STOCK PRICE MOVEMENTS THROUGH TECHNICAL ANALYSIS: EMPIRICAL EVIDENCE FROM BANKING AND IT SECTOR

Ms.K.Manjula, Assistant professor, St Joseph Engineering College, Vamanjoor.
E-mail: manjulak@sjec.ac.in, Ph: 9945136180

Priyanka B Rao, Final year MBA student, St Joseph Engineering College, Vamanjoor.
E-mail: priyankara0417@gmail.com Ph:8095668239

Abstract

Technical Analysis is the process of prediction of future price movements of stocks based on examination of past price movements. Numerous technical indicators have been employed by analysts to accurately forecast future price movements of stocks. This study aims at carrying out technical analysis of the securities of the selected companies from the Information Technology sector and Banking sector and to assist investment decisions. The present study has collected data for a period of 10 years starting from January 2008-December 2017. Nine IT Companies and Banks are considered to analyse the price movements in the given period of time. Various technical indicators have been used to identify the strength of the stocks and direction of price movement. It indicates when the investors must buy or sell the stocks to accumulate more profits. It also highlights when the stocks were overbought or oversold and helps to distinguish between riskier and less risky stocks. From the study it can be concluded that the indicators have helped to identify the price trend. The technical indicators are used by the investors to know when one must enter or exit market. Use of technical indicators gives a better understanding of the performance of the stocks.
**Introduction**

Technical Analysis is the process of prediction of future price movements of stocks based on examination of past price movements. Like other forecasting, technical analysis does not result in absolute predictions about the future. Instead, technical analysis can help investors anticipate what may happen to stock prices over time. Technical analysis uses a wide variety of charts that show price behaviors over a period of time. This practice involves discovering the overall trend line of a stock's movement. Technical analysis uses tools and indicators for the prediction of price pattern. Charts are used for pictorial representation of performance of the company in the market. It helps in identifying trend and patterns and directs when to buy or sell stocks.

**Literature Review**

**Prasad, Chaitanya and Kumar (2018)** evaluated bank performance based on price movements using technical analysis. The data was collected for a period of 3 years of 6 banks and upon which technical indicators such as RSI, bollinger bands etc were applied. They concluded that investors must watch the current trend in the market and this is determined using various tools and charts of technical indicators. Technical analysis is one of the best tools to analyze the securities.

**Ramesh, Devendar (2017)** used Candlestick charts, RSI and MACD indicators to identify sell and buy signals. They also stated that technical analysis is required to study the stock market. They have conducted their research for a year to analyse the price movements of selected 13 Indian equities.

**Jabeen, Jabeen (2017)** stated that investors and investment analysts examine the historical prices of the company for better results. Their study presented that certain technical tools such as RSI, stochastics, Beta and Simple Moving Average were applied on 3 years closing price of 10 pharma companies to analyse and predict future price movements.

**Srivastava (2015)** cited that the investors should use various tools of technical analysis to determine the price movements of the scrips. Hence this technique aids in recognizing the right stock to invest in. Technical analysis helps to understand whether the scrips are undervalued or overvalued. Her study sample consisted of 3 Public Sector Banks and the sample period was 5 years. The study employed tools such as RSI, ROC and Moving Averages.

**Kaushik, Jain (2015)** stated that the examiners widely use various tools of technical analysis in forecasting the price
movements. In their study on 6 pharmaceutical companies, they used Relative Strength Index, Rate Of Change and MACD to analyze the stocks of pharmaceutical companies. Their descriptive research-based study was made for 5 years.

Umaprabha, Malavika (2015) mentioned that Technical analysis helps the investors to avoid risk and assists in determining the current trend of the market. The sample size included 3 Pharmaceutical companies upon which technical tools such as RSI, Moving Average and Beta were applied. They concluded that technical analysis facilitate the investors to understand the financial market.

Boobalan (2014) reported that technical analysis is a method that predicts the future share prices of selected companies. On this basis one can make an investment decision of the stock market. The technical indicators such as Stock charts, EMA, MACD, RSI have been used in his study on 5 Companies listed in Stock Exchange which will enable the investors to decide in which securities they can invest to reap huge gains.

