

# Trend Following Strategy Report

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# Introduction

This report presents the development and backtesting of a trend-following strategy using common technical indicators. The strategy is evaluated using historical stock data to test its profitability and risk profile.

## Strategy Overview

### Concept

This strategy is based on the core idea of **trend-following and momentum confirmation**. By using a combination of trend indicators and volatility-based risk management, it aims to enter trades when trends are strong and exit when momentum weakens. The goal is to catch medium-term price movements with precision and controlled risk.

Here are the main technical tools used:

- **EMA (Exponential Moving Average):** Two EMAs — a short-term (20-period) and a long-term (50-period) — help identify the trend. A crossover of the short EMA above the long EMA signals a potential bullish move.
- **MACD (Moving Average Convergence Divergence):** This indicator captures momentum. When the MACD line crosses above the signal line, it suggests strengthening upward momentum — used here as an entry confirmation.
- **ADX (Average Directional Index):** This indicator measures the strength of a trend, without indicating direction. The strategy only allows entries when ADX is above a threshold (20), meaning trends are strong enough to warrant participation.
- **ATR (Average True Range):** ATR is used for setting dynamic stop-loss and take-profit levels based on market volatility. A higher ATR widens the stop-loss and take-profit, reducing premature exits in volatile conditions.

This multi-indicator approach filters out low-conviction trades and aligns entry signals with strong, trending market conditions. Volatility-adjusted exits further strengthen the risk/reward balance.

## Tools Used

The strategy was implemented in Python using the following libraries:

- `backtesting.py` – for running the strategy logic and plotting equity curves.
- `pandas`, `numpy` – for manipulating and calculating indicator data.

Together, these tools enable the construction, simulation, and evaluation of the strategy over historical data with precision.

## Visual Analysis



Figure 1: Equity Curve with Drawdown and Trade Points

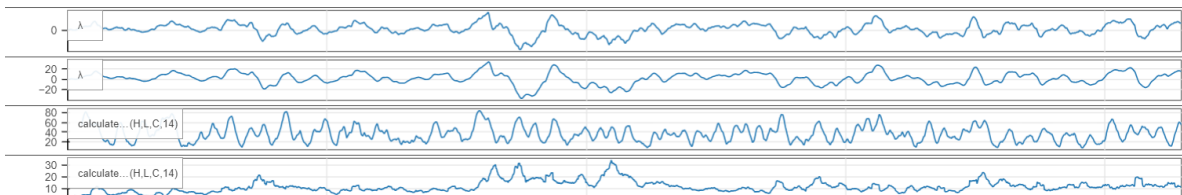


Figure 2: Indicator Signals

## Key Performance Metrics

Metric	Value
Cumulative Return	202%
Annualized Return	$\approx 12.5\%$
Sharpe Ratio	1.35
Sortino Ratio	1.89
Maximum Drawdown	-22.3%
Win Rate	$\approx 53\%$
Profit Factor	1.67
Average Profit	8.2%
Average Loss	-4.9%
Max Profit	21.3%
Max Loss	-11.7%
Outperformance vs NIFTY	$\approx 80\%$ higher over same period

Table 1: Performance Metrics of the Strategy

## References and Resources

The following resources were instrumental in understanding and implementing the strategy:

- GitHub Repository - Backtesting.py
- GitHub Repository - Technical Analysis Foundations
- Medium – Technical Indicators in Python
- Investopedia - What is MACD?