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Research on Stock Selection Strategies Based on the Basic Value of Stocks Based on Buffett's Theory

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Abstract: The paper presented is highly significant as it explores the applicability and effectiveness of Warren Buffett's stock value investing theory in China's A-share market. By employing five key indicators—dividend yield, debt-to-asset ratio, ROE, net profit growth rate, and the 200-day moving average (MA200)—, the paper attempts to adjust the values of these indicators to construct a model. This model is tested on the Chinese A-share market to verify its universality and effectiveness. Ultimately, the author concludes that the stock value investing theory is practical in the Chinese market, although the numerical values differ significantly from those recommended in traditional Western literature. Specifically, the return on equity (ROE) within a specific parameter range yields better returns, which are a quarter lower than the values mentioned by Buffett; the forecasted net profit growth rate for the coming year shows a slight negative correlation with excess returns within a certain range; and the latest balance sheet debt-to-asset ratio and dividend yield are positively correlated with excess returns within a specific range.

Keywords: Value Investing, Quantitative Investing, Chinese Market, Buffett Theory

1. Introduction

Stock value theory refers to a theoretical system that determines whether a stock price is undervalued or overvalued by analyzing a company's fundamentals. The development history of this theory is starting from the late 19th century to early 20th century. This method is based on the theory of how shareholders can obtain returns from stocks. There are three main ways for shareholders to obtain returns from stocks. First, due to the good operating conditions of the company, the value of the company increases, which raises the stock value and returns to shareholders in the form of price difference or dividends. Second, the company raises funds through IPO by issuing new shares or splitting its subsidiaries. Third, investors need to be more rational. In the short term, investor sentiment will cause unreasonable stock fluctuations that are not based on performance and other indicators. Such volatility may change stock prices and allow investors to profit through price differences. The first two ways of obtaining returns are reasonable and safe in the long run because the market will likely achieve efficient results through continuous adjustments. At the same time, the third is inefficient and has no actual efficiency output as support, and the risk is relatively high [1]. Value investing mainly uses the first two methods of obtaining returns. Buffett is a pupil of value investing pioneer Benjamin Graham. They both received good returns in the

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stock market. However, many doubt whether value investing can achieve adequate returns in China's A-share market, as more than 70% comprises retail investors. Emotions play a significant role in stock price fluctuations, making the market immature, and few investors adopt value strategies [2]. However, prior research shows that value investing is effective in China. For example, research by scholars such as Sun Youqun bases on the overall quality of listed companies in China prove that value investing is feasible in China [3]. Research by scholars Yao Hui and Wu Tingting also affirm that an investment model that considers both fundamentals and valuation indicators can achieve significant excess returns in the medium to long term [4].

The primary purpose of this paper is to combine Buffett's theory and construct a quantitative model to construct an investment portfolio by using five indicators: return on equity (ROE), expected net profit growth rate in the next year, latest report debt-to-equity ratio, dividend yield, and long-term moving average (MA200) to explore further the applicability of value investing in A-share trading in China.

In the second section of the paper, the specific meaning of the indicators of this model and how they are selected will be introduced. In the third section, we will introduce how the model specifies the parameters of these indicators, how it is applied to the return rate and Sharpe ratio of the A-share trading in China from March 2023 to April 2024, and whether it is universal. Finally, at the end of the paper, we will put forward extensions and suggestions.

2. Model Formulation

Fundamental quantitative investing is a method that combines fundamental indicators with quantitative investment, which means using fundamental indicators to achieve excess returns [5]. In this model, the quantitative stock selection indicators based on fundamentals mainly include company financial data (ROE, net profit growth rate, asset-liability ratio, dividend yield) and stock market performance indicators (long-term moving average MA200). The calculation formulas for these indicators are as follows:

$$\text{ROE} = \frac{\text{net profit}}{\text{average net assets of shareholders}} \tag{1}$$

$$\text{Net profit growth rate} = \frac{\text{net profit of this period} - \text{net profit of the previous period}}{\text{net profit of the previous period}} \tag{2}$$

$$\text{Asset} - \text{liability ratio} = \frac{\text{total liabilities}}{\text{total assets}} \tag{3}$$

$$\text{Dividend yield} = \frac{\text{dividend per share}}{\text{stock price}} \tag{4}$$

$$\text{MA200} = \frac{\sum \text{closing price in the past 200 trading days}}{200} \tag{5}$$

