RSI BASED ALPHA RETURN: A STUDY OF TOP THREE COMPANIES FROM NIFTY AUTO INDEX

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Abstract

The Paper is based on a ten-year experiment examining the effectiveness of RSI on the top three stocks in the Nifty Auto Index. The study uses a ten-year data collection that runs from April 1, 2012, to March 31, 2022. The data is broken down into two sub-periods, the first of which runs from April 1 to March 31, 2017, and the second of which is from April 1 to March 31, 2017, 2022. The researcher employed the 50 crossover rule in conjunction with the relative strength index approach. The researcher estimated Alpha returns for every stock in order to evaluate the effectiveness of the strategies. The stocks taken for the study are three most weighted stocks of Nifty Auto Index which includes Maruti Suzuki India Ltd. (19.28%), Mahindra & Mahindra Ltd. (18.02%) and Tata Motors Ltd. (14.48%). The alpha returns are computed by deducting the index return, or the return of a passive strategy, from the return produced by the markets employing the various methodologies being investigated. It has been discovered via study that the effectiveness of RSI is not strong in the first subperiod but is strong in the second subperiod. The outcome demonstrates that there is a sizable variation in alpha returns over two subperiods. However, the researcher believes that additional data must be gathered before drawing any conclusions about the effectiveness of RSI.

Key Words: - Relative Strength Index, Efficiency, Alpha Returns, Auto Index, Technical Analysis and Fundamental Analysis.

Introduction

It is always a very important point of discussion among the various parties who invest in the stock markets or any of the financial market whether these markets can be predicted or not. Normally a person while investing in the stock market or in any of the financial market may opt any of the two approaches which are broadly known as fundamental analysis and

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technical analysis. Fundamental analysis is one of the technique where the investor or any researcher analyse the fundamental of the economy as well as of the company in order to take any investment decision. In case of fundamental analysis one normally analyse the financial position of the company, different ratios of the company such as EPS, PE Ratio, Liquidity ratio etc., future prospects of the company and many more information. In case of technical analysis the researcher uses different types of techniques in order to predict the future prices of the stocks or any other financial market. Technicians (also called chartists) are always looking for predicting the possible movement in the prices of the concerned assets/securities primarily based on the historical price trends. Technical analysis basically merely analyses supply and demand in a market in an effort to predict what direction, or trend, will continue in the future, despite all the fancy and exotic instruments it utilises. In other words, technical analysis studies the market as a whole rather than just its components in an effort to comprehend the emotions that are present in the market. Technical analysis may provide you with a new set of tools or abilities that will help you become a better trader or investor if you comprehend its advantages and limits. The three underlying tenets of technical analysis are that the market undervalues everything, price fluctuates mostly at random, and history tends to repeat itself. Compared to technical analysis, fundamental analysis analyses the market over a longer period of time. Fundamental research frequently looks at data spanning a number of years, but technical analysis can be employed on a timescale of weeks, days, or even minutes. The nature of the investment style to which each of these two techniques adheres accounts for the differing timelines that they employ. When a fundamental analyst calculates intrinsic value, a gain is not realised until the stock's market price increases to its "correct" value since it might take some time for a company's worth to be reflected in the market. This style of investment, known as value investing, makes the assumption that the short-term market is incorrect but that the price of a certain company would eventually right itself. This "long run" may, in some situations, refer to a period of time that lasts for several years. A fundamentalist's analysis of the numbers only includes data that has been available for a long time. Financial statements are submitted on a quarterly basis, and unlike price and volume data, changes in earnings per share do not surface every day. Also keep in mind that a business's basics are what make it who it is. The creation of new goods, marketing initiatives, supply networks, etc. takes time, and new management cannot make significant changes over night. Therefore, one of the reasons fundamental analysts have a longer time horizon is that the data they employ to evaluate a company is produced at a considerably slower rate than the price and volume data employed by technical analysts.

RSI is a technique of technical analysis which actually analyse whether a stock bought is oversold or overbought. The formula for calculating RSI is as under:-

RSI = 100-(100/1+RS)

Where RS= average gain/ average loss

The efficiency of the market is based on how clearly the information are available to the public. An important concept which is related to the efficiency of the market is known as efficient market hypothesis. There are mainly three types of forms in EMH which are known as weak form of efficiency, semi strong form of efficiency and strong form of efficiency. The test of efficiency in any market is based on what type of information's are available to the investors. In case only historical information's are available then it is known as weak form of

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efficiency, in case present information are available and reflected than semi strong form of efficiency and in case all information's are reflected than it is a case of strong form of efficiency (Rehman, 2021). Technical analysis is actually tries to challenge these forms and to find out which market has more predicted capability on the basis of technique used by the researcher.

