International Journal Of Engineering Research And Development
e- ISSN: 2278-067X, p-ISSN: 2278-800X, www.ijerd.com
Volume 21, Issue 1 (January, 2025), PP 102-109

Behavioral Finance-Based Analysis of the Markowitz Model Investment Strategy for the Energy Sector

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Abstract: *In recent years, financial anomalies have occurred frequently in both domestic and international markets, and traditional financial theories often fail to provide reasonable explanations for the irrational behaviors of market participants. Behavioral finance, by studying the psychology and decision-making behavior of investors, has challenged the optimal decision-making models of traditional financial theory and effectively explained financial market anomalies. This paper explores the irrational behaviors in the Chinese market based on the theory of behavioral finance and utilizes investors' cognitive and behavioral biases to construct behavioral investment strategies, providing practical reference for investors. At the same time, in the severe environmental pollution and energy shortage development context, the Chinese people have realized the importance of energy and gained attention from various aspects.With the rapid development of the energy industry, the investment efficiency of energy listed companies has become an important means of judging investment objectives.*
Therefore,this team combines the theory of behavioral finance with the analysis of irrational phenomena in the Chinese stock market and selects the value strategy for empirical research. This team selects the cumulative return,annual return, Sharpe ratio,etc. as evaluation indicators to measure the performance of investment strategies from the perspectives of return and risk, and comprehensively evaluates the 15 energy stocks selected from the energy sector in China. The results show that the cumulative return, annual return, standard deviation, maximum drawdown rate, and Sharpe ratio of Kemerti Gas, China Coal Energy, DQ Energy, Shanghai Energy, Hunan Development, Chint Electrical Equipment, BYD Co., Ltd., L&F Energy, and ADE Energy are relatively good, with a comprehensive performance level of excellent, which can be considered as investment objects by the team. This can help the team improve their self-awareness, reduce cognitive biases and other irrational behaviors, and choose appropriate investment strategies to obtain excess returns.
Finally,the team knows that investment involves both risks and profits, and in order to increase the expected return on investment, investors may have to face higher risks. Based on the Markowitz portfolio model, the team can derive the optimal weight and derive the optimal portfolio investment strategy.

Keywords: Behavioral finance;Value strategy;Irrational phenomena in Chinese stock market.

Date of Submission: 02-01-2025 Date of acceptance: 13-01-2025

I. Introduction

With a series of policy, technical, and financial support, China has achieved significant progress in wind power generation, ocean energy generation, and solar energy utilization. Currently, seven industries, namely the new-generation IT industry, renewable energy industry, energy-saving and environmental protection industry, new-energy vehicle industry, and new material industry, have become key strategic and growth-oriented industries in China. Notable advancements have been made in some renewable energy utilization technologies. Against this backdrop, the renewable energy industry has flourished, and it is supported by the public due to its low-carbon and energy-saving characteristics.

As China’s reform and opening-up continue and the national economy steadily improves, investing to preserve and increase wealth has become an essential skill for everyone and every household. Due to the late start of China’s securities market, which is still in its developmental stage, many investors have not yet established a scientific and effective investment strategy and analysis method. As a result, emotional and intuitive investments are common, leading to unsatisfactory investment outcomes. Instead of preserving and increasing assets, most investments result in losses. Therefore, for securities investment analysis, establishing correct investment philosophy and utilizing an investment strategy are particularly crucial. Only by adopting more scientific analysis methods can investors reduce risks and achieve wealth growth in the volatile securities market.

With the deepening of financial research, many anomalies unexplainable by traditional financial theories have emerged in the market, such as the equity premium puzzle, calendar effects, momentum effects, and long-term reversals. The emergence of behavioral finance can effectively assist investors in securities investment analysis. Investment strategies based on behavioral finance exploit market mispricing caused by different psychological biases among investors for arbitrage. Therefore, analyzing irrational phenomena and investor

behavior characteristics in China's securities market first can help select appropriate investment strategies and facilitate profit generation in investments.

