
A comparative study of Bollinger Bands and rate of change with reference to NIFTY

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ABSTRACT

The purpose of this study is to compare Bollinger Bands (BB) and Rate of Change (ROC) indicators on Nifty50 for the financial year starting from 01/04/2021 to 31/03/2022 to find out which one of the indicator or the combination of the indicator can generate better returns with the use of Streak software. Streak is an algo trading platform which facilitates traders to back test trading strategies by giving some entry and exit conditions and deploy the same for automatic trading. A good technical indicator should give fewer signals with high accuracy as there will be more brokerage costs involved if there are more signals. In this study it is found that BB can give fewer signals with greater accuracy. ROC gives more signals with poor accuracy. Superior returns can be obtained if these indicators are combined. Therefore, it is always recommended to investors not to use any indicator in isolation as it is prone to more risk.

KEYWORDS: BB, Nifty50, ROC.

1. INTRODUCTION

Stock market investments are always associated with certain risks (systematic and unsystematic) and mitigating the same becomes necessary. Those who want to invest in stock market avenues should have minimum knowledge of security analysis. Fundamental analysis and technical analysis are two different approaches, each one of which has its unique style of analysis. The fundamental approach emphasis much on the growth prospects of economy, stability of government, the prospects of the specific industry and specific company whereas technical approach emphasis much on the price and volume movement of the stock (Ramadoss & Muthuvel, 2013).

This paper intends to compare two technical indicators i.e., BB and ROC on the closing prices of NIFTY50 the benchmark index of India for the financial year starting from 01/04/2021 to 31/03/2021 with the help of Streak software. Streak is an algo trading platform

which facilitates traders to back test trading strategies by giving some entry and exit conditions and deploy the same for automatic trading. Investors or traders are emotionally involved in trading and therefore could not make better profits. With the help of algo trading, traders can make better profits without the involvement of any emotions. This paper shows how better returns can be obtained with the use of technical indicators.

2. REVIEW OF LITERATURE

C. Lenteo, N. Gradojevic and C.S Wright (2007), have tested the profitability of BB on TSX, DJIA, NASDAQ and CDN/USD for the period of 09/05/1995 to 31/12/2004. They have chosen three variants i.e. 20 days moving average, +/-1 sigma, 30 days moving average, +/-2 sigma along with the standard setting i.e. 20 days moving average, +/-2 sigma. The study found that BB is not profitable and unable to generate consistent profits than compared to buy and hold trading strategy. They identified that contrarian approach (i.e. buy on sell and sell on buy) can maximize profits.

Rommy Pramudya and Sakina Ichsan (2020), this study is conducted with the purpose to determine which indicator or combination of indicators give accurate buy and sell signals on the LQ45 index (Indonesia Stock exchange index). They have chosen three indicators namely BB, Relative Strength Index (RSI) and Moving Average Convergent and Divergent (MACD). In order to determine how accurately the chosen indicators can give buy and sell signals they conducted various types of tests such as K-S normality testing and paired sample t-test. The study concluded that both BB and RSI can give sell signals with good accuracy than buy signals and where as MACD is slow in capturing buy and sell signals.

Shah Nisarg Pinakin and Patel Taral Manubhai (2015), have compared two indicators namely BB and RSI to test profit generating capacity. They tested these indicators on daily closing prices of Bajaj Auto, M&M and Hero Moto Corp from 01/03/2014 to 28/02/2015. They found that BB can give more accurate signals and better profits than compared to RSI.

Shaozen Chen, Bangquian Zang, Genjian Zhou and Qiaoxu Qin (2018), have conducted research on CSI 300 stock index of China for the period of 2010 to 2013. They used BB trading strategy by considering factors such as returns, retracement, number of transactions and income risk ratio. The purpose of this paper is to test BB trading strategy on CSI 300 stock index by reducing the market noise with the help of Wavelet analysis. It has concluded that BB trading strategy based on Wavelet analysis is able to effectively prevent the occurrence of false signals and maximize profits.

