

Technical Analysis in the Cryptocurrency Market

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Plain Language Summary

In the cryptocurrency market, like any market, prices fluctuate continuously, and the level of fluctuation differs for different assets or cryptocurrency pairs. Technical analysis strategies help analyze these price fluctuations to predict price movements and indicate the appropriate time to buy and sell to maximize profit. This paper examines 9 different strategies that evaluate historic movements and predict future movements based on mathematical functions such as moving averages. This study investigates a greater range of strategies than previous studies, ultimately identifying the best performing strategies.

Publication Category

Course-based Assignment

Academic Context

In a 100-level Principles of Macroeconomics course, students prepared professional reports on various class topics. The present report is about the digital asset module of the class. Students learned how to code trading algorithms by using PineScript and had the chance to familiarize themselves with the concepts and applications of technical analysis.

Introduction

The cryptocurrency industry has tremendously grown in the past years along with the decentralized finance, Web 3, and NFT fields starting to emerge and increase the demand for cryptocurrencies (Grobys et al., 2020). Technical analysis has so far been proven to be useful in its application to the stock, bond, commodities, and forex markets. Since technical analysis can be used for any security with historical trading data, technical analysis strategies can be applied to the cryptocurrency industry, as well. This analysis has shown to be useful in predicting the movement of the market price, which can benefit traders and investors.

The existing literature on technical analysis is mainly focused on application of technical analysis within the stock and bond market (Yufeng et al., 2021). Studies that are focused on cryptocurrencies tend to engage a limited number of techniques, restricting their applicability. One study in the crypto market investigates the moving

averages strategy and tests it only on Bitcoin cryptocurrency, comparing moving averages over two periods of time: longer-term and shorter-term (Grobys et al., 2020). Comparing moving averages is currently the most researched technique in both the stock and cryptocurrency market due to its strong capabilities at predicting a price trend, so most papers exclusively investigate this technique (Brown & Pelosi, 2019; Yufeng et al., 2021).

However, there is little to no research available on other strategies, which makes it difficult to evaluate and use the best strategies. In addition, the simple moving average is less precise at reacting to a more recent price change, making it less timely and relevant to the future movements. In the present study, we use strategies involving exponential moving averages which put more weight on the latest price changes. Further, the literature available tests trading strategies on one-minute charts, which can reduce the accuracy of the results. To increase

accuracy, we use the longer period by looking at the 30-minute charts (Miller et al., 2019).

Since the available literature limits the scope of tests to one or a couple of trading strategies (Grobys et al., 2020), it's more difficult to compare and assess their effectiveness in predicting the future price movement. With multiple strategies, our study can evaluate and rate the best performing strategy for a specific cryptocurrency pair. Our study contributes to the growing literature on the three large cryptocurrencies. Specifically, it brings new insight into the field of technical analysis in the cryptocurrency industry by testing several strategies that have not been researched to the same extent as the simple moving average strategy. Therefore, investigating a greater range of strategies is justified.

Executive Summary

- The Triple EMA strategy provided the highest average percentage gain in winning trades value for the BTCUSDT pair accounting for 2916.9%, as well as the largest maximum percentage gain of 33.95% and the lowest total number of trades of 66.
- The TTM Squeeze + EMA had the highest number of trades for all the three currency pairs with the number of trades being 620, 641, 622 for BTCUSDT, ETHUSDT, and ADAUSDT respectively.
- The Triple EMA strategy provided the highest average percentage gain in winning trades value for the ETHUSDT pair accounting for 337.79%, as well as the largest maximum percentage gain of 48.91% and the lowest total number of trades of 41.
- The Triple EMA strategy provided the highest average percentage gain in winning trades value for the ADAUSDT pair accounting for 0.16%, as well as the largest maximum percentage gain of 95.96% and the lowest total number of trades of 61.
- The EMA + Heikin Ashi + Parabolic SAR is the best strategy for all the currency pairs with a percentage of winning trades of above 50% for each currency pair.
- The TTM Squeeze + EMA strategy has the highest number of winning trades for all the currency pairs.
- The stochastic + WMA strategy provided the highest average percentage loss in losing trades value for the BTCUSDT pair accounting for 1625.02%.