II. Literature Review

Since the 1980s, the continuous emergence of financial anomalies in the market has challenged the Efficient Market Hypothesis (EMH). To provide more reasonable explanations for these anomalies, Behavioral Finance Theory has made breakthrough progress. During this period, notable contributors to the development of behavioral finance theory include Thaler, Shiller, etc. Thaler (1985)[10] mainly analyzed time series of stock returns, investors' mental accounting, and other issues. Shiller (1990)[9] conducted detailed research on abnormal stock price fluctuations, herd behavior in the stock market, and the relationship between speculative prices and investor psychology. Orden (1998)[6] studied the disposition effect, momentum effect, etc., by analyzing the trading records of corporate accounts. After entering the 21st century, with the outbreak of financial crises, behavioral finance theory was gradually used to explain macro-financial phenomena and the causes of crises.

Regarding the inefficiency of the stock market and existing irrational phenomena, scholars proposed the Bubble Theory by analyzing market transaction entities, among which the most widely recognized theory is the Noise Trader Theory. Blanchard et al. (1982)[4] believed that the real effects of bubbles would affect the fundamental value of assets, thereby changing the direction of price movements. Shiller (2000)[8] explained the process from the emergence to the bursting of the stock market bubble using feedback theory. Black (1986)[3] introduced the concept of noise into the bubble theory and, by studying the interaction mechanism between market efficiency and noise, argued that noise traders gradually accumulate noise into stock prices through frequent trading, causing stock prices to deviate from their true value and forming stock bubbles, while also reducing market efficiency.

To address irrational phenomena in the stock market, researchers have constructed a series of behavioral investment strategies to obtain excess returns. Through extensive empirical analysis, it has been found that value investment strategies based on fundamental analysis and momentum investment strategies based on technical analysis can bring higher returns to investors. Jegadeesh et al. (1993) [5] were the early scholars to discover the momentum effect. By dividing multiple formation and holding periods and constructing different momentum trading strategies, they found that this strategy could obtain higher returns. Asness et al. (2013)[1] used the book-to-market ratio as a value indicator and the average return over the past year as a momentum indicator to construct buy-sell investment strategies for stocks, commodities, fixed-income products, and other products in Europe and Japan. The results showed that the "momentum + value" portfolio could obtain higher returns compared to single value or momentum portfolios.

2.1 Current Research Status in China

Since the 1990s, research on behavioral finance theory in China has gradually emerged with the opening of domestic capital markets. From the application and deepening of basic theories to empirical analysis based on stock market data, numerous researchers have made significant contributions to the development of behavioral finance theory in China.

(1) Research Status of Behavioral Finance Theory

Although Chinese scholars have conducted research on behavioral finance theory for a relatively short time, they have also achieved a series of key results. Liu (1999)[16] was an early scholar in China who systematically introduced the debate between behavioral finance theory and the Efficient Market Hypothesis. He believed that behavioral finance theory emphasizes the diversification of decision-makers' psychology and can provide reasonable and effective explanations for anomalies in the securities market. Li (2005)[14] mainly analyzed the differences between traditional finance and behavioral finance, as well as between individual and group behaviors of investors. Combining the special structural characteristics of China's securities market, he formulated research direction strategies for behavioral finance.

(2) Research Status of Irrational Phenomena in China's Stock Market

Regarding irrational phenomena in China's stock market, domestic scholars have applied behavioral finance theory, combined with publicly available data in the market, and conducted empirical tests using different methods. Li et al. (2002)[15] conducted a systematic study on the behavior of investors in China's financial markets, finding that individual investors in China exhibit cognitive biases such as overconfidence, loss aversion, conformity, and policy dependence. Zhu et al. (2010)[18] studied the intrinsic connections between underreaction, overreaction, and bubble phenomena. The empirical results showed that these three phenomena are all positive feedback overreactions, but with different processes and natures. Hao et al. (2014)[13] conducted empirical research on the irrational behaviors of general managers and securities regulators using a questionnaire survey method with situational elements, finding that they both exhibit cognitive biases such as anchoring effects, mental accounting

and overconfidence. Ma (2016)[17] studied the existence and characteristics of herd behavior in China's stock market based on the Cross-Sectional Absolute Deviation (CSAD) measure, finding that herd behavior is more pronounced in China's stock market during periods of declining stock prices.

