

## Evaluating the Share Prices of Irctc on the National Stock Exchange (Nse) with Reference to Lockdown in India

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**Abstract**—The aim of the paper is to study and evaluate the performance of share price of IRCTC since its listing on NSE, India. The paper also focuses on studying the pre and post-performance in share prices with respect to the lockdown announcement in India. The Research Design is descriptive in nature. Data are collected for the daily share prices of IRCTC, from 14<sup>th</sup> October 2019 to 15<sup>th</sup> January 2021, on NSE, India. Descriptive statistics and one variable analysis were carried out to study the prices. Pre and post-performance of prices was studied using t test and Kolmogorov-Smirnov Test. Backed by strong fundamentals, IRCTC Share witnessed huge appreciation at the time of listing on NSE. Also the rally continued on the basis of positive sentiment among the investors. With the rise in global pandemic scenario, the government of India, announced lockdown which brought the entire nation to a standstill, along with the railways. The study inferred that the IRCTC share prices started the downfall one month prior to the announcement of lockdown in the country, and it remained so until the date of commencement of lockdown. The post lockdown period, witnessed a V shaped recovery in the IRCTC share prices, and it managed to regain its position.

**Keywords**—IRCTC, Lockdown, NSE

## I. BACKGROUND

With the president of India, as a promoter, Indian Railway catering and Tourism Corporation limited (IRCTC) enjoys the privilege of being the only company authorized to provide catering services, online railway ticket booking to railway passengers in India by Indian Railways. IRCTC is also sole entity to provide packaged drinking water at railway stations in India. IRCTC segments their business operations into: Online ticket booking for railways, Catering, Packaged drinking water 'Rail Neer' and travel & Tourism. With such advantage, when IRCTC floated its IPO, in September 2019, it was received in high spirits by the investors. An IPO of 635.04 Crores, was oversubscribed by over 111 times (source: moneycontrol.com), and a strong listing was on the cards.

Table 1: IPO details of IRCTC

Issue opens	30-Sep-19				
Issue closes	03-Oct-19				
Listing on	BSE, NSE				
Issue size (Rscr)	635.04				
Issue price / Floor Price (Rs)	315.00-320				
number of times issue is subscribed (BSE + NSE)	QIB	NII	RII	EMP	TOTAL

	108.79	354.52	14.94	5.82	111.95
Finalization of Basis of Allotment:	9 October 2019				
Transfer of shares to demat accounts:	11 October 2019				
Listing Date:	14 October 2019				
Opening Price on NSE:	Rs. 626 per share				
Listing Date Closing Price on NSE	Rs. 727.75 per share				

(Source: moneycontrol.com, ipocentral.in)

#### OBJECTIVE OF THE STUDY.

1. To study the performance of share prices since of IRCTC on NSE, India.
2. The study aims to study the effect of lockdown on the share prices of IRCTC on NSE, India.

#### DATA USED FOR THE STUDY.

- The study is based on the daily closing prices of IRCTC on NSE, for a period starting from 14<sup>th</sup> October 2019 to 15<sup>th</sup> January 2021.
- The closing prices for the above period were collected from [www.nseindia.com](http://www.nseindia.com)

#### II. RESEARCH METHODOLOGY

Research Methodology adopted for the study is descriptive in nature.

#### III. ANALYSIS OF DATA AND DISCUSSION

To study the closing prices of IRCTC on National Stock Exchange, India, one variable analysis was carried out. The variable “Close” contains 317 values (daily closing prices) ranging from 700.65 to 1951.95.

#### ONE VARIABLE ANALYSIS

Data variable: close

Table: 2 Summary Statistics for close

Count	317
Average	1260.71
Standard deviation	245.161
Coeff. of variation	19.4463%
Minimum	700.65
Maximum	1951.95
Range	1251.3
Std. skewness	-2.21491
Std. kurtosis	-0.561619

The descriptive statistics for closing prices shows a mean of 1260.71 and standard deviation of 245.161. The standard skewness was calculated at -2.21491 and standard kurtosis at -0.561619. Both these values are found significant. Values of these statistics outside the range of -2 to +2 indicate significant departures from normality, which would tend to invalidate any statistical test regarding the standard deviation. In this case, the standardized

skewness value is not within the range expected for data from a normal distribution, however the deviation is marginal. The standardized kurtosis value is within the range expected for data from a normal distribution.

