A REPORT

ON

Data Analysis for Investments

By

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Stock exchange

The stock exchange in India serves as a market where financial instruments like stocks, bonds, and commodities are traded. The prices of these commodities are decided by the market forces of supply and demand in the stock market. A company is said to have ‘gone public’ when it becomes a publicly traded company and thus offers its shares to the public for the first time through an initial public offering (IPO). Then the company can be listed in the stock exchange, where its shares can be bought and sold by individual investors and institutional entities. In India, the company could be listed on the national stock exchange (NSE) or the Bombay Stock Exchange (BSE). The two major stock exchanges.

NSE

The National Stock Exchange (NSE) was founded in 1992 in Mumbai and was the first electronic stock exchange in India. A vast array of financial instruments, such as stocks, derivatives, debt securities, and exchange-traded funds (ETFs), can be traded on the NSE's platform.

NIFTY 50

The Nifty 50 represents the performance of the 50 largest and most liquid stocks listed on the NSE. These stocks are selected based on certain criteria, including market capitalization, liquidity, and other financial parameters. The aim is to represent the diverse sectors of the Indian economy, ensuring that the index is a comprehensive reflection of the market. It acts as one of the key benchmarks for the Indian stock market and serves as a widely tracked indicator of its overall health and direction.

Index methodology

The index methodology refers to the set of rules and principles governing how an index is constructed, maintained, and calculated. Each stock market index follows a specific methodology to ensure that it accurately reflects the intended market segment and provides a fair representation of the underlying securities. The Nifty 50 Index represents about 59% of the free float market capitalization of the stocks listed on the NSE as of September 29, 2023.

The index level is calculated using the free float market capitalization of its constituents. This calculation considers the market value of the freely tradable shares of each stock. The methodology also accommodates corporate actions, such as stock splits and bonuses, to ensure accuracy in index representation.

The combination of these calculation methods ensures that the Nifty 50 reflects the performance of a diversified set of stocks in a way that is transparent, representative, and sensitive to market dynamics.

Market capitalization = Freely tradable shares* Price

For the value of free-float market capitalization for a certain company, we need to multiply market capitalization with the Investable Weight Factors (IWF). IWF is a unit of floating stock expressed in terms of a number available for trading that is not held by entities having strategic interests in a company.

The sum of the Free float market capitalization for the Nifty 50 companies gives us the current market value. The NIFTY 50 index's base period began on November 3, 1995, the day the NSE's Capital Market Segment completed one year of business. The index's base capital of Rs 2.06 trillion and base value of 1000 have been established. Using these values, we get the index value as,

Index Value = Current Market Value / Base Market Capital * Base Index Value (1000)

Why do we need to invest? Does it increase my stress level?

For several reasons, investing is critical, and it is a key component of obtaining long-term security and financial well-being. Investing offers the chance for your money to increase in value over time. Investing your funds in assets with appreciation potential will help you accumulate wealth over time, as opposed to having them sit idle. In addition, the cost of living tends to increase with time—a process called inflation. By aiming for returns that outperform the rate of growing prices and maintaining the purchasing power of your money, investing helps mitigate the effects of inflation.

Regular income in the form of dividends, interest, or rental payments can be obtained from some investments, such as real estate, dividend-paying stocks, and bonds. Investing can indeed be a source of stress for some individuals, especially during periods of market volatility or when faced with uncertainties. Investing always involves some level of risk, but making informed decisions, staying disciplined, and aligning your investments with your financial goals can significantly reduce stress and contribute to a more successful investment experience.

<u>Some methods are as follows:</u>

- Diversify Your Portfolio

Diversification involves spreading your investments across different asset classes, industries, and geographical regions. A well-diversified portfolio is less vulnerable to the impact of poor performance in any single investment, reducing overall risk and potential stress during market fluctuations.

- Invest for the Long Term

Adopt a long-term investment perspective. Short-term market fluctuations are normal, but focusing on your long-term goals helps put temporary downturns into perspective. This approach can reduce the stress associated with day-to-day market volatility.

Why shouldn’t I deposit my money in a reputable bank and get the nominal interest without any worry?

While depositing money in a reputed bank and earning nominal interest is a safe and secure option, there are several factors to consider, and it may not always be the most advantageous strategy for everyone. Nominal interest rates offered by banks may not always keep pace with inflation. If the interest earned on your deposits is lower than the rate of inflation, the real purchasing power of your money could erode over time.

Also, the interest rates on traditional bank deposits are often relatively low. For individuals seeking higher returns, especially to meet long-term financial goals or beat inflation, other investment options with the potential for greater returns might be considered.

While bank deposits offer safety and liquidity, they might not optimize returns for those with a longer investment horizon or seeking to outpace inflation. Diversifying your investment portfolio and considering a mix of assets can be key components of a well-rounded financial strategy. For example, consider the following scenario: you put $10,000 at a bank with a 1% yearly interest rate. If the inflation rate is 2%, your actual return is negative (1% - 2% = -1%). In this instance, even if you are earning interest, your money's purchase value is diminishing.

Effective Investing

Effective investing is a dynamic journey that demands strategic planning, risk intelligence, and a clear understanding of individual financial goals. While the definition of a good investment varies from person to person, certain principles universally guide investors towards making informed decisions that align with their unique circumstances. Investors must craft a well-thought-out plan, acknowledging that a good investment aligns with their unique circumstances, risk tolerance, and objectives. Participating actively in the market, understanding volatility, and diversifying assets contribute to effective risk management.

Additionally, staying informed about various factors, such as economic indicators and market conditions, enhances decision-making. Importantly, the use of technical indicators plays a pivotal role in staying informed and making educated investment decisions. Whether it's assessing trends, identifying entry and exit points, or gauging market sentiment, indicators provide valuable insights for investors striving to navigate the complexities of the market and achieve financial success.

Technical analysis using indicators

Technical analysis in trading involves the use of various mathematical calculations, known as technical indicators, to predict price movements and make informed trading decisions. These indicators offer valuable insights from different perspectives of trading strategies. The four main types of technical indicators are as follows:

Types of Technical Indicators:

1. **Trend Indicators:**

    Definition: Trends represent the prolonged direction of price movement. Trend indicators help traders identify the current trend and potential trend reversals.

- *Examples:*
  - Moving Average (MA): Smooths out price data, providing a clear trend direction. Two common types are Simple Moving Average (SMA) and Exponential Moving Average (EMA).

    1. <u>SMA</u>: Calculates the average of a set of values over a specified time period.

    2. <u>EMA</u>: Gives more weight to recent data points, making it more responsive to changes.

- Parabolic Stop and Reverse (Parabolic SAR): Helps identify potential reversal points in a trend.
- Ichimoku Cloud: Offers a comprehensive view of support, resistance, and trend strength.

2. **<u>Volume Indicators:</u>**

   Definition: Volume indicates the number of trades executed within a specific timeframe, reflecting the asset's supply and demand dynamics.

   - *Examples:*
     - On Balance Volume (OBV): Measures buying and selling pressure based on volume.
     - Accumulation / Distribution Indicator: Gauges the flow of money in and out of an asset.
     - Money Flow Index: Evaluates the strength of buying and selling in a market.

3. **<u>Volatility Indicators:</u>**

   Definition: Volatility measures the extent of price movements over time. High volatility indicates rapid and unpredictable price changes.

   - *Examples:*
     - Bollinger Bands: Defines price range boundaries based on standard deviations.
     - Donchian Channel: Highlights the highest and lowest prices over a specified period.
     - Average True Range (ATR): Quantifies the average price range for a set period.

4. **<u>Momentum Indicators:</u>**

Definition: Momentum refers to the speed of price changes. Momentum indicators help identify potential trend changes.

- *Examples:*
  - Relative Strength Index (RSI): Measures overbought or oversold conditions.
  - Moving Average Convergence Divergence (MACD): Captures the trend's strength and potential crossovers.
  - Stochastic Oscillator: Identifies potential reversal points based on closing prices.