III. Theoretical Foundations

3.1 Overview of Traditional Finance Theory

Traditional finance theory has evolved based on the rational actor hypothesis and the efficient market hypothesis. In 1952, Markowitz pioneered the use of portfolio variance to measure risk, mathematically defining investor preferences and utilizing mean-variance analysis to determine optimal portfolio compositions, marking the inception of modern portfolio theory. Subsequent research by Roberts revealed that stock price fluctuations align with Brownian motion, exhibiting random walk patterns where price changes are entirely random. Economists drew upon these findings to propose the efficient market hypothesis. Building on this theory, Sharpe introduced the Capital Asset Pricing Model (CAPM) under market equilibrium conditions, precisely delineating the relationship between returns, risks, and their interplay. Further expanding the CAPM, Fama and French introduced the renowned three-factor model. Ross, along with Black and others, subsequently formulated the Arbitrage Pricing Theory and the Option Pricing Theory. Consequently, traditional finance theory matured, establishing a relatively comprehensive theoretical framework.

The efficient market hypothesis, originating in the early 20th century, elucidates the ability, extent, and speed of price responsiveness to various information influencing prices. Based on the information reflected in market prices, Fama classified markets into three types: weak-form, semi-strong-form, and strong-form efficient markets. In weak-form efficient markets, asset prices reflect historical information pertinent to price changes, rendering future price movements independent of current and historical prices. Thus, predicting stock prices is futile, and investors cannot garner excess returns using past price or return history data. In semi-strong-form efficient markets, asset prices encapsulate publicly available information relevant to asset pricing. Future price movements hinge solely on new public information, unrelated to currently known public information. Consequently, analysis based on publicly available data lacks profitability, while traders with inside information may achieve excess returns. In strong-form efficient markets, asset prices encompass all information pertinent to asset pricing, including insider-only information. This encompasses both public and non-public information, rendering any analytical method or tool ineffective for generating excess profits.

3.2 Behavioral Finance Theory

Since the 1980s, an increasing number of empirical studies have identified anomalies in securities markets, such as the size effect, calendar effect, momentum effect, and the puzzle of closed-end fund discounts. To explain these financial anomalies, scholars sought to relax the perfectly rational actor hypothesis of efficient market theory, integrating insights from psychology to uncover irrational behaviors and decision-making patterns in financial markets. This endeavor culminated in the formation of behavioral finance, a significant academic discipline.

Behavioral finance, a branch of behavioral economics, builds upon human bounded rationality. By observing and analyzing investors' behavioral characteristics and psychological tendencies, it expands upon traditional finance theory, forming a new theoretical framework. Compared to traditional finance, behavioral finance emphasizes emotions, subjectivity, and individual behavioral variations in markets. At its core, prospect theory challenges the axiomatic assumptions and logical decision-making preferences of expected utility theory, asserting that investors often make irrational or bounded rational decisions in uncertain situations. From a cognitive and psychological perspective, prospect theory revises expected utility theory. Based on this, behavioral financiers analyze investors’ risk aversion or risk-seeking behaviors under different circumstances, developing behavioral decision-making models for investors and proposing related behavioral investment strategies.

As illustrated in Figure 1, while both behavioral finance and traditional finance analyze financial decision-making, address asset pricing, analyze financial market trends, and propose solutions, behavioral finance diverges by focusing on cognitive biases, psychological biases, emotional differences, and realistic assumptions. It leans more towards the emotional and intuitive aspect. Conversely, traditional finance starts from cognitive unbiasedness, rational expectations, and traditional rational assumptions, emphasizing the rational and analytical aspect. Therefore, studying behavioral finance offers a closer approximation to investors' psychology, enabling a better analysis of financial phenomena and assisting investors in constructing more effective decision-making models.

