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Effectiveness of the MA10–MA50 Golden Cross Trading Strategy: Evidence from Kweichow Moutai Stock

Shiyuan Peng

Faculty of Business and Economics, University of Melbourne, Melbourne, Australia
shiyuanp@student.unimelb.edu.au

Abstract. This study examines the performance of a moving average crossover strategy based on MA10 and MA50 using the daily stock prices of Kweichow Moutai. The study constructs the trading signals by analysing the daily stock prices from January 2023 to January 2025 and implements a trading strategy and back-test to assess the performance. The results are compared with a buy-and-hold strategy and the Shanghai Composite Index. The empirical findings show that the MA10-MA50 strategy provides lower total returns than the other strategies. However, it also provides lower volatility and a lower maximum drawdown. The MA10-MA50 strategy thus shows a balance on the trade-off between the return and risk control. To assess the robustness of the MA10-MA50 strategy, a Monte Carlo simulation based on its historical return is implemented to produce several potential price outcomes over the time span of one year. The simulation results indicate the uncertainty of future price movements and suggest that only relying on historical back-testing is insufficient for strategy evaluation. Overall, the findings show that although the moving average crossover strategy cannot consistently outperform the market, it can provide relatively stable performance under certain conditions and can be a complementary tool in quantitative trading and risk management.

Keywords: Moving average strategy, back-testing, Monte Carlo simulation, Kweichow Moutai

1. Introduction

Technical analysis becomes more important for investors and researchers in financial markets. The goal is to use past trading patterns to predict future prices. There is a plethora of technical analysis indicators, but one of the most popular is moving averages. These indicators' primary function is to smooth out the noise of short-term price changes to help identify longer-term trends. Usually, investors use them to signal a tradeable opportunity. One popular moving average trading strategy is called the moving average crossover strategy. Briefly, if a short-term moving average crosses a long-term moving average upwards, this is called a 'Golden Cross' and is believed to be a signal of a potential price increase [1].

The academic popularity of technical indicators is also present in the academic discipline of quantitative finance. There are several studies supporting the idea that moving average strategies can lead to positive abnormal returns through 'trend-following' in certain market environments. For

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example, the study by Romo et al. showed that the dual moving average strategy, when trading systems are formulated with the proper parameters, leads to increased stability and profitability of systems [2]. Similarly, Huang and Huang analysed moving average strategies in ETF markets and found that such strategies signalled trading opportunities in some cases [3]. However, there are studies that demonstrate the limited effectiveness of many technical indicators. These indicators are less predictive within the so-called 'efficient market' hypothesis [4]. The distillation and application of moving average strategies within specific financial markets are important propositions within the discipline of empirical finance research.

Simulation techniques have been included in various processes in the financial industry to assess various market reversibility and performance of strategies in today's markets, besides the traditional back-testing methods. One of the most utilised methods is the Monte Carlo simulation, which evaluates the risk and predicts the future outcomes in different scenarios of the market. Based on the previous research studies mentioned above, it can be seen that Monte Carlo simulation for stock price fluctuation can offer richer support for financial decision-making [5]. Simulation can be used to develop and test trading strategies, and their stability and robustness can also be examined at this time [6].

Kweichow Moutai is a typical and well-known listed company on the Chinese stock market. As a first-tier enterprise in China's liquor sector, it has been highly profitable and relatively high-valued over the years. Due to its market impact and attention from investors, the operating conditions of Kweichow Moutai have frequently been taken as a reference for financial studies [7]. Although it has been requested, very few studies have been conducted on how this technical trading strategy affects the stock mentioned above in practice. Given the above deficiencies, further studies have been carried out to determine whether moving-average crossover strategies can generate effective signals in the Chinese stock market.

This paper will examine how well the MA10-MA50 moving average crossover strategy performs in Kweichow Moutai stock data. First, a cross-over strategy of MA10-MA50 will be built based on historical stock price data. Next, the Strategy will be back-tested. Based on the above comparison, we will determine whether the new strategy has performed better or worse than the buy-and-hold strategy and the Shanghai Composite Index. Finally, assuming that the strategy (MA10-MA50) will remain stable, Monte Carlo simulations are employed to generate multiple price paths for Kweichow Moutai stock prices in the given period and determine how robust the strategy is. Thus, it can be concluded that the moving-average method is suitable for daily equity trading in China.

