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TECHNICAL ANALYSIS OF HDFC USING BOLLINGER BANDS

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"Technical Analysis is a term used to define the process of forecasting future price movements based on the past price movements within the stock charts". The investor is enabled to do a thorough analysis before taking his investment decision. Through the analysis, the investor is able to ascertain the varied levels of support or resistance, or price level changes that have phenomenally impacted the financial markets leading to a strong demand or overabundance of supply of securities. Trading volume observance largely guides the investors in taking their decision **(J.B.Maverick, 2015).** By evaluating the current and historical prices and/or volume activity, investors are able to forecast future price movements and detect high probability trade entry/exit levels. Technical Analysts across the world make use of simple moving averages, trend lines and momentum based indicators like Bollinger Bands, moving averages, oscillators or Candlestick patterns to map future price predictions and movements.

Bollinger Bands – A Peek

Trading bands were originally developed by J.H.Hurst, who designed the outer band such that it touched the price at turnaround points. The calculation of trading bands using the moving average came into vogue during the late 1970s. According to this, the average value of a security was calculated over a pre-set period of time, such that a given increase/decrease in the price of a security resulted in a synchronized increase/decrease in its average prices.Bollinger in early 1980s traded warrants and options and focused on volatility as the key variable for securities and instruments.In 1983, John Bollinger, Chief Market Analyst, introduced Bollinger Bands on Financial News Network (currently CNBC) (Jiali Fang, Ben Jacobsen and Yafeng Qin, 2004). He published his book "Bollinger on Bollinger Bands" in 2001 (www.bollingerbands.com).Bollinger Bands are "curves drawn in and around the price structure, usually comprising of a moving average (middle band), an upper band and a lower band that work best when the middle band is chosen to reflect the intermediate term trend, so that trend information is combined with relative price level data" (Jean Folger).Bollinger Bands are seldom used alone as indicators of price movements, but combined with basic Trend Analysis and other indicators for confirmation (Song Xn and Yujiao Yang, 2013).Investors use them as guidelines to highlight probable trend reversals, rather than as objective indicators of buy/sell pointers and confirmation(K. Senthamarai Kannan, P.Sailapathi Sekar, M.Mohamed Sathik and P.Arumugam, 2010).The investor is steered to buy when the security price is bottom (hits low) and sell when the price tops (price hike).Bollinger Bands were used as indicators of over bought or over sold stock in the financial markets. The bands were developed to identify defective areas and revealed 98.59% accuracy (Henry Y.T.Ngan, Grantham K.H.Pang, 2006). According to C.Lento, N.Gradojevic and C.S.Wright (2007), when transaction costs are adjusted in Bollinger Bands, the security faces a continuous and perpetualfailure to churn profits. This holds good when investors indulge in excess buy and hold trading strategy.Bollinger Bands are similar to Bomer Bands and are plotted above and below the moving average of stock prices at standard deviation levels (Oliver Douglas Williams, 2006).Standard deviation is used as it is by itself a measure of volatility, and the bands adjust according to the market volatility. These bands expand during volatile market conditions and contact when the markets are dull and less active. Bollinger has set a bandwidthdue to the sensitive nature of bands to extreme deviations and quick reactions to large price oscillations.

Research Methodology

The study was designed on an exploratory basis, and the researcher has used random sampling technique to source the data. The banking sector was deliberately chosen as the government channelizes its reforms and financial strategies through the banks – be they public sector, private sector or foreign banks. As the functioning of the financial markets is closely associated with the banks who have donned the role as Mutual Fund Managers, choice of banks for the study was obvious.

HDFC was selected as the role of new gen banks in the current economic scenario is very predominant, with a focus on churning profits using a customer centric approach through class banking. Primary data was purposively not used, as the scope of the study revolved around secondary data only.

Secondary data was sourced through several websites and search engines, besides referencing journals, magazines, books and theses for relevant information.