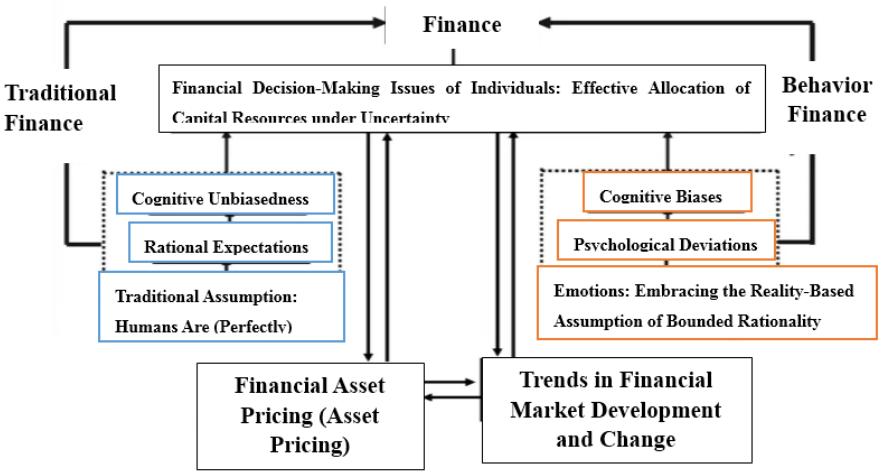

Figure 1 Chart of Finance Development

IV. Empirical Research on Investment Strategies Based on Behavioral Finance

4.1 Selection of Behavioral Investment Strategies

Behavioral finance-based investment strategies are methods that exploit market mispricing caused by different psychological biases of investors for arbitrage. Therefore, before selecting appropriate investment strategies, it is necessary to analyze the irrational phenomena and investor behavior characteristics in China's securities market. Empirical results indicate the existence of irrational phenomena such as noise trading and herd behavior in China's stock market. From the perspective of investors' psychological and cognitive biases, these irrational phenomena are caused by cognitive and behavioral biases such as overconfidence, insufficient or excessive reaction to information.

Investors tend to be overconfident in popular stocks while overly pessimistic about the performance of unpopular stocks, which underestimates the true value of these stocks. When future developments exceed expectations, stock prices rise, bringing returns to the holders of these stocks. On the other hand, when investors lack information, they may imitate others' decisions or overly rely on public opinion, neglecting their independent insights. Such herd behavior can cause stock prices to deviate from their true value, forming a positive feedback mechanism, which provides opportunities for momentum investment strategies. By following the trend, investors can obtain returns from the inertial movement of prices. Therefore, combining behavioral finance theory with the analysis of irrational phenomena in China's stock market, this paper chooses the value strategy for empirical research. To make the research conclusions of our team more practical, this paper selects the Backtrader quantitative trading framework based on Python to conduct backtesting of the strategy. The specific experimental steps are shown in Figure 2.

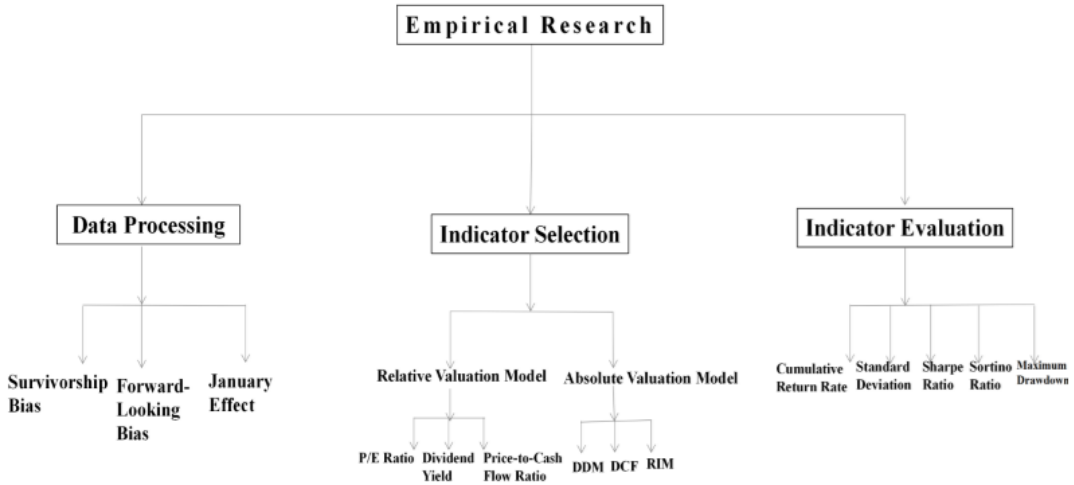

Figure 2 Flowchart of Empirical Research

4.2 Data Processing and Indicator Selection

(1) Data Processing

During the conduct of relevant backtesting experiments, we observed several issues in past domestic discussions that require improvement. The first is the survivorship bias issue, where "survivors" refer to stocks that have not been delisted. Excluding those stocks that have been delisted can lead to an exaggeration of the strategy's returns. Beaver (2007) [2] and other scholars have empirically found that backtesting results differ significantly when including or excluding delisted stock data, emphasizing the importance of incorporating survivor data into the backtesting process. Therefore, in our experiments, we included delisted stocks in the stock pool. Considering the turnover of individual stocks, we also divided different stock pools based on buy-sell timelines. The second issue is the look-ahead bias, which involves considering the lag in the acquisition of financial data. The third issue is the January effect, where stock prices tend to increase more in January than in other months of the year.