- The Triple EMA strategy provided the highest average percentage loss in losing trades value for the ETHUSDT pair accounting for 119.07%.
- The Triple EMA and stochastic + WMA strategy provided the highest average percentage loss in losing trades value for the ADAUSDT pair accounting for 0.06%.

Indicator Descriptions

The technical strategies in our study draw on various combinations of the following indicators:

Exponential Moving Average: A calculation used to analyze data points by creating a series of averages of different subsets of the full data set, that places a greater weight and significance on the most recent data points. The strength of this strategy is that it indicates a change in momentum and trend.

Moving Average Convergence/Divergence: A trend-following momentum indicator that shows the relationship between two moving averages of a security's price. It is calculated by subtracting the 26-period exponential moving average (EMA) from the 12-period EMA.

Heikin Ashi: A smoother-looking candle because essentially taking an average of the movement. There is a tendency with Heikin Ashi to stay red during a downtrend and green during an uptrend, whereas normal candlesticks alternate colors even if the price is moving dominantly in one direction.

Parabolic SAR: A technical indicator used to determine the price direction of an asset, as well as draw attention to when the price direction is changing. On a chart, the indicator appears as a series of dots placed either above or below the price bars.

TTM Squeeze Indicator: A volatility and momentum indicator introduced by John Carter of Trade the Markets (now Simpler Trading), which capitalizes on the tendency for prices to break out strongly after consolidating in a tight trading range. The volatility component of the TTM Squeeze indicator measures price compression using Bollinger Bands and Keltner Channels. If the Bollinger Bands are completely enclosed within the Keltner Channels, that indicates a period of very low volatility. This state is known as the squeeze. When the Bollinger Bands expand and move back outside of the Keltner Channel, the squeeze is said to have "fired": volatility

increases and prices are likely to break out of that tight trading range in one direction or the other. The on/off state of the squeeze is shown with small dots on the zero line of the indicator: red dots indicate the squeeze is on, and green dots indicate the squeeze is off. The indicator also uses a momentum oscillator to show the expected direction of the move when the squeeze fires. This histogram oscillates around the zero line; increasing momentum above the zero line indicates an opportunity to purchase long, while momentum falling below the zero line can indicate a shorting opportunity.

Semaphore Signal Level Channel (SSL): An indicator that combines moving averages to provide a clear visual signal of price movement dynamics. In short, it is designed to show when a price trend is forming. When the two lines intersect, the indicator signals that the price movement is changing direction or is about to.

Schaff Trend Cycle: An oscillator indicator that helps to identify the market trends with improved speed and accuracy. The STC also provides buying and selling signals and pinpoints entry and exit points. It is a combination of stochastic and the moving average convergence/divergence (MACD). As a result, this combination is an STC indicator with an enhanced version of the oscillator indicator that minimizes the choppiness during trends and is quicker and more efficient in responding to price actions. It uses two thresholds to convey valuable information. The first threshold is at 25 and the second at 75.

Relative Strength Index: A momentum indicator used in technical analysis that measures the magnitude of recent price changes to evaluate overbought or oversold conditions in the price of a stock or other asset. The RSI is displayed as an oscillator (a line graph that moves between two extremes) and can have a reading from 0 to 100.

Vortex: An indicator composed of two lines - an uptrend line (VI+) and a downtrend line (VI-). These lines are typically colored green and red respectively. A vortex indicator is used to spot trend reversals and confirm current trends. The traditional application of using VI- and VI+ crossovers can result in a number of false trade signals when price action is choppy. For testing purposes, we will increase the number of periods used in the indicator to reduce this, for example, using 25 periods instead of 14.

Strategies & Results

This section describes each technical strategy and its analysis results.