This type of model has several key advantages: Firstly, it is supported by solid performance, providing a valuable underlying logic. Secondly, the strategy's effectiveness can be verified through long-term quantitative back testing, and statistical regularities can be identified. Additionally, the model's applicability covers all A-shares in China, excluding ST stocks and new stocks, which have been validated with a large sample size, further supporting the strategy's effectiveness.

2.1. Indicator factor

The selection theory of this model is mainly based on Buffett's moat concept, which means selecting good companies, reasonable valuations, and good timing.

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In theory, Return on Equity (ROE) is the most basic and reliable indicator used to measure a company's long-term operating performance because it directly and comprehensively reflects the balance sheet, cash flow statement, and income statement [6]. Buffett believes that companies with a long-term ROE of more than 20% should be bought, while those below 7% are not worth buying [7]. However, Liu Junwei and Zhou Xiaoxiao have demonstrated low effectiveness of using the ROE factor alone in 2017 [8]. It has been found that some risk factors may affect the efficacy of the ROE factor, such as whether the ROE value is sustainable and whether a company's good ROE indicator is due to the use of high leverage. Considering these factors, this model reduces the requirements for the ROE value and gradually adjusts and tests the specific numerical range with ROE > 12% as the benchmark to study the more effective range. Additionally, to reduce the impact of such risks in stock selection, the model introduces the indicators of the expected net profit growth rate for the next year and the latest reported asset-liability ratio.

In addition to a company's good operating performance, reasonable valuation is also essential. There are many indicators used to measure valuation in the market, such as Dividend Yield (DYR), Price/Earnings to Growth Ratio (PEG), Price/Book Ratio (PB), and Price/Earnings to Earnings Ratio (PE). The market capitalization to net asset ratio of a business is known as the PB ratio. It is typically used to assess the growth value of the business, its capacity to employ capital, and its net asset research. The market capitalization to net profit ratio of a business is known as the PE ratio, which is usually used to measure how long it takes for a stock to return its earnings [9]. The PEG ratio is the PE ratio to the earnings growth rate of the enterprise, which is usually used to evaluate growth stocks and is an indicator of stock valuation and growth potential. However, it is unsuitable for value stocks whose growth rate has slowed. The advantage of the PEG ratio is that it can more comprehensively reflect the dynamic growth of a company to make up for the shortcomings of the traditional PE ratio. However, all three indicators have the risk of financial manipulation. Compared to the first three indicators, the advantage of the Dividend Yield (DYR) is that it can prevent the risk of financial manipulation. Because dividends require actual cash outflows, companies that genuinely distribute dividends are relatively less likely to falsify operating performance. No matter how high the book profit is, if it cannot be used for cash dividends, then the high book profit is questionable. At the same time, with investors' rational return and the market's improvement, investors have gradually paid more attention to the dividend yield. Therefore, this model uses the dividend yield as a model indicator.

Buying stocks at the right time is also very important. There are many retail investors in China's stock market, so due to their lack of professional knowledge, they are more likely to be emotional, which can easily lead to significant deviations from the value of stocks in the short term. Furthermore, due to the imperfect trading mechanisms in the stock market, arbitrage in the Chinese market is relatively tricky, further exacerbating the phenomenon of stocks deviating from their values [10]. To avoid excessive short-term emotional fluctuations affecting stock prices and thus the model, and because market prices tend to return to their practical values over a more extended period gradually, this model chooses the 200-day moving average (MA200) as a reference.

