

Comparative Analysis of Investment Methods and Retail Investors Based on Graham Value Investment Theory

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Abstract. China's A-share market has many retail investors, and individual investors are easily affected by emotions and impulse to buy and sell, so they will be a lot of losses in the market. This paper imitates the investment model of retail investors, chases after going up trading behavior, and constructs investment strategies based on Graham's value investment theory through screening out several simple, clear, and measurable indicators, and selecting the appropriate trading cycle. Finally, in the past decade of A-shares, through back-testing, the proposed relevant strategy proves that it can get a return much higher than the return of retail investors' investment returns, inflation rates and government bond return. The sensitivity analysis of various indicators of the strategy is carried out. This paper hopes that through the analysis and comparison of the two investment methods, a better investment model can be obtained, and a stable preservation and appreciation of wealth can be realized.

Keywords: Graham value investment theory; Back-testing; Retail investors.

1. Introduction

China's A-share market has developed well since its inception in 1990. Up to now, the total market value of the more than 4,000 stocks of retail investors in China's A-share market listed on the main board is about 80 trillion yuan. Unlike other countries, retail investors account for most of the A-share market, with more than 85% of the average daily turnover (US\$50 billion to US\$70 billion) completed by retail investors. Due to the characteristics of retail investors, A shares have huge amplitudes and strong volatility. In general, individual investors are inexperienced, susceptible to emotions, and frequently buy and sell. Short-term trends and rumors have a very large impact on retail investors, often with impulsive buying or selling, and most of them have become harvested "leeks"[1]. But long before the establishment of A-shares, the Western world had many very mature investment methods, such as Benjamin Graham in the United States. As the founder of value investing, Graham believes that value investing is reflected in stock investment, that is, to find undervalued stocks and then sell them at the right price. His books *Securities Analysis* and *Smart Investor* were born more than 100 years ago and remain the best-selling classics in the world of investing. As a generation of masters, Warren Buffett, John Neff, John Borg, etc. were greatly influenced by his ideas. Graham's value investment theory mainly includes two aspects, one is intrinsic value, and the other is the margin of safety. At the same time, he also emphasizes long-term investment and diversification[3].

First, "intrinsic value" is the basis of stock value. Graham does not believe that "stock price equals stock value", in practice, stock prices often deviate from their intrinsic value, but stock prices also fluctuate around their intrinsic value, and when there is a deviation, the efficient market creates a tendency to return the price to its intrinsic value. However, the process of price-to-value return is not necessarily achieved overnight, and it may also be very slow, which is closely related to market perception and market sentiment, so there is a certain investment risk. The second is the margin of safety theory, which refers to buying stocks that are relatively undervalued. Graham believes that risk depends primarily on the gap between the market price of a stock and its intrinsic value, and that the lower the market price is below intrinsic value, the lower the risk, and the higher the margin of safety. Third, Graham advocates long-term investing, but he believes that long-term investment is not to buy and hold it all the time, but to make value judgments and swing operations at the same time. He believes that the role of technical analysis is weak, and investors should get benefits through timing

and price judgment. The so-called timing is the judgment of market movements, buying stocks when predicting that the market will rise, and selling stocks before falling. The so-called price judgment means that value investors should buy a stock when the price is lower than its intrinsic value and sell a stock when the price is higher than its intrinsic value. Fourth, Graham's portfolio investment theory believes that investors must buy a group of securities if they want to obtain high security, and they can also sell other securities for arbitrage or hedging while buying certain securities. Specifically, in stock investment, people should diversify their holdings of multiple stocks[3].

According to Graham's intrinsic value theory and the calculation method of intrinsic value of the enterprise, the judgment of intrinsic value can be further broken down into specific criteria such as profitability (profit growth rate, return on net assets, gross margin on sales), stability of performance (no significant decline in the past few years), financial condition (current ratio and liabilities), dividend yield and dividend sustainability (there are relatively stable and sustained cash dividends)[4]. The margin of safety theory requires us to select stocks whose stock price is much lower than their intrinsic value, and the specific judgment of the stock price is the price-to-earnings ratio, and the yield of the stock should be at least 2 times the yield of the bond. Regarding the selection of value investment parameters, there have been many mature studies in the past. Ohlso and Feltham made groundbreaking contributions by proposing the EVA model. Basu first conducted investment research in 1977 using specific financial indicators to allow (P/E) to demonstrate its value in investment. Warren E. Buffett, as a representative of value investing, his "Buffett Letter to Shareholders" (from 1957 to the present) can discuss value investment from the three aspects of corporate governance structure, company valuation and market expectations. JeremyJ. Siegl warns investors not to blindly follow suit, and identifying the real content also provides a good inspiration for this article to compare the two models[5].

This paper constructs a relatively simple stock selection strategy based on Graham's value investment theory, which is used to verify whether Graham's value investment theory can continue to play an effective role in the unique environment of the A-share market on the one hand, and on the other hand, it hopes to provide investors in the A-share market with a rational stock selection idea.