2. Methods

2.1. Data source

Kweichow Moutai (600519.SH) is chosen as the main research sample. It is one of the most typical and valuable listed firms in China's stock market and a suitable subject for stock trading strategies [7]. The stock price data, including opening, highest, lowest, closing price and volume (OHLCV), are sourced from the TuShare financial database.

The data period is from January 2023 to January 2025. The market index is represented by the Shanghai Composite Index. This enables the proposed strategy to be compared with a buy-and-hold strategy as well as the market performance.

All data processing and empirical analyses were performed in Python. The analysis process involves data pre-processing, moving average analysis, signal generation, back-testing and the Monte Carlo simulation.

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2.2. Indicator selection

The moving average crossover strategy of this study includes the 10-day moving average (MA10) and the 50-day moving average (MA50). Moving average rules are popular technical trading rules to detect market trends and price reversals [1, 2]. A moving average rule with two moving averages is also widely used in recent empirical research, because it reflects both the short-term and middle-term price trends [2, 4]. Table 1 shows the definitions of variables and indicators.

Table 1. Definitions of variables and indicators

Variable	Description	Calculation
MA10	10-day moving average of closing prices	$MA10_t=\frac{1}{10}\sum_{i=0}^{9}P_{t-i}$
MA50	50-day moving average of closing prices	$MA50_t=\frac{1}{50}\sum_{i=0}^{49}P_{t-i}$
Buy Signal	Generated when MA10 crosses above MA50	$MA10_t>MA50_t$
Sell Signal	Generated when MA10 crosses below MA50	$MA10_t<MA50_t$
R_t	Daily return of stock price	$R_t=\frac{P_t-P_{t-1}}{P_{t-1}}$
σ	Annualized volatility	$\sigma=\sqrt{252}\bullet std(R_t)$
SR	Sharpe ratio (risk-adjusted return)	$SR=\frac{R_p-R_f}{\sigma}$
MDD	Maximum drawdown	$MDD=max(\frac{Peak-Trough}{Peak})$

2.3. Methodology

A relative performance evaluation for the strategy was conducted using a well-defined empirical framework, which consisted of generating signals, back-testing and performance analysis. The MA10-MA50 crossover rule was used to generate trading signals. A buy signal occurred when MA10 was over MA50, and a sell signal occurred when MA10 was under MA50. These signals

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were then tested using historical price data of Kweichow Moutai. When a buy signal was triggered, the strategy took a long position and maintained this position until a sell signal occurred. The performance of the strategy was then compared with a buy-and-hold strategy and the Shanghai Composite Index [8].

Performance was evaluated by calculating various indicators such as annual return, annual volatility, Sharpe ratio, and maximum drawdown. These indicators offer a holistic view of both profitability and risk.

Price prediction was also made using a Monte Carlo simulation. By drawing random samples of returns from historical distributions, generated multiple price scenarios by building price series over time [5, 6]. A period of 252 trading days was used for simulation. This method allows for the analysis of potential outcomes under uncertainty and supplements the back-testing results [9]. Figure 1 shows the Monte Carlo Simulation process.

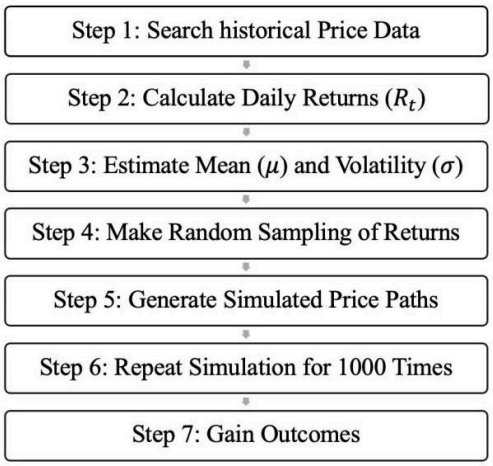

Figure 1. Monte carlo simulation process

3. Results

3.1. Trading signals

The MA10-MA50 crossover trading signals are shown in Figure 2. Figure 2 shows the historical closing price of Kweichow Moutai and the MA10 and MA50 indicators and highlights the buy and sell signals. As illustrated, the strategy produced a relatively small number of trades over the sample time period, which implies that the strategy is more suitable to capture medium-term trends rather than short-term price movements.

