

Sefirot

Financial Research

RSI and Volatility: An Automated Trading Strategy

Authors:
Mallia Corrado
Croci Mattia

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Disclaimer

This document and the accompanying code are intended for backtesting and educational purposes only. The information provided does not constitute investment advice. Past performance is not indicative of future results, and real-world trading involves significant risk. Users should exercise caution and conduct their own research before making any financial decisions. The authors and distributors of this document are not responsible for any gains or losses resulting from the use of the presented strategy.

1 Introduction

In this article, we will examine the development and testing of an automated trading strategy designed to enhance decision-making in financial markets. The strategy leverages well-known technical indicators, such as the Relative Strength Index (RSI), while incorporating sophisticated risk management techniques, including trailing stops and volatility-based adjustments. This approach aims to automate the trading process, ensuring optimal entries and exits with effective risk control.

The backtest is performed on historical 15-minute intraday data from stocks including AstraZeneca (AZN), Barclays (BCS), Coca-Cola (KO), Pfizer (PFE), Sony (SONY), Stellanis (STLA), Tesla (TSLA), and Posco (PKX), providing a comprehensive view of the strategy's historical performance.

The script used for this backtesting process is written in Python and utilizes the following libraries:

- **Pandas**: for handling and analyzing the data
- **NumPy**: for numerical operations and calculations
- **Matplotlib**: for plotting the performance of the strategy
- **Datetime**: for managing timestamps and time-based operations

[Click here to find the database and Python code](#)

2 Strategy Description

The strategy is designed to execute automated trades based on technical indicators and volatility-driven risk management. The conditions for entry and exit, along with the risk management approach, are as follows:

- **Entry conditions**: A buy signal is generated when the Relative Strength Index (RSI) drops below 30, indicating that the stock is potentially oversold and may be due for a reversal. This is a common signal used to identify buying opportunities in an uptrend
- **Exit conditions**: The position is closed under the following conditions
 - ◇ The price hits the trailing stop, which is dynamically adjusted as the price moves in the trader's favour

- ◇ The take profit level, calculated based on volatility, is reached
- ◇ The RSI rises above 70, indicating that the stock may be overbought and a potential downward correction could follow
- **Risk management:** To protect against large losses, the strategy uses a dynamic stop loss. This stop loss is calculated based on the stock's daily volatility, which helps ensure that the stop loss adapts to market conditions rather than being fixed at a set price. The volatility is measured by calculating the standard deviation of daily percentage returns, which reflects the variation in the stock's price movement over a period of time
- **Trailing stop:** A 2% trailing stop is employed once a position is in profit. This means that the stop loss is adjusted upwards by 2% below the highest price reached after the entry, thereby locking in profits as the stock price increases. The trailing stop helps secure profits while allowing the position to stay open if the price continues to rise.

3 Technical Implementation

3.1 Data Preprocessing

The initial phase of the backtesting script is dedicated to data preprocessing, a critical step to ensure that all subsequent operations are performed on a clean, consistent, and chronologically ordered dataset. This is particularly important in intraday trading, where the data is sampled at 15-minute intervals.

Historical price data is imported from a CSV file using the pandas library, which provides efficient structures for handling tabular time-series data. Each file includes essential columns such as timestamp, open, high, low, close, and volume.

The main steps in the preprocessing stage are as follows:

- **Timestamp conversion:** The timestamp column, initially stored as a string, is converted into Python datetime objects using `pd.to_datetime()`. This enables the use of pandas' time-based indexing, accurate sorting, rolling window functions, and time-series visualisation
- **Chronological sorting:** Once converted, the dataset is explicitly sorted by the timestamp column. This step is essential: without proper chronological ordering, the calculation of indicators like RSI and the simulation of trade positions would yield invalid or misleading results

Although not explicitly handled in the script, it is considered good practice to check for missing or duplicate data entries, especially when working with real-world or multi-source datasets. By the end of the preprocessing phase, the dataset is ready for technical analysis and signal generation. Each row now represents a well-defined 15-minute interval with clean, temporally ordered data suitable for reliable simulation and performance evaluation.

```

31
32 # Ensure the 'timestamp' column is in datetime format
33 df['timestamp'] = pd.to_datetime(df['timestamp'])
34
35 # Sort the data by timestamp
36 df = df.sort_values(by='timestamp')
37

```

Figure 1: Python code

3.2 Indicator Computation

3.2.1 RSI (Relative Strength Index)

The Relative Strength Index (RSI) is one of the most widely used technical indicators in trading. Developed by J. Welles Wilder, it is a momentum oscillator that measures the speed and magnitude of recent price movements. The RSI helps traders evaluate whether an asset is being overbought or oversold, which can signal potential reversals or entry and exit points.

