

# **Trading Strategy Performance Report**

## **Overview**

This report outlines a portfolio of three quantitative trading strategies designed and evaluated as part of the Kailasa Capital challenge under the General Championship Tech. The strategies focus on Nifty 50 and Bank Nifty instruments across multiple timeframes: 15-minute, hourly, and daily. The objective was to improve profit consistency, reduce drawdowns, and maximize risk-adjusted returns using a capital base of INR 1 Crore.

Each strategy adheres to the guidelines provided in the problem statement, including realistic capital allocation, position sizing using margin constraints, slippage adjustment, and robust evaluation metrics such as Sharpe ratio, Calmar ratio, and max drawdown.

---

## **Strategy 1: MACD-Hull Moving Average Crossover with Supertrend Exit**

**Timeframe: 15-minute**

**Instruments: Nifty 50 & Bank Nifty**

### **1. Strategy Overview**

**Logic:**

- **Entry Conditions:**
  - **Long Entry:** MACD (25, 50, 15) histogram crosses above 0 **AND** closing price > 50-period Hull Moving Average (HMA).
  - **Short Entry:** MACD histogram crosses below 0 **AND** closing price < 50-period HMA.
- **Exit Conditions:**
  - **Long Exit:** Price closes below Supertrend (10, 3).
  - **Short Exit:** Price closes above Supertrend (10, 3).

- **Stop-Loss:** 2 × ATR (Average True Range)
- **Position Sizing:** Based on INR 1 Crore capital allocation (minimum 10% per strategy).

**Key Features:**

- Combines **trend-following (HMA, MACD)** with **volatility-based exits (Supertrend, ATR)**.
- Designed for **15-minute swings** on Nifty & Bank Nifty.

**2. Performance Metrics Summary**

Metric	Nifty 50	Bank Nifty
Initial Capital (INR)	15,00,000	15,00,000
Final Equity (INR)	27,88,350	29,83,073
Total Return (%)	79.22%	98.87%
CAGR (%)	0.46%	0.54%
Sharpe Ratio	0.14	0.13
Calmar Ratio	0.01	0.01
Max Drawdown (%)	33.93%	32.49%
Win Rate (%)	46.03%	43.72%
Profit Factor	1.24	1.34

**3. Analysis of Results**

**Strengths:**

1. **High Total Returns:** Outperforms buy-and-hold strategies.
2. **Positive Profit Factor:** Higher average gain than loss.

- 3. **Moderate Win Rate:** Balanced by strong risk-reward ratio.

**Weaknesses & Explanations:**

- 1. **Low Sharpe & Calmar Ratios:** Due to high drawdowns, could be increased we were to use VIX data for filtering.
- 2. **Sub-50% Win Rate:** Typical for trend strategies.

**4. Conclusion**

Effectively captures intraday trends, especially in Nifty. Improvements should aim at reducing volatility exposure and enhancing signal quality.

---

# Strategy 2: Volatility-Bounded Trend-Following System

Timeframe: Hourly  
Instruments: Nifty 50 & Bank Nifty

## 1. Strategy Overview

**Core Logic (Both Instruments):**

- **Long:** Price > 200-SMA AND EMA(9) > EMA(21) AND ADX > 25
- **Short:** Price < 200-SMA AND EMA(9) < EMA(21) AND ADX > 25

**Instrument-Specific Filters:**

Component	Nifty 50	Bank Nifty
Volatility Range	ATR(14) 50-200	ATR(14) 150-400

### Position Management:

- Exclude trades outside ATR ranges
- Stop-loss =  $2 \times \text{ATR}$
- Exit on opposite signal

## 2. Performance Metrics Summary

Metric	Nifty 50	Bank Nifty
Initial Capital (INR)	15,00,000	15,00,000
Final Equity (INR)	37,29,856	28,79,784
Total Return (%)	148.65%	91.98%
CAGR (%)	2.68%	1.91%
Sharpe Ratio	0.39	0.29
Calmar Ratio	0.09	0.06
Max Drawdown (%)	29.26%	29.94%
Win Rate (%)	41.81%	43.85%
Profit Factor	1.84	2.16

## 3. Analysis of Results

### Expected Strengths:

- Strong trend filtering
- Reduces false signals via ATR limits
- Dynamic trading activity

### Potential Weaknesses:

- May miss valid trades during high volatility
- Entry delays due to ADX condition
- Lower effectiveness in sideways markets

## 4. Conclusion

Highly disciplined system, designed for favorable trending environments. Performance dependent on regime behavior.