The strategy generated five trades in the sample period between January 2023 and January 2025. This is not surprising as the dual moving average strategy is generally slower and more trend-following than short-term technical indicators [1, 10]. Figure 2 also demonstrates that some signals generated occurred after the turning of the price, which is due to the lagging nature of moving averages.

This finding is consistent with previous research suggesting that moving average-based strategies are good at capturing sustained long-term trends, but not fastly changing short-term trends [2, 3]. Hence, while the signals may be able to capture large turning points, they may not be able to capture timely entry and exit points.

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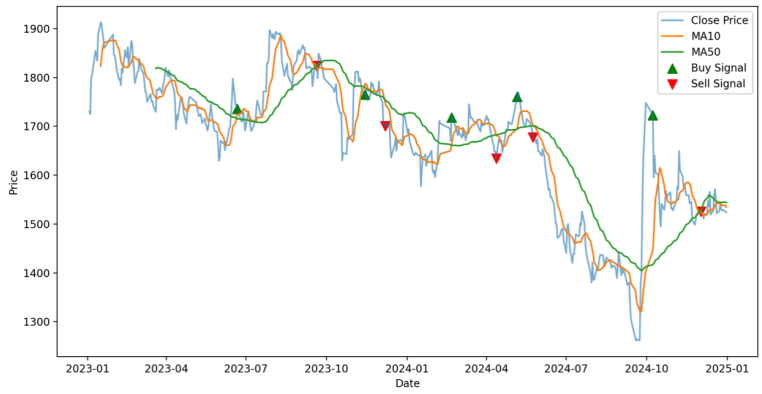

Figure 2. *MA10–MA50* golden cross trading signals (kweichow moutai)

3.2. Strategy performance

The MA10-MA50 strategy's performance was compared to a buy-and-hold strategy and the Shanghai Composite Index to assess its performance. The cumulative returns of the three strategies are presented in Figure 3.

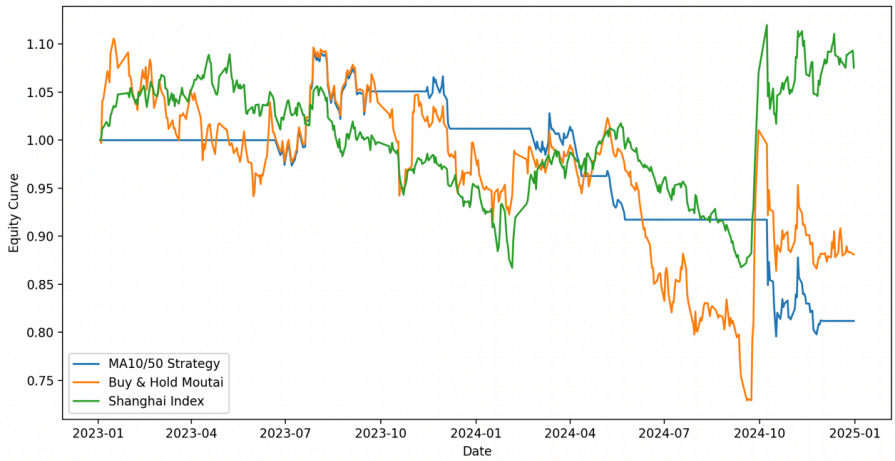

Figure 3. Strategy vs buy & hold vs Shanghai index

As Figure 3 illustrates, the MA10-MA50 strategy performed worse than the benchmark strategies. Even though the strategy attempted to reduce risk during some downward periods, the cumulative return of the strategy was lower than that of the buy-and-hold strategy and the Shanghai Composite Index. This suggests the strategy missed some of the upward movements in the sample periods.

The detailed performance indicators are summarised in Table 2. The annual return, annual volatility, Sharpe ratio and maximum drawdown are reported for each strategy. The results show that the MA10–MA50 strategy generated a negative annual return, whereas the Shanghai Composite Index achieved a positive return over the same period. In addition, the Sharpe ratio of the strategy was negative, reflecting inadequate risk-adjusted performance.