Key characteristics:

- The RSI is plotted on a scale from 0 to 100 and is typically calculated over a 14-period window
- It is typically calculated over a 14-period window (e.g. 14 candles in a 15-minute chart)

```

# Function to calculate RSI
def calculate_rsi(data, window=14):
    delta = data['close'].diff()
    gain = (delta.where(delta > 0, 0)).rolling(window=window).mean()
    loss = (-delta.where(delta < 0, 0)).rolling(window=window).mean()
    rs = gain / loss
    rsi = 100 - (100 / (1 + rs))
    return rsi

```

Figure 2: Python function to calculate RSI

$$RSI = 100 - \left(\frac{100}{1 + RS} \right), \quad \text{where } RS = \frac{\text{Average Gain}}{\text{Average Loss}}$$

How to interpret RSI:

- **RSI < 30**: The asset may be oversold, suggesting that selling pressure could be exhausted. This is often interpreted as a potential buying opportunity, especially when confirmed by other signals
- **RSI > 70**: The asset may be overbought, indicating that the price could be due for a pullback or correction. This is commonly viewed as a potential sell signal

Why it matters:

- The RSI helps to filter false trends and identify momentum shifts early
- It is especially useful in range-bound markets, where prices oscillate within support/resistance levels. Combined with other indicators (e.g. volatility or moving averages), RSI can strengthen overall trading strategies and improve risk management

3.2.2 Volatility

Volatility refers to the degree of variation in an asset's price over a given period. It reflects how much and how quickly prices move—providing a direct measure of market uncertainty and risk. High volatility signals large and frequent price swings, while low volatility indicates more stable and predictable movement.

Why it matters:

- Higher volatility = Greater potential for gains and losses
- Lower volatility = More stable trading environment, often with tighter price ranges

Understanding volatility is essential for effective risk management and strategy adaptation.

```
# Calculate volatility
df_change = df['close'].pct_change()
std = df_change.std()
```

Figure 3: Python function to calculate volatility

How volatility is used in trading:

- Stop-Loss & Take-Profit Calibration: Traders adjust stop-loss and take-profit levels based on current volatility
 - ◇ In **volatile markets**, wider stop-losses help avoid premature exits due to noise
 - ◇ In **stable markets**, tighter levels help control risk and optimise returns
- Position Sizing: During periods of high volatility, traders may reduce position size to limit exposure, while increasing it in calmer conditions

Formula for calculating volatility: Volatility is often calculated as the standard deviation of the asset's returns, typically over a specified period (e.g. 14 periods for intraday trading). The formula is as follows:

Calculate the daily returns (or log returns) for each period:

$$R_t = \ln \left(\frac{P_t}{P_{t-1}} \right)$$

Where:

r_t = return at time t

P_t = closing price at time t

P_{t-1} = closing price at time t-1

\ln = natural logarithm

Calculate the standard deviation of the returns over the desired period (e.g., 14 days or 15 minutes):

$$\sigma = \sqrt{\frac{1}{N} \sum_{t=1}^N (R_t - \bar{R})^2}$$

Where:

σ = standard deviation (volatility)

n = number of periods

\bar{r} = average return over the period

3.2.3 Dynamic Stop-Loss in Risk Management

A Dynamic Stop-Loss is a risk management tool that automatically adjusts the stop-loss level as the price of an asset moves in a favorable direction. Unlike a fixed stop-loss, which stays at a predetermined price, a dynamic stop-loss moves up (or down) to protect profits while allowing for the market's natural fluctuations. This tool is designed to lock in profits while reducing the risk of a position being prematurely closed in a volatile market. It allows for flexibility as the price increases, ensuring that traders can benefit from the upside movement while still protecting themselves from significant downside moves.

