ANALYTICAL STUDY ON PRICE MOVEMENT OF PARTICULAR AUTOMOBILE STOCKS USING TECHNICAL INDICATORS

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Abstract
The study aims to understand the price movements of selected automobile stocks such as Tata Motors, Ashok Leyland, Mahindra & Mahindra and Bajaj Auto using technical indicators such as Relative strength Index and Bollinger Bands. Using technical analysis helps us to understand about the price movements and predict future price movements. The data for this collected from authenticated secondary sources such as websites, Newspapers and magazines. The technical indicators help us to forecast the uptrend/downtrend, Divergence and other trading strategies of selected automobile stocks chosen for this study. It also helps the Investors to create effecting trading strategies, Entry and exit level, identify bullish & bearish trends and volatility of automobile stocks.

Keywords: Technical Analysis, Relative Strength Index, Bollinger Bands, Automobile stocks.

Introduction

The study will help the investors to have effective trading strategies, understand price trends, buy and sell signals of chosen automobile stocks using technical analysis. Technical analysis is a tool for an investor to understand about the price trends and patterns from the technical charts. Analysts using technical analysis believe that past trading activities and volatility in price can be the valuable indicators in predicting the future price movements of different stocks.Fundamental analysis focuses on financials of the company whereas the technical analysis focuses on historical price patterns/trends.

Relative Strength Index, an important technical indicator which helps investors to understand the buy/sell signals at particular period. The RSI oscillates between zero and 100. Traditionally the RSI is considered overbought when above 70 and oversold when below 30. Signals can be generated by looking for divergences and failure swings. RSI can also be used to identify the general trend.

Bollinger Bands is a technical analysis tool defined by set of trendlines plotted two standard deviations (positively and negatively) away from a simple moving average (SMA) of a security's price, but which can be adjusted to user preferences. Bollinger Bandsare a highly popular technique. Many traders believe the closer the prices move to the upper band, the more overbought the market, and the closer the prices move to the lower band, the more oversold the market.

Overview of Automobile Industry

The automobile industry in India is the world's fourth largest. India was the world's fourth largest manufacturer of cars and seventh largest manufacturer of commercial vehicles in 2019. Indian automotive industry (including component manufacturing) is expected to reach Rs 16.16-18.18 trillion (US$ 251.4-282.8 billion) by 2026. The industry attracted Foreign Direct Investment (FDI) worth US$ 24.21 billion during April 2000 to March 2020 according to the data released by Department for Promotion of Industry and Internal Trade (DPIIT).

Domestic automobile production increased at 2.36 per cent CAGR between FY16-FY20 with 26.36 million vehicles being manufactured in the country in FY20. Overall, domestic automobiles sales increased at 1.29 per cent CAGR between FY16-FY20 with 21.55 million vehicles being sold in FY20.

Overall, automobile export reached 4.77 million vehicles in FY20, growing at a CAGR of 6.94 per cent during FY16-FY20. Two wheelers made up 73.9 per cent of the vehicles exported, followed by passenger vehicles at 14.2 per cent, three wheelers at 10.5 per cent and commercial vehicles at 1.3 per cent. Hence, this paper studies

about the performance of the automobile industry by analyzing the price behaviour of few selected automobile stocks.

Chart 1: Chart showing the Bearish view region of Nifty Auto using Bollinger Bands

Review of Literature

The literature with respect to Bollinger Bands simulations is quite vast. Butler and Kazakov [4] apply swarm optimization techniques to search for optimal Bollinger Band Bollinger parameters. The optimizations are done with respect to the profit and loss of Bollinger Band pairs trading strategies.

Similarly, Ni and Zhang [5] use genetic algorithms to find the optimal Bollinger Band window length and band width jointly. The research regarding variations on Bollinger Bands is less plentiful. Oleksii [6] uses different algorithms for the construction of the bands including kriging, a method more common in geostatistics. Chande [7] uses an exponentially weighted moving average as a low pass filter for prices and adjusts the smoothing parameter dynamically based on the volatility of prices.

Finally, Tilley [8] combines the moving average with the concept of support and resistance in order to switch between emerging markets funds and small cap funds to and from the SAP 500.The rest of this article is organized as follows. In Section 3 we demonstrate an equivalence between Bollinger Bands and the rolling regression time series model. In Section 4 we describe how Bollinger Bands can be used in pairs trading as a mechanism for capturing the mean reversion behavior.

