

The Logical Framework of Industry Analysis and Stock Investment

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ABSTRACT

In recent years, China's economy has continued to grow at a high speed, which has led to a substantial increase in the performance of listed companies, laying a solid foundation for my country's stock market. Especially in 2007, my country's stock market surpassed most people's imagination and completed a historic leap in the development of my country's stock market. From the perspective of mature international markets, my country's securities market is an emerging market. However, with the continuous growth and development of my country's securities market, my country's securities market will continue to be full of vitality in the future. The function of optimizing the allocation of resources in the securities market by excellent domestic enterprises is more reflected. With the maturity of my country's stock market, how investors can invest under such stock market conditions has become a problem. Generally speaking, investors need to solve two problems when investing: one is how to analyze the industry and choose an excellent investment plan; the other is how to determine the investment ratio when investors choose multiple excellent stocks. The purpose of this article is to study the logical framework of industry analysis and stock investment, and using actual data, first use the simulated annealing algorithm to experiment, observe the rate of return and risk when the preference coefficient increases, and then base the algorithm on the basis of this algorithm. A particle swarm algorithm simulation experiment was carried out on the data. The experiment proved that the particle swarm simulation algorithm has a higher return on stock investment and lower risk than normal stock investment, with a return rate of 0.41 and a risk of 0.8. The expected results of the experiment are achieved, and the stock investment based on the algorithm is effectively proved.

Keywords: *Industry Analysis, Stock Investment, Factor Analysis, Risk Control*

1. INTRODUCTION

With the rapid development of the securities market, the government has continuously strengthened the supervision of the market and the transparency of listed companies has become higher and higher. The development and investment philosophy of stock investors are also changing with these changes. Fundamental analysis has gradually begun to pay attention, and many financial institutions are also launching research projects to study stocks that have been seriously undervalued for investment in the hope of obtaining long-term returns. Among them, industry analysis has become more and more important. In addition, with the strengthening of supervision, various investment ideas have violently conflicted. At this time, both institutional investors and individual investors need to think deeply about investment concepts and other aspects. Since no institution can handle the price of a stock to a degree far away from its value, the correlation

between stock price and stock value is becoming more and more obvious. Therefore, it focuses on the basic knowledge of listed companies and focuses on value discovery. Gradually become the mainstream of the market. At this time, it is necessary to deeply study the application of value investment theory in China.

In the research on the logical framework of industry analysis and stock investment, many scholars have conducted research on it and come to many valid conclusions. Danguy focuses on analyzing the impact of earnings per share, dividends, and net assets per share on the intrinsic value of stocks. After the impact, a valuation model was established and empirical research methods were used to study investment strategies [1]. Tokuoka K evaluates stocks from the perspective of corporate growth and proposes corresponding overdraft strategies [2]. Zhou J combined factor analysis and analytic hierarchy process to get a new method to calculate the intrinsic

value of stocks, and calculated the branches of stock growth, profitability and risk [3].

This paper examines a variety of industry analysis methods in industry analysis, such as industry type analysis methods, industry demand analysis methods to analyze the industry. In terms of stock investment, the simulated annealing algorithm and particle swarm simulation algorithm were tested and the experimental data were compared, and the optimal algorithm for stock investment was obtained.

2. THE LOGICAL FRAMEWORK SUB-METHODS OF INDUSTRY ANALYSIS AND STOCK INVESTMENT

2.1. Research on Industry Analysis Methods

(1) Industry type analysis method

1) Industry life cycle classification

In the life cycle of the industry, there are usually four periods from naive to recession. These four periods are general descriptions of trends, but they are not applicable to all industries. Under the influence of many other factors, changes in the industry life cycle are more complicated [4].

2) Industry economic cycle classification

The industry economic cycle classification method is actually more applicable to the analysis of securities investment: its classification of industry types is based on the industry's response to the economic cycle. Economic growth is not non-linear, but gradual. Usually, before entering the recession period, there will be a period of prosperity or steady growth. After entering the recession period, economic growth will slow down or stop growing; and then enter the recovery period, different industries will react differently in the economic cycle. At every stage of the business cycle, some industries have better activities and benefits than others. In the case of different industrial economic cycle responses, the types can be divided into three types: growth type, passive type and circulation type [5]. An evolving industry can usually be independent of cyclical economic changes and grow at a faster rate than economic growth. Even in the economic downturn, sales revenue and industry profitability can maintain significant growth. For example, high-tech industries such as computer software and biopharmaceuticals fall into this category. In the process of economic cycle changes, the operation of the passive industry is in a state of steady growth: during the period of economic growth, the industry's operating performance rises, and during the period of economic recession, the industry can maintain stable growth. Passive industries are usually (according to the life cycle of classification) mature industries. For example: the electricity and gas utility industry, regardless of the

economic situation, the daily electricity and gas consumption will not change; another example is the food industry, because the market demand for food belongs to the demand for steel [6]. The profit of the cyclical industry The trend of change follows the direction of the economic cycle. The industry made huge profits due to economic growth and suffered losses due to the economic downturn. The profit path of this type of industry coincides with the trajectory of the economic cycle in a more exaggerated form. Through the secondary classification, we can judge the changes and growth trends of the industry according to the changes in the business cycle, and then judge the current and future profits of enterprises in the industry [7].

