



# MARKET PREDICTION BY RELATIVE STRENGTH INDEX

Dhruvika Jadav<sup>1</sup>, Dr. Vaidehi Vaghela<sup>2</sup>

<sup>1</sup>Teaching Assistance, P.P. Savani University, Kosamba, India

<sup>2</sup>Assistance Professor, P.P. Savani University, Kosamba, India

**Abstract**—RSI works as references when you want to gauge if the market is going through a bullish or bearish trend. While the general assumption that an indicator above 70 indicates overbought and below 30 indicates oversold holds true for most of the cases, there are others who insist that it can be held true value above 66.6 and below 33.3 as well. If the RSI close above 66.6 but goes below the value, it should not be assumed that the trend has reversed. RSI shows the current and historical strength and weakness of particular stock on closing price. This technical indicator clears the vision with relative strength. RSI is mostly used on 14 days' time-frame if it is below 30 value it is considered as oversold, if it is above 70 value it is considered as overbought. In this paper, we try to apply the Relative Strength Index (RSI) indicator. We apply this strategy on stock, which is sampled using some important fundamental factors.

**Keywords**—Relative Strength Indicator, Technical Indicator

## I. Introduction

Nowadays, investments in the financial market are very popular because their returns are comparatively high than banks and other risk-free securities. According to behavioral finance, people are risk averse. However, nowadays returns in risk-free security are very low so people are willing to take risks to get a good return on investments. In particular, Equity markets are places where people and companies come to buy and sell securities.

The relative strength index (RSI) is a momentum indicator used in technical analysis. RSI measures the speed and magnitude of a security's recent price change to evaluate overvalued or undervalued conditions in the price of that security. The RSI can do more than point to overbought and oversold securities. It can also indicate securities that may be primed for a trend reversal or corrective pullback in price. It can signal when to buy and sell. Traditionally, an RSI reading of 70 or above indicates an overbought situation. A reading of 30 or below indicates an oversold condition. As a momentum indicator, the relative strength index compares a security's strength on days when prices go up to its strength on days when prices go down. Relating the result of this comparison to price action can give traders an idea of how security may perform. The RSI, used in conjunction with other technical indicators, can help traders make better-informed trading decisions.

Trading strategy is one of the significant tools in the market that can help identify profitable investments. This strategy is a part of technical analysis. Technical analysis is useful for the purpose of forecasting future prices and identifying price movements and trends. Technical indicators are known as the financial method in which developer applies mathematical and statistical formulas to the price of securities. There are several technical indicators like Trend Indicators, Volume Indicators, Momentum Indicators, and Volatility indicators. In this paper, we work on the Relative Strength Index (RSI) indicators. The RSI is the momentum indicator.

### • Technical Indicator :

Relative Strength Index Indicator (RSI): Relative Strength Index (RSI) was developed by J. Welles Wilder in 1978 and introduced in his book "New Concepts in Technical Trading Systems". RSI is a momentum indicator that measures the oscillation of directional price movements. Momentum indicators help traders to identify the speed of price movement by comparing prices over time. RSI oscillates between 0 and 100. According to Wilder, RSI is considered overbought when it goes above 70 and oversold when it goes below 30. In this work RSI set to 14-period.

Calculation:

$$RSI = 100 - \left[ \frac{100}{1 + RS} \right]$$

where,

$$Relative\ Strength\ (RS) = \frac{Average\ Gain}{Average\ Loss}$$

$$First\ Average\ Gain = \frac{Sum\ of\ Gains\ over\ the\ past\ n - periods}{n}$$

$$First\ Average\ Loss = \frac{Sum\ of\ Losses\ over\ the\ past\ n - periods}{n}$$

$$Average\ Gain = \frac{(previous\ Average\ Gain) \times (n - 1) + current\ Gain}{n}$$

$$Average\ Loss = \frac{(previous\ Average\ Loss) \times (n - 1) + current\ Loss}{n}$$

$$n = 14\ period$$

In this paper, we focus on applying the RSI indicator to increase profitability. To make a complete investment/trading strategy, add some fundamental factors to the stock selection process. Fundamental analysis is a method used to determine the value of stock by analyzing the financial data. An important characteristic of fundamental analysis is that it focuses exclusively on those variables that are directly related to the Company. Here, market capitalization has been used.