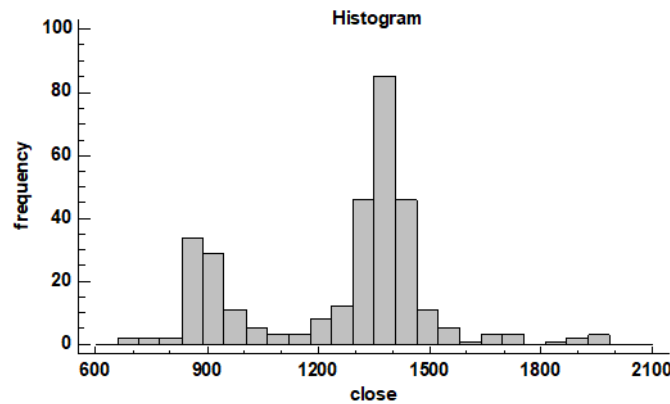


Figure: 1 Histogram chart of Closing prices of IRCTC on NSE, India.

In order to test the normality of the variable 'Close' statistical tolerance limits were calculated

#### [Statistical Tolerance Limits - close](#)

Data variable: close

Distribution: Normal sample from a normal distribution, the tolerance limits state that we can be 95.0% confident that 99.0% of the distribution lies between size = 317

mean = 1260.71

std. dev. = 245.161

95.0% tolerance interval for 99.0% of the population

Xbar +/- 2.7617 sigma

Upper: 1937.77

Lower: 583.646

Assuming that close comes between 583.646 and 1937.77. This interval is computed by taking the mean of the data +/-2.7617 times the standard deviation

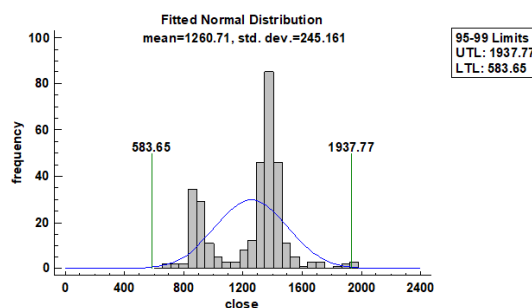


Figure 2: fitted normal distribution for closing prices of IRCTC on NSE

Table: 3 Tests for Normality for close

Test	Statistic	P-Value
Shapiro-Wilk W	0.88346	8.43769E-15

Since the P Value is less than 0.05, we can reject the idea that close comes from a normal distribution with 95% confidence

Testing for any outliers in the variable 'Close'.

Outlier Identification - close

Data variable: close

317 values ranging from 700.65 to 1951.95

Number of values currently excluded: 0

Table: 4 Location estimates

Sample mean	1260.71
Sample median	1351.35
Trimmed mean	1281.15
Winsorized mean	1246.37

Trimming: 15.0%

Table: 5 Scale estimates

Sample std. deviation	245.161
MAD/0.6745	108.377
Sbi	207.206
Winsorized sigma	291.546

Table: 6 Sorted Values

		Studentized Values	Studentized Values	Modified
Row	Value	Without Deletion	With Deletion	MAD Z-Score
3	700.65	-2.28444	-2.30723	-6.00406
2	713.15	-2.23345	-2.2549	-5.88873
4	724.3	-2.18797	-2.20827	-5.78584
1	727.75	-2.1739	-2.19385	-5.75401
5	779.15	-1.96424	-1.9795	-5.27974

...				
96	1909.4	2.64599	2.68011	5.14918
93	1923.5	2.7035	2.73974	5.27928
92	1930.05	2.73022	2.76746	5.33971
95	1951.65	2.81833	2.85905	5.53902
94	1951.95	2.81955	2.86032	5.54179

Grubbs' Test (assumes normality)

Test statistic = 2.81955

P-Value = 1.0

Grubbs test, assumes that the most extreme values comes from the same normal distribution as other observations (Ho).