The researcher has used Bollinger Bands and Japanese Candlesticks as the ideal tools for technical analysis. As these bands involve a 20 day moving average calculation for drawing meaningful inferences, the study period chosen is 04.09.17 to 03.11.17.

Important Terminology Used In Bollinger Bands

Bollinger Bands consist of a **middle band** with two outer bands. The middle band is a simple moving average normally set at 20 day periods. The simple moving average and standard deviation both are used, as the look back period is also the same. The price of the stock is bracketed by an upper and lower band together with the simple moving average for 20 days. According to **Chandan Taparia, Derivatives Analyst,** "Mathematically, two standard deviations mean 95% probability. It is plotted by two standard deviations above and below the 20 day moving average. Its bandwidth can be used to measure highness and lowness of the price related to previous trade". When the moves touch or exceed the bends, they indicate the strength or weakness of the security. A move to the **upper band** shows strength, while a move to the **lower band** reflects weakness. These bands are used to determine if the prices are relatively high or low.

When trends happen, the moving average holds accuracy, and a break in that implies that there is a shift in investor sentiment from buying to selling and vice versa. This helps a trader to adopt an active trading methodology **(Tradecity Academy).**

Calculation of Bollinger Bands

Bollinger bands are calculated using simple moving averages for a period of 20 days, and standard deviations from the stock prices. Based on these the values of the upper, middle and lower bands are calculated applying the formulae tabulated below:-

Table No: 1 Table Showing Formulae used

Type of Bands	Formula
Middle Band	20 day Simple Moving Average (SMA)
Upper Band	20 day Simple Moving Average + (20 day standard deviation of price x2)
Lower Band	20 day Simple Moving Average - (20 day standard deviation of price x2)
Absolute Band Width	Upper Band – Lower Band

Source: Review of Literature

For the purpose of analysis, the researcher had calculated Simple Moving Average and Standard Deviations, based on which the band width, upper, lower and middle band values were found using Microsoft Excel.

Results and Discussion

The researcher has sourced the daily prices of HDFC for a period between 04.09.17 to 03.11.17 for the calculation of Bollinger Bands. The researcher is able to comprehend the market sentiments behind the price fluctuations through the study of the chart and figures, which have influenced the investor in choosing the stocks.The study of the past performance of the stock based on the historical data of stock prices and with the help of trends, future trading pattern has been predicted by the researcher. This has largely contributed to identify stock whose prices are appreciating, and sell off those when a decline in prices is anticipated. Both the bands are plotted according to the volatility of the share market. A wider space between the upper and lower bands indicates high volatility, and they tend to come closer to each other when the market is less volatile.

