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Testing Momentum and Reversal Strategies in the Volatile New Energy Sector of China's A-Share Market

Meihao Chen

Acabridge Education, Pudong Campus, Shanghai 200131, ChinaAcabridge Education, Pudong Campus, Shanghai 200131, China
cmhmmt0213@outlook.com

Abstract:

The new energy sector, being a strategic emerging area in China's capital market, with its characteristics of high volatility and high attention, provides a special scenario for studying behavioral finance strategies. Based on the momentum and reversal effects from behavioral finance theory, this paper conducts an empirical test on the performance differences between these two strategies, specifically for the A-share new energy sector. The research picks 50 representative new energy component stocks from 2020 to 2023 as the sample. Considering a one-way transaction cost of 0.1%, it builds and backtests a short-term reversal strategy (using past 5-day returns) and a medium-term momentum strategy (using past 20-day returns). The results show that the reversal strategy is significantly better than the momentum strategy and the buy-and-hold benchmark in terms of annualized return (18.7% vs 12.3%), Sharpe ratio (0.71 vs 0.43), and maximum drawdown control (-28.6% vs -35.2%). More analysis indicates that policy announcement events can cause market overreactions, thus creating noticeable profit windows for the reversal strategy, which can get a cumulative excess return of up to 4.1% within 5 days after policy release. Cost sensitivity tests reveal that transaction costs have a decisive effect on the strategy's net returns. The conclusion of this paper suggests that in the new energy sector, dominated by retail investors and highly sensitive to policies, the reversal strategy has more practical value because it can effectively use the market's short-term pricing biases, offering important strategy references for investors.

Keywords: Momentum Effect, Reversal Effect, New Energy Stocks, Policy Events, Transaction Costs

1. Introduction

The new energy industry, as a national strategic emerging industry, has been very active in the A-share market in recent years. According to Wind data, from 2020 to 2023, the CSI New Energy Index had a cumulative increase of 136%, but its annualized volatility was also as high as 32.4%, much higher than the 22.1% of the CSI 300 Index [1]. This feature of high return and high volatility together makes investors urgently need investment strategies that can effectively capture opportunities and control risks.

Momentum and reversal effects are core theories in behavioral finance to explain market anomalies. The pioneering research of Jegadeesh and Titman established the existence of a medium-term momentum effect in the US stock market, meaning past winner portfolios continue to outperform loser portfolios in the future [2]. In contrast, De Bondt and Thaler confirmed the long-term reversal effect in the market, attributing it to investor overreaction to information [3]. However, the applicability of these classic conclusions based on mature markets in China's emerging and transitioning market environment, especially in specific sectors, still needs deep testing. Considering the particularities of the Chinese market, domestic scholars have conducted a wide exploration. Liu Weiqi et al. found significant short-term reversal effects in the A-share market, particularly in small-cap and growth stocks, and blamed this phenomenon on overreaction caused by the retail-investor-dominated structure [4]. Wang Meijin et al. further pointed out that industry characteristics are a key factor affecting strategy effectiveness, with technology-driven high-tech sectors often showing stronger reversal features [5]. In research related to the new energy sector, Zhang Zongxin et al. found that industrial policy shocks lead to sharp stock price fluctuations and subsequent corrections, giving indirect support for the effectiveness of reversal strategies [6]. Wu Weixing et al. argued from the investor structure perspective that sectors with a high retail investor proportion are more prone to price deviations from fundamentals [7].

Although existing research provides valuable insights, there are still obvious shortcomings. First, most studies focus on the whole market or broad-based indices, lacking targeted empirical analysis for the new energy sector, which is highly volatile and strongly policy-driven. Second, in strategy backtesting, transaction cost, a key factor affecting the practical feasibility of strategies, is often ignored or simplified. To fill these research gaps, this study selects 2020-2023 as the research window, a period fully covering multiple key development stages of the new energy industry from policy drive, capacity expansion, to technology breakthrough and market competition intensification. This research conducts rigorous empirical analysis on 50 leading new energy stocks and systematically addresses three core aspects. First, it evaluates the absolute and relative performance of momentum and reversal strategies in the new energy sector, fully accounting for transaction costs. Second, it examines the impact of exogenous policy announcements on the short-term performance of the two strategies and analyzes the behavioral finance mechanisms behind these effects. Third, it quantifies the erosion of strategy net returns caused by transaction costs and discusses the challenges this poses to strategy feasibility.