However , there are now hundreds of alpha factors proposed, scholars have found that most alpha factors, as they are used over time, provide gradually decreasing excess returns[11][12].

3. Results

This model's stock price, backtesting, and other data are sourced from the JoinQuant website, covering all A-share stocks except ST stocks. The model has selected reasonable theoretical data for five indicators—Return on Equity (ROE) greater than 12%, the expected net profit growth rate for the next year (ENPGR) greater than 5%, the latest reported asset-liability ratio(LRALR) less than 70%, dividend yield greater than 2%, and the 200-day moving average (MA200). The model also

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adjusts its stock selection every month. Based on these parameters, the author will gradually refine the model by tuning the data indicators according to actual market data to achieve a reasonable return rate(RR) and Sharpe ratio(SR).

The following are the model backtesting result figures from February 1, 2023, to April 1, 2024.:

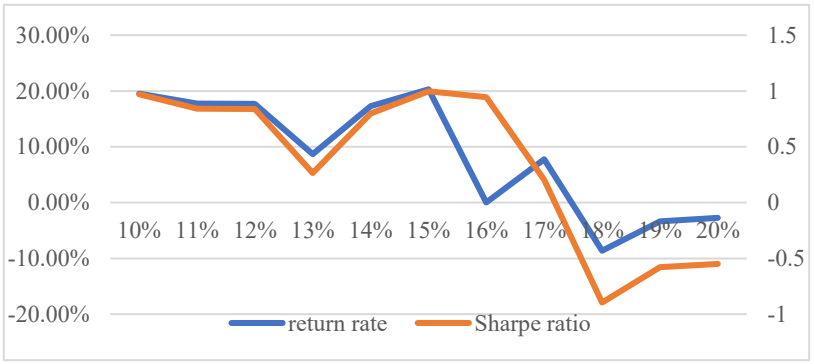

Figure 1: Backtesting chart for different ROE indicators.

Figure 1 shows the results of changing the size of the ROE indicator while keeping the expected net profit growth rate for the next year > 5%, the latest reported asset-liability ratio < 70%, dividend yield > 2%, and the long-term moving average (MA200) constant. The figure has the size of the ROE indicator on the x-axis, the return rate on the left y-axis, and the Sharpe ratio on the right y-axis. It can be observed that when the ROE is in the range of 10% to 15%, the return rate is nearly around 20%, while the Sharpe ratio is around 0.5 to 1. This figure demonstrates that the model is effective within the range of ROE values of 10% to 15%, indicating its universality rather than being a particular result of a specific ROE indicator size. However, after the ROE exceeds 16%, the return rate and Sharpe ratio significantly decrease. This could be due to several reasons: some companies may increase their ROE through financial engineering or manipulating financial statements, which may not reflect the company's true profitability or value. It could also be because companies with high ROE may have higher financial leverage or operational risks, which could affect stock returns if these risks increase. Additionally, a high ROE may reflect the overall profitability of an industry rather than the internal management or competitive advantages of a company. Companies with high ROE may still need better returns if the industry faces challenges or increased competition.

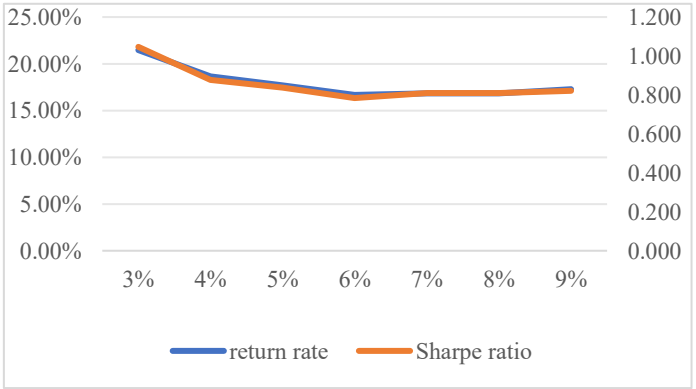

Figure 2: Backtesting chart for different ENPGR indicators.