Interpretation – 1: W Bottoms

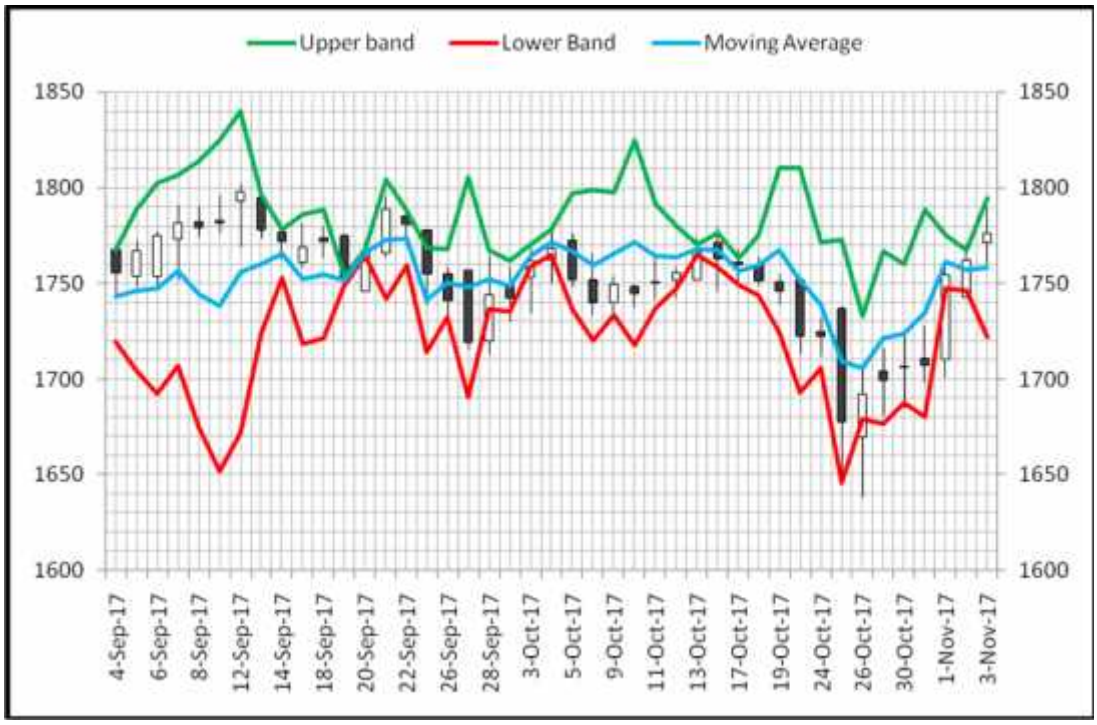
The chart reveals that there is an expansion of the upper and lower bands in the beginning of the period from 04.09.17 to 12.09.17; 22.09.17 to 28.09.17 and 05.10.17 to 13.1017. We are also able to trace three **W Bottoms** during these said periods, of which two are very pronounced. Bollinger had also identified and used these W patterns with his bands. W Bottoms normally form when there is a downtrend, involving two low reactions. Normally but not always, the low is below the lower bands. This holds good in the data analysed for the study, which is clearly seen in the chart. Bollinger used these W patterns for analysing the stock based on the contributions made by Arthur Merrill, who identified sixteen patterns with a basic W shape.