Combining Indicators:

When using technical indicators, traders often combine 2-3 indicators to increase the accuracy of their trading decisions. For instance, they may pair a trend indicator with a volume indicator to confirm the strength of a trend change. It's crucial to note that while technical indicators enhance analysis, they are not foolproof predictions and do not guarantee 100% accuracy.

Other Indicators:

While technical indicators focus on price and market behaviour, fundamental indicators provide insights into a company's financial health and overall market conditions. Some key fundamental indicators include:

1. Earnings Per Share (EPS): Measures profitability.
2. Price-to-Earnings Ratio (P/E): Evaluates the market's perception of a company's future earnings.
3. Dividend Yield: Indicates the return on investment through dividends.
4. Debt-to-Equity Ratio: Measures financial leverage.

Incorporating a mix of technical and fundamental indicators allows traders and investors to make well-informed decisions. Hence, effective investing involves a comprehensive understanding of both technical and fundamental factors, along with a disciplined approach to risk management.

IMPLEMENTATION OF FORECAST TREND INDICATORS ONTO ICICI BANK DATA

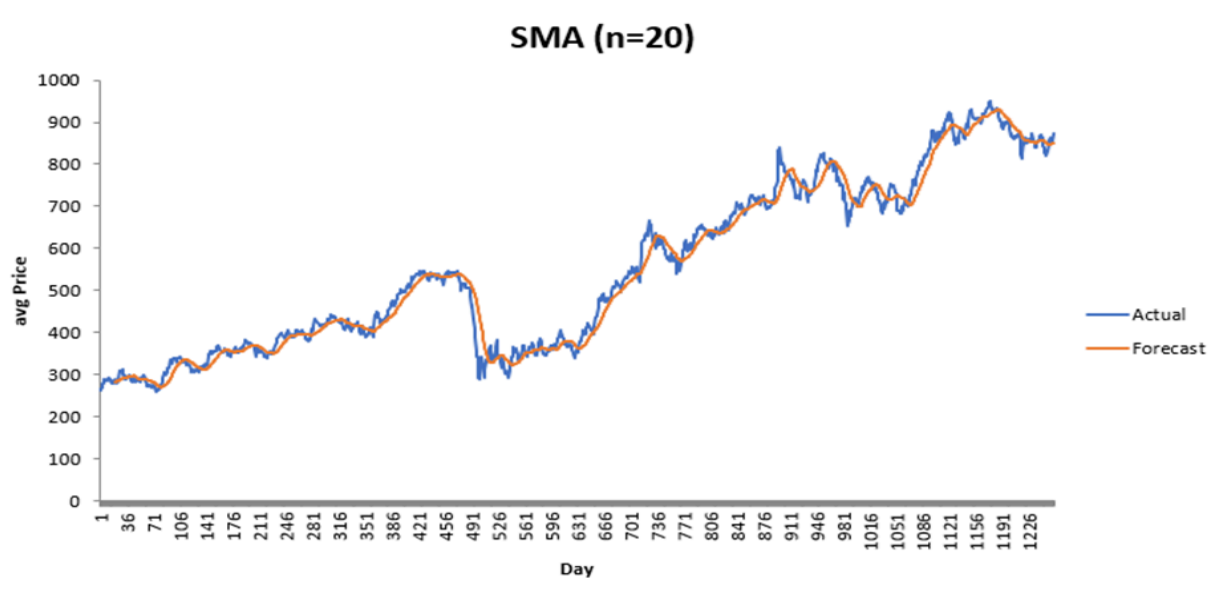
MOVING AVERAGE

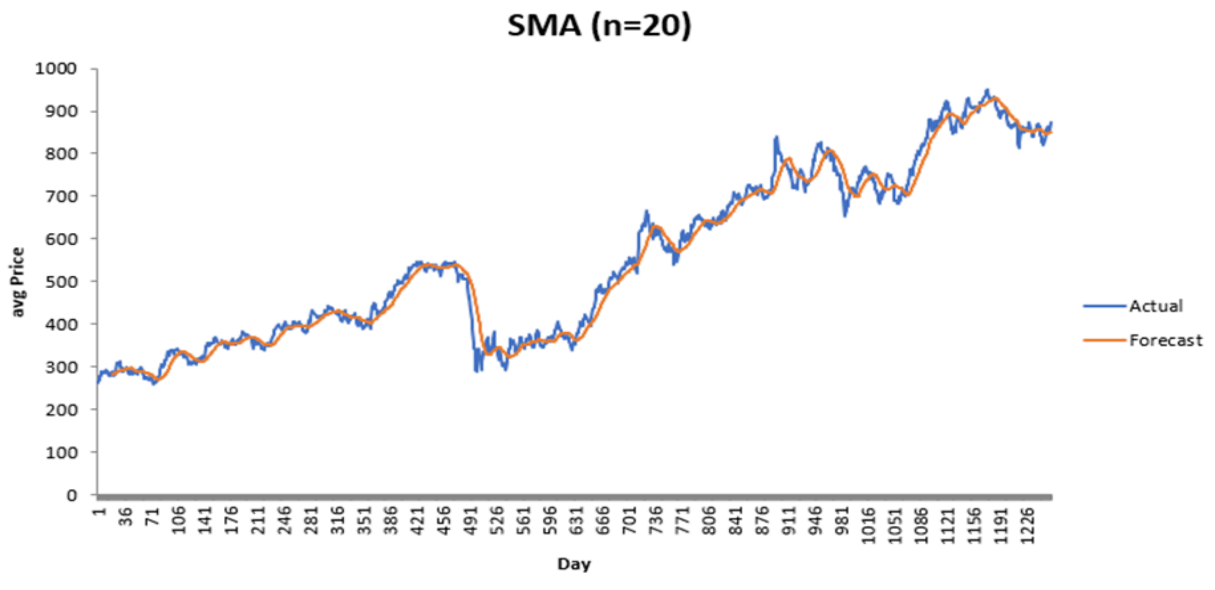
It is a trend indicator that is calculated by taking the average of a set of values within a specified window or interval, and then moving that window or interval through the data set.

SIMPLE MOVING AVERAGE

This is the most basic form of a moving average. It calculates the average of a set of values over a specified time period. The formula for the SMA is:

