Journal of Theoretical Accounting Research
ISSN: 1556-5106
Volume 21 Issue 2 Year 2025 Page 13-21

A Comparative study between returns on RSI and Stochastic RSI using the Buy and Hold Strategy on Indian Equities

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Abstract:
Purpose:
The research will focus on trying to establish the better returns on Stochastic RSI in comparison to Relative Strength Index. The study puts technical trading indicators in context of financial econometrics, performance analysis via accounting, to fill the gap between market-based indicators, on the one hand, and theoretical models of predictability of returns in finance, on the other. The hindrance on the way is the absence of evident research on what indicator gathers more effectively.
Design, Methodology and Approach:
With the help of hypothesis testing supported by python we test the performance of 23 equities of various sectors to determine whether the returns on the 23 equities combined outperform the lagging Relative Strength Index with the help of the StochasticRSI. At the same time we also can test the performance of the two indicators on the said equities in order to know whether a selectively pointed approach gives us an outcome in which we can know what indicator to use on what equity.
Findings:
The study gives tangible understanding of the performance of the indicators and assists in advising which indicator to trade which equity in order to get better returns. We are able to determine the equities that StochasticRSI is performing better than RSI. We also determine performance of StochasticRSI v/s RSI performance on sample we are testing.
Research Limitations:
Trading costs have not been included. With these costs in mind, we will have a better picture. The sample is small and does not work on the whole universe of equities in Indian Equity Market.

Keywords: StochasticRSI, RSI, Buy and Hold Strategy, Indian Equity Market, Hypothesis Test, Divergence.

Introduction

Technical analysis is an aspect that has been used in the financial markets. It helps the investors to visualize trends and patterns patterns of the market action of security by plotting Past price information on a graph. Technical analysts believe that the past price movements can. are indicators of future performance, and they use this assumption to build trading, chart-based, historical and statistical based trading strategies. Although the academic community tends to doubt the profitability of technical analysis in the long-term, it has continued to be the object of active research and discussion over decades. Market action is a term that usually covers the three relevant data that technicians use, namely, price, trading volume, and open interest (Tsinaslanidis, 2014). According to (Murphy, 2000) , the technical approach is based upon three premises namely, Market action discounts everything, Price move in trends and History repeats itself. Technical trading has been controversial in terms of reliability to select investments. Whereas technical analysis involves the analysis of market action, fundamental analysis involves the economic forces of supply and demand that bring about changes in prices to either increase, decrease, or remain the same (Murphy, 2000). A large number of studies have been done on the performance of technical trading analysis. According to (Jensen and Benington, 1970), previous information cannot be utilized in forecasting future prices. According to (Neftci, 1991), it is impossible that technical analysis can win the market when the underlying process is linear. (Dunsby et al., 1999) find that the abnormal profits of technical trading rules do not surpass the buy-and-hold strategy, even on a post-tax basis when transaction fees are included. More recently, (Tanaka-Yamawaki and Tokuoka, 2007) also note that some of the most common technical indicators, namely Moving Average Convergence-Divergence (MACD) and Relative Strength Index (RSI), are not effective in predicting different intra-day prices of US stocks. Nevertheless, (Treynor and Ferguson, 1985) claim that in the event that the non-public information is taken into consideration, technical analysis may generate substantial returns. According to (Bessembinder and Chan, 1995) results indicate that the trading range breakout and the moving average are more effective than the buy-and-hold strategy in Asian stock markets.

Significant excess returns to technical trading rules are also reported in (Sullivan et al., 1999), (Gunasekarage & Power, 2001),(Kwon & Kish, 2002) and (Chong and Ng, 2008). According to (Chong and Ip, 2009), the momentum strategy would be very fruitful in the emerging currency markets. (Kim Man Lui) 2013 Use human trader experiment method to compare performance of old and new traders.