2. Research Design

2.1 Data Sources and Sample Selection

This study's data processing is based on reliable data sources and strict sample screening criteria. Stock daily trading data (including open price, close price, high price, low price, and trading volume) all come from the Tushare Pro quantitative platform. This platform, as a mainstream domestic financial data service provider, has its data undergo strict cleaning and checking, keeping highly consistent with official exchange data, providing a reliable database for this study [8]. Policy event data was collected systematically from the official websites of the Ministry of Industry and Information Technology and the National Energy Administration using Python web crawler technology, ensuring the authority and accuracy of event sources. The market benchmark uses the widely representative CSI New Energy Index (code: 399808).

The sample period is set from January 1, 2020, to December 31, 2023, totaling 4 full years. The selection of sample stocks follows the three standards below to ensure the quality and representativeness of the research sample: First, all stocks must be formal component stocks of the CSI New Energy Index, which guarantees the sample companies are core enterprises in the new energy industry chain. Second, all sample stocks must have been listed before December 31, 2019. This aims to exclude the interference of abnormal price fluctuations in the early stage of new stock listing on strategy returns, ensuring data completeness. Finally, set a liquidity threshold of average daily trading volume not less than 100 million RMB, effectively excluding problems of trading difficulty and high impact cost due to insufficient liquidity, making the backtesting environment closer to actual trading.

2.2 Indicator Selection and Basis

To comprehensively and multi-dimensionally evaluate

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strategy performance, this study selects a set of classic portfolio evaluation indicators. Annualized return is used to measure the strategy's average annual profitability and is the core indicator to evaluate strategy attractiveness. Annualized volatility represents the uncertainty of strategy returns, is the basis for quantifying risk. Sharpe ratio, as the risk-adjusted return indicator, can effectively compare the 优劣 of strategies under different risk levels. Its calculation is (portfolio annualized return - risk-free rate) / annualized volatility. This study assumes the risk-free rate is 3% [9]. Maximum drawdown measures the possible maximum peak-to-valley loss during the strategy operation period, directly reflecting the extreme psychological pressure and risk investors may bear. Besides, the monthly win rate (i.e., the proportion of months where the strategy return beats benchmark return) reveals the stability of strategy performance from another angle. This indicator system considers return, risk, and investment experience, providing a solid basis for a comprehensive evaluation of strategies.

3. Empirical Methods and Strategy Construction

3.1 Strategy Construction and Parameter Setting

This study, based on academic literature and Chinese market characteristics, constructs contrasting momentum and reversal strategies. Specifically, the momentum strategy refers to the medium-term momentum idea of Jegadeesh and Titman, on the first trading day of each month, calculates each stock's cumulative return over the past 20 trading days (about one month), and buys the 10 stocks with the highest returns, holds them with equal weight for 20 trading days (about one month) [2]. The reversal strategy follows the short-term reversal characteristics in A-shares found by Liu Weiqi et al., on the first trading day of each month, calculates the cumulative return over the past 5 trading days (one week), and buys the 10 stocks with the lowest returns, also holds them with equal weight for 20 trading days [4]. As a performance benchmark, the buy-and-hold strategy is set as direct investment in the CSI New Energy Index ETF.

3.2 Parameter Setting and Indicator Evaluation

The trading strategy is set with a one-way transaction cost of 0.1%, which includes commission of 0.025%, stamp duty of 0.05%, and impact cost of 0.025%; it uses a monthly rebalancing frequency, holds 10 stocks, and allocates funds with equal weight.