SMA = Sum of values over n periods / n



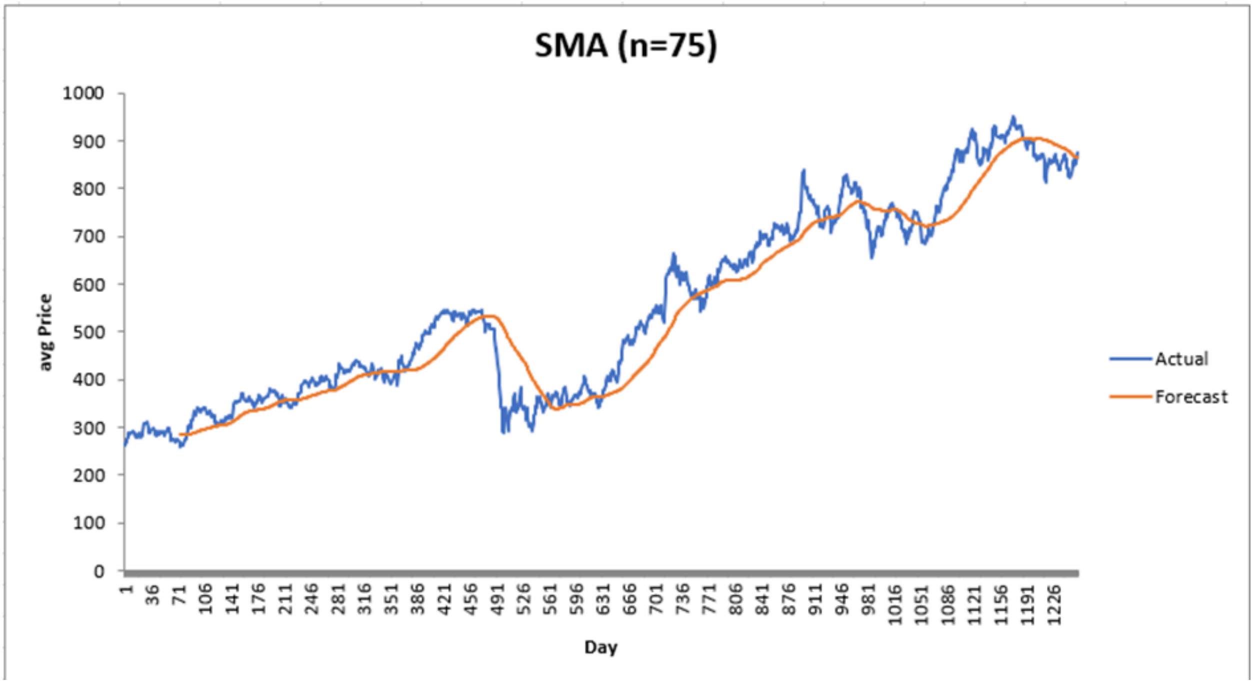


Mean Absolute Error (MAE): 18.74

Mean Absolute Percentage Error (MAE): 3.395

Mean Squared Error (MSE): 666.03

Root Mean Squared Error (RMSE): 25.81

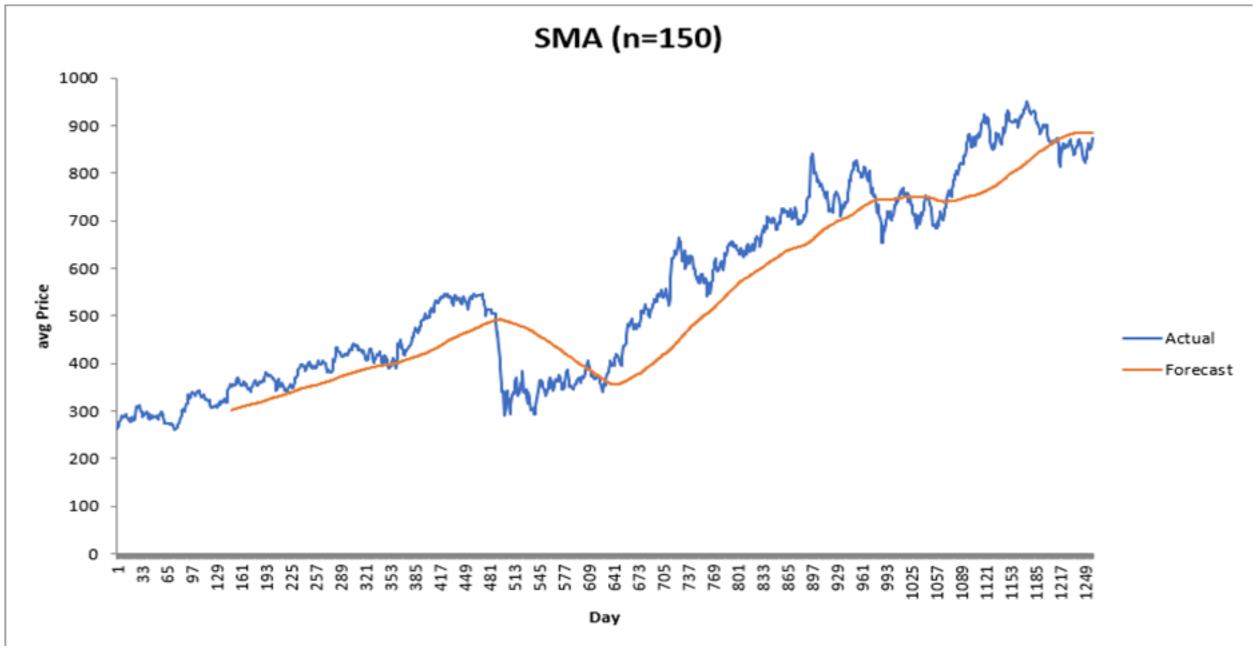


Mean Absolute Error (MAE): 39.92

Mean Absolute Percentage Error (MAE): 7.233

Mean Squared Error (MSE): 2751.14

Root Mean Squared Error (RMSE): 52.45



Mean Absolute Error (MAE): 66.14

Mean Absolute Percentage Error (MAE): 11.983

Mean Squared Error (MSE): 6234.52

Root Mean Squared Error (RMSE): 78.96

INFERENCE:

We can see that the SMA indicator (calculated using Excel and Python) gives varied results depending on the choice of the period ‘n’.

The above shows SMA indicator results for 3 choices of n: 20, 75, and 150.

The above data shows that as n increases, the smoothing effect becomes greater. This means that the value of n reflects a sensitivity/response to recent changes in the market, a greater value of n shows a delayed response to sudden short-term market fluctuations. The above is validated by the increasing MAE as n increases.

An increase in MAE doesn’t necessarily mean the model is bad, for example, the n = 150 graph shows a good trend of the data from 9th July 2020 to March 2023. So, a person who invested in the stock on 9th July 2020 will believe that the stock will continue to rise irrespective of the intermediate short-term fluctuations. However, the model is very bad at adapting to the drop in price, or “level shift” from 4th March 2020 to 9th July 2020.

Hence, during this time, following a SMA model with a n value around 20 will be much more beneficial.

The SMA model doesn't give accurate forecast values when we compare the predicted value to the actual value, but it captures the essence of the data and it forecasts a trend that has the same characteristics of the actual data.

EXPONENTIAL MOVING AVERAGE

In contrast to the SMA, the EMA gives more weight to the most recent data points, making it more responsive to changes. The formula for the EMA is a bit more complex and involves a smoothing factor:

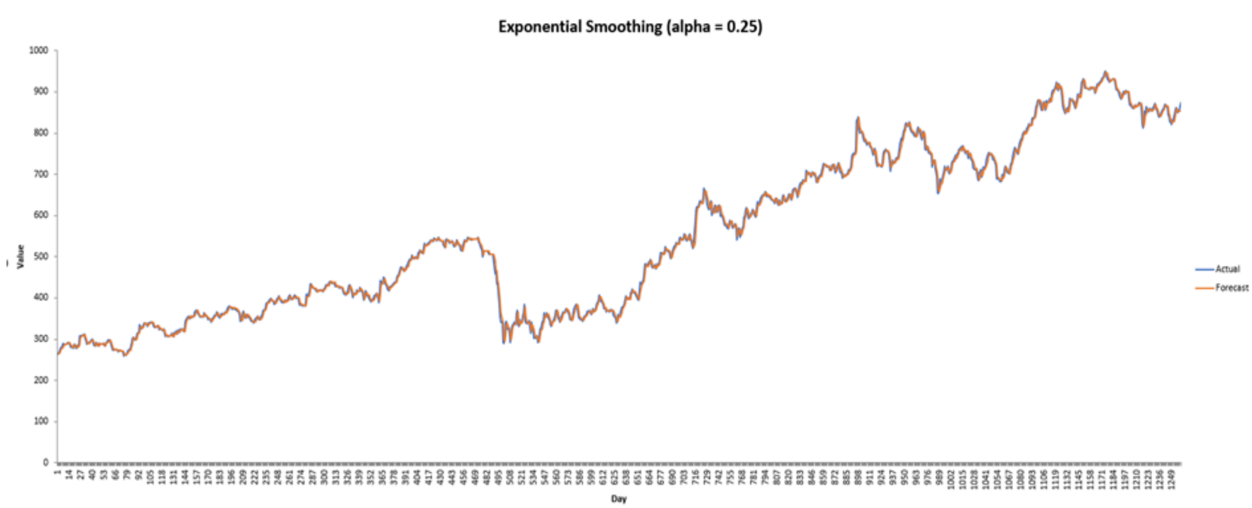
$$EMA_t = \alpha \times X_t + (1-\alpha) \times EMA_{t-1}$$

