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Back-Testing Super Trend in 15 Mins Time Frame among Top 5 Contributors of Nifty 50 Stocks

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ABSTRACT

This study evaluates the profitability and risk of the Super Trend indicator on a 15-minute intraday timeframe across the top five NIFTY 50 contributors: Reliance, HDFC Bank, ICICI Bank, Infosys, and Bharti Airtel. Using historical OHLC data from February 2019 to February 2025, key performance metrics such as average return, win rate, Sharpe ratio, and maximum drawdown were analyzed. The strategy's performance was tested under varying market conditions and compared to alternatives like moving average crossovers, RSI momentum, and VWAP entries. Practical trading factors including slippage and transaction costs were considered. The findings provide actionable insights for traders and system developers seeking effective intraday strategies in the Indian equity market.

***Keywords**: NIFTY, Super Trend, Relative Strength Index, Equity Market.*

Introduction

In today's volatile financial markets, intraday traders rely on precise strategies for effective decision-making. This study examines the Super Trend indicator—valued for its simplicity and trend-based signals—using a 15-minute intraday timeframe on the top five NIFTY 50 contributors: Reliance, HDFC Bank, ICICI Bank, Infosys, and Bharti Airtel. Built on the ATR and a multiplier, the Super Trend helps filter market noise and identify reversals, making it suitable for short-term trading. The study aims to evaluate its profitability, risk, and reliability across bullish, bearish, and sideways market conditions using historical data from February 2019 to February 2025.

Statement of the Problem

Intraday trading has become more complex due to increased volatility, unpredictable price swings, and false signals, creating a demand for reliable technical indicators. One such indicator is the Super Trend, which utilizes the Average True Range (ATR) to detect trend reversals. However, there is limited empirical evidence supporting its effectiveness in high-frequency trading, particularly in the Indian equity market. This study aims to fill that gap by back-testing the Super Trend strategy on a 15-minute timeframe for the top five NIFTY 50 stocks. It will evaluate its profitability, risk factors, win/loss ratios, and drawdowns, while considering practical challenges like slippage and transaction costs. Most existing research focuses on daily or higher timeframes, leaving short-term applications underexplored.

Objectives

- To evaluate the effectiveness of the Super Trend indicator in generating profitable buy and sell signals on a 15-minute intraday time frame.
- To measure the performance of the Super Trend strategy across the top 5 most weighted NIFTY 50 stocks by analyzing key metrics such as win rate& profit factor,

- To compare the consistency and accuracy of the Super Trend signals under different market conditions—bullish, bearish, and sideways trends.
- To identify which of the top NIFTY 50 stocks respond more effectively to the Super Trend strategy and provide insights for strategy optimization and stock selection.

Research Questions

- How effective is the Super Trend indicator in identifying profitable trading opportunities on a 15-minute intraday time frame for the top 5 NIFTY 50 stocks?
- What is the win rate, profit factor, and risk-adjusted return of trades generated using the Super Trend strategy over the back-tested period?
- How does the Super Trend strategy perform under different market conditions such as bullish, bearish, and sideways trends?
- Which of the top 5 NIFTY 50 stocks show the highest consistency and profitability when the Super Trend indicator is applied, and why?

Review of Literature

Kumar & Natarajan (2023): Found that combining the Super Trend with dynamic stop-loss strategies, particularly ATR-based trailing stops, improved profitability and reduced drawdowns during volatile periods in Indian equities.

Verma & Sharma (2023): Highlighted that the Super Trend outperforms moving average crossovers but noted its success depends on market conditions and risk filters like volatility thresholds.

Rao & Iyer (2020): Demonstrated that the Super Trend works well during directional momentum in NIFTY 50 stocks, with better accuracy on 15- and 30-minute charts during clear trends.

Singh & Gupta (2021): Stressed the importance of robust back-testing and showed that the Super Trend can be optimized for 15-minute intraday charts by minimizing signal noise.

Yadav & Sinha (2024): Found that NIFTY 50 top contributors provide more consistent Super Trend signals due to stable volumes and reduced intraday volatility.

Research Methodology

Research Design

Quantitative-Research

This study is based on numerical data (price movements, profit/loss per trade) and statistical analysis (win rate, loss rate, etc.).

Sampling Method

- **Purposive Sampling**: The top 5 NIFTY 50 stocks were deliberately selected based on their high market capitalization and index weightage to ensure relevance and influence in market movement.
- **Time-Based Sampling**: A 15-minute intraday time frame was chosen to capture frequent trading signals, balancing short-term responsiveness with sufficient trend data.