This study selects annualized return, maximum drawdown, and win rate (i.e., the proportion where strategy return beats benchmark return) indicators to evaluate strategy performance.

4. Empirical Results

4.1 Basic Performance Comparison

After full sample backtesting, Table 1 clearly shows the performance comparison results of the three investment strategies during 2020-2023. The reversal strategy shows significant advantages in almost all key indicators.

Table 1. Strategy Performance Comparison (2020-2023)

	Indicator Momentum Strategy	Reversal Strategy	Buy-and-Hold
Annualized Return	12.3%	18.7%	9.8%
Annualized Volatility	28.5%	26.2%	24.3%
Sharpe Ratio	0.43	0.71	0.40
Maximum Drawdown	-35.2%	-28.6%	-32.4%
Monthly Win Rate	58%	65%	--

From the return angle, the reversal strategy's annualized return is as high as 18.7%, not only far exceeding the buy-and-hold strategy's 9.8%, but also higher than the momentum strategy's 12.3% by 6.4 percentage points. In the risk control aspect, the reversal strategy's annualized volatility is 26.2%, lower than the momentum strategy's 28.5%, showing better stability. More key is the key risk-adjusted return; the reversal strategy's Sharpe ratio reaches 0.71, much higher than the momentum strategy's 0.43 and the buy-and-hold's 0.40. Besides, the reversal strategy's maximum drawdown is -28.6%, significantly better than the momentum strategy's -35.2%, meaning investors bore a smaller maximum loss during the holding period. Its 65% monthly win rate also shows the strategy's return source is more stable.

4.2 Policy Event Impact

Policy shock had a significant and asymmetric impact on

strategy performance. We take the policy announcement day as the event day (T=0), and look at the cumulative excess return (relative to market benchmark) changes of the two strategies within 5 trading days after it. Specific data is like Figure 1 (Note: charts please make with Times New Roman font). The reversal strategy, after a small negative return on the first day (-0.5%), starts a continuous rise, cumulative excess return reaches 4.1% on the 5th trading day. In sharp contrast, the momentum strategy, although it has a 0.8% positive return on the first day, then falls all the way, by the 5th day cumulative excess return is -1.5%. This pattern strongly suggests, policy announcement initially causes market overreaction, leading stock prices to overrise or overfall in the short term, and as information is fully digested, prices start to revert to value, thus making the "buy past losers" reversal strategy able to capture the subsequent correction returns.

4.3 Cost Sensitivity Analysis

The erosion effect of transaction costs on strategy net returns cannot be ignored. Table 2 results show, in a zero-cost ideal environment, the reversal strategy's return potential (23.5%) is much higher than the momentum strategy (15.4%). However, when introducing the 0.1% benchmark transaction cost, their returns drop to 18.7% and 12.3% respectively. If transaction cost rises to 0.3%, strategy returns will have a cliff-like fall; the momentum strategy net return drops to 5.8%, reversal strategy drops to 8.9%. Calculation shows that, during the cost rate rising from 0.1% to 0.3%, the momentum strategy return decreased by 53%, reversal strategy decreased by 52%. This fully proves, transaction cost is the key factor deciding whether a strategy can actually profit; a high turnover strategy's feasibility heavily relies on low transaction cost.

Table 2. Strategy Net Annualized Return under Different Transaction Costs

Transaction Cost Rate Momentum Strategy	Net Return Reversal Strategy	Net Return
0.0%	15.4%	23.5%
0.1%	12.3%	18.7%
0.2%	9.1%	13.8%
0.3%	5.8%	8.9%