The Indian markets before the Covid-19 pandemic depended heavily on the investments of the Foreign Institutional Investors (FII). NSE and BSE publish daily reports to show the positions of FII. These trends were very decisive in the market. India boasts of one of the greatest household savings rates globally. These savings were to be invested in the Indian equity and commodity markets during and after the pandemic. Direct investors - cherry picking equities and commodities are the people with know-how. The investors who are risk averse and those who lack the necessary knowledge invest in the mutual funds and commodity ETF route. In developed markets, traders have taken the weapon of technical analysis to make investment decisions. India is also shifting towards the same ideology in the recent past as younger traders are getting more interest in equities and commodities. This paper will research on two strong tools that have a very simple and common strategy that produces a result, which leads to a better way to traders of choosing among indicators. Broadly speaking, the technical analysis may be subdivided into two umbrellas, namely the first one, Pattern and/or Candle analysis, and the second one, Analysis using indicators. The construction of the chart is done by establishing historical trends in future price forecasts by visual recognition. Pattern analysis is highly subjective, and the effectiveness of pattern analysis only lies within skills and experience of the individual applying it. Technical indicators, on the other hand, are mathematical formulas that run over price, volume and open interest to give buy and sell signals. Technical indicators-based trading is highly systematic and disciplined method of price forecasting. Oscillators refer to the effective tools which the technical analysts utilize to examine candlestick charts of equity and commodity among other financial assets with a view of making profits through the price movement. Oscillators are more useful at times. In choppy market consolidation cases where the market moves sideways over a few weeks or months, oscillators follow price changes and assist in determining when there is an overbought or oversold market. In most instances, the price and oscillator have the same sideways movement resulting in the visualization of similarities between the peaks and troughs on the price chart and the oscillator. But when a breakout in the prices takes place it is an indication of the start of a new trend. The oscillator is in the extreme state when a breakout has taken place because of its nature. The upward breakouts represent the oscillator being located in the overbought area and the reverse. In this case, it is clear what the dilemma of the traders is. Purchasing overbought or selling overbought? Selling oversold or buying oversold? (Murphy, 1999). Under these circumstances, one should temporarily forget about the oscillator and make a position. The reason behind this is that when a new trend is gaining momentum in the initial stages of the new trend, most of the time oscillators tend to go to extreme levels within a short period of time. At these points, the basic trend analysis will be of primary importance, and secondary will be the oscillators. With the trend growing, more attention should be paid to oscillators. Most traders have missed bullish actions by identifying the big trend signal and waiting until their oscillators showed indicators of oversold condition before taking action. In conclusion, at the initial phases of an important move, it is better to concentrate less upon the oscillator, but more on the signals of the oscillator as the move becomes mature (Murphy, 1999). In developed markets, traders have taken the weapon of technical analysis to make investment decisions. India is also shifting towards the same ideology in recent times as young traders are getting more and more interested in equities. This paper analyses two potent tools/indicators and an extremely simple and standard strategy with a result that provides traders with a clearer direction in picking of indicators. The place of residence of the writers being India and the fact that there has been very little research on the local equity market make a solid case of the writers to experiment with their hypothesis on the same.

As an accounting and financial point of view, technical indicators like RSI and Stochastic RSI are crucial in explaining financial market efficiency and investment performance. Their empirical evaluation adds to the knowledge of the interaction of accounting-based measures of returns and econometric models with the behavior of the market. The paper hence makes contributions to the financial econometrics knowledge base, as well as in the field of management accounting, due to the discussion of whether the momentum-based indicators can improve investment decision-making frameworks.

The writers have provided the indicators through the paper and given a detailed account of market terminology and the procedure to come up with each indicator. It is a detailed explanation that is comprehensive in nature. Those references that are relevant have been made to the appropriate authors. The paper aims at comparing the returns of the Stochastic RSI and RSI through the buy and hold approach on both. Based on hypothesis testing, we compare the profits on each indicator on a plane of 23 equities. We also compare the overall profits and indicate which indicator does well on this slice of data.

This paper is divided as follows to the extent that Section 2 will examine literature that is relevant to the integration of accounting, finance, and market efficiency theories; Section 3 will describe the research design and econometric approach; Section 4 will present the findings of the empirical research and discussion; and Section 5 will provide the conclusion based on how it

can be applied to accounting-based investment and financial management practices.

Literature Review

According to (Murphy, 2000), Charles Dow, the father of the technical analysis today and founder of Dow Jones and Company, established the 6 tenets of the Dow Theory that are used differently today in technical analysis.

