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AN IMPACT OF DIFFERENT TECHNICAL PARAMETERS ON SHARE PRICE RETURNS: A CASE STUDY OF IT SERVICES SECTOR COMPANIES

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ABSTRACT

The stock market is a complex system that is influenced by a variety of factors, including technical parameters. This study investigated the impact of different technical parameters on the share prices of selected Nifty IT Services Index companies listed on the National Stock Exchange (NSE). The study used a logistic regression model to analyze the data collected for NSE listed IT Services sector companies. The results showed that the percentage of correctly classified share price returns was 60%. This suggests that the logistic regression model is a good and accurate tool for predicting share price returns. The study also found that there was a significant difference in the Moving Average (MA) of share prices among the different IT Services companies selected for the study. This suggests that the MA is a useful technical parameter for predicting share price returns. The findings of this study have implications for investors and traders. By understanding the impact of technical parameters on share prices, investors and traders can make more informed decisions about their investments.

Keywords: *Nifty Index, Share Price Returns, IT Services, NSE.*

Introduction

Share prices can be impacted by a multitude of elements, encompassing economic circumstances, shifts in industries, investor attitudes, market psychology, news and occurrences, and the balance between the demand for and supply of shares. The interplay between demand and supply is particularly crucial in determining share prices, as all other factors exert their influence on the overall demand and supply dynamics of a stock. With technical analysis relying on the foundation of demand and supply, our aim is to examine how various technical parameters affect the returns of share prices.

Seven technical indicators were used as predictor variables in the model formulation. These indicators were the Moving Average (MA), Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), Rate of Change (ROC), Stochastic Oscillator, and Volume Trading. The impact of these indicators on the market price of a share was determined.

The IT services sector holds immense importance in the Indian economy, contributing significantly to its growth and development. With its robust presence and expertise in the global IT market, India has emerged as a key player in providing IT services, generating substantial economic value. The sector plays a crucial role in job creation, employing millions of skilled professionals across the country. This has not only reduced unemployment rates but has also fueled economic growth. Additionally, the IT services sector has been instrumental in driving innovation and technological advancements, transforming various industries and enhancing their competitiveness. Furthermore, it has played a pivotal role in boosting India's export earnings through the provision of IT solutions and services to global clients. This has strengthened the country's foreign exchange reserves and contributed to its overall balance of trade. The sector has also fostered a culture of entrepreneurship and nurtured a vibrant startup ecosystem, attracting investments and encouraging indigenous talent. Thus, researchers have focused on analyzing the IT Services sector to investigate how various technical parameters affect the market price of shares.

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Objectives of the Study

- To find out different technical parameters used by traders/investors.
- To measure the relationship between technical parameters and share price return.
- To examine the significant difference of Moving Average (MA) of share among different IT Services companies selected for the study.

Review of Literature

Mohd Naved. (2013) has studied technical parameters such as MA & MACD and its application on Nifty stocks. He finds out that the objectiveness in the technical analysis helps investors in taking timely decisions on stocks without getting confused due to volatility and news flow.

Sudheer, V. (2015) has studied technical analysis is a systematic approach to analyzing historical market data and using it to forecast future price trends. While it can assist investors in identifying potential trading opportunities and understanding market dynamics, it should be complemented with fundamental analysis and considered within the context of market uncertainties.

Aman Bhatia. (2021), This Technical analysis study found that charting patterns, including Japanese candlesticks and classical price patterns, demonstrated a high success rate in smallcap and midcap companies. Proper observation and timely execution of trades based on these patterns can lead to significant rewards for investors.

Varshini Venu, Dr. Bhavya Vikas, Charithra C M. (2019) The research emphasizes the role of technical analysis in forecasting stock price movements and aiding short-term traders in making informed decisions. By analyzing the trends of twelve companies from different sectors, valuable insights are provided for maximizing profits during the specified period.

Julee. (2021) this research study emphasizes the significance of technical analysis in maximizing gains and minimizing risks in stock market investments. By providing a comprehensive analysis of existing literature, it serves as a valuable resource for researchers and practitioners interested in further exploring the concept of technical analysis.

Prof. Nada Petrusheva, Igor Jordanoski (2016) has done comparison between the fundamental and technical analysis of stocks. They found that fundamental and technical analysis differs in many aspects like time horizon used, functioning and execution.

