# GOLDEN CROSS: A MYTH OR AN EFFECTIVE TOOL TO STOCK MARKET ANALYSIS

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## ABSTRACT

*This research examines the validity of Golden Cross methodology in making investment decisions. Stock market prices may fluctuate in the short run but in the long run, they move in trend, i.e., either upward or downward. The investor can fix his entry and exit points through technical analysis. Technical analysis helps in answering the question of when to buy and sell a particular stock [Wing-Keung Wong (2003), Meher Manzur (2003), Boon-Kiat Chew (2003, Sudheer V. (2015), Jenela Stankovic (2015), Ivana Markovic (2015), Milos Stojanovic (2015) Yung-Shun Tsai (2018) and Chun-Ping Chang (2018)]. It is the process of identifying the trend reversals at an early stage and taking them into consideration to formulate the buying and selling strategies. The objective of this paper is to examine the soundness of the golden cross. The golden cross refers to a dual exponential moving average methodology which includes 50 days EMA and 200 days EMA. A sample of 50 blue chip companies forming part of Nifty 50 index, ranging from the period 2019 till the golden cross is over, has been chosen for examining the validity. Based on the data collected of that period, we have calculated the different statistical measures like standard deviation; mean return percentage, average R square and beta. The standard deviation and beta help in understanding the volatility of the stock. It was seen that, most of the times golden cross tool has given considerable returns to the investors. This result is in line with Kotaro Miwa (2002) and Kazuhiro Ueda (2002), Alajbeg (2012), Denis (2012), Bubas Zoran (2012), Vukas Jurica (2012), Noor Ainy Harish (2019), Siti Khatijah Mohd Hairullah (2019), Sumarni Abu Bakar (2019) and Kahartini Abd Rahman (2019).*

**Key words**: Technical Analysis, Golden Cross, Exponential Moving Average.

## INTRODUCTION

The doctrine outline by Charles H Dow in 1884, in the Wall Street Journal, is the basis for technical analysis. The analyst used charts of individual stocks and moving averages in the early 1920s.Now, in modern times, there is extension of technical indicators which are available to the investors to make their decisions.

The profitability of investing in stock market depends on the success of anticipating the future movement of the market prices. The fluctuations in stock market prices can be adverse and to combat the possibility of losses, it is essential to understand the market trends. This can be done through technical analysis. According to Leandro Maciel (2020), fractionally cointegrated vector autoregressive model is helpful in predicting high and low prices of equity stocks. Cheol-Ho Park and Scott H. Irwin (2004) reviewed the profitability of technical analysis and studied empirical works regarding technical trading strategies. On the other hand, technical analysis was evaluated from Indian perspective and its importance was highlighted (Dr. Asha E. Thomas 2014). The basic principle is that the past trends in prices can be used as basis for predicting future price movements as history repeats itself.It is done through chart patterns and statistical figures. Jenela Stankovic, Ivana Markovic, Milos Stojanovic (2015) examined the efficacy of technical analysis using LS-SVM model taking MACD and RSI as the inputs.Andrew W. Lo, Harry Mamaysky, Jiang Wang (2000) discussed another aspect towards technical analysis using systematic and automatic approach. Technical analysis is a trading discipline employed to evaluate investments and identify trading opportunities in price trends and patterns seen on charts. The chart patterns can be analysed through Japanese candlesticks and classical price patterns (Aman Bhatia, 2021). However, chart reading is of no real value to the stock market investors (Eugene F. Fama 1965). Various indicators are used to study the past trends like moving averages, rate of change, relative strength index etc. Adjusted moving averages are helpful in determining the profitability than the single and fixed moving averages (Chan Phooi M'ng, 2018). Technical Analysis works best on current market and intermediate in stock market, using RSI, ROC, MACD (Varshini Venu, Dr. Bhavya Vikas, Charithra C M 2019). (Sudheer V.

(2015) identified the scrips to be technically strong using MACD. Matheus José Silva de Souza, Danilo Guimarães Franco Ramos, Marina Garcia Pena, Vinicius Amorim Sobreiro and Herbert Kimura (2018) found that technical analysis and fundamental analysis complement each other to find the most dynamic companies, using MACD. Whereas, Ansari Saleh Ahmar (2018) found that the Sutte indicator is more reliable than MACD and SMA. Various studies have been conducted using oscillators as the tool to technical analysis. Mingyuan Wu, Xiaotian Diao studied three oscillators: MACD, RSI and Stochastic Oscillator and found that they are beneficial in predicting short term changes in prices. Mohd Naved, Prabhat Srivastava (2015) found that commodity channel index oscillator outperforms Stochastic Oscillator and RSI oscillator for determining the profitability. However, indicators are the most effective tools for technical analysis (Salim Lahmiri , 2012).Another view was that the oscillator indicators are more efficient than trend indicators in generating profits (Abass Saleh Ardestani, 2016). The technical analysis helps aid buy, hold and sell decisions. Issam Kouatli (2022) generated maximum and minimum price level tolerance using fuzzy spectrum. Jordan Ayala, Miguel García-Torres, José Luis Vázquez Noguera, Francisco Gómez-Vela, Federico Divina (2021) found that the combination of Machine learning techniques like linear model, neural network, random forest and support vector regression and technical strategies improves the trading signals. In short, through efficient technical analysis the investors can make the maximum profits out of it and minimize their risk.

Another indicator is Golden cross which refers to dual exponential moving averages of 50days and 200 days. EMA places greater weightage to most recent data points and is more efficient than simple moving averages. The objective of moving averages is to identify various trends in the prices of financial instruments. When an EMA line is going in an upward direction, it denotes an uptrend and vice versa. An EMA in stock market helps to mitigate the adverse effects of lag as it gives higher priority to the price action and is more responsive. This is a great way to arrive at a trade entry signal. The cross is useful in forecasting market trends and investors are bull-biased in Japanese market [Kotaro Miwa and Kazuhiro Ueda (2002)]. The effectiveness of the 50/200 dual EMA is high in formulating the investment strategies and decide the time for entry and exit [Alajbeg, Denis, Bubas, Zoran, Vukas, Jurica (2012)].Eng Wat Kim, Nadeeya Eli Syaheerah Abd Shukor, Nur Rashidah Ismail and Syazwani Abdul Halim (2012) also found that the entry at golden cross and exit at the start of death cross fetches consistent returns. The golden

cross and death cross helps in reducing the risk of loss and maximize the profits (Noor Ainy Harish, et. al. , 2019).

## LITERATURE REVIEW

The role of the technical analysis and trading strategies has earlier been discussed to a great extent. Stephan Tayler (1990) tried to analyse these indicators in the currency future markets by buying a fixed amount when there is golden cross and selling the same in case of death cross. "Foundations of Technical Analysis: Computation Algorithms, Statistical Influence and Empirical Implementation" (2000) by Andrew W. LO, Harry Mamaysky and Jiang Wang focussed on systematic approach to recognise the technical patterns using the non-parametric kernel regression. It concluded that the technical patterns provide the information regarding the increments and suggested that technical analysis can be improved by using automated algorithms. Also, patterns that are ideal for detecting the statistical inconsistencies need not be best for trading profits and vice versa. "The Influence of Investor Sentiment on the formation of Golden cross and Death cross" by Kotaro Miwa and Kazuhiro Ueda (2002) analysed that the investors are bull biased i.e., they are easily convinced towards the bull trend. Also, the golden cross and dead cross are effective as signal if appropriate days of moving averages are used. The role oftechnical analysis in deciding the entry and exit points was discussed by Wing-Keung Wong, Meher Manzur, Boon-Kiat Chew in 'How Rewarding is Technical Analysis? Evidence from Singapore Stock Market' (2003). It had applied indicators like MACD, RSI, dual moving average and triple moving average over a period of 21 years and concluded that single moving average produces the best result followed by dual moving average and RSI. "The profitability of Technical Analysis- A Review" by Cheo-Ho Park and Scott H. Irwin (2004) concluded that simple technical trading strategies were profitable in a variety of speculative markets at least until the early 1990s. To examine the profitability of stock trading, Thira Chavarnakul, David Enke in "Intelligent Technical Analysis based Equi-volume Charting for Stock Trading Using Neural Networks" (2008), used neural network model to assist the technical decisions of volume adjusted moving averages and ease of movement indicators and concluded that neural network with VAMA and EMV outperforms the VAMA and EMV used without neural networks. Eng