How it works:

- The initial stop-loss is set when the trade is entered, typically based on a percentage distance from the entry price or using a volatility-based formula. For example:

$$\text{Stop} - \text{Loss} = \text{Entry Price} * (1 - N * \text{Volatility})$$

N is a multiplier that determines the distance between the entry price and the stop-loss level, based on the asset's volatility. The value of N customizable and reflects the trader's risk tolerance

Adjustment as Price Increases:

- Once the price moves in the trader's favor, the stop-loss is adjusted to trail the price. The stop-loss distance is maintained based on a set percentage or volatility calculation. If the price rises, the stop-loss rises with it, but if the price falls, the stop-loss remains at the last adjusted level. This helps to protect profits without being prematurely stopped out by normal market fluctuations

Benefits of a Dynamic Stop-Loss:

- Locking in Profits
- Reducing Risk in Volatile Markets
- Improved Trade Management: Dynamic stop-losses offer traders more control and flexibility over their trades. As the market moves in the trader's favor, the stop-loss adjustment reflects an adaptive risk management strategy, improving the overall management of the trade

3.3 Trade Signal Generation

Our strategy uses the Relative Strength Index (RSI) to determine entry points. Specifically, a buy signal is triggered when the RSI drops below 30, indicating an oversold condition. Conversely, a sell signal is generated when the RSI exceeds 70, signaling an overbought market.

```
65  
66     if row['Signal'] == 0 and row['RSI'] < 30 and buy_price is None: # Buy when RSI < 30  
67
```

Figure 4: Python code for signal generation

Position Management is key to minimizing risk and optimizing returns. Once a trade is initiated, the stop-loss and take-profit levels are dynamically set based on market volatility. These levels are adjusted in real-time, using a trailing stop-loss mechanism to lock in profits as the asset price rises. The volatility-adjusted stop-loss prevents premature exits while maintaining protection against significant losses.

```
69  
70     # Calculate stop loss and take profit based on volatility and multipliers  
71     stop_loss = buy_price * (1 - n * std) # SL = entry_price * (1 - N * vol)  
72     take_profit = buy_price * (1 + m * std) # TP = entry_price * (1 + M * vol)
```

Figure 5: Python code for calculate stop loss and take profit based on volatility and multipliers

Key Features:

- RSI-based Trade Signals: Buy when RSI \downarrow 30, sell when RSI \uparrow 70
- Dynamic Stop-Loss and Take-Profit: Adjusted based on market volatility
- Trailing Stop: Dynamically updated as price rises, securing gains

This system aims to improve decision-making, enhance risk management, and ensure efficient position management, ultimately driving better trading outcomes.

4 Performance Evaluation

4.1 AstraZeneca (AZN)

Sector: Pharmaceutical & Biotech
Market Capitalisation: \$221.63B (NASDAQ)
Headquarters: Cambridge, United Kingdom

Key Areas of Focus:

Oncology
Cardiovascular
Respiratory
Immunology

Stock Listings:

London Stock Exchange (LSE)
NASDAQ

Trading Considerations:

Stable long-term growth
Moderate volatility for trading strategies

Date: 03/04/2025 – 02/05/2025

Timeframe: 15 minutes

Number of trades made: 27

Win Rate: 51.85%

Average Win: 1.80

Average Loss: -1.24

Risk/Reward Ratio: 1.45

Final capital with RSI strategy (starting from \$1000): \$1136.71

Final capital with Buy and Hold strategy (starting from \$1000): \$966.14

The RSI-based strategy performed relatively well during the period, with a win rate of 51.85%. This suggests that slightly more than half of the trades were successful, indicating a fairly balanced performance. The strategy's average win of 1.80 and average loss of -1.24 reflect a positive risk/reward ratio of 1.45, which suggests that the potential gains from winning trades outweighed the losses from losing trades, contributing to the overall profitability.

The final capital of \$1136.71 represents a solid 13.67% return, outperforming the Buy and Hold strategy, which ended with a slight loss of 3.39%. This highlights the effectiveness of the RSI strategy in capturing short-term opportunities while mitigating risks through its stop-loss and take-profit mechanisms. The strategy's use of the RSI indicator to identify oversold (below 30) and overbought (above 70) conditions appears to have provided solid entry and exit points, further enhanced by the volatility-adjusted stop-loss and take-profit levels. Despite the relatively moderate win rate, the strategy's consistent ability to manage risk and protect gains through the trailing stop mechanism led to better overall capital growth compared to the passive Buy and Hold approach.