Strategy 1: EMA Crossover

Indicators

Exponential Moving Average (9)
Exponential Moving Average (21)
Exponential Moving Average (200)

Strategy Description

Long Position

- Candle is above EMA (200)
- EMA (9) crosses over EMA (21)
- Take Profit: EMA (21) crosses over EMA (9)
- Stop Loss: Double value of our ATR percentage

Short Position

- Candle is below EMA (200)
- EMA (21) crosses over EMA (9)
- Take Profit: EMA (9) crosses over EMA (21)
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 1 shows that the ADAUSDT currency pair had the highest number of trades with 195 trades, however, ETHUSDT had the highest percentage of winning trades, at 34.09%. BTCUSDT had the highest average percentage gain in winning trades as well as the highest average percentage loss in losing trades compared to other currency pairs, which also resulted in the highest implied number of winning trades for every losing trade of 2.52, meaning that \$2.52 is gained by risking a dollar on average. ADAUSDT had the highest maximum percentage gain in winning trades and the highest number of maximum consecutive winning trades, while ETHUSDT had the maximum percentage loss in losing trades. BTCUSDT had the highest number of maximum consecutive losing trades.

TABLE 1. STRATEGY 1 RESULTS SUMMARY

EMA- Crossover Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	175	176	195
Number of Winning Trades	53	60	60
Average % gain in winning trades	1757.95%	101.37%	0.08%
Average % loss in losing trades	696.83%	46.57%	0.04%
Number of maximum consecutive winning trades	3	3	4
Number of maximum consecutive losing trades	14	8	11
Maximum % gain in winning trades	31.06%	31.00%	45.16%
Maximum % loss in losing trades	14.52%	26.97%	25.31%
Percentage of winning trades	30.29%	34.09%	30.77%
Number of winning trades for every losing trade	2.52	2.18	2.00

Strategy 2: MACD + EMA

Indicators

Exponential Moving Average (200)

Moving Average Convergence/Divergence

Strategy Description

Long Position

- Candle is above EMA (200)
- MACD Blue line crosses above Red line
- MACD histogram is blue/green and becomes concave-up
- Take Profit: MACD Red line crosses above Blue line
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- MACD Red line crosses above Blue line
- MACD histogram is orange/red and becomes concave-down
- Take Profit: MACD Blue line crosses above Red line
- Stop Loss: Double value of our ATR percentage in points above entry price

It can be seen from Table 2 that ETHUSDT had the highest number of trades under this strategy with 211 trades in total and 69 winning trades which resulted in the highest percentage of winning trades of 32.70%. It also had the highest maximum gain in winning trades with 31.77% compared to 19.46% of BTCUSDT and 19.50% of ADAUSDT. BTCUSDT had the highest average percent gain in winning trades with 1061.75%, the highest number of maximum consecutive winning trades, and the highest average percent loss in losing trades of 699.24%. ADAUSDT had the highest implied number of winning trades for every losing trade of 2 and the highest number of maximum consecutive losing trades.

TABLE 2. STRATEGY 2 RESULTS SUMMARY

MACD + EMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	168	211	190
Number of Winning Trades	52	69	56
Average % gain in winning trades	1061.75%	73.68%	0.06%
Average % loss in losing trades	699.24%	47.35%	0.03%
Number of maximum consecutive winning trades	7	4	3
Number of maximum consecutive losing trades	9	7	12
Maximum % gain in winning trades	19.46%	31.77%	19.50%
Maximum % loss in losing trades	13.99%	22.11%	18.70%
Percentage of winning trades	30.95%	32.70%	29.47%
Number of winning trades for every losing trade	1.52	1.56	2.00

Strategy 3: EMA + Heikin Ashi + Parabolic SAR

Indicators

Exponential Moving Average (200)

Heikin Ashi Chart Type

Parabolic SAR

Strategy Description

Long Position

- Candle is above EMA (200)
- Green Heikin Ashi Candle
- Parabolic SAR Dot getting below candles

