

# Forecasting Stock Market Trend Using Relative Strength Index

Pooja Talreja<sup>1</sup>

<sup>1</sup>*Acropolis Institute of Technology & Research, Manglia Square, Indore (M.P.) India.*

pooja.talreja2004@gmail.com

**Abstract**-Forecasting accuracy is the most important factor in selecting any forecasting methods. Research efforts in improving the accuracy of forecasting models are increasing since the last decade. The appropriate stock selections those are suitable for investment is a difficult task. The key factor for each investor is to earn maximum profits on their investments. Numerous techniques used to predict stocks in which fundamental and technical analysis are one among them. This paper examines the impact of volatility on the implementation of a trading rule, based on the relative strength index (RSI) in the Indian stock markets.

**Keywords:** *Stock Market, Market Trend, Technical analysis, Relative Strength Index, Overbought, oversold*

## I. INTRODUCTION

Generally, stock market across the globe replicates the fluctuation of the market's economy, and attracts the attention of millions of investors. The stock market is characterized by high risk and high yield; hence investors are concerned about the analysis of the stock market and are trying to forecast the trend of the stock market.

There are two main schools of thought in the financial markets, technical analysis and fundamental analysis. Fundamental analysis attempts to determine a stock's value by focusing on underlying factors that affect a company's actual business and its future prospects. Fundamental analysis can be performed on industries or the economy as a whole. Technical analysis, on the other hand, looks at the price movement of a stock and uses this data to predict its future price movements. In this paper technical analysis tool i.e. Relative Strength Index is applied on some selected stock. The Relative Strength Index (RSI) is one of the most used methods of technical analysis. RSI, developed by J. Welles Wilder, Jr. is an overbought/oversold oscillator that compares the performance of an equity to itself over a period of time. It should not be confused with the term "relative strength," which is the comparison of one entity's performance to another.

Basically, the relative strength index allows the investors to gauge the probability of a short- to intermediate-term reversal. It does not tell about the exact entry or exit point, but it helps investors to be aware that a reversal is on the horizon. In this paper our selected companies are Tata Steel Ltd.(TATA STEEL), Steel Authority of India Ltd.(SAIL), Reliance Infrastructure Ltd.( RELINFRA), Sesa Goa Ltd.( SESAGOA), Maruti Suzuki India Ltd.( MARUTI). We choose this stock mainly because it is popular and there is a large amount of information online that is relevant to our research

and can facilitate us in evaluating ambiguous news. Our technical data is in the form of historical stock prices.

## II. CONCEPTUAL FRAMEWORK

The forecasting market trend is one of the most difficult tasks as the trend is a function of fear and greed of market participants. This paper deals in most popular tool to define market trends i.e. Relative Strength Index.

### A. Market Trend:

The terms bull market and bear market describe upward and downward market trends, respectively, and can be used to describe either the market as a whole or specific sectors and securities.

#### 1. Bull market:

A bull market is associated with increasing investor confidence, and increased investing in anticipation of future price increases (capital gains). A bullish trend in the stock market often begins before the general economy shows clear signs of recovery. (capital)

#### 2. Bear market:

A bear market is a general decline in the stock market over a period of time.<sup>[5]</sup> It is a transition from high investor optimism to widespread investor fear and pessimism. According to The Vanguard Group, "While there's no agreed-upon definition of a bear market, one generally accepted measure is a price decline of 20% or more over at least a two-month period.

### B. Relative strength index:

Developed J. Welles Wilder, the Relative Strength Index (RSI) is a momentum oscillator that measures the speed and change of price movements. RSI oscillates between zero and 100.

Traditionally, and according to Wilder, RSI is considered overbought when above 70 and oversold when below 30.

RSI will grade the price movement exhibited between candles for the last X periods (with x being the input used by the trader, commonly 14 with RSI). As price changes, RSI will register these changes in price – relative to previous price movements – in an effort to show us 'strength.'

Higher values on RSI will generally denote Bullishness, and lower values will generally show Bearishness. Oscillators are often set to boundaries between 0 and 100. Below you will see a diagram of RSI with the range of 30 & 70. Wilder

considered RSI overbought above 70 and oversold below 30 using the default input period of 14 (which is the most common input period used with RSI).



Chart 1: RSI shows overbought & oversold line

Breakout: From the above chart it can be interpreted that when RSI went below 30 and crossover the oversold line gives indication of uptrend and when RSI goes above 70 and cross under the overbought line it gives an indication of downtrend.

### III. REVIEW OF LITERATURE

Technical analysis is generally compared to fundamental analysis, which is based on the intrinsic value of securities (see, Damodaran, 2002 or Kirkpatrick and Dahlquist, 2007). Fundamental analysis assumes that the price of a security reflects its true value, taking into consideration all the characteristics of the macroeconomic and microeconomic environment, a detailed analysis of the industry framework and an analysis of the security itself (Hooke, 1998). By contrast, the information set used in technical analysis, is limited to past prices and volumes.