Wat Kim, Nadeeya Eli Syaheerah Abd Shukor, Nur Rashidah Ismail and Syazwani Abdul Halim (2012) in "Golden Cross as Buying Indicator for Stock Investment in Bursa Malaysia" concluded that buying in bulk at golden cross and selling at peak of the shorter EMA before the death cross is formed gives consistent returns. In 2012, Alajbeg, Denis, Bubas, Zoran, Vukas, Jurica in their study of "The Effectiveness of the 50/200 Dual Exponential Moving Average Crossover on the S&P 500" analysed the entire index on a stretch of 8123 days, which is a very long period for the investor to get the returns. Although the golden cross and death cross had been proved beneficial in their study. The only limitation is that the time period to get the maximum returns is very large, hence the investors will not be encouraged to invest in securities market. EMA helps investors in making a systematic plan for entering and exiting the market. Salim Lahmiri in "Resilient Back Propagation Algorithm, Technical Analysis and the Predictability of Time Series in the Financial Industries" (2012) used four categories of technical analysis measures namely, indicators, oscillators, stochastics and indexes and concluded that indicators are the most effective tools among all.With the aim to exhibit the investment strategies of Contrarian and Momentum, Dr. Asha E. Thomas in "A Study on Technical Analysis and its Usefulness in Indian Stock Market" (2014), discussed about principles of technical analysis, indicators, tools, chart patterns and usefulness of the same. It concluded that the investors can get the maximum returns by studying the historical prices of the securities and that it supported weak form inefficiency of Indian Stock Market. Sudheer V., in "Trading through Technical Analysis: An Empirical Study from Indian Stock Market" (2015) used EMA of 12 and 26 days to analyse the scrips and found in the study that moving average convergence divergence helps in analysing the securities to earn good returns. However, there were some limitations as the study focussed on short time period i.e., 1 year based on limited factors. Jenela Stankovic, Ivana Markovic, Milos Stojanovic (2015) in "Investment Strategy Optimization Using Technical Analysis and Predictive Modelling" in Emerging Markets examined the efficacy of technical analysis and predictive modelling in defining the optimal strategy for investing in the stocks indices of emerging markets by using LS-SVM prediction model. It was found that technical analysis has certain level of prediction power that could fetch good returns. "Technical analysis of three stock oscillators testing MACD, RSI and KDJ rules in SH & SZ stock markets" (2015) studied by Mingyuan Wu, Xiaotian Diao examined three oscillators: MACD, RSI and Stochastic Oscillator and concluded that these can be used for predicting short term stock changes. However, Mohd Naved, Prabhat Srivastava

(2015) in "Profitability of Oscillators Used in Technical Analysis for Financial Market" concluded that commodity channel index oscillator outperforms Stochastic Oscillator and RSI oscillator for determining the profitability.

With the objective to investigate the profitability, Matheus José Silva de Souza, Danilo Guimarães Franco Ramos, Marina Garcia Pena, Vinicius Amorim Sobreiro and Herbert Kimura, in "Examination of Profitability of Technical Analysis based on Moving Average Strategies in BRICS" (2018), used the method of automated trading system based on traditional analysis to identify the trends. It used three combinations: SMA-SMA, SMA-EMA and EMA-EMA. The results showed that returns exceeded the value invested. It also concluded that technical analysis and fundamental analysis complement each other to identify the most profitable companies. To see the effect of Sutte indicator on investors' buying and selling decisions, Ansari Saleh Ahmar in "Sutte Indicator: An Approach to Predict the Direction of Stock Market Movements"(2018) analysed and concluded that Sutte indicator has better level of reliability than other indicators like SMA and MACD in terms of mean squared error, median absolute deviation and mean absolute percentage error. JacintaChan Phooi M'ng in "Dynamically Adjusted Moving Averages Technical Analysis Indicator to forecast Asian Tigers' Future Markets" (2018) concluded that adjusted moving averages are helpful in determining the profitability than single or fixed moving averages. Through results and discussions Noor Ainy Harish, Siti Khatijah Mohd Hairullah, Sumarni Abu Bakar and Kahartini Abd Rahman (2019) in "Fuzzy Golden Cross and Fuzzy Death Cross as Stock Market Forecasting Indicator" discussed that the prices suggested by these indicators are better for making investment decisions to obtain the maximum profit and minimise losses. To technically analyse the stock and help the day traders and short-term investors in making the right decision, various indicators like simple moving average of 7days and 12 days, rate of change, relative strength index has been discussed in "Equity Research Using Technical Analysis" by Varshini Venu, Dr. Bhavya Vikas, Charithra C M (2019) and concluded that technical analysis works best on current market and intermediate on stock market. To address the modelling and forecasting of daily high and low stock prices, fractionally cointegrated vector autoregressive model has been used by Leandro Maciel in "Technical Analysis based on High and Low Stock Prices Forecasts: Evidence for Brazil using fractionally cointegrated VAR Model" (2020). It was concluded that FCVAR is helpful in predicting high and low prices of

equity stocks. The Japanese candlesticks and Classical Price patterns have been discussed by Aman Bhatia in "Technical Analysis and its uses in the Stock Market" (2021) which took into consideration three companies from each mid cap and small cap. It was found that the overall success rate was 75% and it was more in small cap companies than the mid cap companies. However, there were few limitations as it focussed only on the small cap and mid cap companies and that too only three each. The sample size was limited and the time period taken was only 6 months. It concluded that the technical analysis is reliable and rewarding. The machine learning approach, for the purpose of technical analysis, has been focussed by Jordan Ayala, Miguel García-Torres, José Luis Vázquez Noguera, Francisco GómezVela, FedericoDivina in "Technical Analysis Strategy Optimization using a Machine Learning Approach in Stock Market Indices" (2021). Through studies, it was concluded that the combination of machine learning techniques and technical strategies improves the trading signals.

In nutshell, following studies have been conducted related to technical analysis:

**Table1: Studies Related to Technical Analysis**

| Name of the Researcher | Tool Used | Conclusion |
|---|---|---|
| Kotaro Miwa and Kazuhiro Ueda (2002) | Moving averages | Golden cross and death cross helps in signalling a new trend |
| Wing-Keung Wong, Meher Manzur, Boon-Kia Chew (2003) | MACD, RSI, Dual moving averages, tripple moving averages | Simple moving averages produces the best results |
| Thira Chavarnakul, David Enke (2008) | Volume adjusted moving averages and ease of movement using neural network | VAMA and EMV using neural network outperform VAMA and EMV without neural network in assisting technical decisions |
| Eng Wat Kim, Nadeeya Eli Syaheerah Abd Shukor, Nur Rashidah Ismail and Syazwani Abdul Halim (2012) | EMA 50/100, 50/200, 100/200 days | Buying at Golden cross and selling them before the death cross cuts, gives consistent returns |

| Salim Lahmiri (2012) | Indicators, oscillators, stochastics, indexes | Indicators are the most effective tools for technical analysis |
|---|---|---|
| Alajbeg, Denis, Bubas, Zoran, Vukas, Jurica (2012) | Dual EMA 50/200 days | Investors can formulate the investment strategies related to entering and exiting the market |
| Mohd Naved, Prabhat Srivastava (2015) | Stochastic Oscillator, RSI Oscillator, Commodity Channel Index (CCI) | CCI outperformed the other two oscillators to measure the profitability |
| Sudheer V. (2015) | MACD | Technical analysis helps in analysing the scrip to earn significant profit |
| Mingyuan Wu, Xiaotian Diao (2015) | MACD, RSI and Stochastic Oscillator | These tools have high possibility of predicting short term stock changes |
| Jenela Stankovic, Ivana Markovic, Milos Stojanovic (2015) | MACD, RSI used as inputs in LS-SVM model | Significant consistency of trading indicators was missing in the period studied. However, EMA and MACD proved to be acceptable indicators of trend movements |
| Mohd Naved, Prabhat Srivastava (2015) | Stochastic oscillator, RSI oscillator, commodity channel index oscillator | Commodity channel index oscillator is best among all to determine the profitability |
| Matheus José Silva de Souza, Danilo Guimarães Franco Ramos, Marina Garcia Pena, Vinicius Amorim Sobreiro and Herbert Kimura (2018) | Moving averages | Returns have exceeded the value invested and technical analysis complement fundamental analysis |

| Ansari Saleh Ahmar (2018) | Sutte indicator | Sutte indicator is more reliable than MACD and SMA |
| Jacinta Chan Phooi M'ng (2018) | Adjustable moving averages | Helpful in determining the profitability. |
| Noor Ainy Harish, Siti Khatijah Mohd Hairullah, Sumarni Abu Bakar and Kahartini Abd Rahman (2019) | EMA 12/26 days | Golden cross and death cross helps in reducing the risk of losses and maximize the profit |
| Varshini Venu, Dr. Bhavya Vikas, Charithra C M (2019) | SMA, ROC, RSI | Technical analysis works best on current market and intermediate on stock market |
| Aman Bhatia (2021) | Japanese candlesticks and classical price patterns | These tools can be used for analysis as the success rate was 75% |

**OBJECTIVES**

Keeping in mind the above studies, the objectives of our study are:

- To examine the validity of golden cross methodology.
- To assess the returns in the period studied

**SCOPE OF STUDY**

A sample of 50 blue chip companies forming the part of Nifty 50 index has been chosen from the period 2019 till the golden cross is over. The research is based on secondary source of collection. Entire data has been collected from NSE India website.