TABLE No 2: Comprehensive Table Showing Relevant Calculations

Date	Open Price	High Price	Low Price	Close Price	Moving Average	Standard Deviation	Upper Band	Lower Band	Mid Band	Bandwidth
04-09-2017	1767.8	1768.5	1742.05	1755.4	1743.375	12.025	1767.425	1719.325	1743.375	48.1
05-09-2017	1754	1772.2	1748.05	1767.3	1746.35	20.95	1788.25	1704.45	1746.35	83.8
06-09-2017	1754	1777	1749.2	1775	1747.45	27.55	1802.55	1692.35	1747.45	110.2
07-09-2017	1773.1	1790.4	1752.1	1781.7	1756.675	25.025	1806.725	1706.625	1756.675	100.1
08-09-2017	1782	1789.85	1774.1	1779.15	1744.475	34.675	1813.825	1675.125	1744.475	138.7
11-09-2017	1782.5	1796	1776.35	1781.7	1738.525	43.175	1824.875	1652.175	1738.525	172.7
12-09-2017	1792.8	1802	1768.7	1798.1	1756.025	42.075	1840.175	1671.875	1756.025	168.3
13-09-2017	1795	1799.7	1773.6	1778.1	1759.925	18.175	1796.275	1723.575	1759.925	72.7
14-09-2017	1777	1778.15	1763.05	1771.8	1765.525	6.275	1778.075	1752.975	1765.525	25.1
15-09-2017	1761.1	1781.3	1758	1768.95	1752	16.95	1785.9	1718.1	1752	67.8
18-09-2017	1774	1779.45	1763.6	1771.75	1754.95	16.8	1788.55	1721.35	1754.95	67.2
19-09-2017	1775.15	1776.15	1751	1752.6	1751.5	1.1	1753.7	1749.3	1751.5	4.4
20-09-2017	1746	1771	1746	1767.15	1766.2	0.95	1768.1	1764.3	1766.2	3.8
21-09-2017	1766	1795.35	1764	1788.6	1772.975	15.625	1804.225	1741.725	1772.975	62.5
22-09-2017	1785	1786.1	1770.15	1780.95	1773.7	7.25	1788.2	1759.2	1773.7	29
25-09-2017	1777.8	1777.85	1738.9	1755.05	1741.425	13.625	1768.675	1714.175	1741.425	54.5
26-09-2017	1755	1758.8	1728.1	1741.25	1750.15	8.9	1767.95	1732.35	1750.15	35.6
27-09-2017	1757	1757	1715.8	1719.35	1748.125	28.775	1805.675	1690.575	1748.125	115.1
28-09-2017	1720.1	1764.8	1713	1744.35	1751.95	7.6	1767.15	1736.75	1751.95	30.4
29-09-2017	1749	1758.7	1730	1742.15	1748.775	6.625	1762.025	1735.525	1748.775	26.5
03-10-2017	1753.1	1768	1734.15	1761.6	1764.45	2.85	1770.15	1758.75	1764.45	11.4
04-10-2017	1762.1	1777.65	1750	1768.1	1771.55	3.45	1778.45	1764.65	1771.55	13.8
05-10-2017	1772.3	1776	1748.1	1751.7	1766.7	15	1796.7	1736.7	1766.7	60
06-10-2017	1752.2	1765.95	1733.25	1740	1759.575	19.575	1798.725	1720.425	1759.575	78.3
09-10-2017	1739.9	1753.8	1731.2	1749.7	1765.7	16	1797.7	1733.7	1765.7	64
10-10-2017	1748.55	1749.7	1737.3	1744.75	1771.425	26.675	1824.775	1718.075	1771.425	106.7
11-10-2017	1750	1763.4	1741.95	1750.75	1764.425	13.675	1791.775	1737.075	1764.425	54.7
12-10-2017	1752.15	1758.8	1742.1	1755.55	1763.675	8.125	1779.925	1747.425	1763.675	32.5
13-10-2017	1752.1	1773.8	1752	1766.45	1767.7	1.25	1770.2	1765.2	1767.7	5
16-10-2017	1771	1779.4	1746.05	1762.9	1767.325	4.425	1776.175	1758.475	1767.325	17.7
17-10-2017	1760.8	1767.45	1751.3	1759.75	1756.175	3.575	1763.325	1749.025	1756.175	14.3
18-10-2017	1759.75	1764.2	1749	1751.55	1759.35	7.8	1774.95	1743.75	1759.35	31.2
19-10-2017	1751	1754.75	1738.9	1745.75	1767.175	21.425	1810.025	1724.325	1767.175	85.7
23-10-2017	1751.8	1751.8	1713	1722.4	1751.675	29.275	1810.225	1693.125	1751.675	117.1
24-10-2017	1725	1732	1712	1722.3	1738.675	16.375	1771.425	1705.925	1738.675	65.5
25-10-2017	1736.9	1737.9	1649.35	1677.65	1709.45	31.8	1773.05	1645.85	1709.45	127.2
26-10-2017	1669.5	1707	1638	1692.35	1705.85	13.5	1732.85	1678.85	1705.85	54
27-10-2017	1704	1716	1681.35	1699.05	1721.7	22.65	1767	1676.4	1721.7	90.6
30-10-2017	1706.4	1722.8	1685.1	1705.8	1723.975	18.175	1760.325	1687.625	1723.975	72.7
31-10-2017	1711	1727.8	1697.95	1707.4	1734.5	27.1	1788.7	1680.3	1734.5	108.4
01-11-2017	1710	1760.1	1701.25	1754.3	1761.2	6.9	1775	1747.4	1761.2	27.6
02-11-2017	1743.1	1769.85	1743.1	1762.25	1756.975	5.275	1767.525	1746.425	1756.975	21.1
03-11-2017	1771	1790	1760.15	1776.3	1758.15	18.15	1794.45	1721.85	1758.15	72.6

