Mathematical Trading Strategies

Assignment 2

To analyze the performance of the optimized indicators, we followed the following steps:

1. Generated Buy and Sell Signals: Using the optimized parameters for each indicator, we created buy and sell signals. Buy signals were represented by 1, indicating a favorable condition for buying, while sell signals were represented by 0, indicating a favorable condition for selling.
2. Calculated Daily Returns: Based on the generated buy and sell signals, we calculated the daily returns. The daily returns were determined by measuring the percentage change between the opening and closing prices.
3. Computed Cumulative Returns: By utilizing the daily returns, we calculated the cumulative returns. The cumulative returns were obtained by taking the cumulative product of the daily returns and subtracting 1.
4. Determined Maximum Drawdown: The maximum drawdown was calculated by identifying the largest percentage decline from the previous peak in the cumulative returns. This metric provides insight into the largest potential loss incurred during the trading period.
5. Evaluated Sharpe Ratio: The Sharpe ratio was computed to assess the risk-adjusted return of the strategy. It was determined by subtracting the risk-free rate of return from the annual returns and dividing the result by the annualized standard deviation of the daily returns.

By following these steps for each of the three indicators, we obtained the values of cumulative returns, maximum drawdown, and Sharpe ratio. These metrics provide insights into the performance and risk profile of the strategies based on the optimized indicators.

|  | MACD | Bollinger Bands | Keltner Channels |
| --- | --- | --- | --- |
| Cumulative returns | 21.34 | 0.22 | 7.13 |
| Sharpe Ratio | 1.48 | -0.60 | 0.944 |
| Max Drawdown | -0.029 | -0.08 | -0.23 |