Dr. Leena Sharma, Mr. Pratik Patil, Siddhesh Choudhari, Devendra Sangle, V pavan kumar reddy. (2021) Fundamental, technical, and news analysis each have their strengths and weaknesses in assessing stock market investments. While no method guarantees absolute profit, conducting diligent research and analysis can enhance an investor's position and decision-making in the market.

Sources of Data

The current research relies on secondary data obtained from various sources. Specifically, the daily share price data of selected IT Services companies serves as the foundation for this study. The secondary data was sourced from the NSE websites and Yahoo Finance website. The data spans a period of ten years, from January 2011 to December 2022. To ensure consistency and comparability, the daily data was converted into a monthly format, ensuring that each period for share price returns remains distinct and independent. The collected data has been carefully compiled and utilized in accordance with the study's specific requirements, maintaining due diligence throughout the process.

Table 1: Methodology

Sampling Unit	Nifty IT Index
Universe/Population (N)	Nifty IT Services Index = 10
Sample Size (S)	Nifty IT Services Companies = 05
Sample Selection Criteria	Market capitalization more than INR 500 billion
Sampling technique	Judgment sampling

The present study was conducted by taking Nifty Index of IT Services sector. A total of 10 companies have been listed in Nifty Index of IT Services sector of the National Stock Exchange. Out of Nifty index companies, total 05 banks from Nifty IT Index have been selected for the study by applying the Krejcie & Morgan formula of determination of sample size. Purposive sample technique was used for selection of the sample companies from Nifty Index of IT sector. The companies having more than INR 500 billion have been selected as a sample to conduct the study.

Variables for the Study

- **Dependent Variable:** 30 Day Share Price Return (SPR)
- **Independent Variables**
  - Relative Strength Index (RSI),
  - Moving Average Convergence Divergence (MACD),
  - Moving Average: 50 Day SMA – 200 Day SMA (MA),
  - Stochastic Oscillator (SO),
  - Rate of Change: Preceding 30 Day price return (ROC),
  - Volume Trading: Daily Traded Volume in millions (VT),

Model for the Study

$$\text{logit}(p) = \ln\left(\frac{p}{1-p}\right) = b_0 + b_1\,\text{MACD} + b_2\,\text{RSI} + b_3\,\text{SO} + b_4\,\text{MA} + b_5\,\text{EMA} + b_6\,\text{ROC} + b_7\,\text{VT}$$

Period of Study

The period of the present study was twelve years commencing from the year 2011 to year 2022.

Scope & Limitations of the Study

The analysis of this research is confined to the selected IT Services companies which are listed to the National Stock Exchange's Nifty IT Services Index. The reason is that the listed companies are required to follow the norms set by the Securities and Exchange Board of India (SEBI) for financial reporting. This study is only limited to the selected Banks listed in the National Stock Exchange. Further, this study possesses all the inherent limitations of the financial data.

Hypothesis of the Study

H_0: Current Market price of Share is not dependent on Change in Technical Parameters

H_1: Current Market price of Share is dependent on Change in Technical Parameters

H_0: Moving Average (MA) of Share is not significantly different among different banks selected for the study.

H_1: Moving Average (MA) of Share is significantly different among different banks selected for the study.

Analysis and Results

Goodness-of-fit Test of Logit Model

The initial step in logistic regression involves evaluating how well the model fits the data. This assessment is commonly done using statistical tests like the Hosmer-Lemeshow test. The null hypothesis assumes that the model adequately fits the data, while the alternative hypothesis suggests otherwise. In this study, we employed the Hosmer-Lemeshow test to determine the goodness of fit. The results, presented in Table 2, revealed that the null hypothesis could not be rejected (p-value = 0.14). Therefore, we concluded that the model effectively fits the data at a significance level of 5%.

Table 2: Hosmer and Lemeshow Test

Chi-Square	Df	P-Value
9.59	6	0.14

Logistic Regression Model Formulation

Initially, the logit model was formulated with all six predictor variables. Table 3 presents the estimated regression coefficients, standard errors of the regression coefficients, Wald statistics, and odds ratios. However, the results in Table 3 revealed that only three predictors, namely SO, MA, and ROC, significantly contributed to the logit model at a significance level of 5%. Subsequently, the logit model was simplified by excluding insignificant predictor variables, and the outcomes are displayed in Table 4.