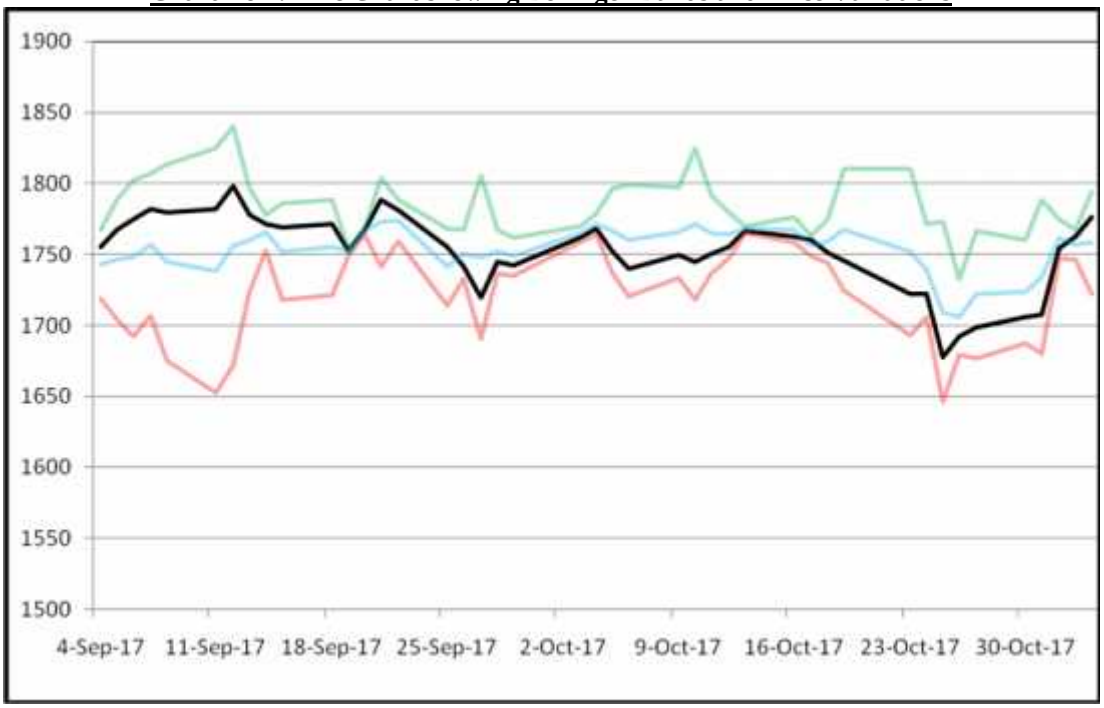
Source: Historical data and Computed

Chart No: 1 Chart Showing Bollinger Bands with candlestick



Source: Table No2

Chart No 2: Line Chart showing Bollinger Bands and Price Variations



Source: Table No2

Inference

As the low holds below the lower band, the researcher is able to identify a strong weakness in the prices in the last decline. Following this is the bounce in prices towards the middle band. In the next phase, the pattern shows a confirmed strong move off the second low and a resistance break. In this pattern, the final lap shows a new price low in the security. The researcher has identified three W bottoms during the period of the study – namely between 22.09.17 and 28.09.17; between 05.10.17 and 09.10.17 and between 26.10.17 and 30.10.17. Of these three W Bottoms, the first leg (ie) between 22.09.17 and 28.09.17 shows sharp plummeting of prices in the latter half of the period, while the first part experienced a comparatively minimal drop in prices. This can be verified with the close prices during this period that ranges between Rs 1780.95 on 22.09.17 and Rs 1719 on 27.09.17, which has caused the deep plunge in the stock chart. However the prices started rising on 28.09.17 touching Rs 1744. The period between 28.09.17 and 04.10.17 shows that the closing prices have been steadily increasing to touch Rs 1768 on 04.10.17. High volatility is seen in the first week of the study period (05.09.17 – 11.09.17), where the distance between the lower and upper bands is wide. This is substantiated by the standard deviation values which were 20.95 on 05.09.17 and 43.175 on 11.09.17, as the volatility of the market is found based on the standard deviations.