## II. Literature review

Bhargavi. R et. al (2017) analyzed that the Relative Strength Index (RSI) effectively used to create a portfolio. They examined the performance of fundamental factors namely Earning Per Share (EPS) and Price to Earning Ratio (P/E ratio) in the Indian Stock Market and concluded that P/E ratio more efficient than EPS.

Alhilfi (2019) studied the use of Relative Strength Index (RSI) plays a fundamental and effective role in rationalizing the speculation decisions of Bank of Baghdad shares listed on the Iraq Stock Exchange/in the shares of the Bank of Baghdad which listed in the Iraq Stock Exchange. The researcher investigated RSI helps in proactive predicting of price trends and what prices will be in the future.

Choudhuri (2019) proved that the returns generated by RSI were much higher than the simple buy and hold strategy. The researcher found that the probability of false signals was also limited.

Reddy and Cheerla(2019) checked that the validity of RSI in Indian stock market. They found that the RSI was the most accurate tool for predicting stock movements.

Anitha and Padmaja (2017) focused on comparing the effectiveness of different technical indicators. They concluded that technical indicators could play a useful role in the trade entry and exit points and also predict the immediate market trend.

Valarmathi and Kowsalya (2016) studied the technical analysis of five IT companies using the technical tools Relative Strength Index (RSI) and Exponential Moving Average (EMA). They found that the market trend of IT industry tends up with gradual price fluctuation.

Vaghela and Gor (2020) worked on the combination of Elliott Wave theory and sentiment indicator to identify future market direction. They tried to reduce the complexity of Elliott Wave theory by using sentiment indicator.

Panchal and Gor (2020) converted chart pattern of technical indicators which followed mean reversion into numeric form and determined buy and sell signal of investment without having to test the chart pattern. They tried to describe the hold phenomenon in the stock market.

Panchal and Gor (2020) attempted to construct a hybrid strategy of Exponential Moving Average and Parabolic Stop and Reversal, which follows Mean Reversion process. They conclude that the hybrid strategy provides better long and short positions in the market and good strength of trend rather than individual indicator.

### Modelling the Hybrid Strategy of Donchian Channel and RSI:

In this work, we use Relative Strength Index. An indicator that measures volatility can be compared to a mean reverting indicator. RSI measures price moment in normal volatile market but it cannot measure breakout in highly volatile market.

#### Stepwise Procedure followed:

- Select stock using fundamental factor market cap.
- Check whether the price of security is in weak trend or strong trend through RSI.
- Using hybrid outcome, take position in market.

## III. Research Methodology

### 1. Data Collection:

The data from 01<sup>st</sup> January 2018 to 31<sup>st</sup> December 2019 was collected from the National Stock Exchange website [www.nseindia.com](http://www.nseindia.com)

### 2. Computation:

Fundamental Factors:

We used fundamental factors for selection of companies. We select 10 companies from NIFTY 50 index by using fundamental factors namely Market Capitalization and Current Ratio. The companies and its fundamentals are given in table 1.

Company Name	Market Cap (cr)
Tata Motors Limited	53,006.76
Hindalco Industries Limited	43,786.56
UltraTech Cement Limited	1,29,056.53
<b>Eicher Motors Limited</b>	<b>52,322.61</b>
Hero MotoCorp Limited	47,877.53
Maruti Suzuki India Limited	2,13,711.07
Indian Oil Corporation Limited	1,09,251.31
Power Grid Corporation of India Limited	99,635.62

In table 1, Eicher Motors Ltd. has been selected for having the highest market capitalization compared

- Relative Strength Index:

Calculation

$$RSI = 100 - \left[ \frac{100}{1 + RS} \right]$$

where,

$$\text{Relative Strength (RS)} = \frac{\text{Average Gain}}{\text{Average Loss}}$$

$$\text{First Average Gain} = \frac{\text{Sum of Gains over the past } n - \text{periods}}{n}$$

$$\text{First Average Loss} = \frac{\text{Sum of Losses over the past } n - \text{periods}}{n}$$

$$\text{Average Gain} = \frac{(\text{previous Average Gain}) \times (n - 1) + \text{current Gain}}{n}$$

$$\text{Average Loss} = \frac{(\text{previous Average Loss}) \times (n - 1) + \text{current Loss}}{n}$$