Nithya, Thamizhchelvan (2014) quoted that how tools of technical analysis can help to forecast the future stock prices of the companies. It enables the investors to identify the right stock for investment. His study was conducted from January 2013-February 2014 on 3 banking Companies using MACD, Bollinger Bands, RSI and other technical tools cited how valuable the technical tool is for the investor.

KarunaDutti, (2014) cited that technical analysis signals the investors when to buy or sell the securities. The charts, technical indicators and oscillators used in his study on 5 IT Companies helps in determining the current trend in the stock market. It also helps to analyze the performance of the company and its financial strength. The data has been collected for a period of one year.

Roopadarshini and Nagarajan (2014) in their research stated that buy and sell signals can be generated using Technical Analysis. Their study was conducted on two companies each from 3 sectors for 2 years. The tools used by the authors were ROC and RSI. Their study was mainly based on buy and hold strategy vs technical analysis.

Varshney (2014) said that technical analysis helps to evaluate the trend. She also mentioned that this technique helps the investors to understand the financial market and will guide the investors when to buy or sell. She has used several technical tools in her study that includes RSI, MACD, Bollinger Band and Beta.

Rajan, Parimala (2013) in their research on FMCG companies stated that technical
analysis is used to predict the future share price of the companies. Demand and supply factors influence the price of the securities. The authors advise that this technique should be used by the investors to gain better returns. They conducted their research on one year closing prices using tools such as Bollinger Band and Moving Average to identify the trends.

Pandya (2013) stated that technical analysis helps the investor in making investment decision and to determine the future trend of the companies they would invest in. The author also reported that technical analysis serves as a tool to identify the market position of selected IT companies. Technical tools like Charts, MACD, ROC, RSI were used for the analysis.

Sudheer, (2012) in his research found that technical analysis is an aid for the investors by letting them decide when to invest in the security. It also helps to recognize the trend in the market. Further, it also helps the investors to earn fruitful returns. Technical indicator- MACD tool was used to determine the price movement of 10 companies listed in NSE.

Vasantha, Dhanraj, Varadharajan (2012) concluded that technical analysis helps to identify price patterns. They also told that the stock prices are affected by various factors. They conducted a research-based study on share price movements of 5 IT companies using technical tools and technical indicators which shed light on the price pattern followed in the market trend.

Chitra, (2011) in her research found that technical analysis helps in understanding the price behavior of shares and to know whether the shares are undervalued or overvalued. The stock market indicators would help the investor to identify the best shares to invest in. In her study she has mentioned the various tools used by her such RSI, Moving Average and Beta.

OBJECTIVES OF THE STUDY

1. To analyze the potential price movement of select IT and Banking stocks through various technical indicators.
2. To calculate relative strength index of IT and banking stocks with CNX IT and Nifty bank index respectively.
3. To predict the share price movement through bollinger bands.
RESEARCH DESIGN & METHODOLOGY
The research is fully based upon secondary data and hence the data has been selected from NSE India and various other websites. The data was collected for the period of 10 years from 1\textsuperscript{st}, January 2008 – 29\textsuperscript{th}, December 2017.

SAMPLE SIZE:
Nine IT Companies were considered from the IT sector and ten banking Companies from Banking sector were selected to analyze the price movement of the companies. The companies are:

