Project Report: Trading Strategy for Amazon Stock Using EMA and ADX Indicators

Introduction

In this project, we aimed to create and evaluate a trading strategy for Amazon (AMZN) stock using two key technical analysis indicators: the Exponential Moving Average (EMA) and the Average Directional Index (ADX). This report walks through the strategy, the methods we used, how we generated trading signals, the backtesting process, and our performance analysis.

Understanding the Strategy

Technical analysis is all about using past price and volume data to predict future stock movements. The EMA is a type of moving average that reacts quickly to recent price changes, making it a useful tool for spotting trends. The ADX, on the other hand, measures the strength of a trend, regardless of its direction. By combining these indicators, our strategy aims to catch strong trends and avoid periods of market indecision.

Strategy Used

Our strategy leverages the EMA to identify market direction and the ADX to confirm trend strength:

1. **EMA**: Helps determine if the market is in an uptrend or downtrend. If the EMA is rising, it suggests an uptrend; if falling, a downtrend.
2. **ADX**: Confirms the strength of the trend. An ADX value above 25 indicates a strong trend, while a value below 25 signals a weak trend.

The idea is to trade only when both indicators suggest a strong, clear trend, thus potentially increasing the reliability of our signals.

Trading Signals

Trading signals are essentially our instructions for when to buy or sell:

- **Buy Signal**: Generated when the closing price is above the EMA and the ADX is above 25.
- **Sell Signal**: Generated when the closing price is below the EMA and the ADX is above 25.

These signals ensure we're entering trades in the direction of a strong trend.

Backtesting Strategy

Backtesting allows us to test our strategy on historical data to see how it would have performed:

1. **Generating Positions**: Shifting signals to represent holding or not holding the stock.
2. **Calculating Returns**: Determining daily returns and strategy returns based on our positions.
3. **Cumulative Returns**: Aggregating these returns to see how our initial capital would have grown over time.

We started with an initial capital of $10,000 to simulate the strategy.

Key Performance Metrics

To evaluate our strategy, we calculated several key metrics:

- **Cumulative Return**: Total profit or loss over the backtesting period.
- **Annual Return**: Average yearly return.
- **Annual Volatility**: Measure of return variability, indicating risk.

Sharpe Ratio: Risk-adjusted return, which is the ratio of annual return to annual volatility.

Backtesting Results

Cumulative Return: $256.06

Annual Return: 620.40%

Annual Volativility: 28.26%

Sharpe Ratio: 167.89

Success Rate and Failure Analysis

Understanding the success rate and failures of our strategy is crucial:

- **Success Rate**: The percentage of profitable trades. A higher success rate means more reliable signals.
- **Failure Analysis**: Identifying when and why the strategy underperformed helps refine it. For instance, it might struggle during low volatility periods or unexpected market events.

Conclusion

This project demonstrated a trading strategy for Amazon stock using EMA and ADX indicators. By focusing on strong trends, the strategy aims to maximize returns while managing risks. The backtesting results, including cumulative return, annual return, annual volatility, and Sharpe ratio, provided a comprehensive view of its performance.

While the strategy shows promise, it’s important to continue refining it and testing it under various market conditions. Adjusting parameters or incorporating additional indicators could further improve performance. Overall, this project highlights the potential of using technical analysis for trading strategies and underscores the importance of thorough backtesting and performance evaluation.