Sampling Size

- **5 Stocks** selected for the study. Each stock was tested individually, and overall results is to find out the probabilities of super trend indicator back testing {probabilities analysis}

Data Collection

- Historical intraday (15-min) OHLC (Open, High, Low, Close) data was collected. Application: ichart & trading views
- **Asset:** RELIANCE. HDFC-BANK. ICICI-BANK.INFY. BHARTI AIRTEL
- Only technical price-based data was used, no fundamental factors consider

Data Analysis Tools: Microsoft Excel. ICHART. TRADINGVIEW

- **Strategies:** super trend indicator {probability analysis} risk & reward: 1;1 – 1;2

- **Backtesting Procedure:** The Super Trend indicator was applied to 15-minute intraday data of the top five NIFTY 50 contributors to generate buy and sell signals. Trades were simulated based on these signals, and performance metrics of probability analysis

Ethical Consideration

This study uses publicly available historical market data, ensuring transparency and compliance with data usage norms. No personal or confidential information is involved. The research maintains academic integrity by avoiding data manipulation and ensuring unbiased analysis.

Performance Metrics

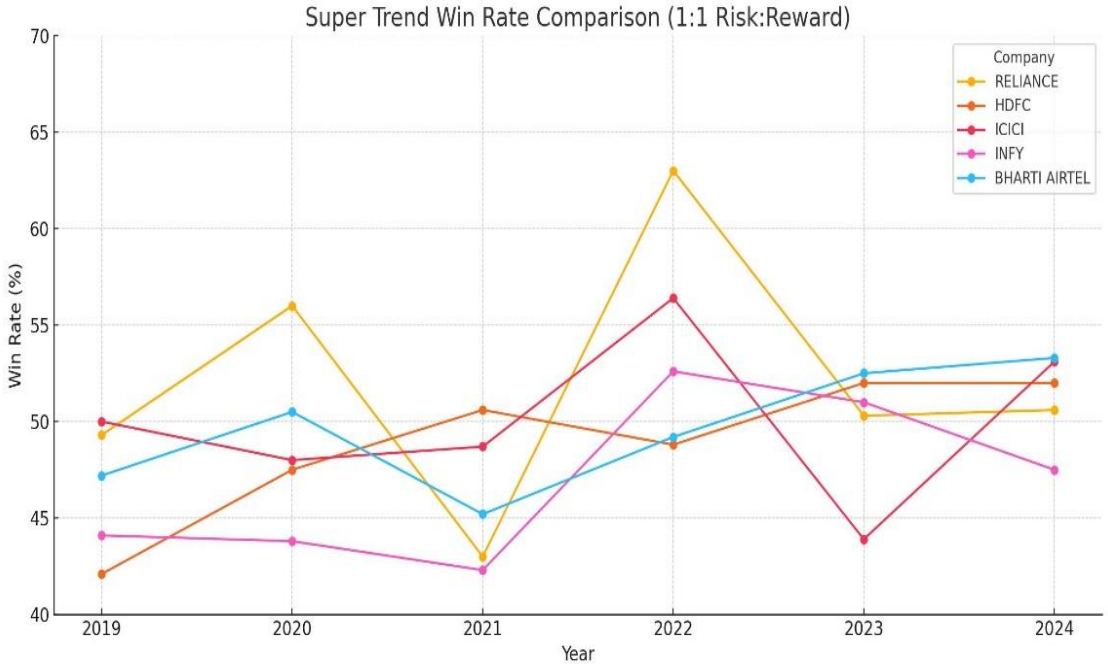
- Profitability (Total returns in %)
- Win Rate (Percentage of winning trades)

Discussion and Analysis

Win Rate=Total number of Trades/Number of Winning Trades×100

RISK: 1% REWARD: 1% -----[1:1]