<table>
<thead>
<tr>
<th>No.</th>
<th>IT Companies</th>
<th>Banking Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TATA Consultancy Services (TCS)</td>
<td>Kotak Bank</td>
</tr>
<tr>
<td>2.</td>
<td>Hindustan Computers Limited (HCL)</td>
<td>HDFC Bank</td>
</tr>
<tr>
<td>3.</td>
<td>Infosys Limited</td>
<td>PNB</td>
</tr>
<tr>
<td>4.</td>
<td>Wipro Limited</td>
<td>SBI</td>
</tr>
<tr>
<td>5.</td>
<td>Tech Mahindra Limited</td>
<td>YES Bank</td>
</tr>
<tr>
<td>6.</td>
<td>MindTree Limited</td>
<td>Federal Bank</td>
</tr>
<tr>
<td>7.</td>
<td>Oracle Financial Services Software Limited</td>
<td>IndusInd Bank</td>
</tr>
<tr>
<td>8.</td>
<td>KPIT Technologies Limited</td>
<td>ICICI Bank</td>
</tr>
<tr>
<td>9.</td>
<td>Tata Elxsi Limited</td>
<td>Bank of Baroda</td>
</tr>
</tbody>
</table>

TOOLS AND TECHNIQUES USED:
Statistical Package for Social Services (SPSS) was used to analyze the data. The following tools were used.

1. **Coefficient of variation (COV)**
   COV is the ratio between standard deviation of stocks to mean value of stocks of the companies. It is the measure of risk compared to the expected return of investment. It is calculated using the formula:
   \[ \text{COV} = \left( \frac{\text{Standard Deviation}}{\text{Mean Value}} \right) \times 100 \]

2. **Correlation**
   Correlation analysis helps to identify the relationship between the two stock prices of the companies with the Index value. Stocks of IT Companies are correlated with the CNX IT Index and Stocks of Banking Companies are correlated with the Nifty Bank Index. Following hypotheses are made:
   \textbf{H0: There is no relationship between share prices of different IT companies and CNX IT index}
H0: There is no relationship between share prices of different Banking companies and Nifty Bank index

TECHNICAL INDICATORS:
Various technical indicators were also used to analyze the share price movement of the companies and the list of indicators is as follows:

1. Relative Strength Index (RSI)
2. Bollinger Bands.

1) Relative Strength Index (RSI)
RSI is one of the technical indicator used to analyze the strength of the stocks. The RSI values lies between 0 and 100. If the value of RSI exceeds 70, the stocks are in overbought position. if the value of RSI lies below 30, then the stocks are in oversold position.

RSI is calculated using the following formula:

\[ RSI = 100 - \frac{100}{(1 + RS)} \]

Where, \( RS = \) Average Gain per day/ Average Loss per day

2) Bollinger Bands.
Bollinger Band is a technical indicator to identify trend and spot new highs and lows in Stock Prices. It consists of three bands that resemble an envelope. The upper band, lower band and the simple moving average (SMA). The upper band lies above the SMA and Lower band lies below the SMA. SMA is a mid-line. The Standard Deviation is set to 2.

Upper Band is calculated using the formula:

**Upper Bollinger band**

\[ \text{Upper Band} = \text{Simple Moving Average} + 2 \times \text{Standard Deviation} \]

Lower Band is calculated using the formula:

**Lower Bollinger band**

\[ \text{Lower Band} = \text{Simple Moving Average} - 2 \times \text{Standard Deviation} \]