EMA_t is the EMA at time t,

X_t is the value of the time series at time t,

EMA_{t-1} is the EMA at the previous time step (t-1),

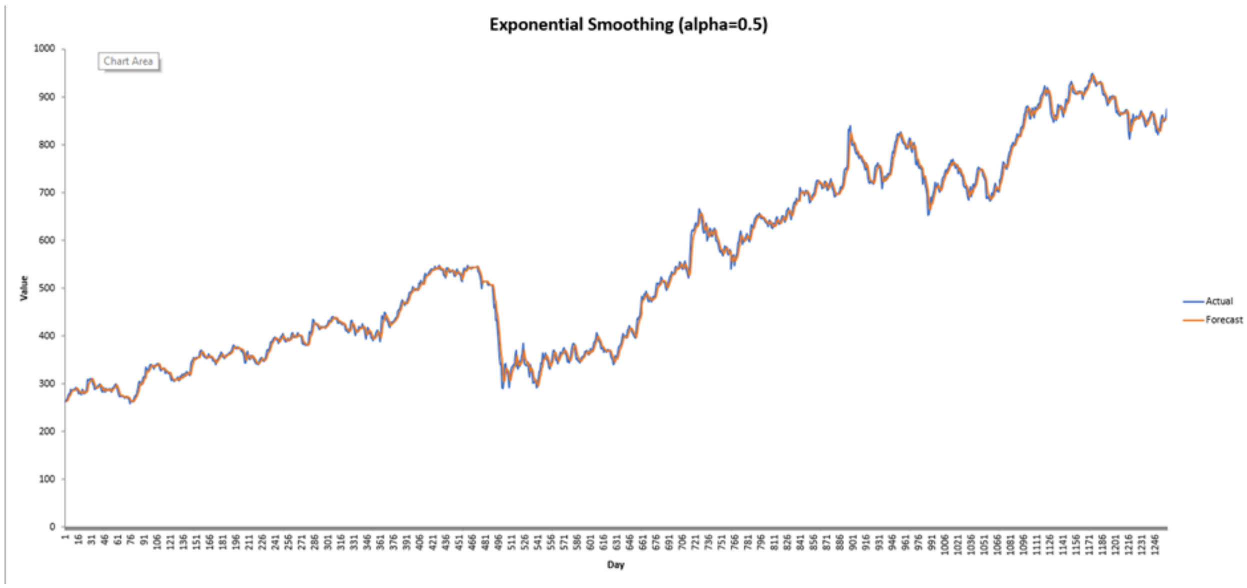
α is the smoothing factor, often calculated as 2/(N+1), where N is the number of periods.



Mean Absolute Error (MAE): 8.29

Mean Squared Error (MSE): 130.01

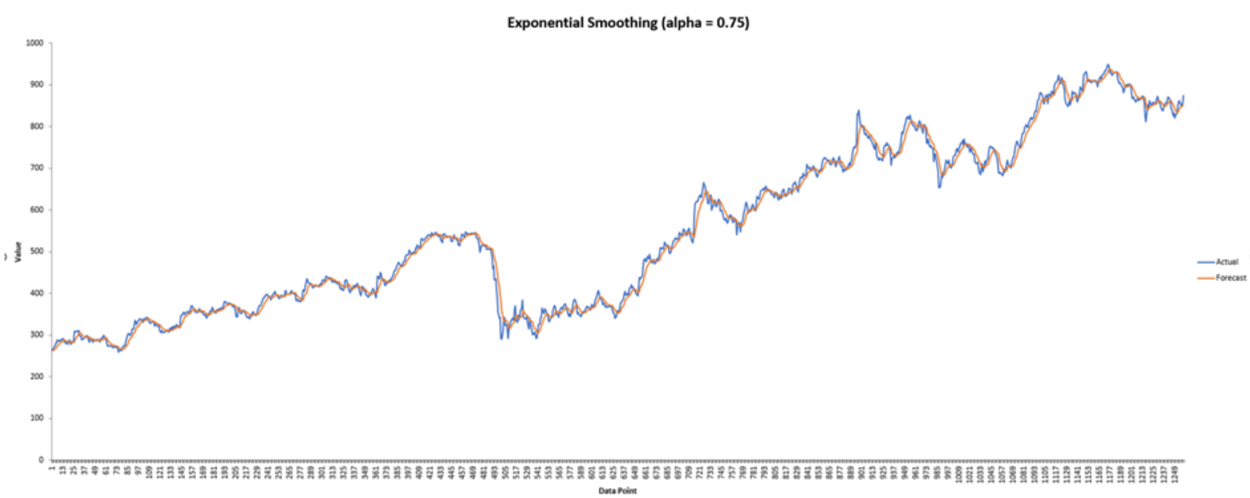
Root Mean Squared Error (RMSE): 11.40



Mean Absolute Error (MAE): 4.08

Mean Squared Error (MSE): 31.77

Root Mean Squared Error (RMSE): 5.64



Mean Absolute Error (MAE): 1.77

Mean Squared Error (MSE): 6.02

Root Mean Squared Error (RMSE): 2.45

INFERENCE:

Before going into the analysis of EMA, we can already see from the graphs of EMA that it does a much better job at giving a predicted value that is much closer to the actual value as compared to SMA.

We can see that the EMA indicator gives varied results depending on the choice of the weight ‘α’.

The above shows EMA indicator results for 3 choices of α: 0.25, 0.5 and 0.75.

The above data shows that as α increases the smoothing effect becomes greater. From this we can make the correlation that for a greater value of α, the EMA has a more delayed and “damped” response to sudden short-term market fluctuations. The above is validated by the increasing MAE as α increases.

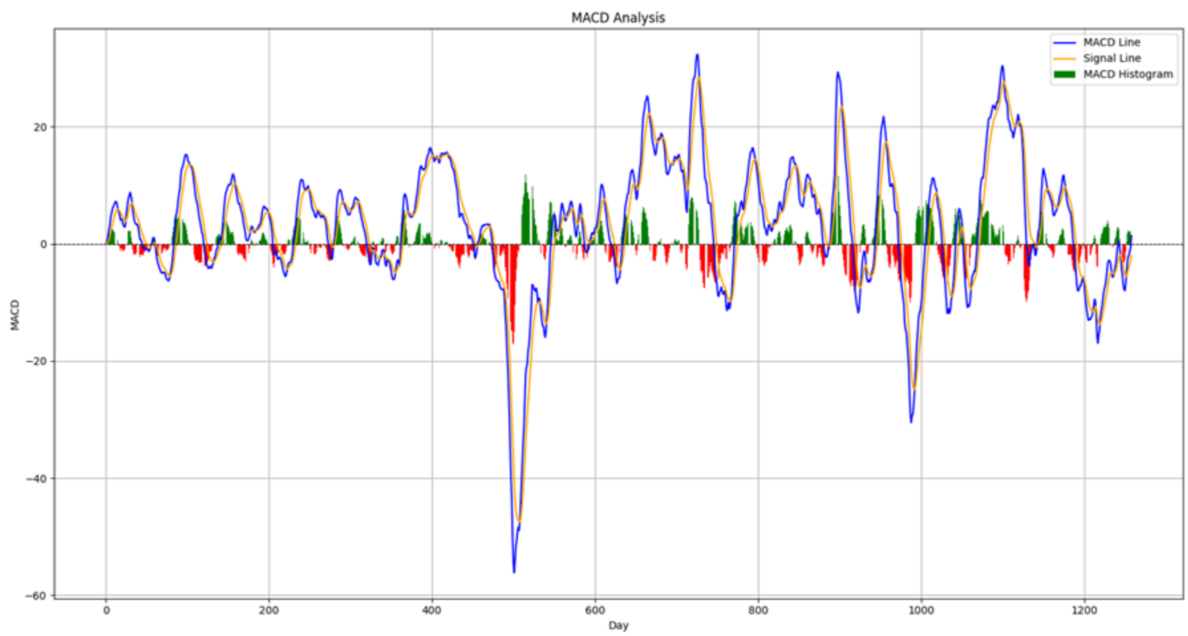
From the above data we can make a conclusion that different values of α give better responses to different time periods. So, a dynamic model that uses different values of alpha depending on magnitude of recent changes will ne an ideal EMA model.