(2) Industry demand analysis method

The analysis of the macroeconomic environment, industry boom cycles and external factors is ultimately an assessment of the future demand for industrial products. The analysis of the influence of external factors on demand mainly judges the influence of these uncertain factors on the demand of industrial products. And based on the results of the analysis, quantitative forecasts and demand trends are given. A deeper and more accurate analysis of requirements allows us to understand the generation of requirements. It is very useful to predict the total product demand of the industry, and more importantly, to understand the source of industry sales revenue through customer analysis [8]. Each branch has to serve thousands of employees, and it is impossible to estimate the needs of each employee. Through the understanding of customers and the classification of customer groups, the industry market can be divided into several sub-markets. This allows submarket analysis to focus on some important influencing factors and improve the accuracy of the analysis. In these sub-markets, total demand for products in related industries can be generated [9].

2.2. Analysis of Stock Investment Methods

(1) Cash flow discount model

The reason investors invest in stocks is to obtain the right to future dividends. For investors, future cash flow is their future dividends. Then the intrinsic value of a company should be the discounted value of all dividends that investors can get. In other words, the intrinsic value of the asset is equal to the discounted value of the expected cash flow, which is the valuation principle of the discounted cash flow method [10]. For some companies with financial constraints, mergers and acquisitions, and cyclical profits, this valuation method will not be applicable because it is difficult to estimate their future cash flow [11].

(2) Simulated annealing algorithm

The principle of this algorithm is somewhat similar to the principle of metal forging and annealing. Some

thermodynamic theories can be applied in statistics. Each point in the search space can be compared to free molecules in the air. Just like air molecules, there are also points in the search space. Energy", energy represents the degree of matching between the sentence and the point. The algorithm selects any point in the space as the starting point: before each step, it will count an adjacent molecule immediately, and then calculate the probability of reaching the adjacent point from the starting point [12].

(3) Particle swarm algorithm

The particle swarm algorithm (CAS for short), the members of the CAS are called the main body. The subject is usually adaptable. The swarm particle algorithm is inspired by the study of bird swarm behavior and is usually used to solve optimization problems. In this algorithm, a point in the search dimensional space can be regarded as a possible solution for each optimization problem, which is called a particle. The objective function determines the fitness value of all particles, and the flight speed determines the flight direction and distance of a single particle. At this time, the optimal solution particle is followed by other particles and flies and searches in the space until the optimal solution is found.

3. SUB-EXPERIMENTAL RESEARCH ON THE LOGICAL FRAMEWORK OF INDUSTRY ANALYSIS AND STOCK INVESTMENT

3.1. Dividend Discount Model Experiment

The dividend discount model is one of the more commonly used stock valuation methods. In the absolute valuation model, the gas cash flow is taken as the cash dividend per share paid by the company to shareholders in each period, and the discount rate is the minimum rate of return required by investors when investing in equity, that is, the necessary rate of return.

Let D_t denote the cash dividends paid in each period, and k denote the discount rate, then there is formula (1).

$$p = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_t}{(1+k)^t} = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)^t} \quad (1)$$

For most investors in the current market, they generally do not hold stocks all the time. Investors are bound to sell stocks at a certain price in the future, hoping to make a difference. In this case, we can consider investors The reason for buying stocks is that they can obtain cash flow from two aspects in the future: one is the cash dividend during the holding period; the other is the expected selling price of the stock. Therefore, the principle of absolute valuation is used to calculate the stock. When the theoretical value of, the cash flow is the sum of the cash dividends of each period and the

present value of the expected stock price at the end of the holding period.