- Take Profit: Parabolic SAR Dot getting above Red Heikin Ashi Candle
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- Red Heikin Ashi Candle
- Parabolic SAR Dot getting above candles
- Take Profit: Parabolic SAR Dot getting below Green Heikin Ashi Candle
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 3 shows that ADAUSDТ had the highest number of trades with 456 trades and ETHUSDТ had the highest number of winning trades of 262 trades. However, ETHUSDТ had the highest percentage of winning trades of 59.68%. BTCUSDТ had the highest average percentage gain in winning trades, the highest average percentage loss in losing trades, and the highest number of maximum consecutive winning and losing trades. ADAUSDТ had the highest maximum percentage loss in losing trades at 4.92%. As a result, ADAUSDТ has the highest implied number of winning trades for every losing trade of 5.

TABLE 3: STRATEGY 3 RESULTS SUMMARY

EMA + Heikin Ashi + Parabolic SAR Results Summary			
Metric of Analysis	BTCUSDТ	ETHUSDТ	ADAUSDТ
Number of Trades	421	439	456
Number of Winning Trades	242	262	243
Average % gain in winning trades	1045.51%	71.21%	0.05%
Average % loss in losing trades	259.84%	16.23%	0.01%
Number of maximum consecutive winning trades	13	9	10
Number of maximum consecutive losing trades	9	6	6
Maximum % gain in winning trades	33.46%	38.59%	22.01%
Maximum % loss in losing trades	2.82%	4.65%	4.92%
Percentage of winning trades	57.48%	59.68%	53.29%
Number of winning trades for every losing trade	4.02	4.39	5.00

Strategy 4: Triple EMA

Indicators

- Exponential Moving Average (9)
- Exponential Moving Average (13)
- Exponential Moving Average (21)

Strategy Description

Long Position

- Candle is above EMA (200)
- Green Heikin Ashi Candle
- Parabolic SAR Dot getting below candles
- Take Profit: Parabolic SAR Dot getting above Red Heikin Ashi Candle
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- Red Heikin Ashi Candle Parabolic SAR Dot getting above candles
- Take Profit: Parabolic SAR Dot getting below Green Heikin Ashi Candle
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 4 shows that the BTCUSDТ currency pair had the highest number of trades with 66 trades; however, ETHUSDТ had the highest percentage of winning trades at 43.90%. BTCUSDТ had the highest average percentage gain in winning trades and the highest number of maximum consecutive losing trades, as well as the highest average percentage loss in losing trades compared to other currency pairs. ETHUSDТ had the highest implied number of winning trades for every losing trade of 2.84, meaning that \$2.84 is gained by risking a dollar on average, and had the maximum percentage loss in losing trades. ADAUSDТ had the highest maximum percentage gain in winning trades and tied with BTCUSDТ and ETHUSDТ for the number of maximum consecutive winning trades at 4.

TABLE 4: STRATEGY 4 RESULTS SUMMARY

Triple EMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	66	41	65
Number of Winning Trades	26	18	21
Average % gain in winning trades	2916.90%	337.79%	0.16%
Average % loss in losing trades	1178.94%	119.07%	0.06%
Number of maximum consecutive winning trades	4	4	4
Number of maximum consecutive losing trades	6	9	7
Maximum % gain in winning trades	33.95%	48.91%	95.96%
Maximum % loss in losing trades	24.12%	28.34%	28.04%
Percentage of winning trades	39.39%	43.90%	32.31%
Number of winning trades for every losing trade	2.41	2.84	2.67

Strategy 5: TTM Squeeze + EMA

Indicators

Exponential Moving Average (200)