The application of Bollinger Bands to pairs trading will be discussed in detail in Section 4.3expected in the asset pair being traded. In Section 5, we make a connection between Bollinger Bandsand a state space model called the random walk plus noise model. This connection provides anotherapproximate statistical framework for Bollinger Bands and leads to a variant of Bollinger Bandscalled Fixed Forecast Maximum Duration Bands. We then construct a pairs trading simulationin order to compare the out of sample performance of the Bollinger Bands pairs trading strategy (BBPT) and the Fixed Forecast Maximum Duration pairs trading strategy (FFMDPT). Finally, inSection 6, we summarize our findings and provide suggestions for future research area Ugur Sahin, A. Murat Ozbayoglu (2014) found that under good market conditions (trendless or bull market) classic RSI performs well; however, it is vulnerable to trend changes.

Bing Anderson and Shuyun Li (2015) Found that for the past decade or so, using the standard configuration of $RSI <= 30$ and $RSI >= 70$ as buy or sell threshold, RSI offers no trading profit, but a small loss instead. However, when the buy/sell threshold parameters are altered, to deviate from the combination most commonly used, using RSI as the trading signal still yields profits.

M. Hashemi Tilehnouei, Shivaraj (2013) observe that MACD performance in making buy, hold and sell signals is better than RSI Divergence. But we cannot skip the important role of RSI in overbought and oversold signals and simply we can diagnose the price whether is it undervalued or overvalued or with suitable value.

Michael R. Melton, Xuan (Susan) Nguyen, Michael Simeone, (2017) "Incorporating technical analysis in undergraduate curricula", the paper is presented to provide support for investment decision-making with the understanding that no one technical analysis technique should ever stand alone. Only when used with other technical indicators – in conjunction with fundamental analysis – can a student come to an accurate buy or sell decision.

Jagadeesh (July 1990) Journal of Finance article, found predictable pattern in monthly returns for theperiod 1934 to 1987. His study revealed that stockswith largelosses inone monthtend toshow asignificant reversal in the following month and vice versa. In December 2000 Journal of Finance article, Lo, Mamaysky, and Wang found that severaltechnical indicators have some practicalvalue as they provide incremental information.

This study is also based on sector analysis where from 4 industries in that 4-5 companies are analyzed using technical indicators. If the indicators show more than 50% of positive results then the relevance of technical tools in trading increases which will be helpful for investors.

Statement of the Problem
Generally, most of the investors and traders find it difficult to predict buy and sell signals on stock markets and not able to time the markets with trending/non-trending zones. Technical indicators such as Bollinger Bands, Relative strength Index indicators helps the technical analysts and traders to predict bullish and bearish views in order to earn maximum profits from their trading strategies.

This paper helps us to find strong buy/sell signals with the help of technical indicators such as RSI, Bollinger bands, in order to generate optimum trading strategies, Entry and exit levels using technical analysis.

Need for the study
This study aims at understanding the price movements of automobile stocks using technical indicators to have better profits in their trading experience. Many traders and investors find it tedious to know about the entry and exit levels while trading. Hence, Unlike fundamental analysis which uses financials of the company to invest in stocks, Technical analysis helps the traders to take optimum trading decisions using technical indicators. There are several technical indicators to predict the buy and sell signals. Among such indicators, Relative strength Index, Bollinger Bands indicators are used in this study.

Objectives of the Study
  ➢ To helps traders to find the optimum trading strategies of automobile stocks using technical indicators
  ➢ To understand the price behaviour of automobile stocks using technical analysis
  ➢ To make investors aware about the entry and exit levels of selected automobile stocks
  ➢ To analyze the effectiveness of technical indicators in predicting future price movements of stocks
  ➢ To understand about the pattern of automobile stocks in trending/non-trending zones in order to make effective decisions.

Research Methodology
Research is a systematic and continues method of defining a problem, collecting the facts andanalysing them, reaching conclusion forming generalizations. Research methodology is a way to systematically solve the problem. It may be understood has a science of studying how research is done scientifically.

Research Design

A research design is the arrangement of condition for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is the conceptual structure within which research is conducted. Analytical Research is used in this study.

Sources of Data

The main sources ofdata for the present studyused are secondary in nature. Secondary dataconsists of information that already existssomewhere and has been collected for specific purpose in the study. The source of secondary data is collected from Company records, Newspaper, Company websites, NSE. Share price and nifty index for selected companies are collected from www.nseindia.com.