Figure 6: RSI Strategy vs Market - AZN

4.2 Barclays (BCS)

Sector: Financial Services & Banking
 Market Capitalisation: \$56.93B (NYSE)
 Headquarters: London, United Kingdom

Key Areas of Focus:

- Retail Banking
- Investment Banking
- Wealth Management
- Corporate Banking
- Asset Management

Stock Listings:

- London Stock Exchange (LSE)
- New York Stock Exchange (NYSE)

Trading Considerations:

- Sensitive to global economic conditions, interest rates, and regulatory changes
- Potential for moderate to high volatility, especially in banking sectors and during economic fluctuations
- Strong brand with diversified revenue streams in retail and investment banking

Date: 03/04/2025 – 02/05/2025

Timeframe: 15 minutes

Number of trades made: 22

Win Rate: 54.55%

Average Win: 0.47

Average Loss: -0.31

Risk/Reward Ratio: 1.55

Final capital with RSI strategy (starting from \$1000): \$1185.93

Final capital with Buy and Hold strategy (starting from \$1000): \$1060.11

The RSI-based strategy showed positive results during the period, with a win rate of 54.55%, slightly above 50%, indicating a higher success rate than failures. The average win of 0.47 and average loss of -0.31, combined with a solid risk/reward ratio of 1.55, demonstrate that the strategy effectively captured profitable trades while limiting the

impact of losses. This indicates a favorable balance between risk and reward. The final capital of \$1185.93 shows a strong return of 18.59%, outperforming the Buy and Hold strategy, which ended with a modest gain of 6.01%. This outperformance highlights the efficiency of the RSI strategy in capitalizing on short-term price movements. The strategy's use of the RSI indicator, combined with a risk-managed approach (via stop-loss and take-profit levels), enabled consistent gains during the period. The higher risk/reward ratio suggests that the strategy, despite its slightly lower number of trades, was able to generate greater returns per winning trade, contributing to its overall profitability. This demonstrates that the RSI-based approach was effective in this market period, with a steady upward trend in capital growth compared to the passive Buy and Hold strategy.



Figure 7: RSI Strategy vs Market - BCS

4.3 Coca-Cola (KO)

Sector: Consumer Staples – Beverages
 Market Capitalisation: \$307.97B (NYSE)
 Headquarters: Atlanta, Georgia, United States

Key Areas of Focus:
 Non-alcoholic beverages
 Carbonated soft drinks
 Bottled water and sports drinks
 Juices, teas, and coffees

Stock Listings:
 New York Stock Exchange (NYSE)

Trading Considerations:
 Defensive stock, often resilient during economic downturns
 Stable dividend payer, attractive to long-term investors
 Low to moderate volatility, suitable for conservative trading strategies
 Sensitive to global consumer trends and input costs (e.g., sugar, packaging)

Date: 03/04/2025 – 02/05/2025
 Timeframe: 15 minutes
 Number of trades made: 27
 Win Rate: 51.85%

Average Win: 0.78
 Average Loss: -0.91
 Risk/Reward Ratio: 0.85
 Final capital with RSI strategy (starting from \$1000): \$984.20
 Final capital with Buy and Hold strategy (starting from \$1000): \$1008.30

During the observed period, the RSI-based trading strategy executed 27 trades with a win rate of 51.85%, indicating a slightly higher proportion of winning trades. However, the average gain per winning trade (0.78) was lower than the average loss per losing trade (-0.91), resulting in a risk/reward ratio of 0.85, which suggests that the strategy took on more risk than it returned.

By the end of the period, the RSI strategy underperformed, closing at \$984.20, which corresponds to a loss of approximately 1.58% from the initial \$1000 capital. In contrast, the Buy and Hold approach ended at \$1008.30, representing a gain of around 0.83%. This outcome highlights that, despite relatively balanced trade outcomes, the unfavourable risk/reward dynamics led to a net loss, underlining the importance of careful calibration when applying technical indicators like RSI, particularly in sideways or low-volatility markets.