Moving Average Convergence Divergence (MACD)

It is a momentum indicator used in finance to analyse the momentum and trend of an asset's price. MACD is used to identify potential buy or sell signals and to gauge the strength of a trend. The MACD is derived from the differences between two Exponential Moving Averages (EMAs) of different periods, where (α=smoothing constant, n =period). Here's a basic breakdown of its components:

1. **Short-term EMA (Exponential Moving Average):** This is typically calculated over a shorter time frame, often 12 periods.
2. **Long-term EMA:** This is calculated over a longer time frame, often 26 periods.

3. **MACD Line:** The MACD line is the difference between the short-term EMA and the long-term EMA. It is calculated as follows: MACD Line=Short-term EMA−Long-term EMA
4. **Signal Line:** The Signal Line is a 9-period EMA of the MACD Line. It helps smooth out the MACD Line to generate a signal. The Signal Line is calculated as: Signal Line=9-period EMA of MACD LineSignal Line=9-period EMA of MACD Line
5. **MACD Histogram:** This is the visual representation of the difference between the MACD Line and the Signal Line. It is calculated as: MACD Histogram=MACD Line−Signal Line



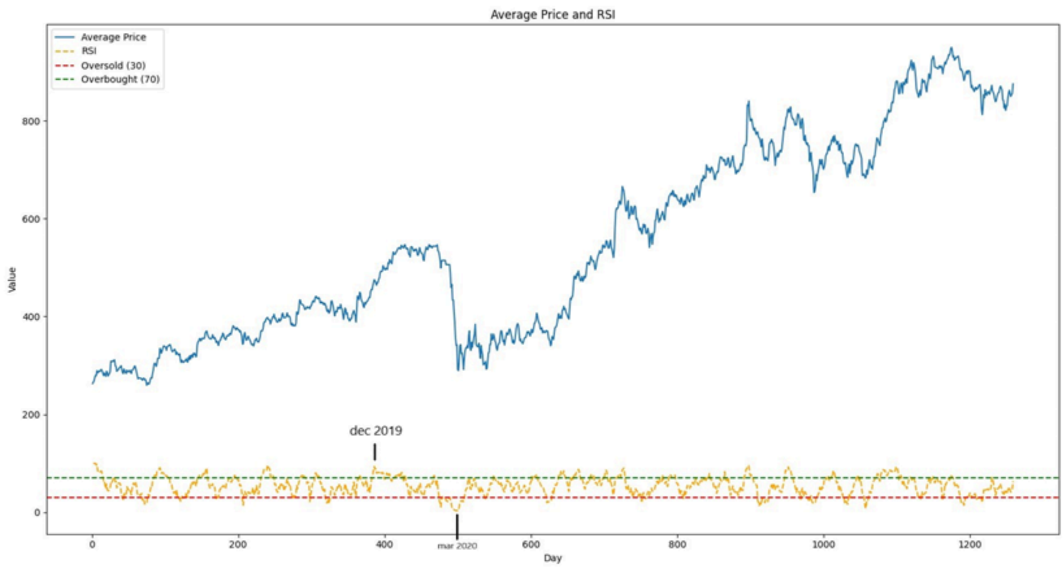
<u>INFERENCE:</u>

Crossovers between the MACD line and the Signal Line are often considered potential buy or sell signals. When the MACD line crosses above the Signal Line, it may be a bullish signal (suggesting a potential upward trend – means BUY). Conversely, when the MACD line crosses below the Signal Line, it may be a bearish signal (suggesting a potential downward trend – means SELL).

Traders often use MACD along with other technical indicators to make more informed decisions about entering or exiting trades.

RELATIVE STRENGTH INDEX (RSI)

The Relative Strength Index (RSI) is a momentum oscillator that measures the speed and change of price movements. It is used to identify overbought or oversold conditions in a market, indicating potential trend reversals. RSI is typically applied to price charts and is most often used with a period of 14. Generally, when the RSI surpasses the horizontal 30 reference level, it is a bullish sign and when it slides below the horizontal 70 reference level, it is a bearish sign.



You can notice that in the following ICICI BANK price chart, in December 2019 the RSI just crossed the 70-level line which indicated a change in momentum and an expected downtrend. The share prices continued to fall till March 2020 until the RSI went below the 30-level mark.

When should someone consider investing?

The data analysis suggests that, over the observed five-year period:

Day of the Week:

- Considering the highest average return on Wednesdays, allocating a portion of investments on Wednesdays might be worthwhile. However, historical trends do not guarantee future performance.

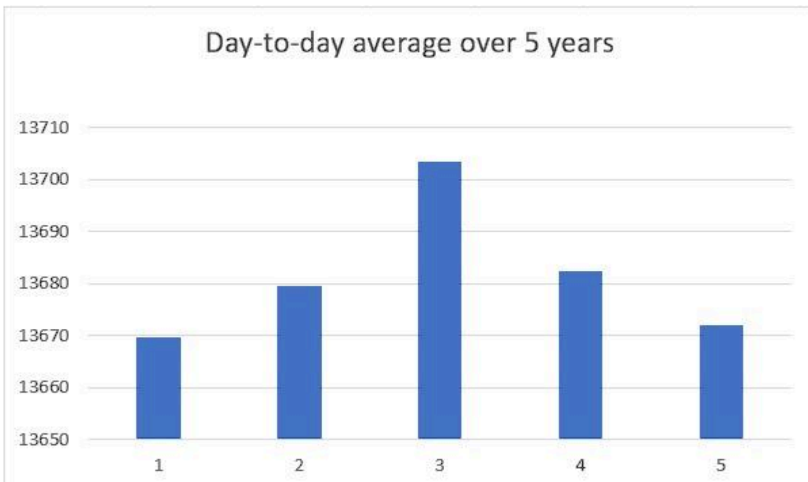


Fig 1: Average return plotted for each day of the week(1-Monday....5-Friday)

Month of the Year:

- With the highest average returns in February, you might consider increasing investment allocations during this month. Keep in mind that market conditions can change, and past performance is not indicative of future results.

Fig 2: Average return plotted for each month of the year(1-Jan....12-Dec)

Predicting ICICI Prices using SARIMA

SARIMA on ICICI share price data

SARIMA, short for 'Seasonal Auto-Regressive Integrated Moving Average' is a general class of models used for forecasting time series data. The ARIMA model is a combination of both an AR model and an MA model, while taking into consideration the seasonality of the inputted data.

SARIMA models are generally denoted as SARIMA (p,d,q) where

1. p is the order of autoregressive model

We can find out order of the AR part using a PACF plot.

2. d is the degree of differencing

Stationarity means that the mean and variance of the data remains constant over time. Differencing the data converts a non-stationary time series into a stationary one, and then predicts future values from historical data, as AR and MA models only work on stationary data.

Differencing is used to stabilize the mean of the time series by removing changes in the level of a time series, which in turn reduces trend and seasonality. We may need to differenciate a non-stationary dataset multiple times before it becomes stationary.

3. q is the order of moving-average model

We can find the order of the MA part using a ACF plot.

Implementing the SARIMA model using Python

We implemented this model using the auto_arima function in the pmdarima library. We converted the data into Pandas DataFrames, and then inputted the closing prices of the ICICI stock over five years into the model.