The present paper is based on the automobile sector. The main purpose of the paper is to find out the applicability of technical analysis technique i.e RSI (Relative Strength Index) on the top three companies in the auto index. The NIFTY Auto Index is created to reflect the actions and results of the financial market's automobile sector. There are 15 exchange-listed, tradable firms that make up the NIFTY Auto Index. The index includes sectors associated to automobiles, such as tyres, automobiles with four wheels, automobiles with two or three wheels, and auto ancillaries. The NIFTY Auto Index level represents the total free float market value relative to a base market capitalization of all the firms included in the index. Using the free float market capitalization method, this index is determined. In addition to benchmarking fund portfolios, NIFTY Auto Index is used to create index funds, ETFs, and structured products. The vehicle index's base date is January 1, 2004, and it was introduced on July 12th, 2011. The index's base value is 1000, and it is rebalanced every two years.

Literature Review

Sagala, Saputri, Mahendra & Budi (2020) has undertaken research on the use of sentiment analysis and technical analysis to forecast stock price movement. Several algorithms, including Support Vector Machine (SVM), K-Nearest Neighbour (KNN), and Naive Byes, were utilised in this work by the researcher. In addition to technical analysis, the researcher employed web crawling and several other online media approaches in this article. The study came to the conclusion that using a combination of technical analysis features and online media, sentiment label, one could reach the maximum accuracy.**.**

Park, Chel-Ho & Irwin (2007)has performed a thorough examination of the numerous investigations that the researchers have carried out. The goal of each study was to determine how profitable technical analysis was on various markets. Depending on the testing methods, all the studies were split into "early studies" and "modern studies" (from 1988 to 2004). Early research supports the idea that profitability may be found in futures and foreign currency markets but not in stock markets. While the conclusion of recent studies suggests that speculative markets can produce steady income. In this study 95 research in all were examined, and it was discovered that, out the 95, 56 had good findings for technical trading methods, 20 had negative responses, and 19 had mixed results. In the study's conclusion, it was discovered that despite a wealth of data demonstrating how technical trading strategies provide positive returns, many academics continue to have their doubts.

Ijegwa, Rebecca, Olusegun & Isaac (2014), Moving Average Convergence (MACD), Relative Strength Index (RSI), Stochastic Oscillator (SO), and Balanced Volume (OBV) are the four technical indicators utilised in this article. The stock market's fuzzy inference was implemented using the approaches. Data from two Nigerian banks was gathered for the testing over the course of two months. It was discovered that the MATLAB experiments were carried out with genuine warehouse data from two Nigerian banks, and the outcomes were successful.

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Barroso, Cardoso & Melo (2021), has conducted research and compared four scenarios from 2012 to 2015: AT (only technical analysis signals are considered but not optimal), OT (consider only optimising risk and return without using technical analysis), ATOT (using technical analysis as a first step to determine which assets should be considered optimally), and OTAT (first using portfolio optimisation and then trading). The OTAT and OT portfolios are suited for investors wishing to reduce risk and increase return on investment since they are rated to outperform other portfolios and benchmarks.

Mizano, Kosaka, yajima & Komoda (1998) performed research and advocated the usage of a neural network model to anticipate buy and sell times for TOPIX using technical analysis of the stock market. Weekly data from TOPIX were gathered for 260 weeks, from September 1982 to August 1987, and 119 weeks, from October 1987 to January 1990, were utilised as the sample to test the forecast system's accuracy. To create entry patterns, a total of 11 technical indicators from TOPIX are used. The prediction system provides buy and sell signals generally at more opportune periods and creates larger returns than the prediction system, according to experimental simulations used with real data.

Aguirre, Medina & Mendez (2020), The purpose of this article is to close the knowledge gap on the use of genetic algorithms to forecast the asset valuation of stock market investing strategies. It also examines the benefits of using genetic algorithms over more conventional buy-and-hold techniques and technical analysis. The use of genetic algorithms with oscillators in the NASDAQ stock index's asset investment strategy has been researched. These approaches have looked at the application of this indicator in technical approaches that provide buy and sell signals from moving averages calculated statistically and sent to the market. (Rehman & Dhiman, 2022)When a researcher has access to enough historical data, technical analysis is seen to be a valuable technique for the consistent examination of price patterns and asset behaviour.

Li, Wu & Wang (2020), In this article, researchers have developed a stock forecasting system that uses technical indicators to numerically express price data, a layered deep learning model, a connected neural network, and completely concatenated implementation to predict stocks. Data from the Hong Kong Stock Exchange is gathered for five years in order to conduct an experiment. The strategies and models offered outperform baselines and patterns using simply technical indicators or news sentiment, it has been discovered.