1. The averages account for all available information.
2. The market broadly operates on three trends- primary, secondary, and minor.
3. Under the umbrella of major trends, there are three phases- accumulation, public participation, and distribution phase.
4. The averages must agree and align with each other.
5. The Volume has to validate the existing trend.
6. Trends remain active and intact until indicated otherwise.

Efficient Market Hypothesis (EMH) is a theory in financial economics that tends to believe that asset prices are based on and reflect all the available information (publicly available and privately available). This implies that one can never always outwit the market with information that other investors are aware of since it is priced in. The EMH has three forms. The weak form of the EMH implies that the historical information and volumes of the transactions are completely reflected in the prices (Dimson and Mussavian, 1998). Consequently, it is not predictable on the basis of this information the future price movements. This means that it is unlikely to continue making trading gains by using such techniques as technical analysis. Although technical trading still has a large following among market players, the Efficient Market Hypothesis does not imply that no one will make a profit, just that within a time frame; the number of people who will make a profit will be comparable to the number of losers. The semi strong form efficiency is whether the price is complete, precise and fast in terms of capturing all new information disclosed by the public; and also capturing all information disclosed by the past (Dsouza et al., 2013). Besides the past and present prices and trading volumes, the market prices also involve company-specific and industry-related data (both accounting and market data) and general economic indicators (interest rates, exchange rates, inflation and unemployment). Semi-strong market efficiency implies that all publicly available information is already enshrined in asset prices and thus that it is impossible to make trading profits by simply doing fundamental analysis on a consistent basis. The strong-form Efficient Market Hypothesis (EMH) is that all the information, both publicly available and privately held, is entirely reflected in existing asset prices. There are however, practical and theoretical reasons to believe that markets are not likely to be strong and efficient. Practically, the insider trading is restricted by regulations and limits that hamper the capacity of people with confidential information to gain out of speculation. Consequently, complete efficiency will not be achieved as barriers do not allow reaching the market with private information that is freely provided. (Dahiya, 2000). In theory, when the prices were completely efficient in the strong-form sense, then there would be no reason to invest resources in the acquisition of private information. This results in the conclusion that prices will never be able to be highly efficient, which is what is referred to as the Grossman-Stiglitz paradox. This is not the only theory that opposes Technical Analysis as it suggests that prices move randomly and no extraordinary gains can be made in the market with the help of historical data (Elaine Cherop, 2020). This theory is possessed with certain assumptions that investors are rational, and they take rapid action to reflect the new information on prices; it does not imply that always the prices are right.

Research conducted by Ball and Brown (1968) and Beaver (1968) among others in the accounting and finance literature highlights that accounting information is instrumental in explaining the behavior of the stock returns. Later econometric models of finance like Fama and French (1993) use both market and accounting factors to conduct returns forecasting. Combining these views with the technical indicators enables one to have the benefit of a complete view on how the accounting-based information and the price momentum interact to affect equity performance (Ball and Brown 1968; Beaver 1968; Fama and French 1993). The market can be volatile and the prices can go up and down with the sentiments of the investors.

Indian Stock market is weak form inefficient (Kumar and Kumar, 2018). Effective stock markets reflect the real information that is publicly available. In stock markets that are not efficient, information that is publicly available is minimal or absent. Technical analysis is employed to make excess returns since the market is inefficient. The technical analysis involves attention to share price and trading volume only, which are illustrated in different tables and graphs because of which the investor can obtain information concerning the definite formation of the trend and regularities of the price movement, the trading volume and their mutual dependence. The main benefit of technical analysis is that it is easy to logically apply and use. It also does not involve subjective factors like the personal expectation of the personal analyst (Petrusheva and Jordanoski, 2016). The significance of technical analysis is very clear through the survey conducted on fund managers (Menkhoff, 2010). Such analysis according to the survey is a pillar to predict the short-term price movements of securities. The oscillator also proves to be very handy in non-trending markets where the price moves within an area of horizontal price fluctuations or a trading area, establishing a market environment in which most trend-following systems just fail to perform. The oscillator will give the technical trader an instrument that could help her or him to benefit out of these recurring sideways and trendless market conditions (Murphy, 1999). The oscillator has a low

value not just to horizontal trading ranges, however. The oscillator is an invaluable companion used together with the price charts when the market is in its trending stages that give a signal to the trader to keep a watch of the short-term extremities of the market that are also known as overbought or oversold. (Murphy, 1999). The oscillator is also capable of alerting the fact that there is a lapse in momentum within a trend prior to the occurrence of a loss of that trend in the actual price activity. Oscillators are able to indicate that a trend can almost come to an end through some divergences. (Murphy, 1999)