The model summary is given below:

[98]:

SARIMAX Results

Dep. Variable:	y	**No. Observations:**	1551
Model:	SARIMAX(2, 1, 2)	**Log Likelihood**	-5546.767
Date:	Thu, 30 Nov 2023	**AIC**	11105.535
Time:	20:56:10	**BIC**	11137.611
Sample:	0	**HQIC**	11117.465
	- 1551		
Covariance Type:	opg		

	coef	std err	z	P>|z|	[0.025	0.975]
intercept	0.5987	0.452	1.325	0.185	-0.287	1.484
ar.L1	-0.1933	0.053	-3.674	0.000	-0.296	-0.090
ar.L2	-0.8874	0.046	-19.453	0.000	-0.977	-0.798
ma.L1	0.1452	0.053	2.719	0.007	0.041	0.250
ma.L2	0.8858	0.046	19.412	0.000	0.796	0.975
sigma2	75.1312	1.113	67.498	0.000	72.950	77.313

Ljung-Box (L1) (Q):	0.81	**Jarque-Bera (JB):**	8528.39
Prob(Q):	0.37	**Prob(JB):**	0.00
Heteroskedasticity (H):	4.14	**Skew:**	0.31
Prob(H) (two-sided):	0.00	**Kurtosis:**	14.47

From here we find that:

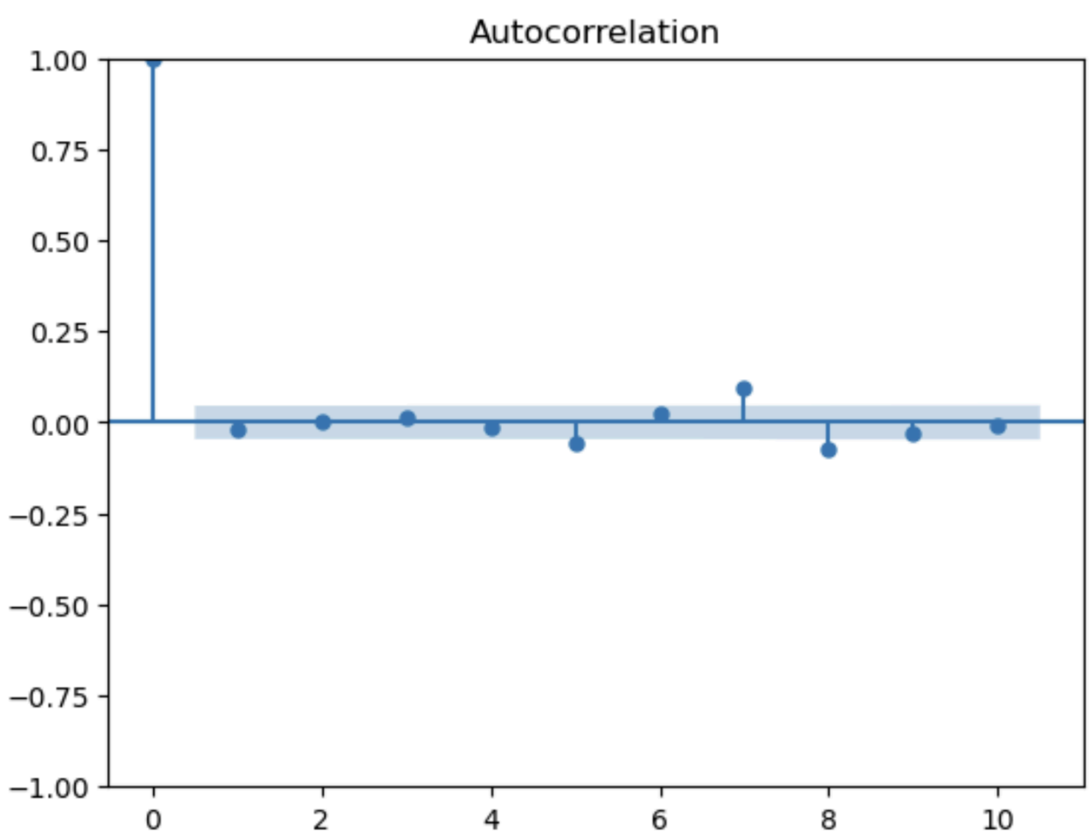
1. p =2
2. d = 1
3. q = 2

We verify these values as shown below, to make sure the function has selected the correct model parameters.

1. p Value

p is the order of the auto-regressive model, which signifies the number of past observations that the new value of the target variable is dependent on. This is also called the log of the model.

We use an auto-correlation function to decide p. We can plot the ACF plot using the library statsmodel. p is the number of significant spikes above the significance area (mentioned in blue).



Here, for 10 lags, we see that there are two considerable spikes (for the stationary data, i.e., singly differentiated data). **Therefore, the value of p = 1 taken by the model is correct**

2. d Value

We are using a unit root test to decide whether data is stationary or not, in particular the Augmented Dickey-Fuller Test. Unit root is a characteristic of a time series that makes it non-stationary.

The augmented Dickey-Fuller (ADF) test consists of testing the null hypothesis that a unit root exists and that the data is non-stationary. If the null hypothesis cannot be rejected, then we cannot reject the existence of a unit root, and can inversely assume/approximate that the data is stationary. We reject and accept the null hypothesis based on the below data:

1. **p-value > 0.05**: Fail to reject the null hypothesis, i.e., the data has a unit root and is non-stationary.
2. **p-value <= 0.05**: Reject the null hypothesis, i.e., the data does not have a unit root and is stationary.

We obtain the p-value from the ADF test, performed using the statsmodel library in Python. The results are shown below:

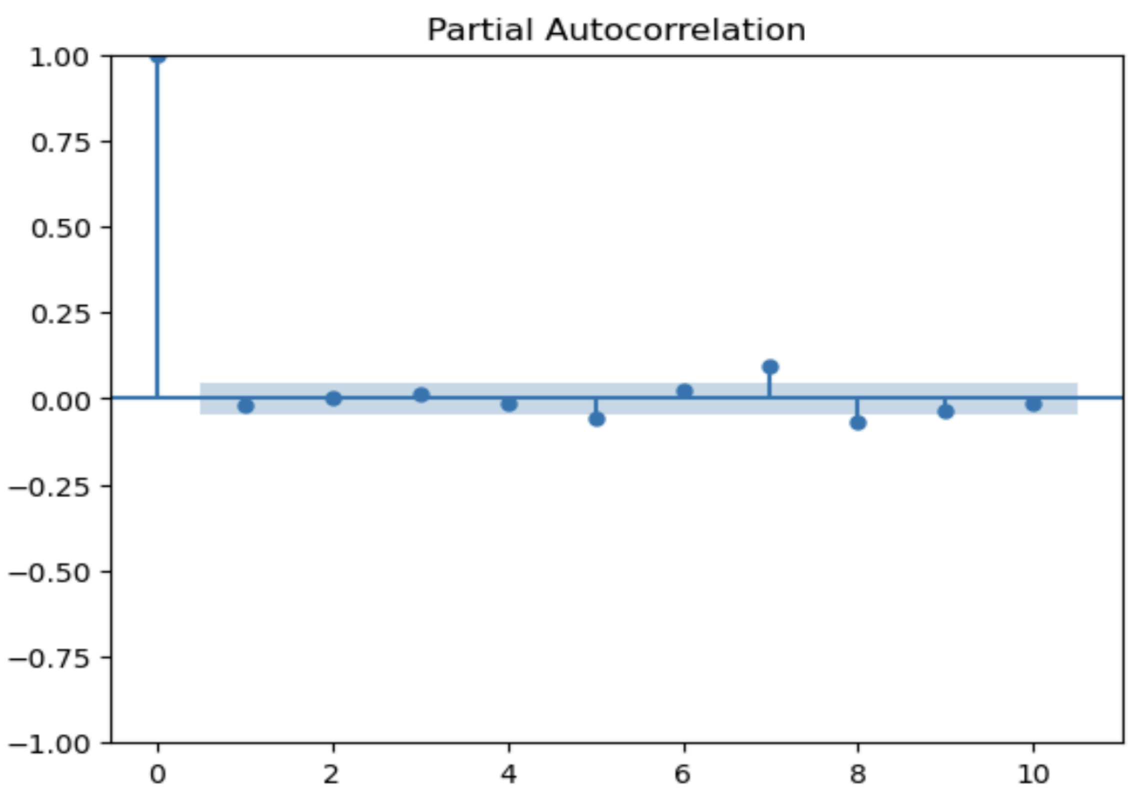
```
d = 0
ADF Statistic: -0.663821
p-value: 0.855899
Critical Values:
        1%: -3.434
        5%: -2.863
        10%: -2.568
d = 1
ADF Statistic: -12.511372
p-value: 0.000000
Critical Values:
        1%: -3.434
        5%: -2.863
        10%: -2.568
```

Here the p-value is > 0.25 for d = 0, but not for d = 1. Therefore, without differentiation, the data is non-stationary and on a single differentiation, the data can be taken as stationary. **Hence, the d value of 1 selected by the model is correct.**