Period of study

The period of study is conducted for a period of 266 trading days (01/04/2019-31/03/2020).

Tools used for Analysis

Statistical tools are used to analyse Indian stock market using past data and information.

Bollinger Bands

John Bollinger, creator of the Bollinger Bands defines Bollinger bands as "a technical analysis tool, they are a type of trading band or envelope". Bollinger bands use a statistical measure known as the standard deviation, to establish where a band of likely support or resistance levels might lie. This is a specific utilization of a broader concept known as a volatility channel.

A volatility channel plots lines above and below a central measure of price. These lines, also known as envelopes or bands, widen or contract according to how volatile or non-volatile a market is. Bollinger Bands® measure market volatility and provide lots of useful information, including:
  ➢ Trend continuation or reversal
  ➢ Periods of market consolidation
  ➢ Periods of upcoming large volatility breakouts
  ➢ Possible market tops or bottoms, and potential price targets

The Bollinger Bands® consist of three bands, which revolve around a centered simple moving average (SMA), with the default value of 20, of which 85% of the time, the price is held within the following boundaries:
Lower band – SMA (minus two standard deviations)
Upper band – SMA (plus two standard deviations)

Relative strength Index (RSI)

Relative Strength Index (RSI) is a momentum oscillator that measures the speed and change of price movements. RSI oscillates between zero and 100. When RSI of share is lies between 30 and 70 investors can hold share and if its RSI crosses 70 there may be downturn and it is time to sell.
RSI = 100 – 100/ 1 + RS
RS = Average Gain / Average Loss Average Gain= [(previous Average Gain) x 13 + current Gain] / 14.
Average Loss = [(previous Average Loss) x 13 + current Loss] / 14.
The standard is to use 14 periods to calculate the initial RSI value. For example, imagine the market closed higher seven out of the past 14 days with an average gain of 1%. The remaining seven days all closed lower with an average loss of -0.8%.
Bullish divergence occurs when the RSI creates an oversold reading followed by a higher low that matches correspondingly lower lows in the price. This indicates rising bullish momentum, and a break above oversold territory could be used to trigger a new long position.

A bearish divergence occurs when the RSI creates an overbought reading followed by a lower high that matches corresponding higher highs on the price.

Data Analysis and Interpretation
I. Bollinger Bands
Tata Motors

The chart of Bollinger Bands showing price movements of Tata motors show that lower band starts contracting during beginning of February 2020 showing a strong sell signal and it is oversold from 05th Feb 2020 and trending in Bearish zone during March 2020 where the upper and lower band has expanded substantially.

Chart 1.1: Chart showing the oversold region of Bollinger Bands in Tata Motors

Ashok Leyland

This chart shows that contraction of band has happened from 19th June 2019 showing a sell signal and it is oversold till August 2019 clearly showcasing bearish zone where the stock has been oversold.

Chart 1.2: Chart showing sell signal of Bollinger Bands inAshok Leyland

Mahindra & Mahindra

The chart showing price movements of M&M during 11th June 2019 where upper band starts contracting showing the indication of bearish trend and sell signal for investors. From 16th July 2019 to 30th September 2020 the stock had a downtrend with sellers taking full control.

Chart 1.3: Chart showing contraction of band of Bollinger Bands inM&M

Bajaj Auto

The chart showing price pattern of Bajaj Auto shows a strong buy signal from 02nd August 2019 and the upper band starts expanding giving a strong indication of buying signal for buyers to trade and a bullish trend starts from 21st August 2019

Chart 1.4: Chart showing Bullish trend of Bollinger Bands inM&M

II. Relative Strength Index
Tata Motors

The chart of RSI of Tata motors show that stock has been oversold from 30th July 2019 to 26th August 2019. The chart clearly shows buy signal from the mid-August 2019 where long position can be created by the traders and RSI Index has inferred below 30 level.