Although the smoothness of momentum oscillators may be constructed in an immense variety of ways, their meaning is still uniform. to a large extent the same in many ways. Most of the oscillators are comparable; most of them are drawn at the bottom of the price chart in the form of a horizontal band. Though prices may be regarded as upwards, downwards, or on both sides, the oscillator itself is relatively flat, with the peaks and troughs which it has, summing up with those of the price chart. Others have a center value of oscillation, which is a breaking of the value or number, into upper and lower, normally represented by a default line. Others have stipulated upper and lower limits, which are normally in the range of 0-100. (Murphy, 1999). It is a rule of thumb that once an oscillator has reached a point at one end or the other of its movement then the current change in price has likely been excessively rapid and will be succeeded by a straightening or a fusion. The other general rule of traders is to buy when. The oscillator is at the lower side of the band and it is selling because it is inclined towards the upper side. Trade indicators are usually generated by crossing the midpoint line. (Murphy, 1999).

Methodology

The research is based on a quantitative financial econometric design, which entails hypothesis test to determine the variance in returns produced by RSI and Stochastic RSI. The data is comprised of the daily equity prices of 23 actively traded Indian companies which indicates accounting based performance on the stock market in terms of accounting of 23 companies that have a well-traded stock market presence. pointers in the landscape of market efficiency. The methodology is associated with accounting and Empirical test of finance research to find out the predictability of returns regarding technical models.

The best scenarios of using an oscillator are three: 1. Extreme Readings: The oscillator will be best used when the oscillator is at the extreme value on the. upper or lower limit. The further above the upper extreme, the more an overbought market is reporting. A low value is nearer to the lower extreme thus an indication of an oversold market. This means that the price tendencies are on the negative side. can be distressed and liable to correction or indemnity. 2. Divergence: This occurs when the price action and the oscillator diverge especially when the oscillator is an upward trend. Oscillators stand in an extremum, is one of the key signals of a likely reversal of the trend. 3. Midpoint or Zero Line Crossovers: The intersecting point of the line of zero or the midpoint could provide. important trade indicators, which confirm the trend in the present price. Momentum is the first concept of oscillators analysis (Murphy, 1999). Momentum is the measure of the speed of change in the prices compared to the real prices. It is computed by incessantly contrasting the price diversification at some point in time and providing a hint of it. the blatancy and speed of the markets. The formula for momentum is-

$$M = V - Vx \quad \text{..... (1)}$$

Where, V represents the latest close price and Vx is the last close price x days ago. A chartist is able to analyze rate of either increment or decrease in rate by graphing the variance in prices through a given period. price movements. The rising trend of the prices and the uptrend that the momentum line is above the zero line and headed upwards indicates that the uptrend is getting additional acceleration. Should there be an upward slope momentum line which starts to flatten, then it means that the current price growth is the same as x days ago. The prices have been on an increasing trend, but the acceleration (velocity) is now flat. At the stage where the momentum line is initiating to strike the zero line, the uptrend is still present but at the reduced pace that gives the appearance of a faltering. When the line of momentum crosses the zero line towards the downwards it is a sign of. The x-day closing price is less than the x-day closing price which means that the most recent x-day closing price has been less. that the moving average has also started to decrease. The down trend is even greater as the momentum goes even lower than the zero line. The downfall is only confirmed in the context of a slowdown. The momentum run is beginning to grow. It is always worth remembering that momentum looks at time change in price in two periods. To get the momentum line to move, the last closing price must indicate more than x days ago increase.