**Table 2: List of Securities Taken For Study**

| Name of the Security | Number of days | Name of the Security | Number of days |
|---|---|---|---|
| Adani Enterprises Ltd. | 611 | ITC Ltd. | 515 |
| Adani Ports and Special | 450 | IndusInd Bank Ltd. | 259 |

| Economic Zones Ltd. | | | |
|---|---|---|---|
| Apollo Hospitals Ltd. | 450 | Infosys Ltd. | 454 |
| Asian Paints Ltd. | 470 | JSW Steel Ltd. | 442 |
| Axis Bank Ltd. | 264 | Kotak Mahindra Ltd. | 333 |
| Bajaj Auto Ltd. | | Larsen and Toubro Ltd. | 356 |
| Bajaj Finance Ltd. | 425 | Mahindra and Mahindra Ltd. | 412 |
| Bajaj Finserv Ltd. | 363 | Maruti Suzuki Ltd. | 170 |
| BPCL Ltd. | 205 | NTPC Ltd. | 510 |
| Britannia Ltd. | 199 | Nestle India Ltd. | 1220 |
| Bharti Airtel Ltd. | 391 | ONGC Ltd. | 373 |
| Cipla Ltd. | 687 | Power Grid Ltd. | 539 |
| Coal India Ltd. | 417 | Reliance Industries Ltd. | 602 |
| Divis Laboratories Ltd. | 1075 | SBI Life Insurance Company Ltd. | 360 |
| Dr. Reddy's Laboratories Ltd. | 527 | State Bank of India Ltd. | 531 |
| Eicher Motors Ltd. | 345 | Sun Pharmaceuticals Ld. | 680 |
| Grasim Industries Ltd. | 421 | TCS Ltd. | 469 |
| HCL Technologies Ltd. | 473 | Tata Consumers Products Ltd. | 670 |
| HDFC Bank Ltd. | 348 | Tata Motors Ltd. | 520 |
| HDFC Life Insurance Ltd. | 367 | Tata Steel Ltd. | 442 |
| Hero Motocorp Ltd. | 212 | Tech Mahindra Ltd. | 421 |
| Hindalco Industries Ltd. | 445 | Titan Company Ltd. | 450 |
| Hindustan Unilever Ltd. | 1178 | UPL Ltd. | 353 |

| HDFC Ltd. | 315 | Ultra Tech Cement Ltd. | 386 |
| ICICI Bank Ltd. | 411 | Wipro Ltd. | 432 |

## RESEARCH METHODOLOGY

Technical analysis uses various tools to analyse the price trends and patterns. In this study, we will use the dual exponential moving averages which are a weighted moving average. Recent prices are given more weights as the basic principle is that the recent prices are more important than older ones, in making the investment decision. The exponential moving average is applied in long run, with shorter EMA of 50 days and longer EMA of 200 days. When the EMA of 50 days cuts the longer EMA of 200 days from downward, it gives the buying signal whereas when the shorter EMA cuts the longer EMA from above, it is the selling signal to investors.

The formula for calculating exponential is:

$$Exp = \frac{2}{n+1}$$

(1)

Where n = the number of days of the moving average

The exponential for 50 days EMA is:

$$Exp = \frac{2}{50+1} = 0.039$$

The exponential for 200 days EMA is:

$$Exp = \frac{2}{200+1} = 0.01$$

The weight given to the shorter period is more than the weights given for the longer period. EMA is calculated by:

$$EMA = (Current\ day's\ close - Previous\ day\ EMA) \times Exponent + Previous\ day\ EMA \quad (2)$$

A rising EMA indicates rising prices whereas a falling EMA indicates declining trend. To analyse the same, we have collected the data of 50 blue chip companies of Nifty 50 index during the Golden cross period and calculated the return percentage, mean return percentage, standard deviation, average R square, beta and P-Value to analyse the securities and their volatility.

1. Mean Return Percentage: It is the average of daily return percentage during a given period. In our study, the mean return percentage is calculated during the golden cross period. Higher the mean return percentage, more are the profits earned by the investors. it is calculated by:

$$\text{Mean return percentage} = \frac{aggregate\ of\ daily\ return\ \%}{number\ of\ days} \tag{3}$$

2. Standard Deviation: It is the statistical tool used to measure the amount of dispersion of a set of values from its mean. It helps in measuring market and security volatility. A low standard deviation indicates that the values tend to be close to its mean i.e., it has less volatility and less risk whereas a high standard deviation indicates high degree of volatility. Usually, standard deviation is low in blue chip companies.

$$\text{Standard deviation} = \sqrt{\frac{\sum(x_i - \mu)^2}{N}}$$

$$\tag{4}$$

Where N = the size of the data

$x_i$ = each value from the data

$\mu$ = the mean of the data

3. Adjusted R Square: It is used to determine the reliability of correlation between the dependent and independent variable. It is the extent of variance of dependent variable which the independent one can explain. In our study, the companies are the dependent variable and Nifty 50 index is independent. Higher adjusted R square indicates that the returns of the companies are in high correlation with the returns of Nifty 50.

Adjusted R square above 0.7 indicates high correlation whereas low correlation exists when adjusted R square is below 0.4.

$$\text{Adjusted R Square} = 1 - \frac{[(1-R^2)(N-1)]}{N-p-1}$$

(5)

Where $R^2$ = Sample R squared

N = total sample size

p = number of independent variables

4. Beta: It is the tool that is used to measure the movement of the stock in relation to the overall market. It helps in understanding whether or not a stock moves in the same direction as the market. In other words, it depicts the sensitivity of dependent variable to the independent variable. It relates to the stock's returns with the returns of overall market. The ideal value of beta is 1.

$$\text{Beta coefficient } (\beta) = \frac{Covariance\,(R_e, R_m)}{Variance\,(R_m)}$$

(6)

Where $R_e$ = the return on an individual stock

$R_m$ = the return on the overall market

Covariance = how changes in a stock's returns are related to changes in the market's returns

Variance = how far the market's data points spreadout from their average value

5. P-Value: It measures the probability of obtaining the observed results, assuming that the null hypothesis is true. $P \leq 0.5$ means that the result is statistically significant whereas $P > 0.5$ is insignificant.

## DATA INTERPRETATION AND RESULT

**Adani Enterprises Ltd**

**Figure 1**



A (200.75)
From: 11-08-2020 (611 days)
Return: 287.05%
B (2378.55)
C (3834.55)

| PERIODICAL STATISTICS | |
|---|---|
| Mean | 0.469% |
| Standard Deviation | 0.028 |
| Adjusted R Square | 0.029 |
| Beta | 0.482 |
| P-Value | 0.00 |

**INTERPRETATION**

The golden cross period is starting from point A (200.75) and is continued till now. The investors can enter at point A and further they have the selling opportunities at point B (2378.55) and C (3834.55). Depending on their target returns they can exit from the market. It can be analysed from the above data that the investors staying from the starting of golden cross till the end, had earned mean return of 0.469% in the golden cross period of 611 days. The standard deviation being near to zero implies that the values are close to the mean of the data. Since, adjusted R square is less than 0.4, there exist low correlation between Adani Enterprise stock and Nifty 50 index. In this case, the beta is positive and less than 1 which implies that the stock is moving in the same direction as the index but at a slow rate. P-value approximately equal to zero shows that the data of study is highly significant

**Adani Ports and SEZ Ltd.**

| Figure 2 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  | Mean | 0.143% | Point A (341.60) is the entry point for the investors and Adani Ports and SEZ Ltd. had given the maximum returns a point B (839.75) and C (887.30). It is up to the investor when he wishes to exit from the market. During the period of 450 days of golden cross, the stock has yielded mean returns of 0.143%. There is less volatility as the standard deviation is close to zero. Low correlation exists between the stock and the index as adjusted R square is less than 0.4. As the beta is positive and more than 1, it implies that the stock has moved more in the same direction as compared to Nifty. P-value approximately equal to zero shows that the data of study is highly significant |
| | Standard Deviation | 0.025 | |
| | Adjusted R Square | 0.361 | |
| | Beta | 1.357 | |
| | P-Value | 0.00 | |

**Apollo Hospitals Ltd.**

| Figure 3 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  | Mean | 0.194% | The golden period has started from point A (1481.15) with minimum price level and had gone up till point D. The investors can enter at point A and sell it at its peak points i.e., B (5043.50) and C (5701.05). The investors have earned a mean return of 0.194% in 450 days. The standard deviation of 0.024 shows that there are low deviations from the mean |
| | Standard Deviation | 0.024 | |
| | Adjusted R Square | 0.118 | |
| | Beta | 0.792 | |
| | P-Value | 0.00 | |

| | | |
|---|---|---|
| | | value of the data. Low adjusted R square shows low correlation between the security and the index. Since, beta is positive and less than 1, it can be interpreted that the stock is moving in the same direction as the index but comparatively at lesser rate. P-value approximately equal to zero shows that the data of study is highly significant |
| **Asian Paints ltd** | | |
| **Figure 4**<br> | **PERIODICAL STATISTICS**<br><br>Mean         0.110%<br><br>Standard     0.018<br>Deviation<br><br>Adjusted R   0.204<br>Square<br><br>Beta          0.748<br><br>P-Value     0.00 | **INTERPRETATION**<br><br>The entry point here is A (1686.25) which a low price level is. The investors can sell their shares at points B (2720.55) and C (3538.75) wherever the investors get the satisfied returns. During the golden period, it is observed that Asian Paints Ltd. had given mean returns of 0.11%. There is less deviation of the returns from its mean value as the standard deviation is low. As the adjusted R square is below 0.4, there is low correlation between the returns of nifty and the stock. Positive and less than 1 beta shows that the movement is stock is in the same direction as the index but at a low rate. P-value approximately equal to zero shows that the data of study is highly significant. |
| **Axis Bank Ltd** | | |

| Figure 5 | PERIODICAL STATISTIC | | INTERPRETATION |
|---|---|---|---|
|  From 24-11-2020 to 20-12-2021 (264 Days) Return: 8.459% | Mean | 0.032% | The golden cross exists from point A to D. The appropriate point to buy the share is A (599.85) whereas for selling it may be either B (794) or C (841.90). Axis Bank Ltd. has generated the average profits of 0.032% during the golden period of 264 days. Standard deviation is 0.019 which shows that there is low dispersion of returns from its means value. Adjusted R Square is greater than 0.4 which shows there is medium correlation between the stock and nifty 50 index. Beta is positive and greater than 1 which indicates that the stock had moved in the same direction and more as compared to nifty 50, during the period of golden cross. P-value approximately equal to zero shows that the data of study is highly significant |
| | Standard Deviation | 0.019 | |
| | Adjusted R Square | 0.445 | |
| | Beta | 1.286 | |
| | P-Value | 0.00 | |