H_0: Market price is not dependent on Change in Technical Parameters

H_1: Market price is dependent on Change in Technical Parameters

Table 3: Initial Model Results

Final model results	b	Standard Error	Wald Statistic	e^b
RSI	0.010	0.014	0.506	1.010
SO	-0.017***	0.004	15.234	0.983
MACD	-0.014***	0.004	10.263	0.986
MA	0.001	0.001	0.688	1.001
ROC	4.981**	2.518	3.912	145.620
VT	0.007	0.016	0.193	1.007
Constant	0.738	0.660	1.252	2.092

*** Significant at 1%, ** Significant at 5%

Source: - Logistic Regression output

Table 4: Final Model Results

Final model results	b	Standard Error	Wald Statistic	e^b
SO	-0.015***	0.004	14.120	0.985
MACD	-0.012***	0.004	8.407	0.988
ROC	4.963**	2.118	5.489	143.077
Constant	1.169	0.232	25.477	3.218

*** Significant at 1%, ** Significant at 5%

Source: - Logistic Regression output

Based on Table 4, all the predictors in the final logit model are significant at 1% indicating that all of them are important in predicting the category of stock movement. The model can be written as follows,

$$\text{logit (p)} = \ln\left(\frac{p}{1-p}\right) = +1.169 - 0.015\ SO - 0.012MACD + 4.963ROC$$

The e^{bi} is the odds ratio for the predictor variables and the values give the relative amount by which the odds of stock movement are going up or remain unchanged increase when the odds ratio value of MA and ROC increased by 1 unit. The odds of stock movement decrease when the odds ratio value of MACD, MA, ROC & RSI increased by 1 unit.

Accuracy of the Model

Using the logistic regression, the goal of the analysis is to classify the observation into a particular group. Classification of observations is done by first estimating the probabilities in the indicated group, which can be computed from the logistic regression. From the classification table in Table 4, it is shown that the percentage of correctly classified stock market movement is 60%.

Table 5: Classification Table

		Predicted Group		Percentage
		0	1	Correct
Observed Group	0	69	230	55.2%
	1	56	361	61.1%
Overall Percentage Correct				60.1%

H_0: Moving Average (MA) of Share is not significantly different among different IT Services companies selected for the study.

H_1: Moving Average (MA) of Share is significantly different among different IT Services companies selected for the study.

Table 6: ANOVA output

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	375924.4	4	93981.11	11.22316	7.76732E-09	2.384388
Within Groups	5987304	715	8373.851			
Total	6363228	719				

Source: - ANOVA Output

It has been evident from above table that, P calculated value is 0.00 which is less than the P critical value of 0.05. Hence, null hypothesis is rejected. Therefore, moving average of share is significantly different among different IT Services companies selected for the study.

Findings

- Six technical parameters consist of Relative Strength Index (RSI), Moving Average Convergence Divergence (MACD), Moving Average: 50 Day SMA – 200 Day SMA (MA), Stochastic Oscillator (SO), Rate of Change: Preceding 30 Day price return (ROC), Volume Trading: Daily Traded Volume in millions (VT), have been identified to know the impact on share price return of different IT Services companies selected for the study.
- In case of IT Services, out of these technical factors, only three factors namely SO, MA & ROC are having significant impact on the future share price return of shares of IT Services companies selected for the study
- The coefficients of SO is -0.015, MA is -0.012, ROC is 4.963 and constant is 1.169 respectively.

Conclusion

In this study, a logit model is successfully developed using logistic regression to predict stock market trends. By applying logistic regression to historical data from January 2011 to December 2022, the study identifies three key technical indicators, namely SO, MA, and ROC, that are effective for forecasting stock market movements. The validation results indicate a satisfactory accuracy rate of 60%. These results demonstrate that the formulated logit model performs well, correctly classifying more than half of the data.

The stock market plays a vital role in providing unique benefits and services to businesses, individual investors, and governments. This study seeks to offer valuable insights to individuals involved in the stock market. It is essential to identify the key factors that influence stock price fluctuations to maximize desired profits. This understanding will assist in improving or maintaining the performance of price movements and achieving target profit goals.

This paper exclusively emphasizes the utilization of statistical logistic regression for predicting stock market movements. However, to enhance the accuracy of forecasting using recent stock data and a wider range of technical indicators, it is recommended to explore alternative approaches such as discriminant analysis and multiple regression. By incorporating these approaches, a broader set of methods can be employed to improve the accuracy of predictions concerning stock market movements.

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