TTM Squeeze Indicator

Strategy Description

Long Position

- Candle is above EMA (200)
- TTM Squeeze above the zero line
- Positive range with green/blue dots histogram
- Take Profit: Decreasing TTM Squeeze, dots moving to the zero line from the green side
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- TTM Squeeze below the zero line
- Negative range with red/purple dots histogram
- Take Profit: Increasing TTM Squeeze, dots moving to the zero line from the red side
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 5 shows that the ETHUSDT currency pair had the highest number of trades with 641 trades, the highest number of winning trades, the highest maximum percentage gain in winning trades, and the highest maximum consecutive losing trades. However, BTCUSDT had the highest percentage of winning trades at 45%. BTCUSDT had the highest average percentage gain in winning trades as well as the highest average percentage loss in losing trades compared to other currency pairs. ADAUSDT had the highest implied number of winning trades for every losing trade of 1.50, meaning that \$1.50 is gained by risking a dollar on average. ADAUSDT had the highest maximum percentage loss in losing trades and tied with ETHUSDT and BTCUSDT on the number of maximum consecutive losing trades at 10 trades.

TABLE 5: STRATEGY 5 RESULTS SUMMARY

TTM Squeeze + EMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	620	641	622
Number of Winning Trades	279	282	271
Average % gain in winning trades	535.27%	33.61%	0.03%
Average % loss in losing trades	407.22%	28.63%	0.02%
Number of maximum consecutive winning trades	6	8	7
Number of maximum consecutive losing trades	10	10	10
Maximum % gain in winning trades	25.97%	33.25%	25.95%
Maximum % loss in losing trades	10.01%	9.50%	13.06%
Percentage of winning trades	45.00%	43.99%	43.57%
Number of winning trades for every losing trade	1.31	1.17	1.50

Strategy 6: SSL Channel + EMA

Indicators

Exponential Moving Average (200)

Semaphore Signal Level Channel

Strategy Description

Long Position

- Candle is above EMA (200)

- Positive green/blue line of the SSL channel crossing above the negative orange/red line
- Take Profit: Negative orange/red line of the SSL channel crossing above positive green/blue line
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- Negative orange/red line of the SSL channel crossing above the positive green/blue line
- Take Profit: Positive green/blue line of the SSL channel crossing above negative orange/red line
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 6 shows that ADAUSDT had the highest number of trades under this strategy with 127 trades in total, the highest maximum percentage gain in winning trades and highest implied number of winning trades for every losing trade of 3.33. BTCUSDT had the highest percentage of winning trades at 35.71%. BTCUSDT also had the highest average percentage gain in winning trades, as well as the highest average percentage loss in losing trades compared to other currency pairs. ETHUSDT had the highest maximum consecutive winning and losing trades and the maximum percentage loss in losing trades.

TABLE 6: STRATEGY 6 RESULTS SUMMARY

SSL Channel + EMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	112	120	127
Number of Winning Trades	40	42	42
Average % gain in winning trades	1929.78%	122.57%	0.10%
Average % loss in losing trades	772.85%	57.86%	0.03%
Number of maximum consecutive winning trades	3	4	3
Number of maximum consecutive losing trades	7	9	7
Maximum % gain in winning trades	31.46%	30.47%	40.00%
Maximum % loss in losing trades	12.43%	27.24%	20.45%
Percentage of winning trades	35.71%	35.00%	33.07%
Number of winning trades for every losing trade	2.50	2.12	3.33

Strategy 7: STC + EMA

Indicators

Exponential Moving Average (200)

Schaff Trend Cycle

Strategy Description

Long Position

- Candle is above EMA (200)

Short Position

- Candle is below EMA (200)
- Change in STC color from red to green
- Change must happen under the 25 threshold
- Take Profit: Change in STC color from green to red with it happening above the 75 threshold
- Stop Loss: Double value of our ATR percentage in points below entry price

Long Position

- Candle is below EMA (200)
- Change in STC color from green to red
- Change must happen above the 75 threshold
- Take Profit: Change in STC color from red to green with it happening under the 25 threshold
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 7 shows that ADAUSDT had the highest number of trades under this strategy with 253 trades in total, the highest implied number of winning trades for every losing trade of 2. ETHUSDT had the highest percentage of winning trades, at 37.76% and the highest number of winning trades of 91. BTCUSDT had the highest average percentage gain in winning trades, highest average percentage loss in losing trades, the highest number of maximum consecutive losing trades, the maximum percentage gain in winning trades, and the maximum percentage loss in losing trades. The number of maximum consecutive winning trades is 4 for BTCUSDT, ETHUSDT, and ADAUSDT.