When price gains do not increase faster than they were x days ago the momentum line levels off. When the latest price increase is less than the increase that occurred x days ago, then the momentum line will reduce- although the prices may still be increasing. This is a mechanism that enables the momentum indicator to accelerate or decelerate a current price trend. Relative Strength Index (RSI) was invented by J. Welles Wilder, Jr., and was introduced in his 1978 book, new concepts in Technical Trading Systems. Relative strength Index (RSI) is a form of momentum indicator, which calculates the pace and scale of the recent price changes in a security to assess both overpriced and underpriced situations in the price of security. It is a lagging indicator. RSI is presented as an oscillator (a line graph) with a scale of 0-100. When RSI exceeds 70 this means that stock is overbought and when it is less than 30 stock means that the stock is oversold. Nonetheless, these levels may be adjusted based on the security as well as the time frame which is

in use. Divergences can also be determined by the RSI where the direction in which the RSI moves is opposite to the price.

Divergences can be a sign of a trend reversal. Divergence between the RSI and the price line, when the RSI is above 70 or below 30, is a serious warning that should be heeded (Murphy, 2000). The actual formula for the Relative Strength Index is calculated as follows:

$$RSI = 100 - \frac{100}{1+RS} \quad ...(2)$$

$$RS = \frac{(Average\ of\ x\ days'up\ closes)}{(Average\ of\ x\ days'down\ closes)} \quad ...(3)$$

A 14-period timeframe is commonly used for RSI calculations, with 14 days for daily charts, 14 weeks for weekly charts, and 14 months for monthly charts.

Divide the sum of the points realized during an up day throughout a 14-day trading period into 14, to obtain the average up value. Equally, in calculating the average value of down then take the total amount of the points lost on the down days and divide them by 14. Then the Relative Strength (RS) = average up value/average down value. This value of RS is then inserted in the formula to determine the Relative Strength Index (RSI). The value of x can be changed to increase or decrease the number of periods to be used to meet various trading strategies.

Wilder had initially applied 14 days as a metric to RSI. It is advantageous because this will reduce the time span which will consequently make them. oscillator more responsive, increasing its amplitude, and increasing its length will make a smoother oscillator with a smaller amplitude. RSI is more effective when the movements are on the upper side. and lower extremes. The short-term traders are more aggressive and would prefer trading on a smaller scale. shorter time period can be applied in oscillator swings. A longer period of time is desirable to a less volatile oscillator smoother. A 9-day RSI has more amplitude than the usual 14. day RSI. Most commonly, 9-day and 14-day periods are applied, but often longer intervals of 9 days and shorter ones of 14 days are used by the analyst. As a way of enhancing some usage of shorter spans such as 5 or 7 days. Other users use longer periods, like 21 or 28 days, to generate more productive RSI. signals. The RSI can be readily interpreted. Relative Strength Index (RSI) is drawn on a. vertical scale (0 to 100). With an overbought reading value above 70, and underbought reading value below 30, an overbought and oversold state respectively. But in trending markets, these limits can change. During bull markets, one can see the level of overbought being 80 whereas during bear markets the overbought level might go 20. Wilder refers to swings of failure as having occurred whenever the RSI has gone above 70 or below 30. When maximum failure swing is at the point of maximum failure swing, the maximum failure swing is maximum. RSI 70 and beyond forms a peak that is unable to break a previous peak in an ascending trend then it is followed by disintegration which was preceded by a trough. Conversely, the bottom failure swing is the area where the RSI is when it reaches a negative direction that does not reach the lower point, and then passes through a lower peak, which denotes the possibility of the reversal. The trading divergence between the Relative Strength Index (RSI) and the price line, the RSI value is more than 70 or less than 30 is a significant warning sign that traders should pay close attention to.

The oscillator charts typically have horizontal lines at the 70 level, and at the 30 level, which the traders use to create buy and sell signals. Any decline that is below 30 is an indication of an oversold position. When a trader is interested in buying but thinks that the market is about to hit a bottom, he/she would monitor the oscillator to read lower than 30. The oversold area can either develop a divergence or a double bottom pattern during this phase. Once the oscillator swings over to a point above 30, this is interpreted by many traders to mean that the trend is no longer downward and hence may create a buying opportunity.