**Bajaj Auto Ltd**

| Figure 6 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  From 20-07-2020 to 23-11-2021 (333 days) Returns: 13.723% | Mean | 0.0412% | The entry points as depicted in the graph could be point A (2883.20) and after gaining the targeted profits, they can sell the same at points B (4236.35) or C (4295.05). Bajaj Auto Ltd. had given average returns of 0.0412% to its investors during the golden cross period. Through the graph we can interpret that |
| | Standard Deviation | 0.015 | |
| | Adjusted R Square | 0.027 | |
| | Beta | 0.280 | |
| | P-Value | 0.00 | |

| | | there is point A for entry and the investors can exit at B or C. There is less volatility in the returns of the security, standard deviation being very close to zero. There is low degree of correlation as the adjusted R square is less than 0.4. The returns of the stock had moved less in the same direction as the returns of the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **Bajaj Finance Ltd** | | |
| **Figure 7**<br> | **PERIODICAL STATISTICS**<br><br>Mean 0.101%<br><br>Standard Deviation 0.023<br><br>Adjusted R Square 0.492<br><br>Beta 1.474<br><br>P-Value 0.00 | **INTERPRETATION**<br>The investors entering the market during the golden period had earned returns of 42.88%. The entry can be made at point A (3262.15) and the investors, depending on their return targets, can sell the share at points B (5779.85) or C (7855.75). Bajaj Finance Ltd. has given a mean return of 0.101%. There is low dispersion of return values from its mean which shows that the returns were constant to some extent. Adjusted R square shows there is medium degree of correlation between the returns of the company and the index. The beta is positive and more than 1 which indicates that the stock was moving in the |

| | | same direction as nifty 50 but comparatively at a faster rate. P-value approximately equal to zero shows that the data of study is highly significant |
|---|---|---|
| **Bajaj Finserv Ltd.** | | |
| **Figure 8**<br> | **PERIODICAL STATISTICS**<br><br>Mean       0.112%<br><br>Standard Deviation     0.021<br><br>Adjusted R Square     0.442<br><br>Beta      1.319 | **INTERPRETATION**<br>During the golden period, Bajaj Finserv had given returns of 40.833%. The investors can buy the share at point A (8542.60) and after earning a specific rate of return, they can sell their shares at various points i.e., B (14599) or C (19076.55). From the data, we get to know that there was a return of 0.112% during the golden period. Low standard deviation means it had given consistent returns in the period studied. There is medium correlation as adjusted R square is more than 0.4 but less than 0.7. The beta is positive and more than 1 which indicates that the returns generated had moved more in the same direction as the nifty 50 index. P-value approximately equal to zero shows that the data of study is highly significant |
| **BPCL Ltd.** | | |
| **Figure 9**<br> | **PERIODICAL STATISTICS**<br><br>Mean      -0.0004%<br><br>Standard     0.017 | **INTERPRETATION**<br>There is golden period for 205 days but the returns generated are negative. If |

| | | |
|---|---|---|
| | Deviation | the investor had bought the shares at point A (387.30) and sold it at point B (463.90), C (485.05) or D (493.10), the investors would have earned good profits. Since, the mean returns are less than 0 or negative, it indicates that the security had given negative returns or losses to the investors during the entire period of golden cross. There is low deviation in the returns from its mean value. As the adjusted R square is less than 0.4, there is low correlation between the returns of BPCL Ltd. and the nifty 50 index. A positive beta less than 1 show that the returns of the stock are moving less but in the same direction as the index.          P-value approximately equal to zero shows that the data of study is highly significant |
| | Adjusted R Square    0.155 | |
| | Beta    0.699 | |
| | P-Value    0.00 | |
| **Britannia Ltd.** | | |
| **Figure 10**  | **PERIODICAL STATISTICS** <br><br> Mean    0.039% <br><br> Standard Deviation    0.013 <br><br> Adjusted R Square    0.093 <br><br> Beta    0.373 <br><br> P-Value    0.00 | **INTERPRETATION** <br> The entry points as depicted in the graph could be point A (3104) and after gaining the targeted profits, they can sell the same at points B (3982.65) or C (3765.85). During the period of 199 days, Britannia Ltd. had fetched average returns of 0.039%. The standard deviation is close to zero which shows that there is low dispersion |

| | | |
|---|---|---|
| | | from the mean value. There is very low degree of correlation as adjusted r square is 0.093 which is less than 0.4. The stock had a positive beta of 0.373 which shows that the returns of the stock and nifty 50 had moved in the same direction but the returns of the stocks are comparatively lesser. P-value approximately equal to zero shows that the data of study is highly significant |
| **Bharti Airtel Ltd** | | |
| **Figure 11**<br> | **PERIODICAL STATISTICS**<br><br>Mean — 0.067%<br><br>Standard Deviation — 0.017<br><br>Adjusted R Square — 0.270<br><br>Beta — 0.824<br><br>P-Value — 0.00 | **INTERPRETATION**<br>The graph indicates that there is entry point at A (509.70). After moving in the upward trend, the investor can exit the market at points B (739.40) or C (765.15). Bharti Airtel had given mean returns of 0.067% during the golden period of 391 days. Low standard deviation implies that there is less dispersion of the values from its mean value. In this case, Adjusted R square is less than 0.4 which indicates that there is low correlation between the stock and the index. A positive beta implies that the stock had moved in the same direction as the index and beta less than 1 shows that the stock had moved comparatively lesser than the index. P-value |

| | | approximately equal to zero shows that the data of study is highly significant |
|---|---|---|
| **Cipla Ltd.** | | |
| **Figure 12**  | **PERIODICAL STATISTICS**<br><br>Mean 0.085%<br><br>Standard Deviation 0.016<br><br>Adjusted R Square 0.027<br><br>Beta 0.255<br><br>P-Value 0.00 | **INTERPRETATION**<br>The graph is depicting that the stock is continuously growing at an increasing rate. It would have fetched good returns if the investors would have entered at point A (570.30) and staying with it till points B (813.65) or C (944.35) or D (1068). During the golden period, Cipla Ltd. had generated mean returns of 0.085%. There is less dispersion of values from its mean as the standard deviation is close to zero. There is low degree of correlation between the security and the nifty 50 index. The beta is positive and less than 1. It shows that the stock had moved less in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **Coal India Ltd.** | | |
| **Figure 13**  | **PERIODICAL STATISTICS**<br><br>Mean 0.104%<br><br>Standard Deviation 0.021<br><br>Adjusted R 0.167 | **INTERPRETATION**<br>To earn the profits, the investors can buy the share in Coal India Ltd. at point A (147.20) and sell it at peak points i.e., B (197.95) or C (237.60) or D (253.60). During the period |

| | | |
|---|---|---|
| | Square | of 417 days of golden period, it had provided the average returns of 0.104%. The standard deviation is close to zero. It implies that there is less dispersion of values from its mean. Also, there is low degree of correlation as the adjusted r square is less than 0.4. A positive and less than 1 beta indicate that the movement in the stock is less and in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| | Beta          0.889 | |
| | P-Value       0.00 | |
| **Divis Laboratories Ltd.** | | |
| **Figure 14**<br><br> | **PERIODICAL STATISTICS** | **INTERPRETATION** |
| | Mean            0.148% | Divis Laboratories Ltd. has seen immense growth. It is clear from the graph as the golden cross period is starting from 2017. The investors could get a return of 159.55%. They could enter at point A where the price was as low as 855.60. At points B, C the stock prices formed its peaks with the price of 3879.85 and 5248.90 respectively. On an average, it had generated profits of 0.148%. Standard deviation close to zero shows that there is less dispersion in the returns from its mean value. As the value of adjusted R square is less than 0.4, it indicates that there is less correlation |
| | Standard Deviation    0.019 | |
| | Adjusted R Square    0.153 | |
| | Beta            0.622 | |
| | P-Value         0.00 | |

| | | between the stock and the index. The value of beta is positive and less than 1. It can be analysed that the stock had moved less in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
|---|---|---|
| **Dr. Reddy's Labs Ltd.** | | |
| **Figure 15**  | **PERIODICAL STATISTICS**<br><br>Mean         0.099%<br><br>Standard    0.019<br>Deviation<br><br>Adjusted R   0.123<br>Square<br><br>Beta           0.431<br><br>P-Value     0.00 | **INTERPRETATION**<br><br>The stock follows an upward trend generating returns of 52.285%. Here, the buying point was A (2749.20) and for selling, the opportunities were at point B (4690.90), C (5167.95) and D (5562.10). It had given mean returns of 0.099% during the golden cross period of 527 days. Since, standard deviation is close to zero, there is low volatility in the returns of the stock. There is low correlation between the stock returns and the overall returns of nifty. The security had moved less in the same direction as the nifty 50 index. This can be concluded from the value of beta which is 0.431. P-value approximately equal to zero shows that the data of study is highly significant |
| **Eicher Motors Ltd.** | | |
| **Figure 16** | **PERIODICAL STATISTICS** | **INTERPRETATION** |

| | | |
|---|---|---|
| Mean | -0.612% | |
| Standard Deviation | 0.125 | |
| Adjusted R Square | -0.001 | |
| Beta | 0.516 | |
| P-Value | 0.45 | |

The graph of Eicher motors is comparatively less steep, generating returns of 19.09%. The shares could be bought at point A (20800.35) and sold at point B (2693.30) or C (2972.60). Also, it had given negative average returns of -0.612% in the golden cross period. As compared to other securities, there is more dispersion of the returns from its mean value. This implies that there is high volatility. There is negative correlation between the returns of the security and the index. The beta is 0.516 which indicates that the security had given returns less than the index. P-value is 0.45 which means that the data of study is significant but comparatively less as compared to other securities.