Middle Band- 20-day Simple Moving Average
## Analysis and Interpretation

### 1) Coefficient of Variation of IT Companies:

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
<th>C.V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WIPRO closing price</strong></td>
<td>2461</td>
<td>217.0589</td>
<td>61.18536</td>
<td>3743.649</td>
<td>28.1883691</td>
</tr>
<tr>
<td><strong>HCLTech closing price</strong></td>
<td>2463</td>
<td>466.7589</td>
<td>314.5954</td>
<td>98970.29</td>
<td>67.3999897</td>
</tr>
<tr>
<td><strong>TechM Closing price</strong></td>
<td>2461</td>
<td>322.6166</td>
<td>170.4858</td>
<td>29065.42</td>
<td>52.8447203</td>
</tr>
<tr>
<td><strong>Infosys closing price</strong></td>
<td>2460</td>
<td>762.7039</td>
<td>241.405</td>
<td>58276.36</td>
<td>31.6512045</td>
</tr>
<tr>
<td><strong>TCS closing price</strong></td>
<td>2462</td>
<td>1555.462</td>
<td>825.1917</td>
<td>680941.4</td>
<td>53.0512224</td>
</tr>
<tr>
<td><strong>OFSS closing price</strong></td>
<td>2462</td>
<td>2615.465</td>
<td>929.4338</td>
<td>863847.2</td>
<td>35.5360815</td>
</tr>
<tr>
<td><strong>KPIT closing price</strong></td>
<td>2462</td>
<td>103.2157</td>
<td>49.92353</td>
<td>2492.359</td>
<td>48.3681552</td>
</tr>
<tr>
<td><strong>TataElxsi Closing price</strong></td>
<td>2460</td>
<td>327.4882</td>
<td>320.962</td>
<td>103016.6</td>
<td>98.0071837</td>
</tr>
<tr>
<td><strong>Mindtree Closing Price</strong></td>
<td>2463</td>
<td>308.6085</td>
<td>226.2147</td>
<td>51173.1</td>
<td>73.3015222</td>
</tr>
<tr>
<td><strong>CNX IT (Market) price</strong></td>
<td>2476</td>
<td>7669.432</td>
<td>2868.12</td>
<td>8226112</td>
<td>37.3967702</td>
</tr>
</tbody>
</table>

Table no: 1 Coefficient of Variation of IT Companies

From the above table, it can be inferred that Wipro Stocks are less risky compared to other stocks. While, Tata Elxsi stocks are highly risky as it has highest Coefficient of Variation compared to other stocks.
| Bank of Baroda | 2461 | 341516.7 | 138.7715 | 42.09241 | 30.33217 | 30.332172 |
| ICICI Bank | 2461 | 493025.4 | 200.3354 | 61.01083 | 30.45434 | 30.4543431 |
| IndusInd Bank | 2462 | 1333652 | 541.6946 | 457.607 | 84.47693 | 84.4769359 |
| Federal Bank | 2462 | 119977.8 | 48.73186 | 24.7945 | 50.87944 | 50.8794452 |
| YES Bank | 2461 | 275021.2 | 111.7518 | 88.65076 | 79.32825 | 79.3282614 |
| SBI | 2458 | 545251 | 221.8271 | 52.47141 | 23.65419 | 23.6541928 |
| PNB | 2462 | 379613.8 | 154.1892 | 45.13599 | 29.27312 | 29.2731203 |
| HDFC Bank | 2461 | 1785685 | 725.5932 | 426.9545 | 58.84213 | 58.8421308 |
| Kotak Bank | 2462 | 1028539 | 417.7658 | 266.3429 | 63.75412 | 63.7541177 |
| Nifty Bank | 2398 | 30808931 | 12847.76 | 5300.65 | 41.25738 | 41.2573865 |
| Valid N (listwise) | 2398 | | | |

Table no 2 Coefficient of Variation of Banking Companies

From the above table 2, it can be inferred that SBI stocks are better and less risky compared to other stocks. While, IndusInd Bank stocks are highly risky as it has highest Coefficient of Variation compared to other stocks.

2) Correlation:
   IT Companies

<table>
<thead>
<tr>
<th>Market closing price</th>
<th>Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market closing price</td>
<td>1</td>
</tr>
<tr>
<td>wipro closing price</td>
<td>.943(**)</td>
</tr>
<tr>
<td>HCLTech closing price</td>
<td>.961(**)</td>
</tr>
<tr>
<td>Infy closing price</td>
<td>.964(**)</td>
</tr>
<tr>
<td>TechM Closing price</td>
<td>.923(**)</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
</tr>
<tr>
<td>TCS closing price</td>
<td>.974(**)</td>
</tr>
<tr>
<td>OFSS closing price</td>
<td>.929(**)</td>
</tr>
<tr>
<td>KPIT closing price</td>
<td>.865(**)</td>
</tr>
<tr>
<td>TataElxsi Closing price</td>
<td>.812(**)</td>
</tr>
<tr>
<td>Mindtree Closing Price</td>
<td>.926(**)</td>
</tr>
</tbody>
</table>

Table no 3 Correlation of IT Companies

From the table 3, it is clear that the stock prices of KPIT and TataElxsi are positively correlated with the CNX price index and further, it was found that the share prices of MindTree, HCLTech, Infosys, TechMahindra, Wipro, TCS and OFSS are positively highly correlated with the CNX price Index.

