

Study on the Impact of Continuous Probability Model on Financial Investment Strategy

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Abstract: The expected return always carries some risks in financial investment. Those risks cannot be eliminated but only be avoided. Thus, effective measures should be taken to reduce the risks. The analysis of the impact of probability theory and mathematical statistics over financial investment will propose more reliable evidence for investment decisions and risk reduction. This paper introduces the overview of probability theory and mathematical statistics, financial investment and data statistics; it explains the significance of probability theory and mathematical statistics in financial investment, and analyzes the objectives and application cases of probability theory and mathematical statistics in financial investment. It will also provide some suggestions for further research on the application of probability theory and mathematical statistics in financial investment.

1. Introduction

Generally speaking, securities investment is always carried out in an uncertain environment. Any return is accompanied by some risks. The higher the expected return, the greater the corresponding risks. For investors, their investment decisions often require that the return on their investment should be as large as possible, however, the risks they face be as small as possible. To achieve such a dual goal, investors often allocate portfolios of financial assets. In order to diversify larger risks and obtain more stable investment return, diversified investments should be made for various securities in different proportions; that is, portfolio investment. The key to conduct portfolio investment is to weigh the returns and risks according to the preferences of investors; determine the proportions of various securities in the portfolio, and obtain a satisfactory portfolio. Based on the trade-off decision of the risk and return of securities investment, since Markowitz epoch-makingly proposed the “mean.variance” model in 1952, a lot of work has been done on the research of “mean.variance” model in theory expansion and application for more than half a century. In real life, investors are not safe to make decisions in accordance with rational principles. Sometimes they take actions with greater risks in order to achieve higher returns. Different investors, or the same investor under different market conditions, have different profitability requirements. This paper is based on a static study. In many cases, investors want to find an investment portfolio that maximizes the possibility of achieving expected returns, as discussed in this paper. Otherwise, investors would rather consider trying to minimize the probability of certain “catastrophic” levels of risk in asset allocation, which follows safety-first criterion. These methods of weighing investment strategies from a probabilistic perspective are often called probability criteria. The uncertainty of investors facing returns and risks in the securities market is described in terms of probability in accordance with people's psychological cognition.

2. Continuous Probability Model

After analyzing the data given in the title, it is concluded that these data roughly conform to the normal distribution, and then using matlab to conduct a normality test on the sample distribution. From $P\{T < \alpha(n-1)\} = \alpha$, we can get the rejection domain $T < \alpha(n-1)$, and look up the table, calculate, and compare the size so as to arrive at the conclusion. If the conclusion that the data conforms to the normal distribution is determined, the next step is to estimate the parameters of the

data. Calculated by MATLAB, the mean μ is 7.5569, the standard deviation δ is 9.7977, the 95% confidence interval of the mean is [6.3486, 8.7652], and the 95% confidence interval of the standard deviation is [9.0148, 10.7308]. In addition, we need to perform a hypothesis test on the mean of 7.5699 when the variance is unknown, so we call the `ttest` function in matlab, and we get:

(1) The boolean variable $h = 0$ means accepting the null hypothesis, $H_0: = 7.5699$ holds true; (2) 95% confidence interval is [6.3486, 8.76522]; (3) the value of Sig is 1 greater than 0.05, so accept the hypothesis. That is, there is no significant difference. Based on the results of the hypothesis test, we can determine the average value is 7.5569.

Probability theory refers to the rational analysis of many random phenomena, and it further reasonably judges the possibility of a certain phenomenon. Exploring the obtained results and mutual existence; comparing the possibilities between large and small, and assessing the problems that may arise are the theoretical basics of probability theory. In this stage, probability theory, with its reasonable and accurate analysis of various phenomena, has been widely used in many industries, and a series of related theories have been formed. Especially in the venture capital industry, probability theory highlights its own advantages. Seen from the outside of the stock market, there seems to have no laws to follow, and the phenomenon inside the market is also random. Using probability theory in financial investment can not only analyze the random phenomenon but also try to find certain laws of the random phenomenon. Many aspects of financial investment are greatly affected by probability theory. Quantitative statistics is based on the theory of probability. It is a way of exploring how to collect, summarizes, and analyzes the data affected by random factors. Value is the basic method of research. Based on this, probability theory evaluates related issues and provides further information for making or implementing decisions. Since the last century, theories of quantitative statistics combined with regression analysis and hypothesis testing have been widely used in a range of theories, especially in the 21st century. Along with the rapid development of information technology, they have created a very favorable opportunity for the development of quantitative statistics.