**Grasim Ltd**

**Figure 17**



**PERIODICAL STATISTICS**

| | |
|---|---|
| Mean | 0.153% |
| Standard Deviation | 0.019 |
| Adjusted R Square | 0.409 |
| Beta | 1.099 |
| P-Value | 0.00 |

**INTERPRETATION**

The graph clearly portrays the picture of growth in the share price of the company. The investors had the opportunity to buy the shares at Point A (707) and sell the same at point B (1447.80) or C (1855.85). During the golden cross period, Grasim Industries Ltd. had given average returns of 0.153% to the investors. There is low

| | | |
|---|---|---|
| | | volatility as the standard deviation is close to zero. There is medium correlation between the returns of the security and the index. The beta is positive and more than 1 which indicates that the stock had moved in the same direction as the nifty 50 index and comparatively more. P-value approximately equal to zero shows that the data of study is highly significant |
| **HCL Technologies Ltd.** | | |
| **Figure 18**  | **PERIODICAL STATISTICS** <br><br> Mean 0.131% <br> Standard Deviation 0.018 <br> Adjusted R Square 0.205 <br> Beta 0.766 <br> P-Value 0.00 | **INTERPRETATION** <br> HCL Technologies had followed bullish trend where the investors could earn a profit of 61.988%. The feasible buy point could be 'A' (569.60) and after achieving the targeted profits, which varies from investor to investor, can sell it at point B (1055.95) or C (1358.20). It had given average returns of 0.131% in 473 days. There is less volatility as the value of standard deviation is close to zero. Also, there is low correlation in the returns of the security and that of index. Beta is positive and less than 1 which implies that the stock had moved less in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |

| HDFC Bank Ltd. | | |
|---|---|---|
| **Figure 19**<br> | **PERIODICAL STATISTIC**<br><br>Mean　　0.063%<br><br>Standard Deviation　　0.016<br><br>Adjusted R Square　　0.545<br><br>Beta　　1.134<br><br>P-Value　　0.00 | **INTERPRETATION**<br>The chart of HDFC Bank Ltd. is steep in the beginning and after some volatility; it again achieved a new high at point C (1688.70), which is the most appropriate point to sell, in order to get the maximum returns. Whereas to buy the share, point A (1144.10) is a good level. In the period of 348 days, HDFC bank Ltd. had given the average returns of 0.063%. Standard deviation is close to zero which implies that there is less volatility. There is medium degree of correlation between the returns of the security and that of nifty 50 indexes. The beta is positive and more than 1 which indicates that the stock had moved more in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **HDFC Life Insurance Ltd.** | | |
| **Figure 20** | **PERIODICAL STATISTICS**<br><br>Mean　　0.025%<br><br>Standard Deviation　　0.014<br><br>Adjusted R Square　　0.232 | **INTERPRETATION**<br>The good time to buy a share is at its low point, especially in case of blue chip companies. It can be identified from the graph. The share could be bought at point A (582.60) and the same should be sold at high |

| | | | |
|---|---|---|---|
|  | Beta | 0.682 | prices to gain profits i.e., B (740.20) or C (759). HDFC Life Insurance Ltd. had given average returns of 0.025% to its investors during the golden cross period. There is less volatility in the returns of the security, standard deviation being very close to zero. There is low degree of correlation as the adjusted R square is less than 0.4. The returns of the stock had moved less in the same direction as the returns of the index. P-value approximately equal to zero shows that the data of study is highly significant |
| | P-Value | 0.00 | |

**Hero Motocorp Ltd**

| | | | |
|---|---|---|---|
| **Figure 21**<br> | **PERIODICAL STATISTICS** | | **INTERPRETATION**<br>The golden cross period is starting from point A (2611.85). The investors can enter at point A and further they have the selling opportunities at point B (3346.45) and C (3522.85). Depending on their target returns they can exit from the market. The investors have gained average returns of 0.016% during the golden cross period. There is less volatility in the returns of the stock as the standard deviation is close to zero. From the value of adjusted R square, it can be analysed that there is low correlation between the |
| | Mean | 0.016% | |
| | Standard Deviation | 0.019 | |
| | Adjusted R Square | 0.255 | |
| | Beta | 0.872 | |
| | P-Value | 0.00 | |

| | | returns of stock and the returns of the index as a whole. The beta is positive and less than 1 which implies that the stock had moved less in the same direction as the nifty 50 index.                P-value approximately equal to zero shows that the data of study is highly significant |
| --- | --- | --- |
| **Hindalco Industries Ltd** | | |
| **Figure 22**  | **PERIODICAL STATISTICS**<br><br>Mean                0.186%<br>Standard            0.026 Deviation<br>Adjusted R          0.286 Square<br>Beta                  1.313<br>P-Value              0.00 | **INTERPRETATION**<br><br>Hindalco industries Ltd. had given returns of 82.62% during the golden cross period. The investors had earned average returns of 0.186%. They could buy it at point A (184.95) and sell it at high price levels i.e., B (533.75) or C (630). There is less volatility in the returns as standard deviation is close to zero. Adjusted R Square is less than 0.4 which indicates that there is low correlation. The stock has a beta of 1.313 which shows that the stock had moved more in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **Hindustan Unilever Ltd.** | | |
| **Figure 23**  | **PERIODICAL STATISTICS**<br><br>Mean                0.084%<br>Standard            0.015 | **INTERPRETATION**<br>Hindustan Unilever Ltd. is progressing at an increasing rate. The golden |

| | Deviation | | cross period started from 2017 and continued till 2021. The investors had the good opportunity to invest in this company. They would have invested from the starting when the price was A (870.30). It rallied to 1784.75 at point B to 2487.55 and 2775.45 at points C and D respectively. In the period of 1178 days, the security had given average returns of 0.0845 to its investors. As the value of standard deviation is close to zero, it shows that there is less deviation in the returns. Also, there is low correlation as the adjusted R square is less than 0.4. Beta is positive and less than 1. It implies that the stock had moved in the same direction as nifty 50 index but comparatively less. P-value approximately equal to zero shows that the data of study is highly significant |
|---|---|---|---|
| | Adjusted R Square | 0.237 | |
| | Beta | 0.608 | |
| | P-Value | 0.00 | |
| **HDFC Ltd.** | | | |
| **Figure 24**  | **PERIODICAL STATISTICS** | | **INTERPRETATION** |
| | Mean | 0.053% | The entry points here are A (2040.80) and C (2441.15) which a low price level is. The investors can sell their shares at points B (2791.50) and D (3000.85) respectively, wherever the investors get the satisfied returns. HDFC Ltd. had given average returns of |
| | Standard Deviation | 0.017 | |
| | Adjusted R Square | 0.555 | |
| | Beta | 1.305 | |
| | P-Value | 0.00 | |

| | | 0.053% in 315 days. Since standard deviation is close to zero, it implies that there is low volatility in the stock's returns. Adjusted R square is more than 0.4. It indicates that there is medium correlation between the returns of the security and the nifty 50 index returns. The beta is positive and more than 1. It means that the stock had moved more in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **ICICI Bank Ltd.** | | |
| **Figure 25**<br><br> | **PERIODICAL STATISTIC**<br><br>Mean 0.113%<br><br>Standard Deviation 0.018<br><br>Adjusted R Square 0.525<br><br>Beta 1.237<br><br>P-Value 0.00 | **INTERPRETATION**<br>The golden period has started from point A (437.05) with minimum price level. The investors can enter at point A and sell it at its peak points i.e., B (673.95) and C (841.70). The average returns during the golden cross period are 0.113%. There is less volatility in the returns generated as the standard deviation is close to zero. There is medium correlation between the returns of stock and the returns generated by nifty during that period. ICICI Bank Ltd. had moved more in the same direction as the index. This can be observed as the value of beta is more than 1. P- |

| | | value approximately equal to zero shows that the data of study is highly significant |
|---|---|---|
| **ITC Ltd.** | | |
| **Figure 26**<br> | **PERIODICAL STATISTICS**<br><br>Mean       0.092%<br><br>Standard    0.015<br>Deviation<br><br>Adjusted R    0.247<br>Square<br><br>Beta        0.718<br><br>P-Value     0.00 | **INTERPRETATION**<br><br>The investors entering the market during the golden period had earned returns of 47.251%. The entry can be made at point A (208.60) and the investors, depending on their return targets, can sell the share at points B (360.70). In the time period of 515 days of golden cross, ITC Ltd. has given average returns of 0.092% to its investors. Standard deviation is close to zero which implies that there is less dispersion in returns from its mean value. The degree of correlation is low as the value of adjusted R square is less than 0.4. The beat is positive and less than 1 which implies that the stock had moved less but in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **IndusInd Bank Ltd.** | | |
| **Figure 27**<br> | **PERIODICAL STATISTICS**<br><br>Mean       -0.017%<br><br>Standard    0.025 | **INTERPRETATION**<br><br>The entry points as depicted in the graph could be point A (896.25) or B |