Banking Sector

<table>
<thead>
<tr>
<th></th>
<th>Nifty bank Pearson Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank of Baroda</td>
<td>.673(**)</td>
</tr>
<tr>
<td>ICICI Bank</td>
<td>.872(**)</td>
</tr>
<tr>
<td>IndusInd bank</td>
<td>.961(**)</td>
</tr>
<tr>
<td>Federal Bank</td>
<td>.945(**)</td>
</tr>
<tr>
<td>YES Bank</td>
<td>.952(**)</td>
</tr>
<tr>
<td>SBI</td>
<td>.696(**)</td>
</tr>
<tr>
<td>PNB</td>
<td>.069(**)</td>
</tr>
<tr>
<td>HDFC Bank</td>
<td>.967(**)</td>
</tr>
<tr>
<td>KotakMahendraBank</td>
<td>.962(**)</td>
</tr>
<tr>
<td>Nifty bank</td>
<td>1</td>
</tr>
</tbody>
</table>

Table no 4 Correlation of Banking Companies

From the table 4, it is clear that the stock prices of Bank of Baroda, ICICI Bank, SBI and PNB are positively correlated with the CNX price index and further, it was found that the share prices of IndusInd Bank, Federal Bank, YES Bank, HDFC Bank, Kotak Mahindra Bank are positively highly correlated with the Nifty Bank Index.
Technical Indicators

1) Relative Strength Index (RSI)

Figure no.1 RSI of HCLTech

Figure no.2 RSI of Infosys
Figure no.3 RSI of Mindtree

Figure no 4 RSI of OFSS
From Figure 1&2 the RSI of HCLTech & Infosys as on 29/12/2017 stood at 57.76 & 66.94 respectively. It shows that stock price falls slightly in overbought position.

From Figure 3 & 4, the RSI of MindTree & OFSS as on 29/12/2017 stood at 76.16 & 73.07. It shows that stock price is in the overbought position.

From Figure 5, the RSI of WIPRO as on 29/12/2017 stood at 74.75. It shows that stock price is in the overbought position.
RSI of banking Sector Companies

**RSI - HDFC**

![Graph showing RSI of HDFC Bank](image)

*Figure no 6  RSI of HDFC Bank*

**RSI - PNB**

![Graph showing RSI of PNB](image)

*Figure no 7  RSI of PNB*
Figure no 8 RSI of SBI

Figure no 9 RSI of YES Bank
From Figure 6, the RSI value of HDFC as on 29/12/2017 stood at 66.15. It shows that stock price falls slightly in overbought position.

From Figure 7, 8 and 9 the RSI of PNB, SBI and YES Bank as on 29/12/2017 stood at 45.30, 43.78 and 53.17 respectively. It shows that stock price neither falls in overbought position nor in oversold position.

From Figure 10, the RSI of Federal Bank, as on 29/12/2017 stood at 46.55 respectively. It shows that stock price is neither in the overbought segment nor in the oversold segment.

2) Bollinger Bands

From Figure 11, the Bollinger Bands of HCL Tech show a steady increase in stock price over time.
Figure no 12: Bollinger Bands of Infosys

Figure no 13: Bollinger Bands of KPIT
Figure no 14 Bollinger Bands of Mindtree

Figure no 15 Bollinger Bands of OFSS
Figure no 16 Bollinger Bands of TataElxsi

Figure no 17 Bollinger Bands of TCS
It is seen that till mid-2016, the stock price of the HCLTECH has decreased gradually and thereafter the price has risen steadily. In September 2017, stocks of Mindtree value gained momentum. In September 2017, W-bottom formation was seen and the investors are suggested to buy the stocks of KPIT to accumulate more.
profits in future. In November 2016, the price of TataElxsi stocks started to rise after the W-bottom formation occurred. In September 2017, W-bottom formation was observed and the investors should buy the TechMahindra stocks at this time. The chart shows that W-bottom formation was seen in May 2017 and the stock prices of TCS started to rise. In December 2017, W-bottom formation was seen and the scrip of WIPRO gained value.