3. q Value

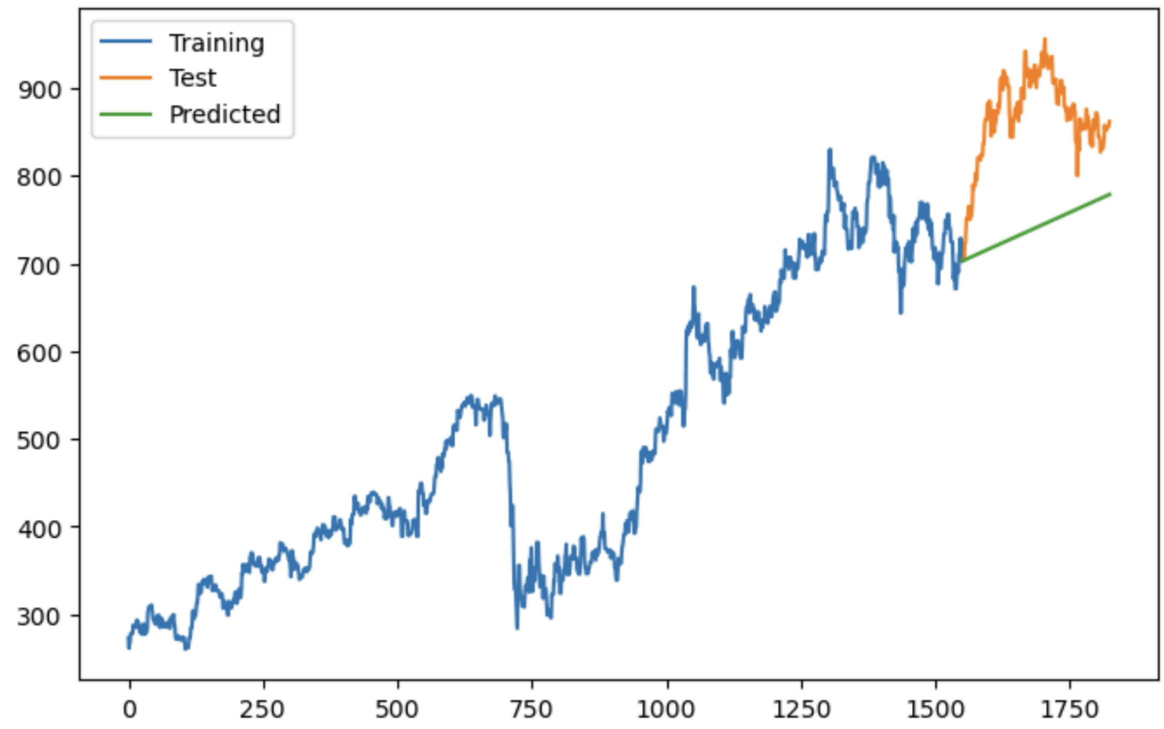
An MA model is taken as a linear combination of past errors in prediction. q is the order of the moving average model and q is the number of past errors we consider. Each value of the prediction can be thought of as a weighted moving average of the past few forecast errors. q is the number of past errors we consider

A partial auto-correlation function (PACF) helps us find the q value. Simialrly to an auto-regressive model, we can plot the ACF plot using the library statsmodel. q is the number of significant spikes above the significance area (mentioned in blue).



Here, for 10 lags, we see that there are two considerable spikes (for the stationary data, i.e., singly differentiated data). **Therefore, the value of q = 1 taken by the model is correct.**

Predicting the Closing Prices using the SARIMA Model



The model is not very accurate as shown above, but does recognise the direction of trend quirte well.

The model reported an MAPE value of approximately 0.137, thus indicating an accuracy of approximately 86.7%.

```
print("MAPE")
print(mean_absolute_percentage_error(cp_test['y8'], predictions1['yhat']))

MAPE
0.13710137135281938
```

This model can be used to approximate how much the data will increase or decrease over a larger window of time than daily.

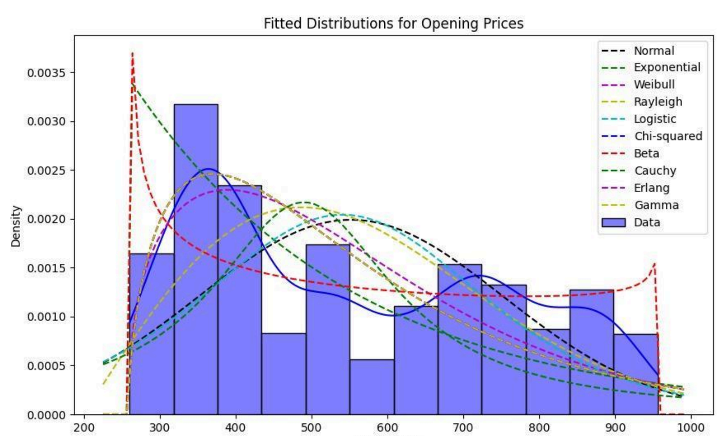
Probability-Fit Distribution for ICICI BANK data FY 2018-2023

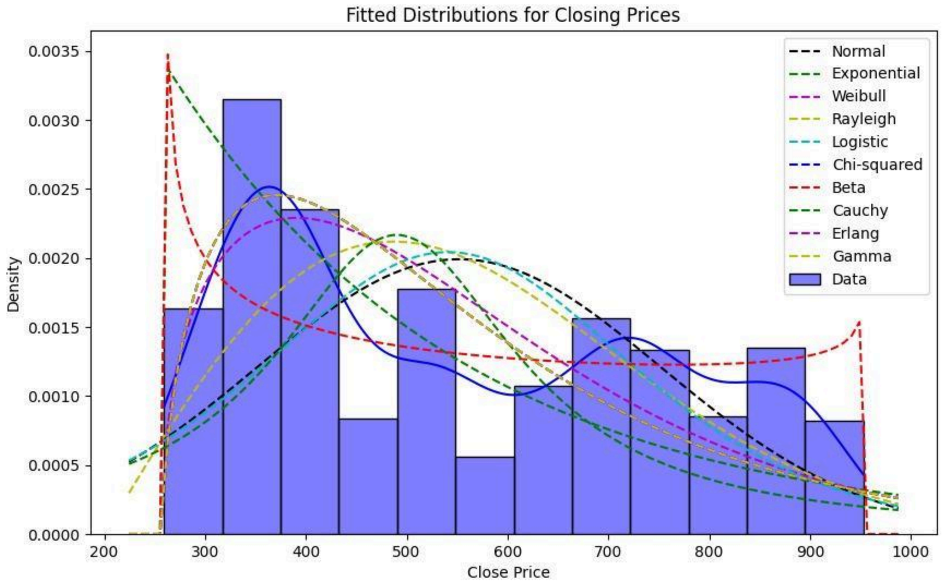
The p-values obtained for the tested distributions were unusually low, suggesting a considerable difference between the assumed and observed distributions. Specifically, the p-values for starting and closing prices were noticeably low across all examined distributions. The AIC values confirmed the inadequacy of the tested models. The AIC values were noticeably high for all distributions, implying that the models could not successfully reflect the intricacies inherent in ICICI Bank's price fluctuations.

In statistical modeling, the Akaike Information Criterion (AIC) and p-values are crucial in assessing the goodness of fit for different probability distributions. AIC is a measure that balances the trade-off between the model's complexity and its ability to explain the observed data. Lower AIC values indicate a better fit, suggesting that the distribution provides a more parsimonious representation of the underlying data.

On the other hand, p-values, often derived from statistical tests like the Kolmogorov-Smirnov or Anderson-Darling tests, quantify the likelihood that the observed data follows a specific distribution. A low p-value suggests a poor fit, indicating that the chosen distribution does not accurately describe the data. Therefore, the interplay between AIC values and p-values is essential for model selection, helping researchers identify the most appropriate distribution that strikes a balance between simplicity and explanatory power, ultimately enhancing the reliability of statistical analyses and predictions.

The figure below depicts the fits of the selected distributions overlayed over the opening and closing price histograms for combined data.