Pramudya R., & Ichsani S. (2020), has looked at how well the indicator can produce more precise buy and sell signals in this study. The moving average divergence (MACD), Bollinger bands, and relative strength index (RSI) were subsequently utilised for this, after the researcher used the LQ45 indicator. The chart exchange mentioned on the indicator was employed by the researcher as part of a qualitative method in this case. It is stated that the RSI and Bollinger Band both carry strong sell indications. As opposed to Bollinger Bands and RSI, MACD is too sluggish to pick up purchase signals..

Nti et al (2019), has done research and tried to conduct a systematic evaluation of 122 current papers that were published in academic publications between 2007 and 2018 and sought to use machine learning to forecast the stock market. For this, three categories of methodologies have been established: technical analysis, fundamental analysis, and hybrid

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analysis. It has been found that Support Vector Machines and Artificial Neural Networks are the two machine learning algorithms most frequently utilised for stock market forecasting.

Wolian Li A. & Bastos G. (2020), The goal of this study was to identify practical methods for predicting stock prices using historical data and a variety of technical indicators. Deep neural networks (DNN), complex neural networks (CNN), long-short-term memories (LSTM), and hybrid algorithms are used to analyse technical data. Reviewing publications on financial time series forecasting is the major goal of this document. 34 papers were examined for this. It is clear that 35.3% of the publications we analysed only included profitability and risk management in pairs. Additionally, the performance of the model has been observed in certain publications to result in a 50% loss.

Shah D., Isah H. & Zulkerninr F. (2019), The researcher has made an effort to give a general overview of the stock market and a categorization of stock market forecasting methods in this article. Researchers often focus on research successes by examining equities and their forecasts. The Efficient Market Hypothesis (EMH) was also highlighted by the researchers. In this article, the major emphasis is on cluster involvement to forecast whether a company will be successful or unsuccessful based on its performance over the previous year. Statistical and pattern recognition techniques, decision trees, artificial neural. The researcher offers a type of mathematical application to stock market analysis and forecasting in this study, providing a thorough lesson from the literature on advanced design and method. A provocation that is occurring in the region, as is often applied to stock market forecasting, calls for particular attention and presents opportunity for research and development. For stock forecasting, a combined perspective that takes into account both statistical and machine learning approaches would undoubtedly be more useful.

Research Methodology: -

One of the most crucial components of any research is the approach. The importance of research methods must be high. In this article, the top three businesses of the Nifty Auto Index—Maruti Suzuki India Ltd. (19.28%), Mahindra & Mahindra Ltd. (18.02%), and Tata Motors Ltd. (14.48%)—are the focus of our major testing of the effectiveness of the Relative Strength Index (RSI). The proportion of each company's weight in the index is indicated by figures in brackets.

Objectives of the study: -

1. To test the efficiency of RSI among top three companies of the Nifty Auto Index.
2. To find out whether there is any significant difference between the efficiency of RSI between two sub periods.

Data Period: -

Data is collected for a period of ten years, from 1 April 2012 to 31 March 2022. Two blocks of five years each are used to split up the overall data. The first block period of the data is from 1 April 2012 to 31 March 2017 while the second block period runs from 1 April 2017 to 31 March 2022. Additionally, the data will be examined for a total of 10 years.

Tools Used: -

RSI analysis methods are used to analyse data. The researcher estimated the Alpha returns by deducting the return of the passive strategy from the return of the active strategy in order to determine the return of the active strategy using the RSI 50 cross over criterion. The Sharpe ratio is also calculated to determine a market's performance.

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Analysis and Interpretation

Table-I: Testing the efficiency of RSI for Panel-I: Whole Sample Period i.e., 01st April 2012 to 31st March 2022)

Markets	No. of trades	Trade Repetition Time (in days)	Gross Returns (%)			T C (%)	Net Returns (%)			Sharpe Ratio (%)	Alpha (↑Index Return)
			Aggregate	CAGR	Rank	Aggregate	Aggregate	CAGR	Rank		
Maruti Suzuki India Ltd.	547	4.53	125.56	8.47	**2**	2.75	122.81	8.34	**2**	-170.52	-49.45
Mahindra & Mahindra Ltd.	622	3.98	-50.63	-6.81	**3**	6.19	-56.82	-8.05	**3**	-58.70	-22.19
Tata Motors Ltd.	642	3.86	144.25	9.55	**1**	6.43	137.82	9.05	**1**	214.75	92.34

Table I analysis : the whole data set's results using the RSI approach. Since Tata Motors Ltd. has the shortest trade repetition time, one must be extremely active while trading in this stock. When applied to the entire data set, RSI has not demonstrated particularly high efficacy. Out of three stocks, only one, Tata Motors Ltd., has positive alpha returns. Therefore, we can state that the poor RSI efficiency is observed for the specified data period.