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Table 2. Performance comparison of trading strategy and benchmarks

Metric	Strategy	Buy & Hold	Shanghai Index
Annual Return	-0.096	-0.036	0.052
Annual Volatility	0.121	0.243	0.163
Sharpe Ratio	-0.790	-0.148	0.321
Max Drawdown	-0.272	-0.341	-0.204

However, the maximum drawdown of the strategy was lower than that of the buy-and-hold strategy. It suggests that although a higher peak was not achieved, the moving average strategy reduced the amount of loss. Biondo et al. have found that in selecting a trading plan, people have to consider both their hopes for a certain profit and the risk involved [8].

3.3. Monte Carlo analysis

Monte Carlo simulation will be used to estimate the range of the stock price in the future. The output of the simulation is shown in Figure 4, and the 25 alternative future paths for the stock price of Kweichow Moutai over 252 trading days are displayed. Although 1,000 possible price paths were simulated to increase the representativeness of the results, only the 25 typical price paths are presented here for simplicity. As shown in Figure 4, the future price paths are quite spread out over time and there is a high degree of uncertainty in the future direction of these prices.

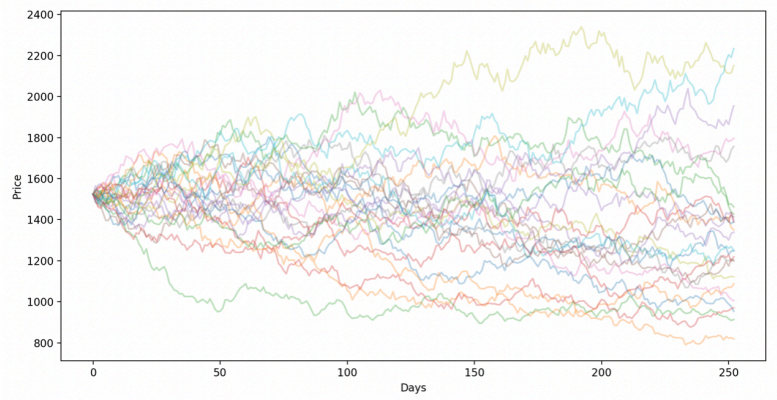

Figure 4. Monte Carlo simulation of moutai price

Some price paths show a rising trend, while others are falling considerably. It is not known whether the future direction of stock prices will change, and thus the result of applying this strategy may also be different. The above results are in line with other studies that have employed Monte Carlo simulation for financial forecasting and stock price modelling [5-9].

Monte Carlo simulations cannot directly tell us whether the MA10-MA50 strategy will be favourable in the future, but they can provide more information on the degree of uncertainty and risk. In this way, simulation can add value to back-testing by introducing some forward-looking cases that may occur in the future.

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4. Discussion

4.1. Interpretation of results

According to the study, the MA10–MA50 crossover strategy is limited in effectiveness in showing return during the sample period. When looking at the overall returns of the crossover strategy in comparison to the returns of the buy-and-hold strategy and the Shanghai Composite Index, the crossover strategy shows lower overall returns. This indicates that it fails to fully capture the upward trend of Kweichow Moutai.

However, this strategy illustrates relatively lower volatility and smaller maximum drawdowns. This suggests that the strategy shows less likelihood of loss. This strategy is unlikely to show the max returns, but the likelihood of some loss is much appreciated. This may be particularly true for the risk-averse investor.

4.2. Comparison with previous studies

An explanation could relate to moving average strategies, which depend on clear and persistent market trends. This trend could indicate that price changes during the sampling period may have relatively stable or varying market conditions that lack the strong momentum needed to trend, thereby reducing the effectiveness of trend-following signals.

As a result, the signals were triggered later than the best moment to buy. This means that the entry points were at sub-optimal prices, which also amplified the exit point prices. This unsatisfactory performance is consistent with previous studies. Romo et al. and Sirborg and Olsson showed that the performance of strategies depended primarily on the market conditions and the alteration of the parameters [2, 10]. Ejder and Özel also pointed out that traditional moving average models had low predictive power [11]. Additionally, the Monte Carlo simulation reflected the volatile nature of the future prices. This shows that solely depending on historical value to back-test would not be enough in terms of standardising their trading strategies.