Dr. N. Manickamahesh, G. Abi Antony, V. Sunil Kumar and T. Jerry Singh, in their study tested the efficiency of sensitivity and reliability of generating signals on chosen technical indicators on selected indices listed on NSE for the period of 2016 to 2021. They have chosen ten technical indicators namely simple moving average crossover, exponential moving average crossover, moving average convergent and divergent, ROC, William % R, BB, relative strength index, stochastic oscillator, commodity channel index, and directional movement index. The research focuses on the use of the best indicator to predict the direction of price movements. The study found that there is negative coefficient of rank correlation between sensitivity and reliability which means both are equally important in making adequate profits. Among the selected technical indicators Bollinger band has proven to be high probability indicator with the success percentage of 70 followed by ROC indicator with the percentage of 55.2. It has been suggested that the retail investors have to understand the overall trend of the market and combine different types of indicators to yield maximum return.

3. OBJECTIVES OF STUDY

- To find out whether BB can give better returns.
- To find out whether ROC can give better returns.
- To find out whether the combination of BB and ROC can give better returns.

4. PROBLEM STATEMENT

There are innumerable technical indicators which is making investors to get confused to select which one among them can give better returns. At the end, investors always expect some return on their investments. This paper studies two technical indicators i.e., BB and ROC and recommends which of these indicators or combination of these indicators can generate less signals but best average returns.

5 RESEARCH METHODOLOGY

- **Type of Research Design:** Analytical research design is used for the purpose of the study.
- **Source of Data:** It is based on secondary data which is collected from various financial websites and journal articles.
- **Time Period of Study:** The time period involved for the study is the financial year starting from 01/04/2021 to 31/03/2022.
- **Sample size:** NIFTY50 index is selected for the study.
- **Tools and Techniques used:** Two statistical techniques i.e., mean and standard deviation and two technical indicators i.e., BB and ROC are selected. The reason of selecting these indicators is, former is a volatility indicator and the latter is momentum indicator. Volatility indicator measures how far security stretches away from its mean price, higher or lower. Momentum indicator is used to determine the strength or weakness of this volatility.

6. THEORETICAL FRAMEWORK

BB is a volatility indicator and ROC (ROC) is a momentum indicator. Lot of literature is available on BB than compared to ROC. Majority of the researchers stated to buy a security when it crosses bellow lower BB considering that it is oversold and sell when it crosses above upper BB considering that is overbought. But a security may fall further from that level. Therefore in this paper it is recommended that to buy once the price crosses above middle Bollinger Band and sell once it crosses bellow upper Bollinger Band. Crossing above the central line of ROC is considered as buy signal and crossing bellow the central line of ROC is considered as sell signal..

7. DISCUSSION AND ANALYSIS

Table 1 shows the buy and sell signals generated by using BB on daily price movement of Nifty50 index for the financial year 1-04-2021 to 31-04-2022.

Date	Buy	Sell	Profit/Loss	%Return
07-04-2021	14875.65			
01-06-2021		15520.35	644.7	4.33
05-07-2021	15813.75			
16-07-2021		15754.5	-59.25	-0.37
22-07-2021	15856.8			
06-08-2021		16281.35	424.55	2.68
04-10-2021	17661.34			
19-10-2021		18439.9	778.56	4.41
12-11-2021	18140.95			
06-01-2022		17797.6	-343.35	-1.89
Signals generated	05	05		
Total Profit/Loss and %Return			1445.01	9.16
Mean				1.83
Std. deviation				2.84

Chart 1 depicts the buy and sell signals generated by using BB on daily price movement of Nifty50 index for the financial year 1-04-2021 to 31-04-2022.



(Source: tradingview.com)

Table 2 shows the buy and sell signals generated by using ROC on daily price movement of Nifty50 index for the financial year 1-04-2021 to 31-04-2022.