The first sharp W bottom can be attributed to the fact that NIFTY appeared weak during this period. The reason for this could be the gradual spiralling of crude oil prices and widening trade deficits. Many of the corporates are still reeling under the impact of the GST shocks and are fighting tooth and nail to overcome it. The stock market was subject to violent price fluctuations in July 2017, and the hiccups caused were directed at the GST implementation, which is passing through anon-going stabilisation process.Monsanto indication is seen on 28.09.17 and 26.10.17, as the prices are relatively low than the lower band, which signposts a bearish trend implying a selling signal for the investors. This reflects a trending market where the prices have walked up the upper band, and down the lower band.As the prices move closer to the lower band, there is a strong sign that the stock is oversold and prices stand every chance of increasing shortly.The sharp price “pull back”that closes beyond the lower band is commonly called as “automatic rally”is caused owing to the significant trade volume.

The second turn of W Bottoms between 05.10.17 and 09.10.17 is not as sharp as the first, and the prices are seen to have bounced back to normalcy within reasonable time.The third W Bottom is very mild and does not make an impressionable impact on the purchasing/selling decisions of the investors and traders. The reasons attributed to this could be due to the fact that price does not close below the lower band; the price does not retrace upwards and close above the middle band or 20SMA and as the price has not corrected to the low- “but not close below the lower band” and has not closed above the 20SMA with a swelling trade volume.

Interpretation – 2: M Tops

M Tops are also part of Arthur Merrill’s work and are the opposite of W Bottoms. Double tops, head and shoulders & diamonds are typical forms of progressing M tops. The first high can be higher or lower than the second higher. M Tops operates on certain rules namely (i) The first close must be outside the upper band; (ii) The price should correct a little and close below the middle bend or 20 SMA; (iii) The price should touch the high, but “not close over the upper band” and again correct below the middle band with an increase in the volume. The prices should have been in an uptrend before the M Tops occur. The Double Top Pattern is found at the peaks of an upward trend and signifies the fast losing interest of the buyers, together with the weakening of the preceding upward trend. On completion of this pattern, the trend is said to be reversed and the security is anticipated to move lower. The forst stage is characterised by an upward trend, followed by resistance and movement to a level of support. The pattern is completed when the prices break down and crash, marking the advent of a downward trend.

The Chart reveals a clear M Top formation between 19.09.17 and 29.09.17 with double tops and shoulder patterns and a diamond representation at the end. When the prices rise above the prior high, but fail to reach the upper band, it acts as a warning signal to the investing community.

Inference

When a security creates a higher reaction exceeding the upper band, it is implied that there is a pull back through the middle band. Such price escalation that moves above the earlier high, but fails to reach the upper band is a cautioning signal to all. After the second high to reach the upper band, its momentum starts waning that forewarns a trend reversal. The chart also reveals Air Products that close above the upper band during the two tops that form the M.As majority of the trends tend to be declining, and there are three W Bottom formations in the study period, the possibility of having more than one M Top formation is not feasible.

This is due to the tendency for the prices to crash often and move to a downward trend. According to **Rao of DBS "**Investors are also looking forward to a turnaround in the earnings anxiously; which will be just as vital as the upgrade, to sustain their interests".

Candle Stick – A Nutshell

Candle sticks were initially used by Japanese, way back in the 17th century as prediction charts. It was further honed by Charles Dow in 1900. It is used to detect the importance of price fluctuations based on the investor expectations. It is basically a type of financial chart used to describe price movements of securities and derivatives. Each candle stick represents one day and so a one month chart shows twenty days as twenty candles. They represent the relationship between open and close price information and helps to draw easy interpretations. Candlestick charts can be created only with open, close, high and low prices for a given period. The wide part of the candlestick is called as the "real body" and signals the investors about the increase or decrease of the closing over the opening price. The black/red candles indicate that the stock has closed lower, while the white/green candles imply that the stock has closed higher. Technical Analysts normally adopt this method to determine when to enter or exit the trade.