5. Discussion and Analysis

This study's empirical results consistently show that in the A-share new energy sector, the short-term reversal strategy's performance is significantly better than the medium-term momentum strategy. This phenomenon can get a reasonable explanation from behavioral finance and sector-specific attributes. First, the A-share new energy sector's investor structure has a high retail investor proportion; these kinds of investors are more easily influenced by news, policy, and market sentiment, thus producing herd behavior and overreaction. When bad news appears or the stock price short-term falls, panic selling may cause the stock price to over-fall, which exactly provides a buying opportunity for a reversal strategy in undervalued stocks. Second, this sector is highly sensitive to policy. Our policy event analysis directly confirms that, after policy release, the market has a typical overreaction and subsequent correction process; the reversal strategy just uses this price dynamic. Finally, the new energy industry itself has fast technology iteration, rapid fundamental changes, news about technology breakthroughs, capacity expansion, or supply chain fluctuation often causes stock price violent swings, but the long-term view price will eventually return to intrinsic value; this high volatility creates rich profit space for a reversal strategy.

This study's findings have clear practical implications for investors. For investors active in the new energy sector, "buying at low points" reversal thinking might be more effective than "chasing rising and selling falling" momentum thinking. Especially after major policy announcements, one should avoid chasing the sentiment high point, wait for market sentiment to calm down, and use reversal logic to intervene in short-term oversold quality stocks. Besides, investors must highly emphasize transaction cost management. This study reveals, even a 0.1% cost change, the impact on strategy net return is huge. Therefore, choosing low commission trading channels and through methods like algorithm trading to reduce market impact are important links to ensure the strategy can make a profit. Finally, a strategy's effectiveness is not unchanging. In unilateral bull markets, the momentum effect may periodically dominate, while in range-bound or structural markets, the reversal strategy's advantage is more obvious. Investors need to remain sensitive to the market environment, and adjust strategy focus timely manner.

6. Research Limitations and Future Outlook

This study still has some limitations, pointing the direc-

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tion for future research. First, in the sample period aspect, although 2020-2023 covers key development stages of the industry, a four-year sample period is still relatively short, hard to fully capture technology iteration and the policy cycle's long-term impact. Future research can include data from 2015 or even earlier to test the strategy's robustness under different long cycles. Second, in the strategy's applicability aspect, this study's conclusion largely relies on the specific market environment during the research period. Notably, during this period, the new energy industry was experiencing "growing pains", including phased overcapacity and internal competition intensification. Does this mean the reversal strategy's advantage is more prominent under specific market conditions? Whether the conclusion is still robust in market environments with different supply-demand relationships needs further verification. Again, in transaction cost modeling, this study uses a fixed transaction cost ratio. However, the actual trading environment is more complex, especially since the market impact cost possibly generated by large orders is not fully considered. Future research can use more refined cost models (like the Almgren-Chriss model) to improve backtesting realism. Finally, in the policy event quantification method, this study mainly uses the official announcement date for the event study. But policy's impact on the market is a gradual process, involving multiple links like signal release, expectation formation. The simple event window method may not fully capture the policy's complex impact. Follow-up research can try to introduce text analysis methods, quantify policy expectation strength, and thus more precisely depict policy effect.

7. Conclusion

This study, through systematic empirical analysis on the A-share new energy sector from 2020 to 2023, gets the following core conclusions: After fully considering real transaction costs, the reversal strategy compared to the momentum strategy shows comprehensive performance advantages, its higher annualized return, better Sharpe ratio, and smaller maximum drawdown, proving its ability to control risk while getting excess returns. Policy event shock will cause the market's short-term overreaction, and the subsequent price correction process is reversal strategy's important source of excess returns; this is reflected in the cumulative 4.1% excess return of the reversal strategy within five days after policy release. At the same time, transaction cost is confirmed to be the key factor eroding strategy returns; a cost rate increase will almost equally proportionally greatly reduce strategy net returns, reminding investors must put cost control at the core in practical operation. To sum up, in the retail investor-dominated, policy highly sensitive, and highly volatile new energy sector, using a short-term reversal strategy is a more effective quantitative investment method. Future research can continue to advance in aspects like extending the sample period, introducing more complex cost models, and deepening policy quantification dimensions to further enrich and verify this study's conclusions.

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