Table-II: Testing the efficiency of RSI for Panel-II: First Sub Period i.e., 01st April 2012 to 31st March 2017)

Markets	No. of trades	Trade Repetition Time (in days)	Gross Returns (%)			T C (%)	Net Returns (%)			Sharpe Ratio (%)	Alpha (↑Index Return)
			Aggregate	CAGR	Rank	Aggregate	Aggregate	CAGR	Rank		
Maruti Suzuki India Ltd.	281	4.41	82.73	12.81	**1**	1.41	81.59	12.67	**1**	-233.79	-67.80
Mahindra & Mahindra Ltd.	352	3.52	-41.40	-10.14	**2**	3.52	-44.92	-11.24	**2**	-306.72	-115.94
Tata Motors Ltd.	353	3.51	-72.48	-22.74	**3**	3.54	-76.02	-24.84	**3**	-299.16	-128.64

Table II interprets the first subperiod data for the RSI approach. Since Tata Motors Ltd. has the shortest trade repetition time, one must be extremely active while trading in this stock. When applied to the entire data set, RSI has not demonstrated any efficacy. For this sub period, all stocks have displayed negative alpha returns. Therefore, we may conclude that the RSI efficiency for the provided data period is 0.

Table-III: Testing the efficiency of RSI for Panel-III: Second Sub Period i.e., 01st April 2017 to 31st March 2022)

Markets	No. of trades	Trade Repetition Time (in days)	Gross Returns (%)			T C (%)	Net Returns (%)			Sharpe Ratio (%)	Alpha (↑Index Return)
			Aggregate	CAGR	Rank	Aggregate	Aggregate	CAGR	Rank		
Maruti Suzuki India Ltd.	266	4.65	42.83	7.39	**2**	1.34	41.49	7.19	**2**	64.21	18.62

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Mahindra & Mahindra Ltd.	270	4.59	-9.23	-1.92	**3**	2.67	-11.90	-2.50	**3**	92.12	34.82
Tata Motors Ltd.	289	4.28	216.73	25.93	**1**	2.88	213.85	25.70	**1**	513.93	220.99

Table III interprets the second sub-period's findings for the RSI approach. Since Tata Motors Ltd. has the shortest trade repetition time, one must be extremely active while trading in this stock. When applied to the entire data set, RSI has proven to be quite effective. For this sub period, all stocks have displayed positive alpha returns. Therefore, we may conclude that RSI is quite effective for the provided data period. In the instance of Tata Motors Ltd., the highest alpha returns are obtained.

Table-IV: Testing the Alpha Returns among the Different Stocks

Name of Stocks	Alpha Returns for First Sub Period	Alpha Returns for First Sub Period
Maruti Suzuki India Ltd.	-67.80	18.62
Mahindra & Mahindra Ltd.	-115.94	34.82
Tata Motors Ltd.	-128.64	220.99

t-Test: Two-Sample Assuming Equal Variances		
	Variable 1	*Variable 2*
Mean	-104.1266667	91.47666667
Variance	1030.042533	12645.88763
Observations	3	3
Pooled Variance	6837.965083	
Hypothesized Mean Difference	0	
Df	4	
t Stat	-2.897066349	
P(T<=t) one-tail	**0.022123974**	
t Critical one-tail	2.131846786	
P(T<=t) two-tail	**0.044247947**	
t Critical two-tail	2.776445105	

Table IV shows the findings of a test for a difference that is statistically significant between the alpha returns of the various stocks used for the research over the two study sub periods. It has been discovered that there is a sizable variance in the return of stocks across various time periods. It is evident that there is a considerable variance in returns across different periods since the p value is determined to be 0.0221 at one tail and 0.0442 at two tails.

Conclusion: -

The study is conducted on three top most weighted stocks in nifty auto index. The three top-weighted stocks in the Nifty Auto Index are the focus of the investigation. Over a ten-year period, we attempted to evaluate the effectiveness of RSI. The data demonstrates that the RSI's efficiency is not very excellent in the first sub-period and if we consider the aggregate period. However, the RSI demonstrated outstanding effectiveness when tested for a second time. The results also imply that there is a significant difference in returns between the two different sub periods. The results do not conclusively prove that markets can be anticipated using technical analysis methods for the provided data set. Although there is some indication

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that procedures will be more effective in the second sub-period, the application of techniques does not provide any outstanding effects during the first sub-period. But ultimately, we have come to the conclusion that the strategies' effectiveness on the chosen stocks for the specified data period is not very high.

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