its excellent mathematical, statistical characteristics and robust risk management characteristics. It can be seen that the application prospect based on CVaR model is very broad, and it provides us with a good analysis tool. This paper adopts complex network theory based on qualitative and quantitative methods for systemic financial risk and systemically important institutions. Conduct research with system vulnerability agencies. In qualitative research, this paper establishes a network model based on mutual information coefficient to study the relationship between network correlation, network structure and financial systemic risk. The innovation of this paper is to try to apply the CVaR model based on general distribution and GARCH family model to the risk measurement of China's financial market, and supplement it with qualitative analysis to measure and study the financial market risk in China. The empirical results show that China's financial market is vulnerable to unexpected news and shows the characteristics of the market with relatively large volatility. This puts higher requirements on the establishment of a more effective risk management system in China's financial market.

2. Financial investment development and financial market risk measurement model

2.1 Definition and classification of financial risks

The emergence of financial risks is unique. On the one hand, the individual's information is not completely made the price of financial assets easy to fluctuate. At the same time, the opportunistic behavioral model exacerbates the speculative tendency of the market, which makes the financial system often in turmoil. In addition, the credit characteristics of financial institutions make the public are included in the financial risk bearers, regardless of their What kind of risk appetite is there, which makes the financial risk magnified in the whole society environment. Also, the financial business has a strong professionalism, and the information asymmetry between the ordinary investors and the ordinary investors is always there. Whether it is a financial institution or an ordinary investor, their behavioral patterns intentionally or unintentionally increase the price volatility of financial assets and easily accumulate financial risks. Compared with general economic risks, financial risks are potentially, cumulative, and sudden. Characteristics of sexuality, acceleration, spread and infectivity.

2.2 Classification of financial risks

Market risk refers to the uncertainty of changes in future profit and loss brought about by changes in market factors (market prices, interest rates, exchange rates, stocks, bond markets, etc.) of financial assets and liabilities held. According to different risk factors, market risk can be divided into interest rate risk, stock price risk, foreign exchange interest rate risk, and commodity price risk.

Credit risk includes two aspects: one is the possibility of default; the other is the amount of losses caused by default. The former depends on the creditworthiness of the counterparty, while the latter depends on the value of the financial product. For financial derivatives trading, because many of them are cross-border transactions and cross-border transactions, the links between traders are closely linked. If any one of the counterparties has a default problem, the snowball-like chain reaction will often result. If in the financial market, a fund is locked up and a default occurs, it will spread rapidly along the debt chain with greater effect.

Liquidity risk refers to the uncertainty of whether financial assets and liabilities held can be realized at any time. Liquidity risk includes two aspects: First, market liquidity risk, that is, the holder of financial products can not level or write off their positions under acceptable market price

conditions, resulting in the risk of unsettled; second, cash flow Risk, that is, the risk that the contractor will not be able to meet the payment obligation due to insufficient liquidity of the dealer or that the margin cannot be increased by the contract.

2.3 Review of financial risk measurement methods

The basis and core of risk management is the quantitative analysis and assessment of risk, that is, risk measurement. With the increase in the size, dynamics and complexity of financial markets and financial transactions, the development of financial theory and financial engineering, financial market risk measurement techniques have become more comprehensive and complex. At present, the main methods of financial market risk measurement include sensitivity analysis, volatility method, VaR method and CVaR method.

The VaR method describes the maximum possible loss under normal market fluctuations. In reality, extreme market conditions in which financial markets fluctuate wildly are abundant, which will bring fatal risks to financial markets. In order to effectively measure the risks in the extreme market state, the CVaR method was developed based on the VaR method. The CVaR method gives an accurate measure of the expected risk value under extreme conditions and a certain level of confidence by describing the tail statistical characteristics of price changes. In summary, with the increasing complexity of financial markets and financial transactions and the development of financial theory and financial engineering, financial market risk measurement has evolved from a simple nominal method to today's complex measurement technology. Figure 1 below shows market risk.