TABLE 7: STRATEGY 7 RESULTS SUMMARY

STC + EMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	220	241	253
Number of Winning Trades	72	91	87
Average % gain in winning trades	1560.19%	88.30%	0.06%
Average % loss in losing trades	795.59%	50.02%	0.03%
Number of maximum consecutive winning trades	4	4	4
Number of maximum consecutive losing trades	12	8	10
Maximum % gain in winning trades	33.26%	28.32%	27.47%
Maximum % loss in losing trades	19.80%	13.58%	14.70%
Percentage of winning trades	32.73%	37.76%	34.39%
Number of winning trades for every losing trade	1.96	1.77	2.00

Strategy 8: Vortex + EMA

Indicators

Exponential Moving Average (200)

Vortex Indicator

Strategy Description

Long Position

- Candle is above EMA (200)
- Green line (VI+) crosses above the Red line (VI-)
- Take Profit: Green line (VI+) value starts declining
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- Red line (VI-) crosses above the Green line (VI+)
- Take Profit: Red line (VI-) value starts declining
- Stop Loss: Double value of our ATR percentage in points above entry price
-

Table 8 shows that the ADAUSDT currency pair had the highest number of trades with 283 trades, as well as the highest percentage of winning trades at 44.88%. BTCUSDT had the highest average percentage gain in winning trades and the highest average percentage loss in losing trades compared to other currency pairs. ADAUSDT also

had the highest implied number of winning trades for every losing trade of 2.0, meaning that there is on average a \$2 gain per \$1. All currency pairs had an equal number of maximum consecutive winning trades at 6.

TABLE 8: STRATEGY 8 RESULTS SUMMARY

Vortex + EMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	262	276	283
Number of Winning Trades	114	120	127
Average % gain in winning trades	754.76%	53.72%	0.04%
Average % loss in losing trades	505.51%	34.53%	0.02%
Number of maximum consecutive winning trades	6	6	6
Number of maximum consecutive losing trades	8	14	7
Maximum % gain in winning trades	31.65%	31.12%	23.35%
Maximum % loss in losing trades	15.90%	25.19%	25.54%
Percentage of winning trades	43.51%	43.48%	44.88%
Number of winning trades for every losing trade	1.49	1.56	2.00

Strategy 9: Stochastic + WMA

Indicators

Exponential Moving Average (200)

Relative Strength Index (2)

Schaff Trend Cycle

Strategy Description

Long Position

- Candle is above EMA (200)
- Change in STC color from red to green
- Change must happen under the 25 threshold
- RSI below the 5 threshold Lower band
- Take Profit: Change in STC color from green to red with it happening above the 75 threshold
- Stop Loss: Double value of our ATR percentage in points below entry price

Short Position

- Candle is below EMA (200)
- Change in STC color from green to red

- Change must happen under the 25 threshold
- RSI above the 95 threshold Upper band
- Take Profit: Change in STC color from red to green with it happening under the 25 threshold
- Stop Loss: Double value of our ATR percentage in points above entry price

Table 9 shows that the BTCUSDT currency pair had the highest number of trades with 67 trades, however, ETHUSDT had the highest percentage of winning trades, at 58.33%. BTCUSDT had the highest average percentage gain in winning trades, the highest number of maximum consecutive losing trades of 7, as well as the highest average percentage loss in losing trades compared to other currency pairs. ETHUSDT had the highest implied number of winning trades for every losing trade of 1.79, meaning that \$1.79 is gained by risking a dollar on average. It also had the highest maximum percentage gain in winning trades and the lowest maximum percentage loss in losing trades.