On the other hand, in an overbought market, when the oscillator returns again under the 70 line, it is usually viewed as a sell signal, which shows that the market can be on its knees and a drop in the price can occur. RSI has been found to give the risk adjusted returns in trading currencies (Shik & Chong, 2007). RSI has been found to be more profitable within Spanish market companies as compared to the Moving Average convergence/divergence indicator (Rosillo et al., 2013). RSI is a superior indicator when the trader is risk averse and intends to invest long term since it has been established that RSI provides superior trade signals compared to Moving Average convergence/divergence and Exponential Moving average indicator (Majumdar and Chakrabarty, n.d.).

The Stochastic Oscillator developed by George Lane in the late 1950s, which is based on the fact that as the price rises, the closing price is brought near to the top part of the price range. During downtrends, closing price is usually at the lower side of the price range. The Stochastic Oscillator involves the use of two lines; the percent K line and the percent D line, the latter most important since it produces the main trading signals. This indicator is meant to evaluate the location of the latest closing price in regard to the total price movement within a specified period of time. The best timeframe that is commonly used with this oscillator is the 14 period. (Murphy, 2000). In order to calculate the K line, which is more sensitive than the other, the following formula is used:

$$\%K = 100\ x\ \frac{C - L14}{H14 - L14} \quad ...(4)$$

Where:

1. C denotes latest Close
2. L14- lowest low for the previous 14 periods
3. H14- highest high for the same 14 periods

The second line %D is a 3-period moving average of the %K line. This formula produces a version called the fast stochastics.
These are just percentages of the relative position of the closing price to the overall price range during a period of time chosen. A large reading (more than 80) means that the closing price is close to the top of the range whereas a small reading (less than 20) indicates that the closing price is close to the bottom of the range.

There are Three Stochastic indicators.
1. Fast Stochastic This is the default stochastic formula with no modifications. It is highly sensitive to price fluctuations and produces a large number of trade indicators.
2. Slow Stochastic-Here, stochastic values are averaged over a time period to smooth the stochastic values. This will lead to the reduced number of trading signals, and it will be less responsive to the short term fluctuations.
3. Full Stochastic - This form is calculated the same way that fast stochastic. It is then smoothed by moving average to form percent K (Full). The other line, one of the most basic moving averages of %K (Full), is finally drawn that is the period of reference in which the other line plotted is a simple moving average of the latter, denoted as %D (Full). To the Full Stochastic indicator and our own rules of trading, we shall apply our particular trading rules in our analysis. Stochastic RSI is an indicator that determines the overbought and oversold market situations in terms of momentum. It is a blend of Stochastic Oscillator and RSI indicators. The combination is done by using the formulae of Stochastic Oscillator to the RSI yielding in an oscillator that is more sensitive to the changes in the momentum compared to the RSI. Thus, Stochastic RSI is an indicator of the future. With this characteristic, the oscillator is defined as providing a greater accuracy in the trading signals.

Divergences, i.e. the occurrence of the opposite direction of the Stochastic RSI and the price, can also be indicated by the use of the Stochastic RSI. Disagreements may indicate a reversal of the trend. The RSI strategy was more lucrative as compared to simple B&H strategy as the paper written by (Cohen and Cabiri, 2015) states that it beat the returns of other the MACD, Stochastic Oscillator and Parabolic Stop and Reverse. The Stochastic Oscillator as a leading indicator indicates that it is a trade prior to the lagging indicator, the RSI. The authors are attempting to put to test through this paper whether the trades produced by the Stochastic RSI produce a higher return than those produced by RSI - in a Buy and Hold Strategy.
RSI monotheism spreads in the technical analysis world. The Main objective of this research paper is to identify whether RSI yields the same number of returns as Stochastic RSI- using a Buy and Hold Strategy. The examination is grounded on the secondary data gathered by means of such sources as Yahoo Finance. The study is historical in that; it examines the historical information with the aim of analyzing and interpreting it. This research is founded on two technical indicators i.e. RSI and Stochastic RSI of all Future and Option (F&O) stocks. The study period is the day when F&O stocks were all listed on stock exchange. The data is analysed using Microsoft excel.