Figure 2 illustrates the results of varying the expected net profit growth rate for the next year under the conditions of ROE > 12%, the latest reported asset-liability ratio < 70%, dividend yield >

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2%, and the long-term moving average (MA200). The x-axis represents the expected net profit growth rate for the next year,the Sharpe ratio is displayed on the right y-axis, while the return rate is displayed on the left. It can be observed that when the expected net profit growth rate for the next year falls within the range of 3% to 9%, the return rate is nearly 18%, with the Sharpe ratio around 0.8 to 1, indicating only a slight decrease. This figure demonstrates that the expected net profit growth rate for the next year within the range of 3% to 9% is effective, showcasing the model's universality rather than being a unique result of a specific expected net profit growth rate for the following year.

Figure 3: Backtesting chart for different LRALR indicators.

Figure 3 shows the results of changing the values of the latest reported balance sheet asset-liability ratio under the conditions of ROE > 12%, expected net profit growth rate > 5%, dividend yield > 2%, and long-term moving average (MA200). The figure plots the latest reported balance sheet asset-liability ratio on the horizontal axis, the return rate on the left vertical axis, and the Sharpe ratio on the right vertical axis. Generally, a lower latest reported balance sheet asset-liability ratio is considered a positive indicator. However, according to the backtesting results, the latest reported balance sheet asset-liability ratio < 55% results in relatively poor returns. This may be due to issues in the company's financial structure, such as improper asset allocation or deficient long-term debt levels, leading to inefficient capital operation. Another possibility is inadequate profitability, where the company may need help to borrow money from banks, resulting in a low asset-liability ratio and poor returns.

Figure 4: Backtesting chart for different DY indicators.

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Figure 4 shows the results of changing the dividend yield under the conditions of ROE > 12%, expected net profit growth rate > 5%, latest reported balance sheet asset-liability ratio < 70%, and long-term moving average (MA200). The figure plots the dividend yield on the horizontal axis, the return rate on the left vertical axis, and the Sharpe ratio on the right vertical axis. The figure shows that both the return rate and the Sharpe ratio increase significantly as the dividend yield rises, it becomes more evident that the yield significantly affects the return.

From the above backtesting results, the model's rate of return is relatively stable, and changing the numerical range within a specific range still yields a stable return. This proves that the excellent return rate is not due to special data conditions but is generally applicable within a particular range. At the same time, ROE and dividend yield significantly impact the model's results. Some of the data in the model differs from what Buffett mentioned, such as Buffett's belief that an ROE above 20% is good and that the balance sheet should be below 50%. However, this is only sometimes the case. This may be due to the different characteristics of different regional markets. However, it can be affirmed that Buffett's value investment model applies to the Chinese market. In the future, with a deeper understanding of stock quantification investment, adding more factors can increase the return on stocks and reduce the risk of stock investment.

4. Conclusion

This paper primarily constructs a stock investment portfolio using indicators such as Return on Equity (ROE), Estimated Net Profit Growth Rate for the Next Year, Latest Balance Sheet Asset-Liability Ratio, Dividend Yield, and the Long-Term Moving Average (MA200). It demonstrates the effectiveness of Warren Buffett's value investing philosophy in the A-share trading in China, providing insights into the suitability of Buffett's approach within the unique data selection scope of the A-share market in China.

Although there are now hundreds of alpha factors proposed, scholars have found that most alpha factors, as they are used over time, provide gradually decreasing excess returns. The no-arbitrage principle can explain this phenomenon: when a specific alpha factor becomes well-known in the market, as people use it more widely, the excess returns it can provide will gradually decrease as multiple traders compete. Therefore, this model will only sometimes be effective, and its excess returns may decrease progressively or even disappear in future market competition. Furthermore, due to the model's limitations, it cannot consider all the fundamental factors, so the model has specific content yet to be considered. Also, since the model uses only data indicators and not textual analysis of financial reports, there may be situations where specific financial factors of certain companies are difficult to discern, leading to errors.

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