Figure 8: RSI Strategy vs Market - KO

4.4 Pfizer (PFE)

Sector: Healthcare – Pharmaceuticals & Biotechnology
 Market Capitalisation: \$135.55B (NYSE)
 Headquarters: New York City, New York, United States

Key Areas of Focus:
 Innovative prescription medicines
 Vaccines
 Oncology
 Internal medicine
 Inflammation & immunology
 Rare diseases

Stock Listings:
 New York Stock Exchange (NYSE)

Trading Considerations:

Considered a defensive stock with stable healthcare demand

Subject to regulatory decisions and patent expirations

Moderate volatility, impacted by drug trial results and healthcare policy

Attractive for long-term investors due to consistent dividend payments and large R&D pipeline

Date: 03/04/2025 – 02/05/2025

Timeframe: 15 minutes

Number of trades made: 31

Win Rate: 41.94%

Average Win: 0.30

Average Loss: -0.31

Risk/Reward Ratio: 0.97

Final capital with RSI strategy (starting from \$1000): \$928.14

Final capital with Buy and Hold strategy (starting from \$1000): \$980.93

The performance of the RSI-based trading strategy over the given period shows limited effectiveness. Despite executing 31 trades, the win rate stands at just 41.94%, indicating that losses occurred more frequently than gains. The average win (0.30) was nearly matched by the average loss (-0.31), resulting in a risk/reward ratio of 0.97, which is below the ideal threshold (>1), suggesting the strategy failed to sufficiently compensate for losing trades.

Starting from \$1000, the RSI strategy closed at \$928.14, representing a loss of approximately 7.2%. In contrast, the Buy and Hold approach ended at \$980.93, corresponding to a loss of about 1.9%. These figures highlight that, under the specific market conditions, passive holding preserved capital better than the RSI-driven approach, suggesting a need to recalibrate the strategy's parameters or enhance trade filtering to improve its effectiveness.



Figure 9: RSI Strategy vs Market - PFE

4.5 Posco (PKX)

Sector: Materials – Steel & Metal Production

Market Capitalisation: \$14.86B (NYSE)

Headquarters: Pohang, South Korea

Key Areas of Focus:
 Steel manufacturing (flat, long, stainless)
 Automotive and construction-grade steel
 Energy and industrial materials
 Green steel and decarbonisation technologies
 Lithium and battery materials (via POSCO Future M)

Stock Listings:
 New York Stock Exchange (NYSE)
 Korea Exchange (KRX)

Trading Considerations:
 Highly cyclical, sensitive to global industrial demand and commodity prices
 Impacted by geopolitical trade policies and steel tariffs
 Volatility driven by economic cycles, Chinese demand, and raw material costs
 Growing focus on ESG initiatives and green transformation for long-term sustainability

Date: 03/04/2025 – 02/05/2025
 Timeframe: 15 minutes
 Number of trades made: 15
 Win Rate: 53.33%
 Average Win: 0.59
 Average Loss: -0.45
 Risk/Reward Ratio: 1.32
 Final capital with RSI strategy (starting from \$1000): \$1043.70
 Final capital with Buy and Hold strategy (starting from \$1000): \$1012.88

The RSI-based strategy executed 15 trades with a win rate of 53.33%, indicating a slight edge in successful trades. The average gain per winning trade was 0.59%, while the average loss per losing trade was -0.45%, resulting in a solid risk/reward ratio of 1.32. This balance suggests the strategy effectively capitalized on favourable price movements while keeping losses under control.

In terms of capital performance, the RSI strategy grew the initial \$1000 to \$1043.70, achieving a +4.37% return, outperforming the Buy and Hold approach, which closed at \$1012.88, a +1.29% return. This outperformance highlights the potential of the RSI indicator in short-term trading under these market conditions, offering better risk-adjusted returns over the evaluated timeframe.