$n = 14$  period

➤ Calculation of RSI using excel:

- Step 1: Calculate Change by using this formula, Change = Close price – Previous Close price
- Step 2: Calculate Gain as given below.  
When Change price > 0 then the value of Change is Gain otherwise Gain is zero.
- Step 3: Calculate Loss as given below.  
When Change price < 0 then the value of Change is Loss otherwise Loss is zero.
- Step 4: Calculate First Average Gain as given below.

$$\text{First Average Gain} = \frac{\text{Sum of Gains over the past } n - \text{periods}}{n}$$

- Step 5: Calculate First Average Loss as given below.

$$\text{First Average Loss} = \frac{\text{Sum of Losses over the past } n - \text{periods}}{n}$$

- Step 6: Calculate Average Gain as given below.

$$\text{Average Gain} = \frac{(\text{previous Average Gain}) \times (n - 1) + \text{current Gain}}{n}$$

- Step 6: Calculate Average Loss as given below.

$$\text{Average Loss} = \frac{(\text{previous Average Loss}) \times (n - 1) + \text{current Loss}}{n}$$

- Step 7: Calculate Relative Strength (RS) as given below.

$$\text{Relative Strength (RS)} = \frac{\text{Average Gain}}{\text{Average Loss}}$$

- Step 8: Calculate Relative Strength Index (RSI) price as given below.

$$RSI = 100 - \left[ \frac{100}{1 + RS} \right]$$

- Step 9: Outcomes:  
Buy signals generates when the RSI price below than 36.  
Sell signals generates when the RSI price above than 66.  
If these two situations do not exist, then Hold position.

For table 3.1 and 3.2	
2 <sup>nd</sup> column	The open price of current day
3 <sup>rd</sup> column	The close price of current day
4 <sup>th</sup> column	Change = Close price – Previous Close price
5 <sup>th</sup> column	Gain: When Change price > 0 then the value of Change is our Gain. When Change price < 0 then our Gain is zero.
6 <sup>th</sup> column	Loss: When Change price < 0 then the value of Change is our Loss. When Change price > 0 then our Loss is zero.
7 <sup>th</sup> column	Average Gain = [(previous Average Gain) x (13) + current Gain] / 14
8 <sup>th</sup> column	Average Loss = [(previous Average Loss) x (13) + current Loss] / 14
9 <sup>th</sup> column	RS = Average Gain / Average Loss
10 <sup>th</sup> column	RSI = 100 – [100 / (1+RS)]
11 <sup>th</sup> column	Outcomes of RSI: <u>Buy signals</u> generates when the RSI price below than 36. <u>Sell signals</u> generates when the RSI price above than 66. If these two situations do not exist then <u>Hold</u> .

Date	Open	Close	Change	Gain	Loss	Average Gain	Average Loss	Relative Strength	RSI	RSI Outcomes
8-Jan	29400	29197.4	-39.6	0	39.6	166.93	201.2	0.83	45.34	<b>HOLD</b>
9-Jan	29201	28596.9	-600.5	0	600.5	155.01	229.72	0.67	40.29	<b>HOLD</b>
10-Jan	28620	28097.5	-499.4	0	499.4	143.93	248.99	0.58	36.63	<b>HOLD</b>
11-Jan	28100	28444.7	347.2	347.2	0	158.45	231.2	0.69	40.66	<b>HOLD</b>
12-Jan	28520	28649.8	205.1	205.1	0	161.78	214.69	0.75	42.97	<b>HOLD</b>