| | | |
|---|---|---|
| | Deviation | | (850) and after gaining the targeted profits, they can sell the same at point C (1068.25). The stock had generated negative average returns during the period of golden cross. The standard deviation near to zero indicates that there is very less dispersion of the returns from its mean value. There is low correlation as the adjusted R square is less than 0.4. During the period, the stock had moved more and in the same direction as the nifty.          P-value approximately equal to zero shows that the data of study is highly significant |
| | Adjusted R Square | 0.357 | |
| | Beta | 1.536 | |
| | P-Value | 0.00 | |
| **Infosys Ltd.** | | | |

| **Figure 28** | **PERIODICAL STATISTICS** | | **INTERPRETATION** |
|---|---|---|---|
| | Mean | 0.110% | The graph indicates that there is entry point at A (903.15). After moving in the upward trend, the investor can exit the market at points B (1339.45) or C (1920.75). In the time period of 454 days of golden cross, Infosys Ltd. has given average returns of 0.11% to its investors. Standard deviation is close to zero which implies that there is less dispersion in returns from its mean value. The degree of correlation is low as the value of adjusted R square is less than 0.4. The beat is positive and less than |
| | Standard Deviation | 0.015 | |
| | Adjusted R Square | 0.286 | |
| | Beta | 0.762 | |
| | P-Value | 0.00 | |

| | | 1which implies that the stock had moved less but in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
|---|---|---|
| **JSW Steel Ltd.** | | |
| **Figure 29**<br> | **PERIODICAL STATISTICS**<br><br>Mean     0.150%<br>Standard Deviation     0.024<br>Adjusted R Square     0.301<br>Beta     1.241<br>P-Value     0.00 | **INTERPRETATION**<br><br>To earn the profits, the investors can buy the share in JSW Steel Ltd. at point A (258.55) and sell it at peak points i.e., B (758.65) or C (767.85). The graph is steep showing the rise in price. This security had given mean returns of 0.15% during the golden cross period of 442 days. Since, standard deviation is close to zero, there is low volatility in the returns of the stock. There is low correlation between the stock returns and the overall returns of nifty. The security had moved more and in the same direction as the nifty 50 index. This can be analysed from the value of beta which is 1.241. P-value approximately equal to zero shows that the data of study is highly significant |
| **Kotak Mahindra Bank Ltd.** | | |
| **Figure 30**<br> | **PERIODICAL STATISTICS**<br><br>Mean     0.373%<br>Standard     0.017 | **INTERPRETATION**<br><br>The chart of Kotak Mahindra Bank Ltd. is |

| | | |
|---|---|---|
| Deviation | | steep in the beginning and after some volatility; it again achieved a new high at point B (2210.95), which is the most appropriate point to sell, in order to get the maximum returns, when bought at point A (1547.40). The investors have gained average returns of 0.373% during the golden cross period which is comparatively more as compared to other securities. There is less volatility in the returns of the stock as the standard deviation is close to zero. From the value of adjusted R square, it can be analysed that there is medium correlation between the returns of stock and the returns of the index as a whole. The beta is positive and more than 1 which implies that the stock had moved more and in the same direction as the nifty 50 index. P-value approximately equal to zero shows that the data of study is highly significant |
| Adjusted R Square | 0.444 | |
| Beta | 1.112 | |
| P-Value | 0.00 | |

**Larsen and Toubro Ltd.**

| Figure 31 | PERIODICAL STATISTICS | INTERPRETATION |
|---|---|---|
| From 01-12-2020 to 11-05-2022 (356 days) Return: 34.187% | Mean 0.096%<br>Standard Deviation 0.0163<br>Adjusted R Square 0.517 | The stock follows an upward trend generating returns of 34.187%. Here, the buying point was A (1113.95) and for selling, the opportunity was at point B (2069.40). In the period of 356 days, it had |

| | | | |
|---|---|---|---|
| | Beta | 1.090 | given the average returns of 0.096%. Standard deviation is close to zero which implies that there is less volatility. There is medium degree of correlation between the returns of the security and that of nifty 50 indexes. The beta is positive and more than 1 which indicates that the stock had moved more and in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| | P-Value | 0.00 | |
| **Mahindra and Mahindra Ltd.** | | | |

| Figure 32 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  | Mean | 0.054% | The graph indicates that there is entry point at A (588.30). After moving in the upward trend, the investor can exit the market at points B (928.40) or C (935.35). The golden cross period had been of 412 days in case of Mahindra and Mahindra Ltd. and it had generated average profits of 0.054%. Standard deviation close to zero shows that there is less dispersion in the returns from its mean value. As the value of adjusted R square is less than 0.4, it indicates that there is less correlation between the stock and the index. The value of beta is positive and more than 1. It can be analysed that the |
| | Standard Deviation | 0.021 | |
| | Adjusted R Square | 0.357 | |
| | Beta | 1.174 | |
| | P-Value | 0.00 | |

|  |  | stock had moved more and in the same direction as the index.        P-value approximately equal to zero shows that the data of study is highly significant |
| --- | --- | --- |
| **Maruti Suzuki India Ltd.** |  |  |
| **Figure 33** | **PERIODICAL STATISTICS** | **INTERPRETATION** |
|  | Mean                -0.008% <br> Standard            0.017 <br> Deviation <br> Adjusted R         0.308 <br> Square <br> Beta                   0.845 <br> P-Value              0.00 | Maruti Suzuki Ltd. had generated negative returns to its investors. However, it had achieved its high point at B (8149.95). If the investors would have sold their shares at this point, they might have earned the positive returns. This security had given mean returns of - 0.008% during the golden cross period of 170 days. Since, standard deviation is close to zero, there is low volatility in the returns of the stock. There is low correlation between the stock returns and the overall returns of nifty. The security had moved less in the same direction as the nifty 50 index. This can be concluded from the value of beta which is 0.845. P-value approximately equal to zero shows that the data of study is highly significant |
| **NTPC Ltd.** |  |  |
| **Figure 34** | **PERIODICAL STATISTICS** | **INTERPRETATION** |
|  | Mean                0.104% <br> Standard            0.017 | The golden cross period is starting from point A (88.95) and is continued till |

| | | |
|---|---|---|
| | Deviation | | now. The investors can enter at point A and further they have the selling opportunities at point B (149.40), C (162.70) and D (181.80). Depending on their target returns they can exit from the market. NTPC Ltd. had given average returns of 0.104% in the golden cross period. There is less dispersion of the returns from its mean value. This implies that there is less volatility. There is low correlation between the returns of the security and the index. The beta is 0.737 which indicates that the security had given returns less than the index. P-value approximately equal to zero shows that the data of study is highly significant |
| | Adjusted R Square | 0.202 | |
| | Beta | 0.737 | |
| | P-Value | 0.00 | |
| **Nestle India Ltd.** | | | |
| **Figure 35**<br><br>From 28-03-2017 to 28-02-2022<br>(1220 days)<br>Return: 99.808%<br>A (6493.20)  B (17642.05) | **PERIODICAL STATISTICS**<br><br>Mean 0.082%<br><br>Standard Deviation 0.015<br><br>Adjusted R Square 0.179<br><br>Beta 0.537<br><br>P-Value 0.00 | | **INTERPRETATION**<br>It is clear from the graph as the golden cross period is starting from 2017. The investors could get a return of 99.808%. They could enter at point A where the price was as low as 6493.20. At point B the stock price formed its peaks with the price of 17642.05. Nestle India Ltd. had given mean returns of 0.082% during the golden period of 1220 days. Low standard deviation implies that there is less dispersion of the values from its mean |

| | | |
|---|---|---|
| | | value. In this case, Adjusted R square is less than 0.4 which indicates that there is low correlation between the stock and the index. A positive beta implies that the stock had moved in the same direction as the index and beta less than 1 shows that the stock had moved comparatively lesser than the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **ONGC Ltd.** | | |
| **Figure 36**<br><br> | **PERIODICAL STATISTICS**<br><br>Mean 0.084%<br><br>Standard Deviation 0.025<br><br>Adjusted R Square 0.090<br><br>Beta 0.702<br><br>P-Value 0.00 | **INTERPRETATION**<br>ONGC Ltd. had followed bullish trend where the investors could earn a profit of 31.258%. The feasible buy point could be 'A' (93.20) and after achieving the targeted profits, which varies from investor to investor, can sell it at point B (168.10) or C (186.95). During the golden period, ONGC Ltd. had generated mean returns of 0.084%. There is less dispersion of values from its mean as the standard deviation is close to zero. There is very low degree of correlation between the security and the nifty 50 index. The beta is positive and less than 1. It shows that the stock had moved less but in the same direction as the index. P-value approximately equal |

| | | to zero shows that the data of study is highly significant |
|---|---|---|
| **Power Grid Corporation Ltd** | | |
| **Figure 37**<br> | **PERIODICAL STATISTICS**<br><br>Mean      0.030%<br><br>Standard    0.022<br>Deviation<br><br>Adjusted R   0.077<br>Square<br><br>Beta       0.596<br><br>P-Value    0.00 | **INTERPRETATION**<br>The stock follows an upward trend generating returns of 16.232%. Here, the buying point was A (189.80) and for selling, the opportunities were at point B (204.65) and C (245.15). The investors have earned a mean return of 0.030% in 539 days. The standard deviation of 0.022 shows that there are low deviations from the mean value of the data. Low adjusted R square shows low correlation between the security and the index. Since, beta is positive and less than 1, it can be interpreted that the stock is moving in the same direction as the index but comparatively at lesser rate. P-value approximately equal to zero shows that the data of study is highly significant |
| **Reliance Industries Ltd.** | | |
| **Figure 38**<br> | **PERIODICAL STATISTICS**<br><br>Mean      0.083%<br><br>Standard   0.018<br>Deviation<br><br>Adjusted R   0.369<br>Square | **INTERPRETATION**<br>The good time to buy a share is at its low point, especially in case of blue chip companies. It can be identified from the graph. The share could be bought at point A (1435.95) and the same should be sold at |