Figure 10: RSI Strategy vs Market - PKX

4.6 SONY (SONY)

Sector: Technology – Consumer Electronics, Entertainment & Financial Services

Market Capitalisation: \$100+ billion (NYSE)

Headquarters: Tokyo, Japan

Key Areas of Focus:

Consumer electronics (TVs, audio equipment, cameras)

PlayStation gaming and online services

Film and television production (Sony Pictures)

Music publishing and distribution (Sony Music)

Imaging & sensing solutions (semiconductors)

Financial services (Sony Financial Group)

Stock Listings:

New York Stock Exchange (NYSE)

Tokyo Stock Exchange (TSE)

Trading Considerations:

Diversified revenue streams across tech and entertainment sectors

Impacted by global consumer demand, gaming cycles, and tech innovation

Currency fluctuations (JPY/USD) can affect earnings

Moderate volatility; attractive for both growth and defensive investors due to its strong brand and recurring revenue in content and services

Date: 03/04/2025 – 02/05/2025

Timeframe: 15 minutes

Number of trades made: 22

Win Rate: 45.45%

Average Win: 0.43

Average Loss: -0.39

Risk/Reward Ratio: 1.10

Final capital with RSI strategy (starting from \$1000): \$971.67

Final capital with Buy and Hold strategy (starting from \$1000): \$1056.16

The RSI-based trading strategy executed 22 trades during the period, with a win rate of 45.45%. Despite the number of wins, the average profit per winning trade (0.43) was slightly higher than the average loss per losing trade (-0.39), resulting in a relatively balanced risk/reward ratio of 1.10.

However, the overall performance was not favorable, as the RSI strategy ended with a capital of \$971.67, showing a small loss of approximately 2.83% compared to the initial capital of \$1000. This suggests that while the strategy was relatively balanced in terms of individual trade outcomes, it was unable to consistently generate profits over the short period analyzed.

In contrast, the Buy and Hold strategy outperformed the RSI strategy, with final capital rising to \$1056.16, representing a gain of about 5.61%. This indicates that, during this specific period, a passive approach to holding the asset was more profitable than the active

trading strategy, despite the relatively high number of trades. The underperformance of the RSI strategy could be attributed to market conditions that did not favor the effectiveness of the RSI indicator, possibly due to periods of low volatility or trends where price movements did not align with the typical overbought or oversold conditions defined by the RSI.



Figure 11: RSI Strategy vs Market - SONY

4.7 Stellantis (STLA)

Sector: Automotive – Manufacturing & Distribution

Market Capitalisation: \$27.31B (NYSE)

Headquarters: Amsterdam, Netherlands

Key Areas of Focus:

Passenger vehicles

Commercial vehicles

Electric and hybrid vehicles

Autonomous driving technology

Sustainable mobility solutions

Global automotive brands

Stock Listings:

New York Stock Exchange (NYSE)

Euronext Paris

Borsa Italiana

Trading Considerations:

Highly sensitive to global economic conditions, including consumer demand and raw material prices

Strong focus on electric vehicle (EV) and hybrid vehicle development in response to the shift towards sustainability

Volatile stock, influenced by regulatory policies on emissions, supply chain issues, and competition within the automotive industry

Attractive to long-term investors due to diversification across multiple automotive brands and increasing focus on EVs and green technologies

Date: 03/04/2025 – 02/05/2025

Timeframe: 15 minutes

Number of trades made: 37

Win Rate: 43.24%

Average Win: 0.17

Average Loss: -0.15

Risk/Reward Ratio: 1.12

Final capital with RSI strategy (starting from \$1000): \$952.43

Final capital with Buy and Hold strategy (starting from \$1000): \$922.12

The RSI strategy executed 37 trades with a win rate of 43.24%. The average gain per winning trade was +0.17%, while the average loss per losing trade was -0.15%, resulting in a risk/reward ratio of 1.12. Despite a relatively balanced performance, the final capital with the RSI strategy was \$952.43, reflecting a 4.76% loss from the initial capital of \$1000. On the other hand, the Buy and Hold strategy saw a decline, ending at \$922.12, which represents a loss of 7.79%.

In the months of March and April 2025, Stellantis experienced one of its worst performances in the stock market, primarily due to the tariffs imposed by Trump, which heavily impacted the automotive sector. The uncertainty surrounding tariffs on imported cars significantly affected the company's sales and growth projections. This negative context had a profound effect on the stock's performance, highlighting Stellantis' sensitivity to such macroeconomic factors and the difficulty of trading in a volatile market driven by protectionist policies.