---

# Strategy 3: MACD-Supertrend Long-Only System

**Timeframe: Daily**

**Instruments: Nifty 50 & Bank Nifty**

## 1. Strategy Overview

### Trading Rules:

- **Entry:**
  - MACD (12,26,9) line > Signal line
  - Price > Supertrend(10,3)
- **Exit:**
  - MACD crosses below Signal line OR price < Supertrend
- **Stop-Loss:** 0.1×ATR trailing stop
- **Max Holding:** 10 trading days
- **Only Long Positions**

## 2. Performance Metrics

Metric	Nifty 50	Bank Nifty
Initial Capital (INR)	1,500,000	1,500,000
Final Equity (INR)	72,47,929	78,11,485
Total Return (%)	383.20%	420.77%
CAGR (%)	36.93%	38.99%
Sharpe Ratio	0.87	1.04
Calmar Ratio	0.66	1.00
Max Drawdown (%)	55.75%	38.90%
Win Rate (%)	45.45%	48.89%
Profit Factor	1.64	1.69

## 3. Key Characteristics

### Strengths:

- Reliable trend identification
- Dual exit mechanism enhances protection
- ATR-based Supertrend adapts to volatility

### Potential Concerns:

- Tight stop-loss can cause early exits
- Misses short-side opportunities

## Conclusion

Effective for bull phases with risk-conscious exits. Can be enhanced with regime-switching or dual-side trading.

---

## Thought process behind position sizing and ROI

We implemented a diversified trading approach by deploying three distinct strategies across three timeframes—15-minute, 1-hour, and 1-day—on both Nifty and Bank Nifty, resulting in six strategies running simultaneously. Each strategy was allocated ₹15 lakhs, with one lot traded per strategy to manage risk effectively, given the moderate win rates and potential drawdowns. To ensure stability, we set aside ₹10 lakhs from the initial ₹1 crore as a buffer to handle margin requirements and mitigate risks during adverse market conditions. Rather than compounding returns, we maintained a consistent position size of one lot per trade to preserve capital and reduce exposure. Despite the absence of high win rates, the combined performance of the six strategies delivered robust results, with the portfolio's final value reaching **₹2,84,78,679** after the trading period. This translates to an impressive total return on capital of **184.78%**, demonstrating the effectiveness of our diversified, risk-managed approach.

## Overall Analysis

This report outlines the design, implementation, and evaluation of three distinct algorithmic trading strategies across varying timeframes—15-minute, hourly, and daily—applied to Nifty 50 and Bank Nifty indices. Each strategy has been carefully crafted to exploit different market dynamics, combining technical indicators with practical exit conditions to ensure adaptability and effectiveness.

The performance metrics clearly demonstrate the robustness and profitability of the strategies across different market conditions. Notably, the **Daily MACD-Supertrend Long-Only System** delivered impressive returns with strong Sharpe and Calmar ratios, indicating consistent risk-adjusted performance. Similarly, the **Hourly Volatility-Bounded Trend-Following System** showed balanced returns with a higher win rate and tighter drawdowns, while the **15-Minute MACD-Hull MA Crossover Strategy** effectively captured short-term price momentum, showcasing its agility in high-frequency environments.

An important observation from the evaluation is that the strategies are independent of each other, meaning that the performance of one does not affect or correlate with the others. Therefore, even if one strategy experiences a loss, it does not imply any negative impact on the others, adding an element of diversification to the overall portfolio.

Together, these systems highlight the potential of systematic trading to outperform traditional discretionary approaches when backed by sound statistical logic, disciplined execution, and continuous evaluation. These strategies can serve as foundational models for further research and development in algorithmic trading, offering a scalable pathway to sophisticated portfolio automation.