Interpretation 3: Candle Stick

The study period opens on 04.09.17 with a short filled candle and also seen on 06.09.17, 20.09.17 and 02.10.17 that point toward very negligible price movements and consolidation. On 05.10.17, a white candlestick means that there is buying pressure as the closing price exceeds the opening price. The long candlesticks on 07.09.17, 29.09.17, 31.10.17 and 01.11.17 all imply a price hike from open to close, signifying the bullish trends of the aggressive buyers. The existence of White Marubozu means that there are no upper or lower shadows. It is a condition where the open is low and the close is high, suggesting that prices are controlled by the buyer from the beginning to the end of the trading session. The existence of the Black Marubozu on 19.09.17 explains a situation where the open equals the high and the close equals the low, with high seller domination that tends to control and influence the prices from the start to the end. On 21.09.17 and 29.09.17 the bid prices are higher because of buyer pressure as revealed by the candle with long upper and short lower shadows.

There are only two Doji in the entire study period that suggests a lack of control over prices by the bulls and bears, with an indication that a turning point is developing. This is so when the opening and closing prices of securities are nearly the same. However there are no long legged Doji and only one instance of a Graveyard Doji indicating buyer pressure. A bearish Harami is seen at the end of September and early October 2017. The spinning tops on 07.09.17, 19.09.17, 04.10.17, mid- October, 27.10.17, 31.10.17 and 04.11.17 reflect the indecision of traders, despite the fact that both the bulls and bears were active during this trading session. The Hanging Man on 10.10.17 signals a bearish reversal pattern that could occur at the top or resistant level.The Bearish Belt Hold pattern is formed when the opening price becomes the highest point of the trading day (intraday). This denotes that there is a small or no upper shadow and the index declines throughout the trading day (Prakash Gaba, Technical Analyst, September 26, 2017).

From the above, it is obvious that some of the reasons that have been identified as the causes for these price fluctuations are the GDP growth rate, global oil price movements and geo political developments that have compelled India to import more than 80% of its oil requirements. Market weakness is likely to continue in the forthcoming sessions based on NIFTY and global symptoms.

Conclusion

The paper has discussed in detail the trading pattern of investors of HDFC stock between the said study periods. The interpretations using Candlestick and Bollinger Bands methods have shown that there were violent price fluctuations wherein on several days, the prices plummeted and crashed reflecting a bearish pattern. The scope for bullish trade practices was very restricted and the reasons were not restricted in-house but also due to external factors. No valid suggestions were made by the researcher as the data was historical in nature and trading is done by investors and traders across the country.According to Prakash Gaba of prakashgaba.com (Sept 22,2017) "In case you are thinking of buying, buy same A quality stocks like HDFC, IndusInd Bank, Ashok Leyland. These are stocks to buy and hold for a long term". Similarly the phased onset of the Gujarat Elections has also impacted the securities market. Besides, the monetary policy of RBI scheduled for the 5th and 6th December,2017 and the Federal Reserve Meet scheduled on December 12th and 13th are also contributors for the price oscillation.In the words of Birendrakumar Singh "as the price reversal gains momentum, the bands tend to sharply rise in the direction of the price trend": According to MC Goverdhana Rangan and Joel Rebello (November 2017), HDFC has created its own niche in the market, especially due to its distribution reach using their banking channel, in terms of better returns and margins. An individual investor is well advised to opt for portfolio investment, rather than individual investments in terms of returns and safety.

HDFC securities face a problem of maintaining its market share and inability to address specific customer requirements, in terms of a strategic portfolio. These may hit the business operations and its opportunities in an adversely."Bolinger Bands perform multiple functions like gauging on an on-going trend, identifying oversold levels and figuring out trend reversals" (Mazhar Mohamad, Chief Strategist, Technical Research and Trading Advisory, chestviewindia.in)To conclude, we can recall the words of Deepak Jasani, Head Retail Research, HDFC Securities "Do check the company's recent earnings growth trajectory and visibility, capital expenditure(CAPEX) plans, and schedule of commissioning of CAPEX plans, before buying its shares".

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