2. Method

According to the above specific analysis of Graham's stock selection strategy, this paper will establish two investment models, select the corresponding financial indicators according to different stock selection investment strategies to select stocks in the A-share market and verify the applicability and rationality of the use of relevant indicators through back-testing. The back-testing data is the stock price of A shares from September 16, 2012, to September15, 2022, and the test platform is Guorn.com.

This article sets up a group A to imitate the behavior of retail investors, and the investment strategy is to chase after going up[6]. Its initial stock selection conditions are mainly momentum indicators, that is, the top 5 in the 5-day gains, the top 5 in the 20-day gains, and the more than 0 in the day's turnover (filtering suspended stocks). In addition, trading cycle in Group A is 5 working days (in line with the retail personality and easy to trade) and the maximum number of stock picks is 8 stocks (not variables that need to be discussed in this article, consistent with Model B).

The next step is to set up Group B for the Graham Value Investing Strategy, which has two major indicators of initial stock selection conditions. First, profitability indicators, the requirements are more than 20% of the return on net assets, deducting the return on non-net assets more than 15% (excluding the impact of non-recurring gains and losses on net profit), and the 5-year compound growth of net profit more than 15% (prevent some years from experiencing a brief decline in growth or no growth) and operating income growth more than 25%[7]. The second is the price indicator, which requires the price-to-earnings ratio to be less than 30 (the yield of one-year treasury bonds is about 2.5, then the price-to-earnings ratio of treasury bonds is 40, then the stock price-earnings ratio should be around 20, taking into account the A stock market in the case of a generally high P/E ratio,

the screening criteria for P/E ratio should be appropriately expanded to 30)[8]. In addition, the number of trading cycle and stock picks is 90 working days (according to Graham's theory, value investing should be a long-term investment) and the 8 largest holdings, respectively.

Since the test results of Group B were not satisfactory, the overall yield after the strategy back-testing was even lower than that of the CSI 300 Index, and the retracement rate was as high as 58.05% (In Table 1). Therefore, this article attempts to improve and optimize the strategy by adding other conditions.

Through further analysis of the stock selection strategy, the author found that the indicators selected by the preliminary stock selection strategy are all the company's profitability indicators, but whether the company can continue to grow and develop rapidly does not only depend on the profitability indicators, whether the profit can be converted into real cash flow and the company's asset status and operational capabilities are equally important for judging the intrinsic value of the company, and even in many cases, cash flow and asset status directly affect whether a company can continue to operate[9]. Therefore, the operating capacity indicator and the solvency indicator have been added to this paper, respectively, the accounts receivable turnover ratio of more than 3 (to ensure that the profits earned by the company can be recovered, rather than just staying on the book profit and becoming accounts receivable) and the cash ratio more than 50% (on the one hand, the high cash ratio indicates that the current liabilities of the enterprise are not large, and the short-term debt repayment pressure is small[10]; On the other hand, it shows that the assets of the enterprise are in good condition, and there are not many assets in the current assets such as accounts receivable and inventories, which are relatively difficult to realize, which confirms the good operational ability of the enterprise)[11]. After obtaining the back-testing results, this paper analyzes the sensitivity of various indicators to verify the influence of the selected indicators on the final income.

3. Results

3.1 Back-Testing Results

Back-testing results (Table 1 and Figure 1) show that the 10-year yield of Group A is -26.36% and the annualized yield is -3.02%. In the ten years when the CSI-300 rose by 78.29%, Group A's investment method could not even keep the principal, which also proved to some extent that this simple and rough investment method could not effectively help ordinary shareholders earn profits in the long run. Based on the Graham's investment strategy in Group B, there was a significant increase in revenue. The rate of return changed from negative to positive, reaching 38.43%. The annualized yield was 3.31%, but it was still below the CSI-300 increase, with a maximum pullback rate of 58.05%. This suggests that Graham's investment strategy and value investing are more effective than blindly following investment trends.

Table 1. Back-testing results

Group	Gross Return	Annualized Return	Maximum Draw Down
group A	-26.36%	-3.01%	28.85%
group B	38.43%	3.31%	58.05%
group C	166.13%	10.29%	49.92%
CSI-300	78.29%	5.96%	46.70%

After the improvement of Graham's value investment strategy, Group C(p2) showed a good total return rate and annualized rate of return, with a total return of 166.13%, which is close to C The SI-300 has an ultra-high rate of return of twice as much. The annualized return was 10.29 percent, more than quadrupling compared to the Graham value investment model in pre-modified group B. At the same time, the maximum pullback rate also dropped to 49.92%, a decrease of twelve points. This shows that in the improved Graham's Investment Strategies, the advantages of value investing are

reflected. The operational capability indicator is an important indicator of ensuring that the profits earned by the company can be recovered, rather than just staying on the book profit, and becoming accounts receivable, while the solvency indicator also indicates the high cash ratio. The current liabilities of enterprises are not large, and the nature of short-term debt repayment pressure is relatively small has a certain impact on stock prices.