Relative Strength Index (RSI) is a technical momentum indicator to determine the intensity of recent price movements to gauge the state of over or under value in the price of a stock or any other asset. The RSI is presented in the form of an oscillator and may take up to 0 and 100. The following are some of the ways through which the RSI indicator can be applied:
1. Determine overbought and oversold: A traditional value of 70 or more is said to be overbought and 30 or less is said to be oversold.
2. Confirm trend direction: RSI can also be used to confirm the trend direction. To the extent the RSI is moving upwards, it means that the asset is an uptrend. An indicator that the asset is experienced in a downward direction is when RSI is falling.
3. Identify divergences: Divergence is the case when the price of an asset and its Relative differ. RSI Indexes reverse directions. This is generally as though there could be a reversal of the trend in the near future.

Stochastic RSI (StochRSI) is a trading indicator that is used to measure the momentum and establish the same. over-valued and under-valued in the market. It is calculated with the help of Stochastic. Oscillator formula to Relative Strength Index (RSI). The StochRSI ranges from 0 to 1. The value of 0.8 or more than that indicates that it is overbought and the value of 0.2 or less indicates it is oversold. The probability to buy is generated when the indicator is changed to the point of 0.2 and goes over and above it and above and below selling. opportunity is generated when the indicators go over and under 0.8 again.

Rules used to generate trades on RSI
Rule 1: When the previous day RSI is lower than the next day RSI, then it is considered a buy signal. Therefore, when the stock is closing higher than it was at the beginning, the authors purchase at the close.
Rule 2: When the next day RSI is lower than the previous day RSI, then a sell signal is generated. Therefore, in cases where the stock is closing lower than it was opened, then the authors sell at the close.

Rules used to generate trades on Stochastic RSI
Rule 1: The buy signal is formed when Stochastic RSI of the last day is less than that of the following day. Therefore, the authors will sell at the end when the stock is up to date as compared to its inception.
Rule 2: The sell signal is generated when the Stochastic RSI today is less than the one of last day. Therefore, at the time when the stock is closing below its open price, the authors sell close.

In the econometric model, the t-test is a statistical test that can be used to determine the significance of the difference between the two means of returns of the two trading strategies. This type of analysis is consistent with the customs of financial econometrics and accounting performance analysis that is focused on hypothesis-based quantitative analysis. On the basis of the above developed framework, the authors will employ the use of t-test in testing whether Stochastic RSI returns are higher than returns produced by RSI.

Where,
Ho: Returns StochasticRSI ≥ Returns RSI
Ha: Returns RSI > Returns Stochastic RSI

The t-test is made at 95% confidence level and the results of the same are as follows.

T-Test in Hypothesis Testing

A t-test is a statistical technique that can be applied to find out whether the meaning of two groups is significantly different. It is normally applied when the sample size is low, and the population standard deviation is unknown. In 1908, t-test was described by its creator William Sealy Gosset. The test made the assumption of normality which is the presence of a bell shaped distribution of the data, independence of every observation in the data with the others in the data, the variance of the data set should be constant, data need not be discrete or categorized and the t-test data should be a random sample of the population data.

Purpose:
To test whether the difference in sample means is statistically significant or occurred by chance.
(Paired T-Test):

$$t = \frac{\bar{d}}{(sd / \sqrt{n})} \quad ...(6)$$

Where:

- $\bar{d}$ = mean of the differences between paired observations
- sd = standard deviation of the differences
- $\sqrt{n}$ = number of pairs

Hypotheses:

- Null Hypothesis (H_0): There is no significant difference in means ($\mu 1 = \mu 2$)
- Alternative Hypothesis (H_1): There is a significant difference ($\mu 1 \neq \mu 2$, or one-sided)

Decision Rule:

- Calculate the t-statistic and compare it to the critical t-value from the t-distribution table at a chosen significance level (e.g., 0.05).
- If p-value<α p-value<α: Reject H_0 → Significant difference.
- If p-value>α p-value>α: Fail to reject H_0 → No significant difference.

where,
Ho: Returns RSI ≥ Returns Stochastic RSI
Ha: Returns RSI <Returns StochasticRSI

Results & Discussion
Individual test of stock wise return.

