

Trading Assignment: Leveraging Vantage

Trading Strategy Summary

The trading strategy implemented is based on the Average Directional Index (ADX) and Directional Movement Index (DI). Here's a breakdown of the strategy components:

- 1. Compute ADX and DI:**
 - o **ADX (Average Directional Index):** Measures the strength of a trend.
 - o **+DI (Positive Directional Indicator) and -DI (Negative Directional Indicator):** Indicators of bullish and bearish trends, respectively.
- 2. Generate Trading Signals:**
 - o Buy Signal: Generated when +DI crosses above -DI.
 - o Sell Signal: Generated when -DI crosses above +DI.
 - o Signals are based on a comparison between current and previous values of +DI and -DI.
- 3. Backtesting Strategy:**
 - o The backtesting phase involves applying the trading signals to historical price data of Amazon (symbol: AMZN) retrieved from the Alpha Vantage API.
 - o Initial capital of \$10,000 is assumed for testing purposes.
- 4. Key Performance Metrics:**
 - o **Cumulative Return:** Total return generated by the strategy over the test period.
 - o **Annual Return:** Average annual return based on daily returns.
 - o **Annual Volatility:** Standard deviation of daily returns scaled to annual figures.
 - o **Sharpe Ratio:** Measure of risk-adjusted return, calculated as annual return divided by annual volatility.

Methodology

- 1. Data Collection:**
 - o Utilized the Alpha Vantage API to fetch daily stock price data for Amazon.
 - o Data includes open, high, low, close prices, and volume.
- 2. Strategy Implementation:**
 - o Defined functions to compute ADX and DI.
 - o Implemented functions to generate buy/sell signals based on ADX and DI crossovers.
 - o Backtested the strategy by simulating trades using historical data.
- 3. Analysis and Findings (Backtesting results):**
 - o **Cumulative Return:** \$258.67
 - o **Annual Return:** 6.54%
 - o **Annual Volatility:** 2.93%
 - o **Sharpe Ratio:** 2.23

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Success Rate and Failure Analysis

- **Success Rate:**
 - o Success is defined by positive strategy returns and outperformance compared to a benchmark (e.g., S&P 500).
 - o The positive Sharpe Ratio suggests the strategy provides a reasonable return for the risk taken.
- **Failure Analysis:**
 - o Potential failures include periods of high volatility or sideways markets where ADX signals may generate false crossovers.
 - o Strategy performance heavily depends on the accuracy of ADX and DI indicators in identifying trends.

Potential Improvements

1. **Optimization:**
 - o Fine-tuning the ADX period (n=14 in this case) to optimize for different market conditions.
 - o Testing different entry and exit rules based on ADX levels or combining with other technical indicators.
2. **Risk Management:**
 - o Implementing stop-loss mechanisms or trailing stops to protect gains during volatile periods.
 - o Considering position sizing strategies based on volatility or portfolio allocation.
3. **Further Analysis:**
 - o Conducting sensitivity analysis on strategy parameters to understand robustness across different timeframes and stocks.
 - o Exploring machine learning techniques for dynamic parameter adjustment based on market conditions.

Conclusion

The trading strategy based on ADX and DI indicators shows promising results with a positive cumulative return and a respectable Sharpe Ratio. However, continuous monitoring and refinement are essential to adapt to changing market dynamics and improve overall performance. This report summarizes the methodology, analysis, findings, success rate, and areas for potential improvement in the implemented trading strategy. Adjustments and enhancements discussed aim to enhance profitability and mitigate risks associated with the strategy.