| | | |
|---|---|---|
| | Beta 1.005<br><br>P-Value 0.00 | high prices to gain profits i.e., B (2305.70) or C (2819.85). During the golden period, it is observed that Reliance Industries Ltd. had given mean returns of 0.083%. There is less deviation of the returns from its mean value as the standard deviation is low. As the adjusted R square is below 0.4, there is low correlation between the returns of nifty and the stock. Beta is positive and more than 1 which shows that the movement of the stock is more and in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **SBI Life Insurance Ltd** | | |
| **Figure 39**<br><br> | **PERIODICAL STATISTICS**<br><br>Mean 0.064%<br><br>Standard Deviation 0.016<br><br>Adjusted R Square 0.207<br><br>Beta 0.676<br><br>P-Value 0.00 | **INTERPRETATIO**<br>The chart of SBI Life insurance Ltd. is steep in the beginning and after some volatility; it again achieved a new high at point C (1287.95), which is the most appropriate point to sell, in order to get the maximum returns. To buy the share, point A (831.60) is a good level. SBI Life Insurance Ltd. has given a mean return of 0.064%. There is low dispersion of return values from its mean which shows that the returns were consistent. Adjusted R square shows |

| | | there is low degree of correlation between the returns of the company and the index. The beta is positive and less than 1 which indicates that the stock was moving in the same direction as nifty 50 but comparatively at a low rate. P-value approximately equal to zero shows that the data of study is highly significant |
|---|---|---|
| **State Bank of India Ltd.** | | |
| **Figure 40**  | **PERIODICAL STATISTICS** <br><br> Mean      0.164% <br><br> Standard Deviation    0.018 <br><br> Adjusted R Square    0.459 <br><br> Beta      1.240 <br><br> P-Value      0.00 | **INTERPRETATION** <br><br> The graph indicates that there is buy point at A(246.95). After moving in the upward trend and gaining the targeted profits, the investor can exit the market at points B (530.45) or C (616.75). From the data, we get to know that there was a return of 0.164% during the golden period. Low standard deviation means it had given consistent returns in the period studied. There is medium correlation as adjusted R square is more than 0.4 but less than 0.7. The beta is positive and more than 1 which indicates that the returns generated had moved more in the same direction as the nifty 50 index. P-value approximately equal to zero shows that the data of study is highly significant |

**Sun Pharmaceuticals Ltd.**

| Figure 41 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  | Mean | 0.117% | It is clearly visible from the graph that there is increase in the share price at an increasing rate. That is why; the graph is steep, generating returns of 79.464%. The investors could buy the share at A (452.20) and sell the same at B (928.65) or C (1051.95). During the period of 680 days of golden period, Sun Pharmaceuticals Ltd. had provided the average returns of 0.117%. The standard deviation is close to zero. It implies that there is less dispersion of values from its mean. Also, there is low degree of correlation as the adjusted r square is less than 0.4. A positive and less than 1 beta indicates that the movement in the stock is less and in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| | Standard Deviation | 0.016 | |
| | Adjusted R Square | 0.173 | |
| | Beta | 0.646 | |
| | P-Value | 0.00 | |

**TCS Ltd.**

| Figure 42 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  | Mean | 0.088% | TCS Ltd. had followed bullish trend where the investors could earn a profit of 41.219%. The feasible buy point could be 'A' (2199.65) and after |
| | Standard Deviation | 0.014 | |
| | Adjusted R | 0.251 | |

| | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
| | Square | | achieving the targeted profits, which varies from investor to investor, can sell it at point B (3954.55) or C (4019.15). The golden cross period had been of 469 days in case of TCS Ltd. and it had generated average profits of 0.088%. Standard deviation close to zero shows that there is less dispersion in the returns from its mean value. As the value of adjusted R square is less than 0.4, it indicates that there is less correlation between the stock and the index. The value of beta is positive and less than 1. It can be analysed that the stock had moved less in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| | Beta | 0.680 | |
| | P-Value | 0.00 | |

**Tata Consumer Ltd.**

| Figure 43 | PERIODICAL STATISTICS | | INTERPRETATION |
|---|---|---|---|
|  | Mean | 0.157% | The graph clearly portrays the picture of growth in the share price of the company. The investors had the opportunity to buy the shares at Point A (244.95) and sell the same at point B (578.50) or C (882.10). Tata Consumers Ltd. has given a mean return of 0.157%. There is low dispersion of return values from its mean which shows that the returns were constant to some extent. Adjusted R square shows |
| | Standard Deviation | 0.022 | |
| | Adjusted R Square | 0.365 | |
| | Beta | 0.907 | |
| | P-Value | 0.00 | |

| | | |
|---|---|---|
| | | there is low degree of correlation between the returns of the company and the index. The beta is positive and less than 1 which indicates that the stock was moving in the same direction as nifty 50 but comparatively at a slower rate. P-value approximately equal to zero shows that the data of study is highly significant |
| **Tata Motors Ltd.** | | |

| **Figure 44** | **PERIODICAL STATISTICS** | | **INTERPRETATION** |
|---|---|---|---|
|  | Mean | 0.201% | The chart of Tata Motors Ltd. is steep in the beginning and after some volatility; it again achieved a new high at point B (509.60), which is the most appropriate point to sell, in order to get the maximum returns. To buy the share, point A (140.10) is a good level. From the data, we get to know that there was a return of 0.201% during the golden period, which is comparatively higher as compared to other securities. Low standard deviation means it had given consistent returns in the period studied. There is low correlation as adjusted R square is approximately 0.4. The beta is positive and more than 1 which indicates that the returns generated had moved more in the same direction as the nifty 50 index. P-value approximately equal to |
| | Standard Deviation | 0.028 | |
| | Adjusted R Square | 0.399 | |
| | Beta | 1.681 | |
| | P-Value | 0.00 | |

| | | |
|---|---|---|
| | | zero shows that the data of study is highly significant |
| **Tata Steel Ltd.** | | |
| **Figure 45**<br> | **PERIODICAL STATISTICS**<br><br>Mean 0.202%<br>Standard Deviation 0.027<br>Adjusted R Square 0.286<br>Beta 1.324<br>P-Value 0.00 | **INTERPRETATION**<br>The investors entering the market during the golden period had earned returns of 89.418%. The entry could be made at point A (428.85) and the investors, depending on their return targets, can sell the share at points B (1519.40). It can be analysed from the above data that the investors had earned mean return of 0.202% in the golden cross period of 442 days. The standard deviation being near to zero implies that the values are close to the mean of the entire data. Since, adjusted R square is less than 0.4; there exist low correlation between the stock and Nifty 50 index. In this case, the beta is positive and more than 1 which implies that the stock is moving more and in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |
| **Tech Mahindra Ltd.** | | |
| **Figure 46**<br> | **PERIODICAL STATISTICS**<br><br>Mean 0.133%<br>Standard Deviation 0.019 | **INTERPRETATION**<br>The stock follows an upward trend generating returns of 55.88%. Here, the buying point was A (722.50) and for selling, |

| | Adjusted R Square | 0.272 | the opportunities were at point B (1521.50) and C (1799.95). During the period of 421 days of golden cross, the stock has yielded mean returns of 0.133%. There is less volatility as the standard deviation is close to zero. Low correlation exists between the stock and the index as adjusted R square is less than 0.4. As the beta is more positive and less than 1, it implies that the stock has moved less but in the same direction as the index.         P-value approximately equal to zero shows that the data of study is highly significant |
| | Beta | 0.937 | |
| | P-Value | 0.00 | |

**Titan Company Ltd.**

| **Figure 47**<br><br>From 24-08-2020 to 15-06-2022 (450 days) Return: 62.509% | **PERIODICAL STATISTICS** | | **INTERPRETATION** |
|---|---|---|---|
| | Mean | 0.139% | To earn the profits, the investors can buy the share in Titan Company Ltd. at point A (1100.50) and sell it at peak points i.e., B (2588.80) or C (2712.75). During the golden cross period, Titan Company Ltd. had given average returns of 0.139% to the investors. There is low volatility as the standard deviation is close to zero. There is medium correlation between the returns of the security and the index. The beta is positive and less than 1 which indicates that the stock had moved in the same direction as the nifty |
| | Standard Deviation | 0.018 | |
| | Adjusted R Square | 0.329 | |
| | Beta | 0.972 | |
| | P-Value | 0.00 | |

|  |  | 50 index but comparatively less. P-value approximately equal to zero shows that the data of study is highly significant. |

**UPL Ltd.**

| Figure 48 | PERIODICAL STATISTICS | INTERPRETATION |
|---|---|---|
|  | Mean 0.025%<br><br>Standard Deviation 0.021<br><br>Adjusted R Square 0.216<br><br>Beta 0.882<br><br>P-Value 0.00 | The entry points as depicted in the graph could be point A (561.30) and after gaining the targeted profits, they can sell the same at points B (762.20) or C (841). The selling points are determined by the level of profit, an investor is expecting to earn. UPL Ltd. had given average returns of 0.025% in 353 days. There is less volatility as the value of standard deviation is close to zero. Also, there is low correlation in the returns of the security and that of index. Beta is positive and less than 1 which implies that the stock had moved les in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant |

**UltraTech Cement Ltd.**

| Figure 49 | PERIODICAL STATISTICS | INTERPRETATION |
|---|---|---|
|  | Mean 0.081%<br><br>Standard Deviation 0.017 | The entry point here is A (3777.80) which a low price level is. The investors can sell their shares at points B (6971.25) and C (8214.05) respectively, wherever the investors get |

|  | Adjusted R Square | 0.371 | the satisfied returns. The investors have gained average returns of 0.081% during the golden cross period. There is less volatility in the returns of the stock as the standard deviation is close to zero. From the value of adjusted R square, it can be analysed that there is low correlation between the returns of stock and the returns of the index as a whole. The beta is positive and less than 1 which implies that the stock had moved less in the same direction as the nifty 50 index.                P-value approximately equal to zero shows that the data of study is highly significant |
|  | Beta | 0.988 | |
|  | P-Value | 0.00 | |

| **Wipro Ltd.** | | | |
|---|---|---|---|
| **Figure 50** | **PERIODICAL STATISTICS** | | **INTERPRETATION** |
|  | Mean | 0.163% | It is clear from the steep graph that there is growth in the share prices. As a result, it generated profits of 70.547% during the golden cross period. The investors had the opportunity to buy at point A (266) and sell the same at B (459) and C (711.55). Wipro Ltd. had given comparatively more returns in the golden cross period. The investors had earned average returns of 0.163%. There is less volatility in the returns as standard deviation is close to zero. Adjusted R Square is less |
|  | Standard Deviation | 0.018 | |
|  | Adjusted R Square | 0.237 | |
|  | Beta | 0.846 | |
|  | P-Value | 0.00 | |

than 0.4 which indicates that there is low correlation. The stock has a beta of 0.846 which shows that the stock had moved less but in the same direction as the index. P-value approximately equal to zero shows that the data of study is highly significant
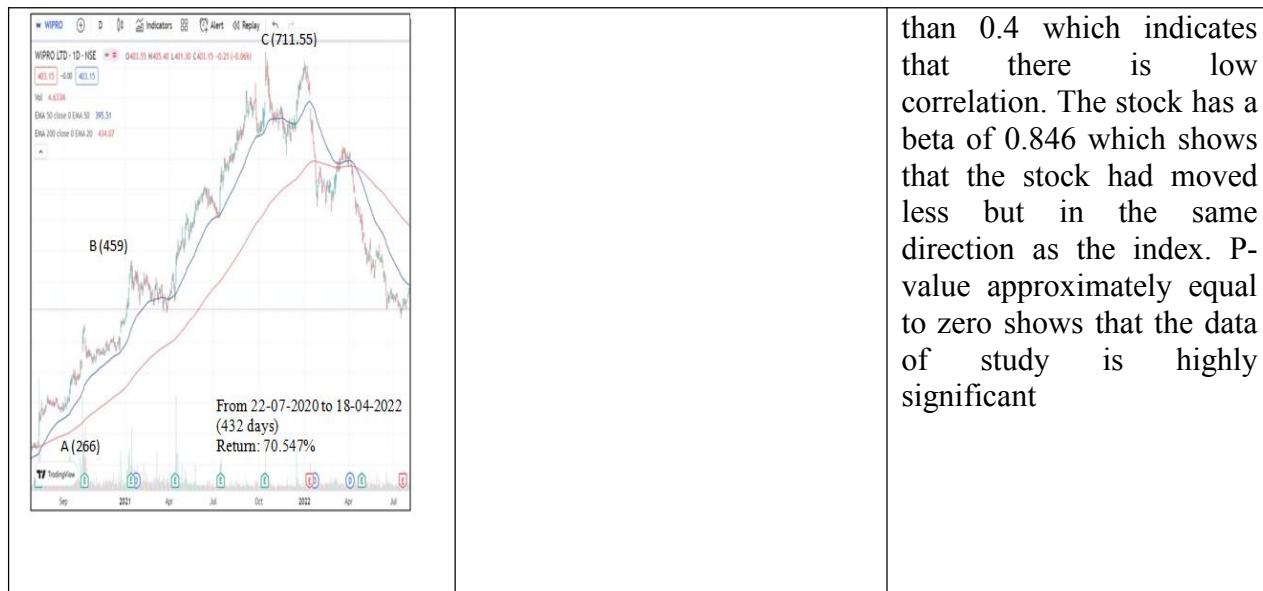
In nutshell, the companies had generated the following returns which had been compared with the Nifty 50 Index returns in the golden cross period of the respective companies. The highlighted companies had given more returns as compared to nifty 50 indexes.

**Table 3: Comparison of Company Returns with NIFTY Returns**

| COMPANY | RETURN (%) | NIFTY RETURNS (%) |
|---|---|---|
| **ADANI ENTERPRISES** | **287.0561472** | **46.51147939** |
| ADANI PORTS | 64.56343331 | 30.82270489 |
| APOLLO HOSPITAL | 87.350888 | 34.90018137 |
| ASIAN PAINTS | 51.94818972 | 42.35967529 |
| AXIS BANK | 8.459446145 | 24.10750594 |
| BAJAJ FINANCE | 42.88072635 | 33.46343517 |
| BAJAJ FINSERV | 40.83328735 | 20.64682974 |
| BPCL | -0.082058501 | 21.5713788 |
| BAJAJ AUTO | 13.72297293 | 45.75094828 |
| BHARTI AIRTEL | 26.28360739 | 18.13095022 |
| BRITANNIA | 7.857840187 | 49.87666933 |
| CIPLA | 58.4460294 | 67.40845948 |

| | | |
|---|---|---|
| COAL INDIA | 43.31578112 | 17.22375843 |
| DIVIS LABS | 159.5529188 | 59.68557868 |
| DR REDDY LAB | 52.28546859 | 49.8562297 |
| EICHER MOTORS | 19.0966017 | 44.55540948 |
| GRASIM | 64.60391434 | 33.49489805 |
| HCL TECHNOLOGIES | 61.98825551 | 50.74992297 |
| HDFC BANK | 22.04303205 | 36.46457336 |
| HDFC LIFE | 9.115022616 | 46.13001227 |
| HERO MOTOCORP | 3.518135565 | 34.26523061 |
| HINDALCO | 82.62222647 | 39.44881943 |
| HINDUSTAN UNILEVER | 98.69526033 | 67.18561713 |
| HDFC | 16.81917541 | 39.18340795 |
| ICICI BANK | 46.58268438 | 28.95162128 |
| ITC | 47.2517246 | 27.09224132 |
| INDUSIND BANK | -4.454812831 | 24.44455864 |
| INFOSYS | 50.16065293 | 38.2704838 |
| JSW STEEL | 66.48783632 | 38.07672256 |
| KOTAK MAHINDRA | 12.42675022 | 33.31531074 |
| LARSEN AND TOUBRO | 34.18789836 | 20.96754817 |
| MAHINDRA AND MAHINDRA | 22.15117859 | 42.2316612 |
| MARUTI SUZUKI | -1.37307375 | 24.30366554 |
| NTPC | 53.24972164 | 25.15288045 |
| NESTLE | 99.8087944 | 61.26534035 |
| ONGC | 31.25840214 | 12.03185273 |
| POWER GRID | 16.23213336 | 34.46749047 |
| RELIANCE | 50.3276044 | 62.74964135 |
| SBI LIFE | 23.03444828 | 23.72307547 |
| STATE BANK OF INDIA | 87.46585287 | 31.82453923 |
| SUN PHARMA | 79.46491498 | 66.25914593 |
| TCS | 41.21934957 | 42.43710811 |

| TATA CONSUMERS | 105.1453779 | 36.27592793 |
|---|---|---|
| TATA MOTORS | 104.6604964 | 41.12031803 |
| TATA STEEL | 89.41810674 | 37.41216129 |
| TECH MAHINDRA | 55.88047819 | 37.4943877 |
| TITAN | 62.5090592 | 31.37352071 |
| UPL | 8.91692111 | 7.627978388 |
| ULTRA TECH | 31.24685804 | 33.16713681 |
| WIPRO | 70.54768716 | 43.34984915 |

## CONCLUSION

From the above study, we can conclude that the golden cross has fetched significant returns to the investors during that period. We have chosen the 50 blue chip companies because they have strong market capital base and hence they form the part of nifty 50 index. Therefore, we have applied the golden cross strategy on those 50 blue chip companies and observed that the investors have gained at least 30 percent of the profits, except a few. The conclusion is in line with the results given by Eng Wat Kim, Nadeeya Eli Syaheerah Abd Shukor, Nur Rashidah Ismail and Syazwani Abdul Halim (2012) in "Golden Cross as Buying Indicator for Stock Investment in Bursa Malaysia" concluded that buying in bulk at golden cross and selling at peak of the shorter EMA before the death cross is formed gives consistent returns. In 2012, Alajbeg, Denis, Bubas, Zoran, Vukas, Jurica in their study of "The Effectiveness of the 50/200 Dual Exponential Moving Average Crossover on the S&P 500" analysed that the golden cross and death cross are beneficial for investment decisions and maximum returns can be earned. Through results and discussions, Noor Ainy Harish, Siti Khatijah Mohd Hairullah, Sumarni Abu Bakar and Kahartini Abd Rahman (2019) in "Fuzzy Golden Cross and Fuzzy Death Cross as Stock Market Forecasting Indicator" concluded that the prices suggested by these indicators are better for making investment decisions to obtain the maximum profit and minimise losses.

However, our study is limited to these blue chip companies only. Further studies can be conducted to check the applicability of golden cross on mid cap and small cap companies.

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