Figure 12: RSI Strategy vs Market - STLA

4.8 Tesla (TSLA)

Sector: Consumer Discretionary – Automotive & Clean Energy

Market Capitalisation: \$901B (NASDAQ)

Headquarters: Austin, Texas, United States

Key Areas of Focus:

Electric vehicles (EVs)

Battery technology and energy storage

Solar energy systems

Autonomous driving and AI

Gigafactory expansion and vertical integration

Stock Listings:

NASDAQ

Trading Considerations:

High volatility stock, influenced by earnings, delivery numbers, and CEO activity

Strong retail investor interest and speculative activity

Exposure to EV market trends, global regulation, and technological disruption

Long-term growth potential tied to innovation, but sensitive to execution risks and competition

Date: 03/04/2025 – 02/05/2025

Timeframe: 15 minutes

Number of trades made: 40

Win Rate: 52.50%

Average Win: 5.49

Average Loss: -5.38

Risk/Reward Ratio: 1.02

Final capital with RSI strategy (starting from \$1000): \$1046.65

Final capital with Buy and Hold strategy (starting from \$1000): \$1060.52

During the observed period, the RSI-based strategy executed 40 trades with a win rate of 52.50%, suggesting a fairly balanced outcome between profitable and losing positions. The average gain per winning trade was +5.49%, while the average loss was -5.38%, resulting in a nearly neutral risk/reward ratio of 1.02. This indicates that although the strategy managed risk relatively well, the overall edge was minimal.

By the end of the period, the RSI strategy yielded a final capital of \$1046.65, marking a gain of +4.67%. However, this performance was slightly outpaced by the Buy and Hold strategy, which closed at \$1060.52, a gain of +6.05%. The result suggests that while the RSI approach offered some growth, it underperformed a simple passive investment over the same period, possibly due to missed upside momentum or short-term market noise affecting entry/exit signals.



Figure 13: RSI Strategy vs Market - TSLA

5 Conclusion

The backtest results show that the use of a strategy based on the RSI indicator on a 15-minute timeframe produces mixed performances depending on the stock analysed, with some evidence of effectiveness but also notable limitations.

In particular, the strategy outperformed the Buy and Hold approach in 5 out of 8 cases: AstraZeneca, Barclays, Posco, Stellantis, and Pfizer, demonstrating a fair ability to generate profits over short-term horizons, especially in contexts of moderate volatility and sound risk management. Barclays delivered the strongest result, with a final capital of \$1185.93 (+18.6%) versus \$1060.11 for Buy and Hold, supported by a solid balance between win rate (54.55%) and risk/reward ratio (1.55). AstraZeneca also showed a favourable risk/reward ratio (1.45), achieving a 13.7% gain.

However, in 3 out of 8 cases, the RSI strategy underperformed compared to simply holding the position, as seen with Coca-Cola, SONY, and Tesla. This suggests that in certain stocks or market conditions, the RSI may produce misleading or overly frequent signals, negatively affecting net profits. For instance, SONY ended with a final capital of \$971.67 using the RSI, compared to \$1056.16 under Buy and Hold, despite a decent risk/reward ratio (1.10).

A noteworthy case is Stellantis, where the RSI strategy still outperformed Buy and Hold despite a sharp decline in the stock price caused by recently imposed import tariffs by Trump. This indicates that, during market shocks and periods of high volatility, a reactive algorithmic strategy like RSI may provide partial protection compared to the more exposed and static Buy and Hold method.

Overall, the strategy showed a modest average win rate (ranging between 41% and 54%), but in several instances, this was offset by a risk/reward ratio above 1, suggesting that even strategies with more losing than winning trades can be profitable if well calibrated. That said, the strategy's performance varied significantly depending on the stock, highlighting the importance of context and individual asset behaviour. Moreover, the short testing window (just one month) and the reliance on a single technical indicator represent key limitations. Broader testing over extended periods, along with the integration of additional technical or fundamental signals, could contribute to more consistent and reliable results.

In conclusion, the RSI strategy has shown good potential in selected contexts and some resilience in turbulent market phases, but it still requires refinement before it can be considered a systematically effective and universally applicable solution.