Fig. 1 The Back-testing results comparison of different groups

3.2 Sensitivity Analysis

In the improved Graham value investment strategy, the author has achieved a good yield, but to explore the degree of influence of the selected indicators on the back-testing results, all indicators in this strategy continue to analyze the sensitivity. First, this paper analyzes profitability sensitivity, the overall indicator is lowered by 5%: the return on net assets more than 15%, the return on non-net assets is more than 10%, the net profit is more than 10% in the 5-year compound growth, the growth rate of operating income is more than 20%, and the back-testing results are 3.84% annualized yield and 45.75% total return. Secondly, the overall indicator is raised by 5%: the return on net assets is more than 25%, the return on non-net assets is more than 20%, the net profit is more than 20% in the 5-year compound growth, the operating income growth rate is more than 30%, and the back-testing results are an annualized yield of -1.01% and a total yield of -9.66%. Through the back-testing results, the strategy is extremely sensitive to yields, and the increase or decrease of related indicators will significantly reduce the final rate of return, if the initial selection of yield indicators is relatively reasonable, so that the normal continuous operation of the enterprise can be maintained in the appropriate yield range, investors can obtain stable returns. Yields that are too high or too low can mismatch returns and risks.

Secondly, this paper analyzes operational capacity and solvency sensitivity. The first is to reduce the 50%: the receivables turnover rate is more than 1.5, the cash ratio is more than 25%, and the back-testing results are 7.91% annualized yield and 113.93% total return. The second is to increase by 50%: the turnover rate of accounts receivable more than 4.5, the cash ratio more than 75%, and the back-testing result is an annualized yield of 4.68% and a total yield of 57.87%. The back-testing results show that higher and lower operating efficiency cannot bring higher returns, which is due to the unrealistic turnover rate, which makes it difficult to select the right investment target, and too low will lose the significance of screening and judgment, and the result is a decrease in yield.

Thirdly, this paper analyzes P/E ratio sensitivity. The first is to increase the P/E ratio: when the P/E ratio indicator is raised from 30 to 40, the yield drops to an annualized rate of 2.49% and the total yield is 27.90%, the risk increases sharply. The second is to lower the P/E ratio: when the P/E ratio indicator is reduced from 30 to 20, the annualized yield is -1.95%, and the total yield is -17.87%.

The P/E ratio indicator reflects the relationship between stock prices and company value, and theoretically a lower P/E ratio means a higher margin of safety. Through back-testing, it is found that when the P/E ratio is lowered, it will lead to a decline in yield, because the P/E ratio is also the market's judgment of the company's value, and the low P/E ratio is likely to be because the company's market prospects are not good and cannot achieve sustained and rapid growth.

In the end, this paper analyzes trading cycle sensitivity. When the trading cycle is reduced from 90 days to 60 days, the annualized yield changes from 1 to 14.99%, the total yield changes from 2 to 303.96%, and the maximum pullback rate drops to 40.18%. Further reducing the repositioning cycle to 30 days, the yield reversed, and the annualized yield became 10.35%, while the total yield was 157.57%. When the trading cycle is adjusted from 90 days to 120 days, an annualized yield of 7.64% and a total yield of 108.63% are obtained; Further raising the trading cycle to 150 days, the annualized yield and total yield have fallen significantly, 3.32% and 38.55% respectively. From the above tests, it is known that appropriately lowering the trading cycle and being flexible is conducive to the improvement of the yield and too high and too low the trading cycle is not conducive to achieving better returns.

4. Discussion

Looking at the results of the analysis of the whole article, it can find that Graham's value investment theory is generally better than the retail investors' chasing strategy, and it is also realistic and common sense to draw such results. However, when conducting sensitivity analysis, this article still finds that all indicators of value investing are basically sensitive, which I think is caused by two reasons. One is the limitations of Graham's theory of value investment, the theory of value investment always has posterity to improve and perfect the theories and models of predecessors, and Graham's model is no exception. The second is the reason why China's stock market is developing, China's stock market is nearly 30 years ago to establish and develop so far, although it has been generally mature, but there are still places that can be improved in terms of integrity, which leads to the value investment theory is not necessarily fully applicable. This article focuses on analyzing value investing, and the simulation of retail investor behavior is not complete enough, which is also the limitation of this article.

5. Conclusion

According to the analysis of the full text, based on Graham's value investment theory, several simple and clear and measurable indicators are screened out, and the appropriate trading cycle can be selected to obtain investment returns that are much higher than those of retail investors chase after go up, inflation rates and government bonds, even if the parameters of the model are modulated, the yield obtained is higher than that of the retail investment model, and this return is relatively stable, and the pullback situation is consistent with the system situation of the entire market, therefore, With this method, it can make wealth achieve stable growth, maintain and increase in value, and enjoy the value of compound interest. If retail investors can use these indicators correctly when selecting stocks, they will be able to select the right stocks, reduce the impact of market sentiment, and avoid excessive losses in the market.

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