(2) Indicator Selection

The valuation methods commonly used by value investors include relative valuation models and absolute valuation models. The relative valuation model, also known as the multiplier valuation method, commonly uses multiples such as the price-to-earnings ratio (P/E ratio), dividend yield, and price-to-cash flow ratio. The absolute valuation model includes the dividend discount model, discounted cash flow model, and residual income model. Among them, the residual income model is favored by researchers due to its advantages of easy data availability and stronger emphasis on the company's value creation process.

The residual income model is based on three assumptions[12], First, the present value of a company equals the sum of the discounted values of its invested capital and future expected residual incomes. Second, taking equity owners as an example, residual income is defined as:

$$RI_t = NI_t - rB_{t-1} = (ROE_t - r) \times B_{t-1} \quad (1)$$

where RI_t is the residual income in period t,NI_t is the net profit in period t, r is the cost of equity capital,B_{t-1} is the net assets at the end of period t-1, and ROE_t is the return on equity in period t. Third, the company's value satisfies the clean surplus relation:

$$B_t = B_{t-1} + E_t - D_t = B_t + (1 - \omega) \times E_t \quad (4\text{-}2)$$

where B_t represents the company's book value at period t, E_t represents the accounting earnings at period t, D_t represents the cash dividends paid at period t, and ω represents the dividend payout ratio. Based on these three assumptions, we can derive the formula for the infinite-horizon residual income model:

$$P_t = B_t + \frac{(ROE_{t+1} - r)}{(1+r)} \times B_t + \frac{(ROE_{t+2} - r)}{(1+r)^2} \times B_{t+1} + \cdots \quad (4\text{-}3)$$

Dividing both sides of Equation (4-3) by B_t yields the pricing model for the price-to-book ratio (P/B ratio):

$$\frac{P_t}{B_t} = 1 + \sum_{i=1}^{\infty} \frac{E[(ROE_{t+i} - r_e) \times B_{t+i-1}]}{(1+r_e)^i \times B_t} \quad (4\text{-}4)$$

where P is the expected value of the company at time t, r_e is the cost of equity capital, and ROE_{t+i} is the return on equity in period t+i. This model establishes a direct link between accounting data such as earnings per share, dividend payout ratios, and company valuation. Therefore, this paper selects the P/E ratio as a representative indicator.

(3) Indicator Evaluation

This paper selects indicators such as cumulative returns, annualized returns, and the Sharpe ratio to evaluate the effectiveness of investment strategies in terms of returns and risks[19].The calculation methods for each indicator are as follows, as shown in Table1 below.

a. total returns: Represents the return of the strategy from the beginning to the end of its execution.

$$R_p = \frac{P_{end} - P_{start}}{P_{start}} \quad (4\text{-}5)$$

where Pend denotes the total value of stocks and cash at the end of the strategy, and Pstart denotes the total value of stocks and cash at the beginning of the strategy.

b. Standard Deviation: Represents the volatility of the strategy's stock prices. A smaller standard deviation indicates smaller fluctuations in stock prices, higher stability, and lower risk.

$$\sigma = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{n-1}} \quad (4\text{-}6)$$

where x_i represents the return rate in different periods i, x represents the average return rate within the strategy period, and n represents the number of stocks.

c. Sharpe Ratio: Indicates how much excess return an investor can earn for each additional unit of risk they bear. It measures both upward and downward volatility of the strategy. A higher Sharpe ratio indicates that each unit of risk generates more returns, and the corresponding price measurement method is better.

$$\text{SharpRatio} = \frac{E(R_p) - R_f}{\sigma_p} \quad (4\text{-}7)$$

where $E(R_p)$ represents the expected return rate of the strategy, R_f represents the risk-free rate (selecting the ten-year treasury bond rate of 0.03), and σ_p represents the standard deviation of the strategy's excess return rate.

d. Sortino Ratio: Similar to the Sharpe ratio, but it only measures downward volatility, indicating the excess return per unit of downside risk relative to the minimum acceptable return.

$$\text{SortioRatio} = \frac{R_p - R_f}{DR} \quad (4\text{-}8)$$

where R_p represents the cumulative return rate of the strategy, and DR represents the downside deviation.

e. Maximum Drawdown: Represents the maximum magnitude of return drawdowns during the backtesting period. Drawdown risk attempts to reflect the worst absolute performance of each price measurement method. A smaller maximum drawdown indicates a better investment strategy.

$$\text{Drawdown} = \frac{\max(P_i - P_j)}{P_i} \quad (4\text{-}9)$$

where P_i and P_j represent the total value of stocks and cash on the i-th and j-th days, respectively, and j is a day after i.