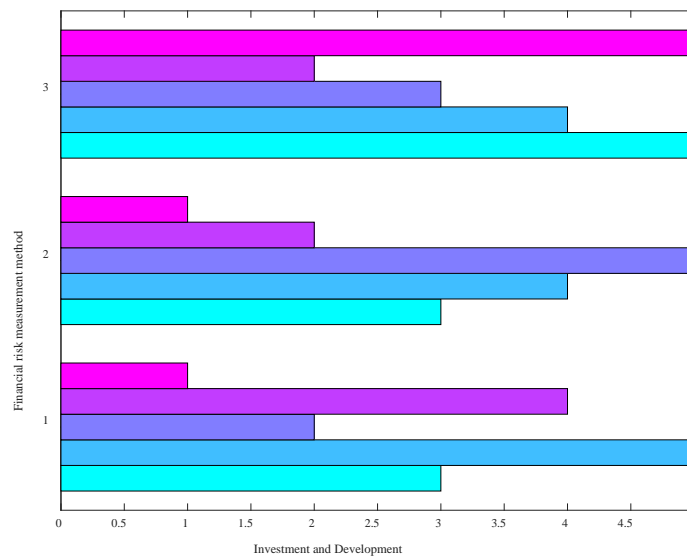


Figure 1 Development of financial risk measurement methods

2.4 Research on VaR model and C VaR model

VaR refers to the potential maximum loss faced by a portfolio during a given holding period under normal market conditions and a given level of confidence, or, under normal market conditions and for a given holding period. Within, the probability of a VaR loss value for a portfolio is only a given probability level (confidence level). The VaR given by J.P.Morgan is defined as the potential maximum loss of a financial portfolio under a certain probability constraint and within a given holding period. The mathematical expression of VaR is:

$$\text{Prob}(\Delta p > \text{VaR}) = 1 - c \quad (1)$$

Among them, Δp is the loss of the portfolio in the holding period Δt , and VaR is the value at risk under the confidence level c .

The observation period refers to the overall length of time for the volatility and correlation of the

return rate for a given holding period, which is the time range for the entire data selection. For example, choose to measure the volatility (risk) of each yield in a portfolio of assets over the next three months or half a year. This choice is to weigh the possibility of historical data and the risk of structural changes in the market. In order to overcome the impact of cyclical changes such as business cycle, the longer the historical data, the better, but the longer the time, the greater the possibility of structural changes in the market such as mergers and acquisitions, making it difficult to reflect historical and future situations. In order to better understand the concept of VaR and the convenience of practical application, we will derive its mathematical expressions below. Let the initial value of the portfolio be W , the expected return at the end of the holding period be R , and the mathematical expectation and standard deviation of R are respectively μ and σ . Under the given confidence level C , the lowest value of the ending portfolio is $w = w(1 + R)$. R is the corresponding minimum rate of return, then:

$$VaR = E(w) = -w * (R - \mu) \quad (2)$$

If α is a certain distribution, corresponding to the quantile of the confidence level C , then $R = \mu - \alpha\sigma$,

The parametric method, also known as the variance-covariance method, is the most commonly used method in VaR calculations. It estimates the combined market risk through historical volatility and correlation. The key factors of the analytical method are the form of the portfolio value function and the distribution form of the market factor. Similar to calling VaR as the value of risk, this paper refers to CVaR as the conditional value. CVaR is the mean value of the loss beyond VaR, also known as Mean Excess Loss (MeanShortfall) and tail VaR (Tail VaR).

Let $f(x, y)$ be the loss function, x be the decision vector, which represents the position or weight of the financial asset, and y is the random variable, which represents the market factor that affects the loss, such as market price or yield. The loss $f(x, y)$ caused by the density function of each x, y is a random variable obeying a certain distribution on R , $p(y)$ is the density function of Y , then the distribution function of $f(x, y)$ is Given by the following equation, the probability that the loss does not exceed the threshold (threshold) is:

$$g(x, \alpha) = \int p(y) d_y \quad (3)$$

Although in the definition of CVaR, there are three important parameters, the holding period, the confidence level and VaR. But for any combination, the VaR value is fixed at a given period and confidence level, so VaR should be endogenous. Any C VaR only makes sense if it has two parameters, the holding period and the confidence level. The choice of confidence level depends on the need for CVaR verification, the need for internal venture capital, regulatory requirements, and the need to compare between different agencies. At the same time, a normal distribution or other distribution patterns with better nature of stepwise features (such as the t distribution) will also affect the choice of confidence level.