Banking Companies

![Bollinger Band- HDFC](image)

**Figure no 20 Bollinger Bands of HDFC Bank**

![Bollinger Band -PNB](image)

**Figure no 21 Bollinger Bands of PNB**
Figure no 22 Bollinger Bands of SBI

Figure no 23 Bollinger Bands of YES Bank

Figure no 24 Bollinger Bands of Federal Bank
Figure no 25 Bollinger Bands of IndusInd Bank

Figure no 26 Bollinger Bands of ICICI Bank

Figure no 27 Bollinger Bands of Kotak Mahindra Bank
During February – August 2017, the stock price of HDFC Bank were in overbought region. This indicates the investors should sell the stocks. In October 2017, there was an M-top formation. Hence the investors should sell the stocks of PNB. In July 2017, there was an M-top formation and the stock price of SBI varied between Rs.315-Rs.368. In May 2017, an M-top formation was observed, and the RSI value was 91. It indicates that the investors should sell the Federal Bank stocks. In November 2017, a W-bottom formation was observed and the scrip value of IndusInd gained upward momentum. The stocks of ICICI Bank were neither in overbought nor in oversold position till September 2017. In November 2017, an M-top formation occurred and the stocks of Kotak Mahindra Bank started to lose its value. In October 2017, an M-top formation was observed and the price of the bank of Baroda’s stock started to rise.

**FINDINGS & SUGGESTIONS**

**Findings**

The Shares of Wipro are better than the shares of other IT Companies because it has the least Coefficient of Variation compared to other IT Companies. Whereas, in the Banking sector The Shares of SBI are better because it has the least Coefficient of Variation compared to other Banking Companies.

The share prices of MindTree, HCLTech, Infosys, TechMahindra, Wipro, TCS and OFSS in the IT sector and in the Banking sector IndusInd Bank, Federal Bank, YES Bank, HDFC Bank, Kotak Mahindra Bank are positively highly correlated with the CNX price Index.

The RSI value of MindTree, OFSS and WIPRO as on 29/12/2017 stood at 76.10,
73.07 and 74.75 respectively. The shares of these companies were overbought. The RSI value of HDFC Bank and YES Banks on 29/12/2017 stood at 66.13 and 53.17 respectively. The shares of these companies were slightly in overbought position.

**Suggestions**
The investor’s risk tolerance level should also be taken into consideration before making any investments. When the RSI values are in overbought position it is advisable to the investors to sell the stocks. In January 2015, when the RSI of stock prices of HDFC Bank stood above 70 and the closing prices crossed Upper Bollinger Band, it is advisable to sell the stocks. When the RSI of stock prices of Mindtree fell below 30 and the closing prices crossed Lower Bollinger Band, it is advisable to buy the stocks.

**Conclusion:**
The technical analysis is used to identify the price patterns and trend of the stock market. The various technical indicators help the investors to predict the future price movements. The stock prices are affected by various news such as the announcement of dividends, stock splits, bonus, elections and so on. The psychology of the investors should also be taken into account. Hence one cannot accurately predict the price movements based on conducting technical analysis. Technical analysis is used by various traders to forecast the price movement in order to trade in the market. It will help to identify the best stocks to invest in. Even though the accuracy cannot be guaranteed, the results of technical analysis are reliable. Since the historical data of the companies are referred and calculations are made, the performance of the company’s stock at any point can be known. This will help investors to frame some strategies and make investment decisions and enter or exit the market at any point of time. It is also required that the investors should have some knowledge about the stock market and about the technical indicators before they make any investments. But it is advisable for the investors to use many technical indicators to get better understanding of price movements as this would help them in making more gains in future.

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