3. Significance of Probability Theory and Mathematical Statistics in Financial Investment

(1) Through the theory of stock market odds probability and comprehensive calculation with mathematical models, the profitability and profitability of a series of technical indicators can be effectively analyzed. Only such established and quantitative research can make self-decisions. From the perspective of implementation, it is obligatory to obtain those scientific and reasonable technical indicators, and at the same time comprehensively eliminate indicators and parameters that do not have value. As long as this mathematical model is used to research and confirm and its effective profit exceeds 60. 0%, then using this indicator in the future will have a reliable guarantee. (2) Only by calculating and using this scientific and mathematical model to determine valuable technical indicators, can we fundamentally strengthen the beliefs of financial investors about buying and selling. It could not be affected by ambiguity and suffer the greatest lost. The best investment is operation timing; not the lack of confidence in holding the shares and early regrets; not to be immersed in the imagination that the stock would pick up quickly when the stock market plunges, etc. Only by fully understanding the scientifically validated sell-off signals, especially by receiving the sell-off signals locally and selling the stock quickly, will the investment not be stuck in a bear market. (3) The benefits that can be obtained by using probability theory and quantitative statistics in financial investment are undeniable. However, the laws and laws in probability theory and quantitative statistics are built on the important premise of statistical analysis of many quantities. Without this premise, probability theory and quantitative statistics would lose their application significance. Therefore, during the technical analysis of stocks, if adopting probability theory and quantitative statistics in the investment is necessary, the investor should spend a lot of time to accumulate the general knowledge by means of market graphs, massive data, etc. At the same time the investor should find out the statistical laws of the stock market transition, and then apply and verify them in the stock market so as to promote the results of investment.

4. The Impact of Probability Theory on Investment Strategies

If the probability of a class of stocks outperforming is 90.0%, it indicates that 9 out of 10 stocks are relatively good, and the investor can choose to invest with full stocks confidently; if this class of inventory stocks has a probability of 70.0%, it means that 7 out of 10 stocks are relatively good, and more than half of the stock can be selected for investment; if the class of stocks has a probability of 50.0% or lower, it shows that 5 of 10 stocks or less are relatively good. At this time, investment operations should be carried out cautiously. If the investment operations are not performed properly, serious losses will occur. It is necessary to stop investing. However, not all the graphs are reasonable. The analysis should be combined with the reality, just as some stocks in some graphs have very good trend, however, other graphs of the same kind are not performing well. Through comprehensive analysis, it is negligible to draw such graphics to show a low probability of profit. If it is profitable, it is only because the probability time is relatively small. Therefore, the investor should invest carefully, or do not invest.

Probability theory and Innovative High are inaccurate. In other words, not all Innovative High stocks are good stocks. On one hand, this is because the corresponding graphics of good stocks must move well. 0% should be a new high. Without a new high, a higher spread could not be formed. On the other hand, stocks after a new high may not always maintain a good trend, because the stock market has maintained a good trend after a high market trend. A real breakthrough can be achieved if the market trend is not good. After a record high, a large part of the stocks could not continue to maintain a good trend or reach a real breakthrough.

In the process of selecting stocks, financial investors usually accept the stock recommendations from other financial investors. Such stock recommendations are based on the relevant financial investment practice verification. Regardless of whether the financial investment is profit or loss in the end, there would be a corresponding randomness. Thus, it is possible to use probability theory to carry out risk research. Some financial investors often recommend a lot of stocks, and some of them do make money. However, the number of money-making stocks is much smaller than the total number of recommendations. During the stock evaluation, survivor biased, and frequent emphasis is based on that previously made money. Of all those stocks, this kind of recommendation is obviously not desirable. The use of probability theory in financial investment to calculate such profit or loss, which part of the stock has a high probability of profit, and which part of the stock has a high probability of loss, could provide financial investors with a favorable choice.

5. Conclusion

This paper establishes a continuous distribution model and solves the problems arisen. However, the model has some advantages and disadvantages as follows: 1) The calculation is not particularly complicated in case of calculating a single cycle. However, in case of two cycles, using the enumerated method will bring much complex calculations, which can only be solved by programming. Complex calculations are disfavored, so more cycles are less practical. 2) In this paper, the application of continuous normal distribution solves the problem proposed very well, and the accuracy is very high. The calculation with MATLAB is not particularly complicated. It can be concluded that the continuous model is better than the discrete model. 3) Monte Carlo method can also be used to estimate the probability value and limit the loss by generating a random number that obeys the normal distribution.

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