Table 1: individual test of stock wise return

Equity	RSI Return (₹1)	StochRSI Return (₹1)	Difference	H_0	H_1	Conclusion
Aurobindo Pharma	334.5	538.9	204.4	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Axis Bank	550.7	439.2	-111.5	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Cipla	-310.15	104.25	414.4	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Coforge	4159.75	3673.15	-486.6	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Dr Reddy's Laboratories	428.84	94.92	-333.92	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Eicher Motors	-16328.85	-16835.7	-506.85	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Glenmark Pharma	464.2	651	186.8	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
HCL Technologies	575.6	302.85	-272.75	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
HDFC Bank	5.57	31.24	25.67	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Hero Motocorp	4391.3	1668.55	-2722.75	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
ICICI Bank	9.11	15.39	6.28	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Infosys	3.18	2.45	-0.73	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Kotak Mahindra Bank	-570.35	-47	523.35	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Lupin	335.3	490.4	155.1	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
State Bank of India	356.7	312.55	-44.15	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Sun Pharma	194.55	53.25	-141.3	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Tata Consultancy Services	1965.35	340.9	-1624.45	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
TVS Motor	1762.25	1104.85	-657.4	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Wipro	-8.95	90.45	99.4	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Yes Bank	18.9	21.96	3.06	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI
Mahindra & Mahindra	305.05	-68.2	-373.25	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI
Tata Motors	435.3	468.85	33.55	StochRSI ≤ RSI	StochRSI > RSI	StochRSI > RSI

Table 2: Overall test of returns on all equities.

Metric	T-Statistic	H_0	H_1	Conclusion
Overall T-Test (StochRSI > RSI)	-1.6957	StochRSI ≤ RSI	StochRSI > RSI	RSI ≥ StochRSI

Regarding finance and accounting perspective, these results suggest that the RSI based strategy is more closely associated with accounting performance indicators since it implies a stable price movement based on the fundamentals of firms. As a leading indicator, the Stochastic RSI can only capture the volatility in the short-term and possibly do not represent accounting-based measures of value. This is corroborated by previous findings of financial econometrics that momentum indicators add value to asset pricing models and risk-adjusted performance measures in dissimilar ratios according to their temporal sensibility.

Conclusion

The result of T-Test shows that there is a large difference in the mean profitability of buy and hold strategy on StochasticRSI and the buy and hold strategy on RSI. It is highly evident based on the table of individual returns that RSI does provide a better return than StochasticRSI solely in some equities. The t-test of all the returns of the Stochastic RSI versus those of RSI provides the RSI with a superior return compared to that of Stochastic RSI. This results dichotomy demonstrates subjectivity of the Stochastic RSI indicator. The hypothesis that StochasticRSI returns are equal or greater than RSI returns in buy and hold strategy is rejected at the level of significance of 5% which means that the buy and hold strategy on the RSI performs better than the buy and hold strategy on the StochasticRSI in the sample space of equities used by the authors. The current research paper is addressing a significant research gap since it is an inversion of the dynamic aspect of a less comprehended indicator- the. StochasticRSI. We shall scrutinize so as to shed light on the performance of the StochasticRSI in comparison with the traditional RSI. By examining this complicated relationship, we trust that we can also contribute our share to the bigger debate on portfolio management and investment schemes and also offer some good tips to the practitioners and academics who are concerned with streamlining the process of making investment decisions in a continuously changing financial world. To shedding the analysis, it is anticipated to enlighten, the implication of investment strategies in practice, as far as we know of the portfolio. management beyond the usual diversification plans. The deficiency in this which can be furthered upon also involves expansion of the sample space to the population of all stocks in the Indian Equity Universe. The effect of this will be increased knowledge about the performance of the two indicators. The other weakness is that we have utilized data over the past 5 years. The result will also be solidified using data of listing till date of each stock. The increased returns by the RSI are not the indicators of the portfolio turnover. RSI is a lagging and choppy indicator and therefore indicates a significant number of trades to be entered and excited. This contributes to the trading costs and therefore lowering returns. These costs will be incorporated into every trade and that will get us nearer to the truth. We would also wish to compare further the use of positive and negative divergent in the two indicators in the future and observe which of the two provides higher returns. We would also recommend in the future which equities would be better off with what indicator. This will assist in the refining of investors and traders in choice of trades.

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