4.2.1. Implications and limitations

Moving average strategies probably should be more focused on risk management and not on return enhancement. Performance could be improved by partnering more flexible models with moving average strategies.

However, several limitations should be noted. First, by analysing one stock with one parameter configuration, the study sacrificed generalizability. Plus, market frictions and transaction costs were ignored, which could limit the study's real-world relevance. Advanced models could also be added to reinforce the results of future studies. Multiple parameters or multiple assets could also be included to strengthen the results. There are also the following defects. First, by analysing a single stock with a single parameter setting, generalisation was not achieved. Market frictions and transaction costs have also been omitted, and therefore this study is not highly practical. Advanced models could be added to extend this study, and other parameters or assets can be also added to improve the results.

5. Conclusion

This research was intended to examine the effectiveness of the MA10–MA50 moving average crossover strategy of the Chinese stock market and set Kweichow Moutai as a sample. The study

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focused on one of the trade techniques and combined the back-testing results and Monte Carlo simulation to examine the technique's trade resiliency and its profitability.

Throughout the sample period, the MA10–MA50 strategy was proven to be inefficient compared to the buy-and-hold strategy and the Shanghai Composite Index. On the other hand, the strategy was shown to be relatively less volatile and had a smaller maximum drawdown. Based on the above tests, the aim of the MA10-MA50 moving average strategy is proved to reduce portfolio risk rather than to enhance returns. Due to the fluctuating and relatively unstable nature of the market, applying MA10-MA50 moving average strategy may show the instability.

This study's results contribute to understanding the effectiveness of the MA10–MA50 moving average strategy, especially in quantitative trading strategies for the interested investor and research colleagues. The diversification of the MA10–MA50 strategy helps identify the market trends, but this should not be relied upon solely. Rather, the prediction models should be combined to assist in improving the MA10–MA50 strategy performance.

Finally, this study indicates the significance of how uncertainty matters in financial markets. The Monte Carlo simulation results show that the uncertainty in future stock prices will continue to exist. This highlights the limitations of relying only on historical back-testing results. Overall, this research contributes to the understanding of technical trading strategies in the Chinese stock market and may support future research and investment decision-making.

References

[1] Monteiro, M. A., Grové, B., & Matthews, N. (2022). Developing a moving average crossover strategy as an alternative hedging strategy for the South Africa maize market. Agriculture, 12(8), 1227.
[2] Romo, A., Soto, R., Vega, E., et al. (2025). Adaptive optimization of a dual moving average strategy for automated cryptocurrency trading. Mathematics, 13(16), 2629.
[3] Huang, J., & Huang, Z. (2020). Testing moving average trading strategies on ETFs. Journal of Empirical Finance, 57, 16–32.
[4] Chen, Y., Fang, Y., Li, X., et al. (2023). A factor pricing model based on double moving average strategy. Humanities and Social Sciences Communications, 10, 830.
[5] Shi, M., Huang, Y., Li, X., et al. (2025). Monte Carlo method in stock trading research based on accelerated diffusion theory with jumps. Physica A: Statistical Mechanics and its Applications, 672, 130667.
[6] Deep, A. (2024). Advanced financial market forecasting: Integrating Monte Carlo simulations with ensemble machine learning models. Quantitative Finance and Economics, 8(2), 286–314.
[7] Li, C., & Yuan, J. (2022). Guizhou Maotai de touzi jiazhi fenxi [Investment value analysis of Kweichow Moutai]. China Journal of Commerce, (22), 116–119. (in Chinese)
[8] Biondo, A. E., Mazzarino, L., & Pluchino, A. (2024). Trading strategies and financial performances: A simulation approach. International Review of Financial Analysis, 95, 103426.
[9] Xiang, J. N. P., Velu, S. R., & Zygiaris, S. (2021). Monte Carlo simulation prediction of stock prices. In 14th International Conference on Developments in eSystems Engineering (pp. 212–216). IEEE.
[10] Sirborg, E., & Olsson, O. (2025). Investigation of the potential of the moving average crossover trading strategy: Evaluation of a trading strategy in nine historical time periods (Dissertation).
[11] Ejder, U., & Özel, S. A. (2024). A novel distance-based moving average model for improvement in the predictive accuracy of financial time series. Borsa Istanbul Review, 24(2), 376–397.