Table 1 Indicator evaluation form.

Evaluation Indicator	Formula	Meaning
total returns	$R_p = \frac{P_{end} - P_{start}}{P_{start}}$	The performance of the strategy, in terms of returns, from its inception to completion.
Standard Deviation	$\sigma = \sqrt{\sum_{i=1}^{n} \frac{(x_i - \bar{x})^2}{n-1}}$	The fluctuation range of the stock price associated with the strategy.
Sharpe Ratio	$SharpRatio = \frac{E(R_p) - R_f}{\sigma_p}$	For every additional unit of risk borne by investors, what is the magnitude of excess returns they can potentially achieve
Sortino Ratio	$SortioRatio = \frac{R_p - R_f}{DR}$	The excess return above the minimum acceptable return corresponding to each unit of downside risk.
Maximum Drawdown	$Drawdown = \frac{\max(P_i - P_j)}{P_i}$	The maximum drawdown in returns during the backtesting period of the strategy.

4.3 Empirical Analysis Based on Value Strategy

Our team selected 15 energy stocks from China's energy sector and evaluated their cumulative returns, annualized returns, standard deviations, maximum drawdowns, Sharpe ratios, and other indicators using the P/E ratio as a benchmark. These indicators were chosen to assess the performance of the investment strategy in terms of returns and risks, further testing the comprehensive performance of each stock.

As shown in Table 2 below, which presents the evaluation of China's 15 energy stocks based on P/E ratio indicators, the comprehensive indicators including the P/E ratio, total returns, maximum drawdown, standard deviation, Sortino ratio, and Sharpe ratio in 2022 indicate the following:

In terms of the P/E ratio in 2022, stocks such as Kaimeite Gas, Huabao Renewable Energy, Hunan Development, EVE Energy, and Xinde New Materials showed significant advantages, with P/E ratios exceeding 50%, making them potential investment targets for our team.

Regarding cumulative returns, Hunan Development and Longyuan Power had negative returns, indicating poor performance. Conversely, Xinde New Materials had a return rate exceeding 80%, indicating good performance. Furthermore, Daquan Energy, EVE Energy, and CATL (Contemporary Amperex Technology Co. Limited) had return rates exceeding 100%, indicating excellent performance and making them potential investment targets for our team.

Lower maximum drawdowns indicate better investment strategies, while higher maximum drawdowns indicate higher risks. Among the stocks, Daquan Energy, Shanghai Energy, Hunan Development, CHNT Group, EVE Energy, and CATL had maximum drawdowns below -30%, indicating good investment strategies and lower risks, making them potential investment targets for our team.

In terms of standard deviation, a smaller standard deviation indicates lower risk, while a larger standard deviation indicates higher risk. Stocks such as Kaimeite Gas, China Shenhua, Daquan Energy, Shanghai Energy, Hunan Development, CHNT Group, EVE Energy, and CATL had standard deviations below 10%, indicating good investment strategies and lower risks, making them potential investment targets for our team.

The Sortino ratio, similar to the Sharpe ratio, indicates that a higher Sortino ratio allows for greater excess returns per unit of risk. Among China's 15 energy stocks, the Sortino ratios were generally high, making all of

them potential investment targets for our team.

The Sharpe ratio uses the capital market line as a benchmark for evaluating investment performance. A higher Sharpe ratio indicates greater excess returns per unit of risk taken, with investors able to tolerate higher volatility risks and achieve better performance. Conversely, a lower Sharpe ratio indicates smaller excess returns per unit of risk taken, with investors able to tolerate lower volatility risks and achieve poorer performance. The Sharpe ratio provides a comprehensive reflection of a strategy's returns and risks. Compared to the CSI 300 Index's Sharpe ratio of 0.34, Jiangsu New Energy, Zhejiang Energy, Jinfang Energy, and Longyuan Power performed better, making them potential investment targets for our team.