3.2. Analysis Experiment of Factors Affecting the Intrinsic Value of Stocks

$$p = \frac{D_1}{1+k} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_t}{(1+k)^t} + \frac{P_t}{(1+k)^t} \quad (2)$$

When the variable t tends to 0,

$$p = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)^t} = \frac{D_1}{k-g} \quad (3)$$

Among them, the ordinary stock value in theory is represented by P , the expected dividend in year t is represented by D_t , the stock market price in year t is represented by P_t , and the discount rate of each year is denoted as k , g ($k > g > 0$) indicates the steady growth rate of dividends. According to the formula, it can be seen that the inherent mechanism of stocks depends on the continuous distribution of dividends during the investment period and the stock price when the investment is sold at the end of the investment period. The higher the dividend growth rate, the higher the intrinsic value of the enterprise. Therefore, in order to avoid investment risks, investment should choose company stocks with good growth potential. In fact, under normal circumstances, the serialization and incrementality of stock dividend distribution mainly depend on the company's growing operating performance. Only when the company's operating performance and operating scale continue to grow, the company will continue to distribute more dividends (including cash dividends). And capital provident fund) to shareholders; and the stock of such a company will be loved by stock market investors, and its stock price will continue to rise over time. Therefore, an important factor affecting the intrinsic value is the growth of the company.

4. SUB-EXPERIMENTAL ANALYSIS OF THE LOGICAL FRAMEWORK OF INDUSTRY ANALYSIS AND STOCK INVESTMENT

4.1. Experimental Analysis of Simulated Annealing Algorithm

(1) Algorithm steps

1) A new solution in the solution space is obtained from the current solution by a generating function.

2) Calculate the difference of the objective function corresponding to the new solution.

3) Determine whether the new solution is accepted.

4) When it is determined to accept the new solution, replace the current solution with the new solution.

Under the condition that the preference coefficient $\lambda = 0.2, 0.5, 0.8$, the optimal investment strategy portfolio and the rate of return and variance of each portfolio, the experimental results are shown in Table 1.

Table 1. Analysis table of experimental results

Preference coefficient	rate of return	risk
0.2	0.55	1.61
0.5	0.57	2.33
0.8	0.58	4.16

It can be seen from Figure 1 that as the value of λ gradually increases, the combined return rate of the simulated annealing algorithm is gradually increasing, but the simulated annealing algorithm pays attention to the rate of return while also causing high risks.

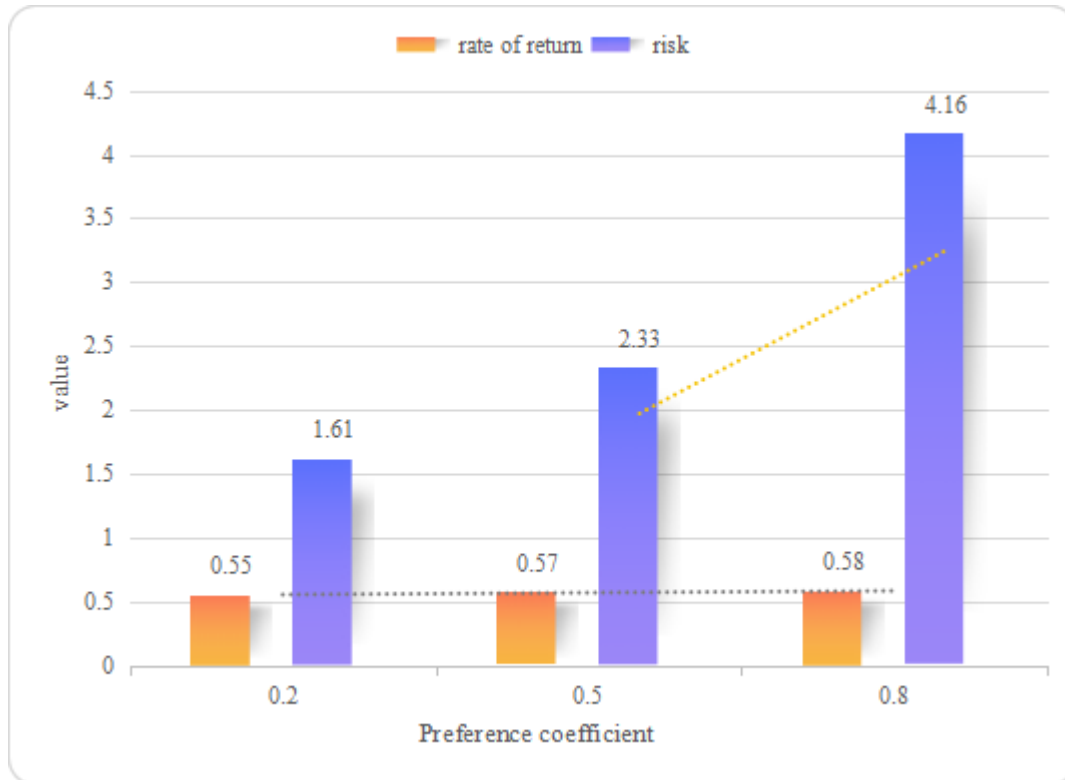


Figure 1. Analysis diagram of experimental results

4.2. Experimental Analysis of Particle Swarm Algorithm

In investment portfolio theory, people hope to find a combination of several investment strategies to achieve the goal of maximizing returns and minimizing risks. If this process is expressed by the above-mentioned particle swarm method, it is through the continuous movement of particles to find the combination that can maximize the profit and minimize the risk. Each particle represents a possible solution, and each particle changes with the change of the optimal solution until the particle converges to a value and no longer changes. For this purpose, a particle swarm algorithm experiment was carried out and the normal investment was obtained. The result is used as a control group to compare with the

particle swarm algorithm. The experimental results are shown in Table 2.