As several authors show, technical analysis is linked to market efficiency. Malkiel (2003) argues that in the case of an efficient market, in the sense of strong-form efficiency (Fama, 1970), either technical analysis or fundamental analysis can generate excess returns compared to a randomly selected portfolio. Even in weak-form efficient market, in which current prices fully reflect the information conveyed by historical prices and volumes, technical analysis is not expected to add value (Bessembinder and Chan, 1998).

Against this background, several empirical studies assess the ability of investors of achieving positive returns with portfolio decisions triggered by technical rules. Neftci (1991) checks the predictive power of technical analysis. In the case of Gaussian time series, generated predictions seemed to be useless, and in the case of a non-linear process, technical analysis might capture some information. Brock, Lakonishok and LeBaron (1992) test moving average models and trading range breaks on the Dow Jones industrial average index. Their results show that the signals generated by the technical models provide higher than expected returns. Similar findings are reported in Mills (1997), who conducted an empirical study

of the FTSE 30 Index. The evidence presented in Lucke (2003) nevertheless fails to support the profitability of the popular head-and-shoulders rule in the foreign exchange market. Park and Irwin (2007) survey the empirical evidence on the profitability of technical trading strategies. Among 95 studies, 56 report positive results regarding technical trading strategies, 20 studies lead to negative results, while 19 studies indicate mixed results.

The relative strength index (RSI), introduced in Welles Wilder (1978), is a momentum oscillator capturing the speed of price adjustments (momentum). Its oscillating property makes it move between 0 and 100, which simplifies its interpretation and allows its users to determine when a security should be bought or sold. According to the author, by relying on average values, the RSI has the additional advantage of further eliminating erroneous erratic market movements. Regarding the implementation of the RSI, Welles Wilder (1978) recommends the use of a 14-day period of calculation.

In a subsequent work, Achelis (2001) however argues that the period of calculation depends on the predominant cycle of the security and that longer periods of calculation lead to less volatile values of the indicator. Petitjean (2004) further argues that the optimal period has to fit with the trading style of the investor. The author identifies four trading style classes, each with a specific time period for the calculation of the RSI. For day trading, he recommends periods of 5 to 15 minutes. For short-run trading, periods are chosen between 60 minutes and one day. A medium-term trader would use weekly periods. Finally, for long-run trading, the author recommends monthly periods of calculation.

In Wong, Manzur and Chew (2003), the RSI triggers a buy or sell signal in one of the following manner. The touch method generates a sell signal when the RSI touches the upper bound, typically set at 70 for a 14-day RSI, and generates a buy signal when the RSI touches the lower bound, typically 30 for a 14-day RSI. The peak method sells the security when the RSI crosses the higher bound and then turns back. By contrast, when the RSI crosses the lower bound and turns back, it is considered a sell signal. The retracement method leads to a buy signal when the RSI crosses the lower bound and goes back to the same lower bound or goes higher. Similarly, it generates a sell signal when the RSI crosses the higher bound and goes back to this one or a lower level. Finally, the 50-crossover method triggers a buy signal when the oscillator rises above 50 and generates a sell signal when it drops under 50. These authors show that the RSI can be used to achieve positive returns over the period from January 1974 to December 1994 by trading the Singapore Straits Times Index (STI). In the same vein, Schulmeister (2009) tests 2,580 models in the S&P 500 spot and futures markets between 1960 and 2000. The reported evidence similarly points to the superior performance of the models based on the RSI relative to moving average trading rules.

IV. RESEARCH METHODOLOGY

Research methodology deals with a systematic and scientific methods that can be adopted to solve research problems. Methodology is a crucial step in any research because it directly influences the whole research and its findings. The data collected for the study is secondary in nature. The objective of the study is forecasting stock market trend using Relative Strength Index

The study is carried out during the period April 2006 to march 2011.

V. FORECASTING STOCK MARKET TREND USING RELATIVE STRENGTH INDEX WITH EXAMPLES

RSI is classified as ‘a momentum oscillator that measures speed and change of price movements.’

The formula for calculating RSI is

$$RSI = 100 - \frac{100}{1 + RS}$$

$$RS = \text{Average Gain} / \text{Average Loss}$$

To simplify the calculation explanation, RSI has been broken down into its basic components: RS, Average Gain and Average Loss. This RSI calculation is based on 14 periods, which is the default suggested by Wilder in his book. Losses are expressed as positive values, not negative values.

The very first calculations for average gain and average loss are simple 14 period averages.

- First Average Gain = Sum of Gains over the past 14 periods / 14.
- First Average Loss = Sum of Losses over the past 14 periods / 14

The second, and subsequent, calculations are based on the prior averages and the current gain loss:

- Average Gain = [(previous Average Gain) x 13 + current Gain] / 14.
- Average Loss = [(previous Average Loss) x 13 + current Loss] / 14.

Taking the prior value plus the current value is a smoothing technique similar to that used in exponential moving average calculation. This also means that RSI values become more accurate as the calculation period extends.