15-Jan	28750	27981.5	-668.3	0	668.3	150.23	247.09	0.61	37.81	HOLD
16-Jan	28010	27891.2	-90.3	0	90.3	139.5	235.89	0.59	37.16	HOLD
17-Jan	27800	28222.8	331.6	331.6	0	153.22	219.04	0.7	41.16	HOLD
18-Jan	28228.8	27954.4	-268.4	0	268.4	142.28	222.57	0.64	39	HOLD
19-Jan	27880	28009.4	55	55	0	136.04	206.67	0.66	39.7	HOLD
22-Jan	28009.4	27649.8	-359.6	0	359.6	126.32	217.59	0.58	36.73	HOLD
23-Jan	27700	27071.2	-578.6	0	578.6	117.3	243.38	0.48	32.52	BUY
24-Jan	27006	26404.1	-667.1	0	667.1	108.92	273.64	0.4	28.47	BUY
25-Jan	26500	26519.4	115.3	115.3	0	109.38	254.1	0.43	30.09	BUY
29-Jan	26730	27453.7	934.3	934.3	0	168.3	235.95	0.71	41.63	HOLD
30-Jan	27450	26689.4	-764.3	0	764.3	156.28	273.69	0.57	36.35	HOLD
31-Jan	26827.3	26923.6	234.2	234.2	0	161.84	254.14	0.64	38.91	HOLD
1-Feb	26984	28047.3	1123.7	1123.7	0	230.55	235.99	0.98	49.42	HOLD

Table 3.2: Observation Table of RSI (Sell Signal)(Year 2018)

Date	Open	Close	Change	Gain	Loss	Average Gain	Average Loss	Relative Strength	RSI	RSI Outcomes
3-Apr	28235.7	27990	-298.8	0	298.8	146.39	147.36	0.99	49.83	HOLD
4-Apr	28498	28934.2	944.2	944.2	0	203.37	136.83	1.49	59.78	HOLD
5-Apr	29200	29677.8	743.6	743.6	0	241.96	127.06	1.9	65.57	HOLD
6-Apr	29748	29799.2	121.4	121.4	0	233.35	117.98	1.98	66.42	SELL
9-Apr	29900	29805.8	6.6	6.6	0	217.15	109.55	1.98	66.47	SELL
10-Apr	29811	29972.1	166.3	166.3	0	213.52	101.73	2.1	67.73	SELL
11-Apr	29999.9	30685.1	713	713	0	249.2	94.46	2.64	72.51	SELL
12-Apr	30545.8	30681.6	-3.5	0	3.5	231.4	87.97	2.63	72.46	SELL
13-Apr	30681	31353	671.4	671.4	0	262.83	81.68	3.22	76.29	SELL
16-Apr	31400	31299.2	-53.8	0	53.8	244.05	79.69	3.06	75.38	SELL
17-Apr	31300	31027.6	-271.6	0	271.6	226.62	93.4	2.43	70.81	SELL
18-Apr	31050.1	30873.9	-153.7	0	153.7	210.43	97.71	2.15	68.29	SELL
19-Apr	31180	30920.2	46.3	46.3	0	198.71	90.73	2.19	68.65	SELL
20-Apr	30850	31148.7	228.5	228.5	0	200.84	84.25	2.38	70.45	SELL
23-Apr	31399.9	31065.2	-83.5	0	83.5	186.49	84.19	2.22	68.9	SELL
24-Apr	31150	31136.8	71.6	71.6	0	178.29	78.18	2.28	69.52	SELL
25-Apr	31150	30746.9	-389.9	0	389.9	165.55	100.44	1.65	62.24	HOLD
26-Apr	30750	31205.2	458.3	458.3	0	186.46	93.27	2	66.66	SELL



66  
36

IV. Conclusion

In summary,once we know how to plot the RSI indicator,it is relatively easy to read it and form an opinion on the asset with the help of RSI indicator graph.RSI is a popular technical analysis tool used to measure the strength of price movements for various financial instruments. Developed by J.Welles Wilder Jr.,it gauges overbought or oversold condition and potential trend reversal,providing valuable insight for traders.The RSI can be applied to different time frames and time periods,with the standard setting being 14 periods,although traders may customize.For example, RSI setting for day trading are typically on a shorter lookback,such as 7 or 10 periods,to increase sensitivity to recent price changes.RSI will help you a technical indicator that can be used with others to support trading strategies.

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