Date	Buy	Sell	Profit/Loss	%Return
08-04-2021	14882.65			
12-04-2021		14364.9	-517.75	-3.48%
16-04-2021	14306.6			
20-04-2021		14219.15	-87.45	-0.61%
27-04-2021	14710.5			
30-04-2021		14481.05	-229.45	-1.56%
04-05-2021	14604.15			
23-06-2021		15737.3	1133.15	7.76%
24-06-2021	15839.35			
30-06-2021		15755.05	-84.3	-0.53%
06-07-2021	15819.6			
09-07-2021		15766.8	-52.8	-0.33%
13-07-2021	15808.7			
20-07-2021		15736.6	-72.1	-0.46%
22-07-2021	15856.8			
26-07-2021		15860.5	3.7	0.02%
29-07-2021	15800.6			
29-10-2021		17783.15	1982.55	12.55%
10-12-2021	17619.1			
13-12-2021		17283.2	-335.9	-1.91%
16-12-2021	17276			
17-12-2021		16824.25	-451.75	-2.61%
24-12-2021	16937.75			
27-12-2021		17177.6	239.85	1.42%
03-01-2022	17681.4			
21-01-2022		17575.15	-106.25	-0.60%
15-02-2022	17408.45			
18-02-2022		17192.25	-216.2	-1.24%

Signals generated	14	14		
Total Profit/Loss and %Return			1205.3	8.22
Mean				0.60
Std. deviation				4.32

Chart 2 depicts the buy and sell signals generated by using ROC on daily price movement of Nifty50 index for the financial year 1-04-2021 to 31-04-2022.



(Source: tradingview.com)

Table 3 shows the buy and sell signals generated by using both BB and ROC on daily price movement of Nifty50 index for the financial year 1-04-2021 to 31-04-2022.

Date	Buy	Sell	Profit/Loss	%Return
27-04-2021	14710.5			
01-06-2021		15520.35	809.85	5.50
13-07-2021	15808.7			
16-07-2021		15754.5	-54.2	-0.34
22-07-2021	15856.8			
06-08-2021		16281.35	424.55	2.68
04-10-2021	17661.34			
19-10-2021		18439.9	778.56	4.41
Signals generated	04	04		
Total Profit/Loss and %Return			1958.76	12.25
Mean				3.06
Std. deviation				2.55

Chart 3 depicts the buy and sell signals generated by using both BB and ROC on daily price movement of Nifty50 index for the financial year 1-04-2021 to 31-04-2022.



(Source: tradingview.com)

Table 4 shows summation of results of the above three tables

BB		ROC		Combination of both	
Signals generated	5	Signals generated	14	Signals generated	4
Winning signals	3	Winning signals	4	Winning signals	3
Losing signals	2	Losing signals	10	Losing signals	1
Total %returns	9.16	Total %returns	8.22	Total %returns	12.25
Mean %returns	1.83	Mean %returns	0.6	Mean %returns	3.06
Standard deviation	2.84	Standard deviation	4.32	Standard deviation	2.55

8. FINDINGS

- BB can give better returns than compared to ROC.
- Superior returns can be obtained by combining both BB and ROC indicators.
- Mean percentage returns is less than compared to standard deviation in case of BB and ROC but in case of combining both the indicators the mean percentage of returns has increased and standard deviation is decreased.

9. LIMITATIONS OF THE STUDY

- Analysis is based only on secondary data collected from various websites and published literature.
- The study is done for a very short period from 01/04/2021 to 31/03/2022 on the Nifty50 index of NSE.
- In this study Nifty50 is considered as a security and buy and sell signals are generated with the use of selected indicators. But Nifty50 is an index and an index cannot be bought or sold. It is assumed that the results obtained on Nifty50 can be replicated on all the fifty companies of that index.
- Brokerage costs are not taken into concern as the study is performed on Nifty50 index and the index cannot be bought and sold.

10. CONCLUSION

This study was intended to compare two technical indicators i.e., BB and ROC. By back testing these indicators on NIFTY50 with the use of Streak software, it is found that BB

can give better returns than compared to ROC. ROC is more sensitive towards fluctuating around the central line and generates more number of false signals. But combining this ROC with BB can give superior profits. Therefore it is always recommended to investors not to use any indicator in isolation as it is prone to more risk.

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