Wilder's formula normalizes RS and turns it into an oscillator that fluctuates between zero and 100. In fact, a plot of RS looks exactly the same as a plot of RSI. The normalization step makes it easier to identify extremes because RSI is range bound. RSI is 0 when the Average Gain equals zero. Assuming a 14-period RSI, a zero RSI value means prices moved lower all 14 periods. There were no gains to measure. RSI is 100 when the Average Loss equals zero. This means prices moved higher all 14 periods. There were no losses to measure.

Now, this paper applies the RSI technique on the selected companies of different sector:

RSI - TATA STEEL



Chart 2: RSI – Tata Steel, Data source TICKERPLANT

RSI - SAIL



Chart 3: RSI – SAIL, Data Source TICKERPLANT

RSI - RELINRA



Chart 4: RSI – Reliance Infra, Data Source TICKERPLANT

## RSI – SESA GOA



Chart 5 Sesa Goa, Data Source TICKERPLANT

## RSI - Maruti



Chart 6: RSI – Maruti, Data Source TICKERPLANT

Trend identification: when RSI (in the second window) crossover 30 (value) line gives signal of uptrend, it is marked with green arrows which says the stock is oversold & it is the right time to take long position in it. The uptrend reverses when RSI cross under 70 line which is marked in red arrows which says the stock is overbought & it is the right time to take short position in it.

We can also interpret the results with the help of following charts:



Chart:7 : RSI showing Oversold Territory

In the case of a Long (or Buy) position, investors wait for RSI to read ‘Oversold,’ and when RSI is leaving the ‘Oversold,’ region (below 30), they will look to buy.

Below is an example of the same entry strategy being used in a Short (or Sell) position:

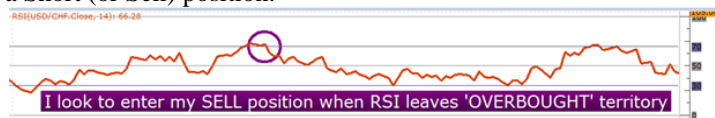


Chart:7 : RSI showing Overbought Territory

As RSI comes down and through 70 (indicating to the trader that price is leaving ‘Overbought,’ territory), investors look to initiate their short position.

## CONCLUSION

The RSI reversal concept applies to all time frame and gives a clear understanding of market trends and also forecasting of market directions. This concept of relative strength is useful not only in highlighting promising investments, but also in enabling you to judge your own performance. While a variety of relative strength measures are available to investors, all attempt to capture stocks showing stronger price movement than that shown by the overall market. Like all investment techniques, proper use requires a careful study and understanding of the factors driving the stock price movement. It is the most popular tool to identify the secular direction of the market trend however the 100% success ratio is not available for any tool or study which guarantee that 10 out of 10 times the identified trend is correct but the probability of success is most with the tools mentioned above.

## REFERENCES

- [1] Abarca, A., F. Alarcon, Pincheira, P. and J. Selaive (2007) Nominal Exchange Rate in Chile: Predictions Based on Technical Analysis," *Journal Economia Chilena, Banco Central de Chile*, 10(2): 57-80.
- [2] Ausloos M, Ivanova K. 2002. Mechanistic approach to generalized technical analysis of share prices and stock market indices. *European Physical Journal B*, 27, 177–187.
- [3] Bessembinder H, Chan K. 1995. The profitability of technical trading rules in the Asian stock markets. *Journal of Pacific-Basin Finance*, 3, 257–284.
- [4] Brock W, Lakonishok J, LeBaron B (1992). Simple technical trading rules and the stochastic properties of stock returns. *J. Financ.*, 47(5): 1731-1764.
- [5] Chang, P.C., Wang, Y. W. and W. N. Yang. “An Investigation of the Hybrid Forecasting Models for Stock Price Variation in Taiwan.” *Journal of the Chinese Institute of Industrial Engineering*, 21(4), 2004, pp.358-368.
- [6] Diebold, F., and X. Mariano (1995) \Comparing Predictive Accuracy." *Journal of Business & Economic Statistics*, 13(3): 503-508.
- [7] Fama E (1965b). The behaviour of stock market prices. *J. Bus.* 38(1): 34-105.
- [8] Gencay R (1998). Optimization of technical trading strategies and the profitability in security markets. *Econ. Lett.*, 59(2): 249-254.

- [9] Grant J, Wolf A, Yu S (2005). Intraday price reversals in the US stock index futures market: a 15-year study. *J. Bank.Financ.*, 29(5): 1311-1327.
- [10] Kirkpatrick, C.D. and Dahlquist, J.R. (2007). Technical analysis: the complete resource for financial market technicians, *FT Press*.
- [11] Leigh W, Purvis R, Ragusa JM. 2002. Forecasting the NYSE Composite Index with technical analysis, pattern recognizer, neural network, and genetic algorithm: a case study in romantic decision support. *Decision Support Systems*, 32, 161–174.
- [12] Levy R (1967). Relative strength as a criterion for investmentselection.*J. Financ.*, 22(4): 595-610.
- [13] Pasiphol A. 2009.Forecasting Stock Index Derection: Comparison of MACD and RSI.*Case Study on SET50 Index .Thammasat University*
- [14] Tripathi, V. (2008). Investment strategies in Indian stock market: a survey, *Mimeo*.

IJSP