Table 2. Experimental analysis table of particle swarm algorithm

Preference coefficient	rate of return	risk
0.2	0.38	0.8
0.5	0.39	0.98
0.8	0.41	1.12
Control group	0.32	1.23

It can be seen from Figure 2 that compared with the normal investment control group, the income obtained by using the particle swarm algorithm for stock investment is greatly improved, the highest can reach 0.41, and the risk is also lower than the control group, the lowest is 0.8, which shows that the particle swarm algorithm is in There is a certain practical application value in stock investment.

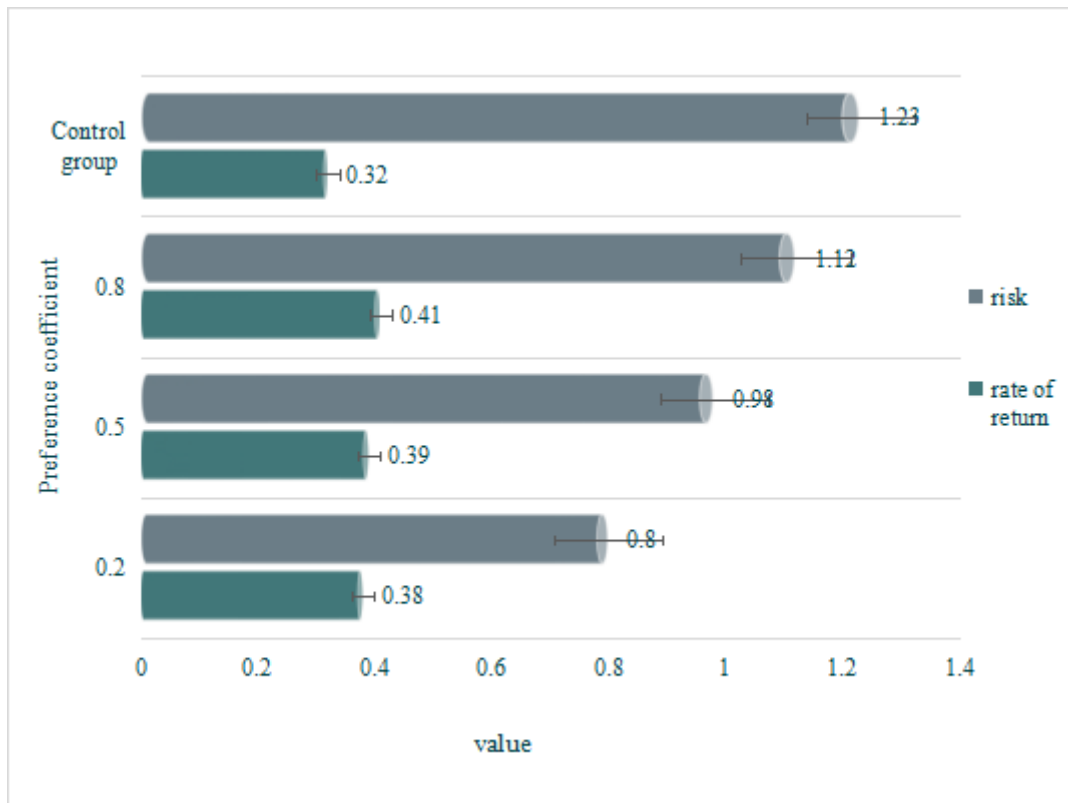


Figure 2. Experimental analysis diagram of particle swarm algorithm

5. CONCLUSION

The idea of investing in stocks has always been the main idea of western securities investment. With the growth of the securities market and the opening of the capital market, the popularization of stock investment concepts has become an inevitable trend. Therefore, it is necessary to have an in-depth understanding and discussion on this kind of investment. This work takes the value investment concept as the basic guiding ideology, and conducts preliminary pricing research on the Chinese securities market. In the research, the main focus is on the analysis of individual stock pricing. Due to space limitations, the company's point ratio and the weight of the valuation results only suggest one way of thinking. There is no specific applied research in the article. In the future, more work may be done in this area. However, this article also has some shortcomings. Because the market is constantly changing, under the trend of global integration, the market in each country is changing and influencing each other. Therefore, there is no need for dynamic valuation based on single market data, I hope it can be improved in monitoring research.

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