Below are the parameter values of the best-fitting distribution for both opening and closing prices.

For closing price:-

p-value for Normal Distribution	8.73878201940395E-22
p-value for Exponential Distribution	5.45174784104111E-12
p-value for Weibull Distribution	5.42391273455947E-12
p-value for Rayleigh Distribution	1.00239846099062E-20
p-value for Logistic Distribution	4.59755046192342E-17
p-value for Chi-squared Distribution	7.40525241653242E-13
p-value for Beta Distribution	6.64423880647014E-10
p-value for Cauchy Distribution	1.03033516555014E-36
p-value for Gamma Distribution	7.40568549794288E-13

For opening price:-

p-value for Normal Distribution	1.49773506047650E-22
p-value for Exponential Distribution	1.00192737727886E-11
p-value for Weibull Distribution	2.51852492974800E-12
p-value for Rayleigh Distribution	2.32761892421547E-20
p-value for Logistic Distribution	1.15657555181909E-17
p-value for Chi-squared Distribution	8.21525675313626E-13
p-value for Beta Distribution	4.59817006360220E-09
p-value for Cauchy Distribution	1.53964639478159E-36
p-value for Gamma Distribution	8.21508234110069E-13

Below are the AIC values for closing and opening prices,

AIC values for closing prices:

AIC for Normal Distribution	16923.1104876491
AIC for Exponential Distribution	16822.0008554660
AIC for Weibull Distribution	16644.3880109390
AIC for Rayleigh Distribution	16731.6970131229
AIC for Logistic Distribution	17042.6400882921
AIC for Chi-squared Distribution	16682.7196306175
AIC for Beta Distribution	16458.7531780236
AIC for Cauchy Distribution	17660.4699530954
AIC for Erlang Distribution	16682.7196306173
AIC for Gamma Distribution	16682.7196306174

AIC values for opening prices:

AIC for Normal Distribution	16923.1105304034
AIC for Exponential Distribution	inf
AIC for Weibull Distribution	16646.2602693074
AIC for Rayleigh Distribution	16731.6971336309
AIC for Logistic Distribution	17042.6402720095
AIC for Chi-squared Distribution	16682.8260994811
AIC for Beta Distribution	inf
AIC for Cauchy Distribution	17660.4713947423
AIC for Erlang Distribution	16682.8260898478
AIC for Gamma Distribution	16682.8260952357

So choosing the best-fitting probability distribution for ICICI Bank Ltd's opening and closing prices is difficult since all evaluated models continually provide poor fits with low p-values and high AIC values. Even though the Beta distribution has the lowest AIC, the generally low p-values indicate that none of the models adequately fits the data.

We tried fitting yearly data also using the identical distributions, but still, the highest p-value was of the order of 10^-2. This is for 01/04/2018 to 31/03/2019 and is a beta distribution.

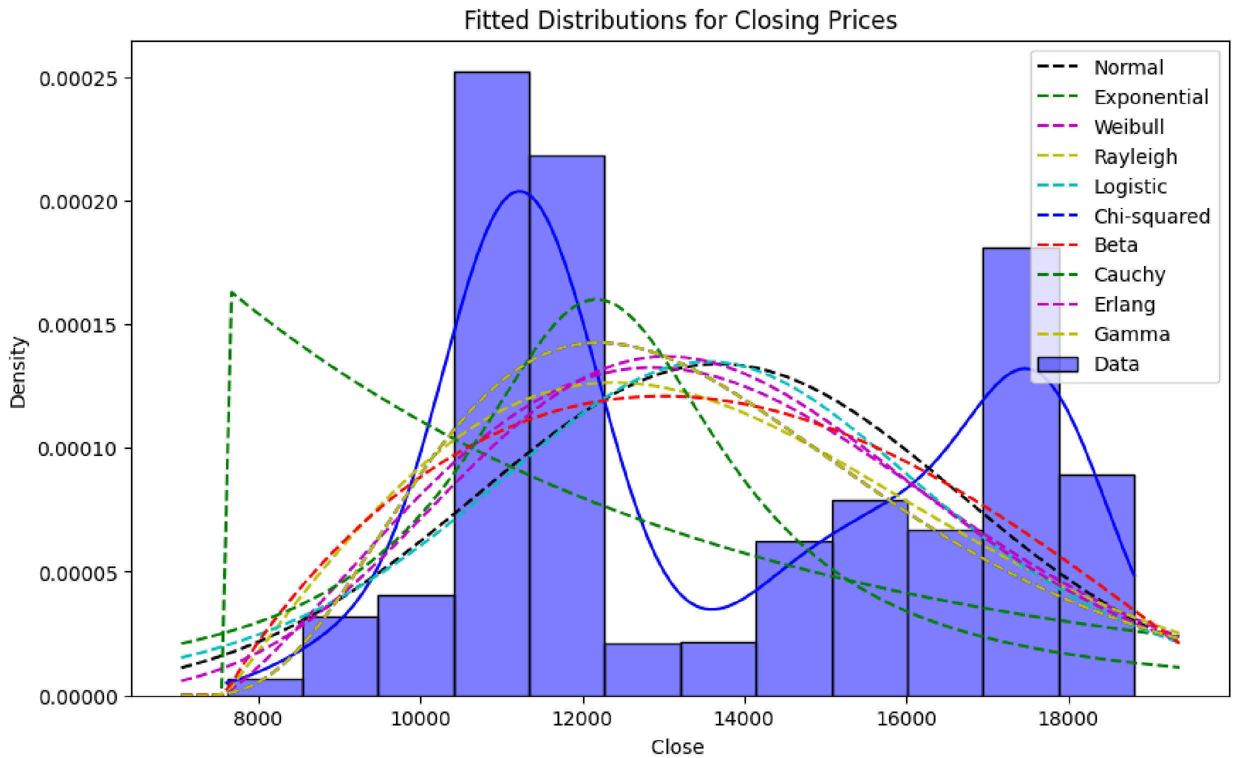
The parameters for beta distribution for the corresponding year are (1.3228533295366038, 1.475341749305588, 258.9055325139391, 143.12139401315466). And the corresponding p-value = 0.23250837.

Probability-Fit Distribution for NIFTY Data FY 2018-2022

The extremely small p-values (e.g., in the order of 10^{-40} to 10^{-20}) for all distributions indicate strong evidence against the hypothesis that the Nifty data follows any individual distributions perfectly. It implies that the data significantly deviates from being perfectly described by any single distribution.

Comparing AIC values across distributions, the distribution with the lowest AIC (in this case, the Beta distribution with an AIC of approximately 23054.95) suggests a relatively better fit than other distributions. However, the differences in AIC values might only sometimes be substantial.

Among the distributions tested, the Beta distribution has a relatively better fit than others, as indicated by its lower AIC value. However, this doesn't imply an ideal fit, just a comparatively better fit within the selected distributions. Also, the analysis doesn't exhaustively cover all possible distributions, and other distributions might provide a better fit to the Nifty data.



P-value for closing price:-

p-value for Normal Distribution	2.277637106926525e-42
p-value for Exponential Distribution	7.534775476372 56e-97
p-value for Weibull Distribution	1.9522426647783248e-31
p-value for Rayleigh Distribution	3.320337617488828e-20
p-value for Logistic Distribution	2.1850785453529784e-35
p-value for Chi-squared Distribution	2.1081988235960932e-23
p-value for Beta Distribution	2.4237382886748687e-24
p-value for Cauchy Distribution	8.262812743434721e-48
p-value for Gamma Distribution	2.102290452186608e-23

AIC values for closing prices:

AIC for Normal Distribution	23286.01503388037
AIC for Exponential Distribution	24013.037903735574
AIC for Weibull Distribution	23171.636598284524
AIC for Rayleigh Distribution	23187.177852401153
AIC for Logistic Distribution	23427.496916021875
AIC for Chi-squared Distribution	23193.98339339793
AIC for Beta Distribution	23054.94790662031
AIC for Cauchy Distribution	24056.519318772458
AIC for Erlang Distribution	23242.476512212335
AIC for Gamma Distribution	23193.983393269278