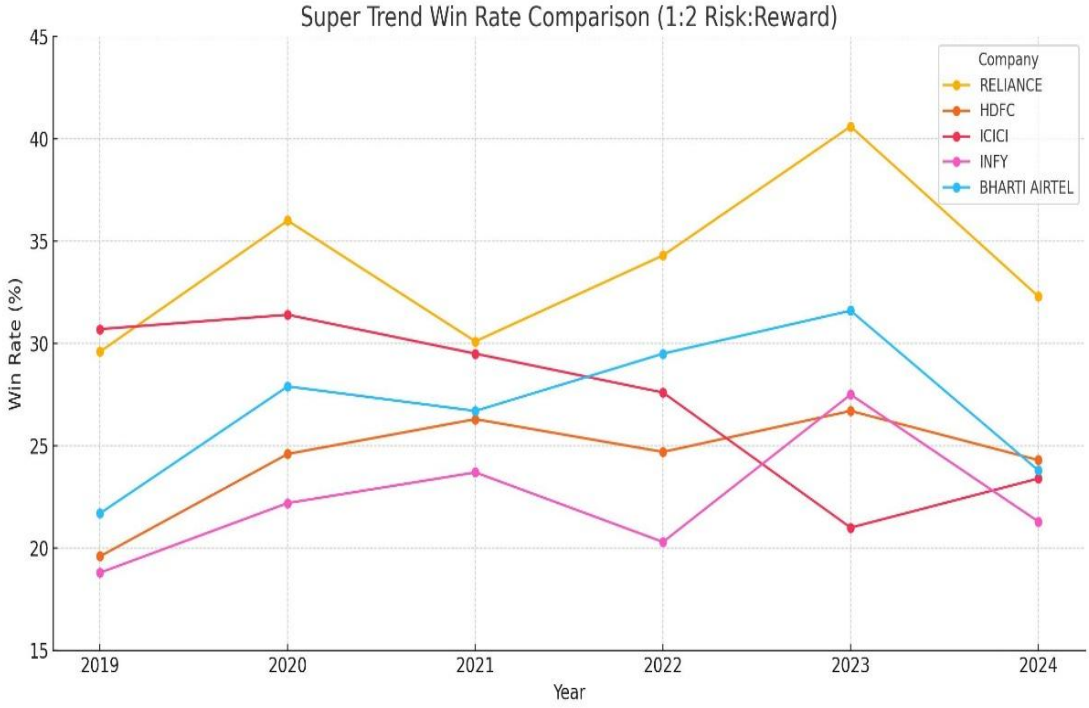
Company	2019	2020	2021	2022	2023	2024
Reliance	49.3%	56%	43%	63%	50.3	50.6
HDFC	42.1%	47.5%	50.6%	48.8%	52%	52%
ICICI	50%	48%	48.7%	56.4%	43.9%	53.1%
INFY	44.1%	43.8%	42.3%	52.6%	51%	47.5%
BHARTI AIRTEL	47.2%	50.5%	45.2%	49.2%	52.5%	53.3%



Risk: 1% Reward: 2% ------[1:2]

Company	2019	2020	2021	2022	2023	2024
Reliance	29.6%	36%	30.1%	34.3%	40.6%	32.3%
HDFC	19.6%	24.6%	26.3%	24.7%	26.7%	24.3%
ICICI	30.7%	31.4%	29.5%	27.6%	21%	23.4%
INFY	18.8%	22.2%	23.7%	20.3%	27.5%	21.3%

BHARTI AIRTEL	21.7%	27.9%	26.7%	29.5%	31.6%	23.8%



Analysis

- For AAPL, the Super Trend (10,3) setting delivered the best performance in terms of profitability and win rate. This configuration is well-suited for volatile stocks where moderate sensitivity captures swift price reversals without too many false signals.
- The Super Trend (7,3) setting showed slightly more trades but suffered from lower accuracy, highlighting the risk of over-sensitivity in trending conditions, particularly in AAPL where short-term noise can lead to whipsaws.

Key Findings

- **Effectiveness of Super Trend Indicator:** The Super Trend showed strong performance on the 15-minute timeframe, particularly in trending markets and high-liquidity stocks like Reliance, HDFC Bank, ICICI Bank, Infosys, and Bharti Airtel.
- **Trending vs. Sideways Markets:** The strategy worked well in bullish and bearish markets but struggled in sideways conditions, generating false signals.
- **Risk Management:** Using stop-loss and proper position sizing, along with a 1:2 risk-to-reward ratio, improved performance and minimized drawdowns.
- **Profitability & Win Rate:** Win rates ranged from 43.9% to 56.4%, with better profitability in higher risk-to-reward settings.
- **Stock-Specific Performance:** Reliance and Bharti Airtel responded best to the Super Trend, offering more consistent profitability, while ICICI Bank showed strong but less consistent results.

Recommendations

- Focus on High-Liquidity Stocks: Prioritize stocks like Reliance, HDFC Bank, and Bharti Airtel for better results.
- Adjust Sensitivity: Use the Super Trend (10,3) setting for balanced accuracy and sensitivity. Avoid overly sensitive settings like (7,3) in volatile markets.

- Combine Indicators: Pair the Super Trend with volume or momentum indicators to reduce false signals.
- Optimize Risk Management: Use a 1:1 risk-to-reward ratio for higher profitability.
- Avoid when market is on sideways
- Not a stand-alone tool my advice to use super trend indicator to combined with other tools to increases probability rate

Conclusion

This study evaluated the Super Trend indicator on a 15-minute intraday timeframe for the top 5 NIFTY 50 stocks. Back-testing showed that the strategy performed well in trending markets, especially with high-liquidity stocks, but faced challenges during sideways phases with false signals. Risk management tools like stop-loss and proper position sizing enhanced performance. Overall, the Super Trend indicator shows potential as part of an intraday trading system, particularly when combined with other indicators for better confirmation.

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