Chart 1.5: Chart showing buy signal of Tata Motors using RSI
Table 1.1 Table showing RSI values of Tata Motors

Date	RSI Values
30-07-2019	29.4692
31-07-2019	32.11776
01-08-2019	28.83628
02-08-2019	30.29415
05-08-2019	26.73017
06-08-2019	26.13464
07-08-2019	23.80439
08-08-2019	32.28293
09-08-2019	31.15992
13-08-2019	31.10166
14-08-2019	30.45776
16-08-2019	31.11597
19-08-2019	30.7331
20-08-2019	35.47469
21-08-2019	27.78512
22-08-2019	25.35553
23-08-2019	30.05055
26-08-2019	29.74978

Ashok Leyland

The chart prices of Ashok Leyland show that stock has been oversold from 23rd July 2019 to 14th August 2019 where it shows a buy signal as sellers has pushed the prices down and the RSI Index has come down below its 30 level during this period.

Chart 1.6: Chart showing buy signal of Ashok Leyland using RSI

Table 1.2 Table showing RSI values of Ashok Leyland

Date	RSI Values
23-07-2019	25.76922
24-07-2019	22.93001
25-07-2019	22.6557
26-07-2019	29.55314
29-07-2019	26.17885
30-07-2019	22.7745
31-07-2019	27.05826
01-08-2019	25.8695
02-08-2019	21.37017
05-08-2019	20.97293
06-08-2019	20.51658
07-08-2019	18.52028
08-08-2019	26.55134
09-08-2019	28.90949
13-08-2019	25.65678
14-08-2019	28.7942

Mahindra & Mahindra

The RSI chart of Mahindra and Mahindra shows that trend is bearish and it has touched lower than 30 level of RSI Index indicating a buy signal from 19th July 2019 to 07th August 2019. The oversold region of RSI indicates a strong indication of bearish exit and entry of bullish trend.

Chart 1.7: Chart showing buy signal of M&M using RSI

Table 1.3 Table showing RSI values of M&M

Date	RSI Values
19-07-2019	25.70836
22-07-2019	24.44241
23-07-2019	23.32158
24-07-2019	21.64455
25-07-2019	21.2025
29-07-2019	28.84635
30-07-2019	27.8351
31-07-2019	28.60088
01-08-2019	28.22669
07-08-2019	25.02235

Bajaj Auto

The chart of RSI index of Bajaj Auto shows that it has crossed higher range of 70 level witnessing bullish trend and it is overbought from 17th October 2019 to 07th November 2019. Hence the chart shows bullish trend and shows a strong buy signal.

Chart 1.8: Chart showing overbought region of Bajaj Auto using RSI

Table 1.4 Table showing RSI values of Bajaj Auto

Date	RSI Values
17-10-2019	71.60179
22-10-2019	70.34672
23-10-2019	72.72808
24-10-2019	73.0287
29-10-2019	70.74218
30-10-2019	73.36597
31-10-2019	74.77891
01-11-2019	72.29564
05-11-2019	71.29803
06-11-2019	71.43943
07-11-2019	72.70986

Findings
- The Bollinger bands of Tata motors show that trending in Bearish zone during March 2020 where the upper and lower band has expanded substantially.
- The chart of RSI of Tata motors show that stock has been oversold and witnessed a bearish trend
- The Bollinger Bands and RSI Index of Ashok Leyland witnessed an oversold region and there was a bearish trending zone
- The Bollinger Bands of M&M showed strong sell signals and there was contraction of band whereas RSI Index charts of a M&M showed strong buy signal as it was oversold
- The Bollinger Bands of Bajaj Auto witnessed a buy signal and there was expansion of band whereas RSI Index charts showed that there was bullish trend and the stock was overbought.

Suggestions
- The investors and traders should have complete knowledge about the stock markets and also trade with discipline
- The traders can use more than 1 or 2 technical indicators in order to take effective trading decisions
- The Bollinger Bands showed the variation in the price patterns witnessing trending and non-trending zones where it can be used for analyzing stocks of different sectors
- The RSI Index charts can also be used as a strong technical indicator as it helps one to understand the overbought and oversold regions effectively
- By selecting stocks from Nifty Index, one can understand about the consolidated price movement of particular sector Example, Here, its Automobile sector

Conclusion
This paper studied the price patterns of selected automobile stocks using technical indicators such as Bollinger Bands and Relative Strength Index. From this study, an investor or a trader can understand to find out entry and exit levels, buy and sell signals, tending and non-trending zones easily. Through Technical analysis, investors can earn better profits by making effective trading strategies using many technical indicators. The usage of Bollinger bands and Relative Strength Index in this study can help us to understand and predict future price movements of automobile stocks and can derive the effective performance of stocks in order to take effective trading decisions.

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