TABLE 9: STRATEGY 9 RESULTS SUMMARY

Stochastic + WMA Results Summary			
Metric of Analysis	BTCUSDT	ETHUSDT	ADAUSDT
Number of Trades	67	60	62
Number of Winning Trades	30	35	32
Average % gain in winning trades	1802.32%	145.12%	0.08%
Average % loss in losing trades	1625.02%	80.87%	0.06%
Number of maximum consecutive winning trades	6	8	5
Number of maximum consecutive losing trades	7	3	5
Maximum % gain in winning trades	33.58%	36.14%	30.45%
Maximum % loss in losing trades	26.94%	23.65%	33.33%
Percentage of winning trades	44.78%	58.33%	51.61%
Number of winning trades for every losing trade	1.11	1.79	1.33

Conclusion

Table 10 presents the ranking of the strategies based on the percentage of winning trades. Strategy 3 is the best

strategy for all the currency pairs providing a percentage of winning trades of over 50% for each currency pair. It is then followed by Strategy 5 for BTCUSDT with percentage of winning trades of nearly 45%, and Strategy 9 for ADAUSDT and ETHUSDT giving a percentage of winning trades of 51% and 58% respectively. Strategy 9 is the third best strategy for BTCUSDT, Strategy 5 for ETHUSDT and Strategy 8 for ADAUSDT.

The top two lowest percentage of winning trade strategies for all currency pairs are Strategies 1 and 2, followed by Strategy 7 for BTCUSDT, Strategy 6 for ETHUSDT and Strategy 4 for ADAUSDT.

TABLE 10: STRATEGY RANKING BASED ON PERCENTAGE OF WINNING TRADES

Strategy Ranking Based on Percentage of Winning Trades			
Rank	BTCUSDT	ETHUSDT	ADAUSDT
1	Strategy 3	Strategy 3	Strategy 3
2	Strategy 5	Strategy 9	Strategy 9
3	Strategy 9	Strategy 5	Strategy 8
4	Strategy 8	Strategy 4	Strategy 5
5	Strategy 4	Strategy 8	Strategy 7
6	Strategy 6	Strategy 7	Strategy 6
7	Strategy 7	Strategy 6	Strategy 4
8	Strategy 2	Strategy 1	Strategy 1
9	Strategy 1	Strategy 2	Strategy 2

Table 11 depicts the ranking of the strategy based on the number of winning trades for every losing trade. According to it, Strategy 3 is the best strategy for all three currency pairs, providing a ratio of around 5. Then this is followed by Strategy 1 with number of winning trades for every losing trade of 2.52 for the BTCUSDT pair, Strategy 4 with ratio of 2.84 for the ETHUSDT pair, and Strategy 6 with ratio of 3.33 for the ADAUSDT pair.

TABLE 11: STRATEGY RANKING BASED ON PERCENTAGE OF WINNING TRADES FOR EVERY LOSING TRADE

Strategy Ranking Based on Percentage of Winning Trades For Every Losing Trade			
Rank	BTCUSDT	ETHUSDT	ADAUSDT
1	Strategy 3	Strategy 3	Strategy 3
2	Strategy 1	Strategy 4	Strategy 6
3	Strategy 6	Strategy 1	Strategy 4
4	Strategy 4	Strategy 6	Strategy 8
5	Strategy 7	Strategy 9	Strategy 7
6	Strategy 2	Strategy 7	Strategy 2
7	Strategy 8	Strategy 8	Strategy 1
8	Strategy 5	Strategy 2	Strategy 5
9	Strategy 9	Strategy 5	Strategy 9

The lowest strategies include Strategy 5 for ETHUSDT, Strategy 9 for BTCUSDT and ADAUSDT. This is followed by Strategy 5 for BTCUSDT and ADAUSDT and Strategy 2 for ETHUSDT. The third from the bottom strategies include Strategy 8 for both ETHUSDT and BTCUSDT and Strategy 1 for ADAUSDT.

Overall, the best strategy that is based on both the percentage of winning trades and number of winning trades for every losing trade is Strategy 3 for every currency pair: BTCUSDT, ETHUSDT, and ADAUSDT.

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