2.5 Financial investment development and risk quantitative verification

In this paper, 62 banking institutions were selected. According to the annual report of the banking institution, the interbank borrowing, interbank deposit data and owner's equity data in the balance sheet of the bank institution were obtained, and the inter-bank debt network was constructed by the largest method. The data should exclude the bank's own lending and deposits. We use the RAS method to obtain interbank lending and interbank deposit data between banks. The selected banking institutions are listed in the Table below.

Table 1 Statistical characteristics of price return series

Mean	Median	Standard deviation	Skewness	Kurtosis	Statistics
0.001736	0.001472	0.017053	-0.352594	4.308924	45.04038

Table 2 Futures contract yield series ADF unit root stationarity test results

	T statistic	Associated probability
ADF statistic	-20.03358	0.000
1% threshold	-2.569709	
5% threshold	-1.941473	
10% threshold	-1.616263	

CVaR has good mathematical and statistical properties. In the case of portfolio optimization, since CVaR is a convex function of weights, convex programming can be used to solve the CVaR optimization problem. In addition, CVaR is continuous for confidence levels and VaR is disconnected at certain confidence levels. Compared to VaR, CVaR calculations can be simplified to LP linear programming problems, especially for large portfolios and scenario analysis (see Figure 2).

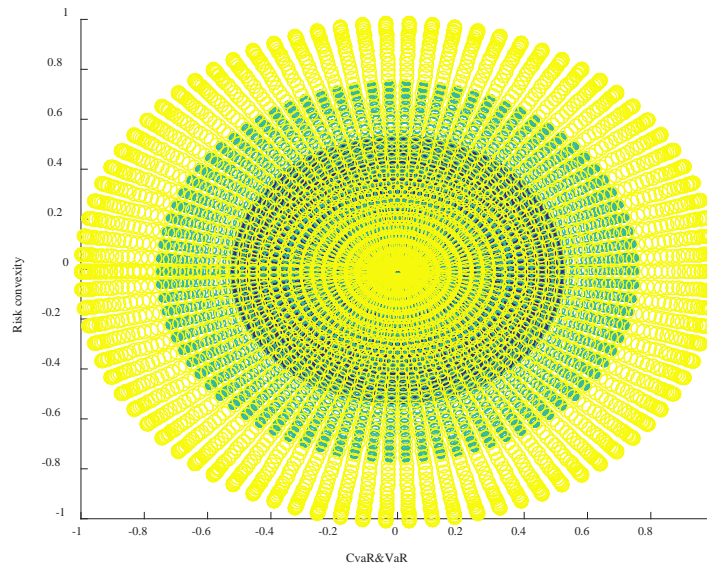


Figure 2 Comparison of convexity of CvaR and VaR

As shown in Figure 2, both VaR and CVaR are just an estimate. When we use a random pattern to describe financial markets, we actually only know a part of the financial market. The purpose of the model is to reduce this uncertainty and use a scientific model to derive our predictions.

3. Conclusion

In summary, in addition to strict penalties for some violations of transactional financial assets investment and risk management and control, the competent authorities should also widely publicize and promote some successful experiences of transactional financial asset investment and risk management and control. The consistency characteristics of risk measurement methods such as variance, VaR and CVaR are studied. The requirements of risk measurement methods under consistency risk and convex risk measurement are obtained. Systemic risk is different from combined risk and does not meet risk consistency measure. The reason is analyzed and the nature of systemic financial risk is analyzed. It is proposed that different risk quantitative measurement methods and risk contribution measurement methods should be selected according to different risk management requirements.

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