Table 2 Evaluation Table Based on P/E Ratio Indicator

Individual Stock	2022 P/E Ratio%	total returns%	Maximum Drawdown%	Standard Deviation%	Sortino Ratio	Sharpe Ratio
ENN Energy Holdings Limited	12.70	33.02	-27.87	17.64	0.65	0.35
Kaimeite Gas	65.14	27.66	-17.36	5.54	0.88	0.57
China Shenhua Energy Company Limited	7.98	2.65	-18.19	3.43	0.83	0.52
Daquan Energy	5.61	185.64	-37.42	4.69	0.89	0.59
Shanghai Energy	5.51	24.39	-31.93	2.53	0.78	0.49
Huabao Renewable Energy	64.62	38.35	-5.02	25.93	0.68	0.38
Shenzhen Energy Group	21.19	16.17	-18.09	21.47	0.71	0.39
Jiangsu New Energy	37.51	6.03	-27.19	17.69	0.61	0.32
Hunan Development Group	58.95	-13.88	-36.59	8.32	0.82	0.49
Zhejiang Energy Power	-1.00	12.83	-17.54	13.24	0.58	0.22
Jinfang Energy	17.83	10.21	-23.89	16.74	0.63	0.31
Longyuan Power Group	22.31	-0.075	-29.24	14.89	0.62	0.31
CHNT Electric	15.44	17.78	-34.56	6.36	0.89	0.48
EVE Energy	54.71	114.82	-52.83	5.85	0.92	0.60
Contemporary Amperex Technology Co. Limited (CATL)	37.34	152.07	-34.27	5.89	0.86	0.67
Xinde New Materials	54.16	83.69	-3.87	21.42	0.76	0.43

In summary, through the analysis of fifteen energy stocks, Kaimeite Gas, China Shenhua Energy Company Limited, Daquan Energy, Shanghai Energy, Hunan Development Group, CHNT Electric, EVE Energy, and Contemporary Amperex Technology Co. Limited (CATL) have demonstrated superior performance across various indicators such as cumulative return rate, annualized return rate, standard deviation, maximum drawdown rate, and Sharpe ratio. With their excellent overall performance, these stocks are considered suitable investment targets for our team.

V. Conclusion

In the rapidly evolving contemporary era, the securities investment market has increasingly stringent requirements for investors. Faced with the impact of the new era, the analysis of investors' psychological behaviors becomes particularly crucial. There is a significant disparity in the cognitive and investment abilities among small and medium-sized investors, with irrational behaviors being more prominent. Therefore, the direction of investors' emotional changes holds important practical significance for investment behaviors. Meanwhile, with the informational and programmed development of the times, quantitative means have enhanced the visualization and operability of achieving optimal stock selection strategies. Hence, this paper, grounded in

the Markowitz model investment strategy of behavioral finance, can provide a reasonable stock selection method and practical reference for more investors, thereby facilitating investors to achieve property appreciation through investment and simultaneously promoting the healthy and sustainable development of China's securities market.

Our team proposes that behavioral finance, through the study of investors' psychology and decision-making behaviors, challenges the optimal decision-making models of traditional financial theory and effectively explains anomalies in financial markets. In the ever-changing stock market, investors must not rely on intuition or irrational and blind investments, as this can easily lead to significant economic losses. Therefore, investors must closely observe the profitability of relevant industry sectors in the stock market and predict future development scenarios. They can select indicators such as stock volatility, turnover rate, and daily return rate to judge whether the pre-selected stocks have investment value. At the same time, investors should always remember that risks and profits coexist in investments, and there is no such thing as risk-free, pure profit. To increase expected profits in investments, investors may have to face higher risks. The Markowitz portfolio model can help investors determine the optimal weights, derive optimal portfolio investment strategies, and make reasonable and effective investment decisions.

From the investors' perspective, this strategy, which examines investor behavior from the perspective of behavioral finance, has both theoretical and practical significance. It can reduce irrational investor behavior, encourage investors to overcome their irrational behaviors by studying investment theories and patterns, gradually develop good investment awareness, enhance investment experience, and master investment skills, thereby reducing the risk of stock price fluctuations. From the perspective of market mechanisms, regulatory authorities should improve relevant systems based on behavioral finance while effectively expanding the securities market, maintaining financial market stability, and continuously expanding the scale of China's economic structure, making risks predictable and preventable.

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