Table 4 & 5 indicates the sample mean and sample standard deviation (sigma) as 1260.71 and 245.16 respectively. Table 6 shows that out of 317 observations, row no. 94, with a value of 1951.95, was the most extreme value, with a standard deviation of 2.81955 from mean. Since the p value of Grubbs test is well above 0.05, we fail to reject the Ho, indicating that all the observations appear to have come from the same population.

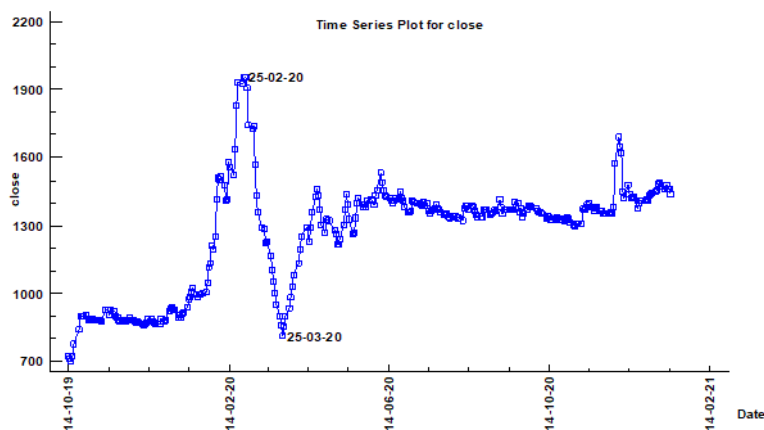


Figure: 4 Time series plot for variable 'close' (closing prices of IRCTC since listing)

Figure 4, shows the performance IRCTC share on National Stock Exchange (NSE), India, since its listing. IRCTC was listed on NSE, on 14<sup>th</sup> October 2019, at a price of Rs. 626 per share, 195% higher than the cut off. On the same day, it closed at 727.75 per share, showing more than 227% rise in 1 day with respect to the cut off price. IRCTC showed excellent listing on NSE as was expected. Even after the listing it continued to move upwards owing to high demand and strong fundamentals.

IRCTC, share prices observed highest closing on 25<sup>th</sup> February 2020, exactly one month before the lockdown was put in effect in the country. During this period, the IRCTC share prices observed a constant decrease in its closing prices, up to the starting date of lockdown in India. However, since 25<sup>th</sup> March 2020, the IRCTC share prices witnessed an upside trend, while the entire country was brought to a standstill.

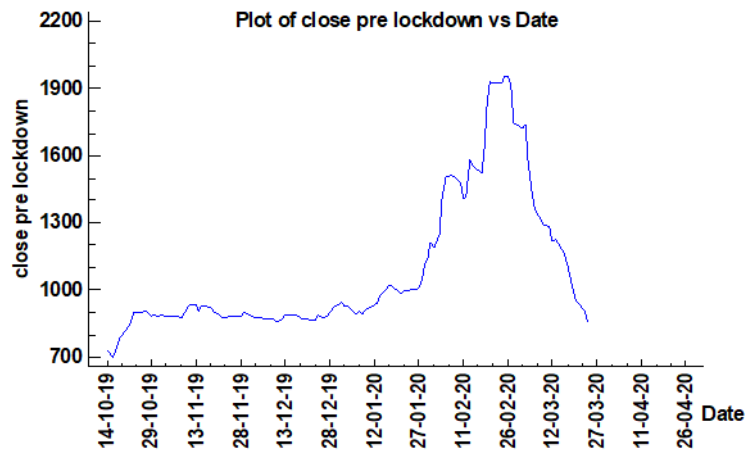


Figure: 5 Time series plot for variable ‘Pre-lockdown close’ (closing prices of IRCTC since listing)

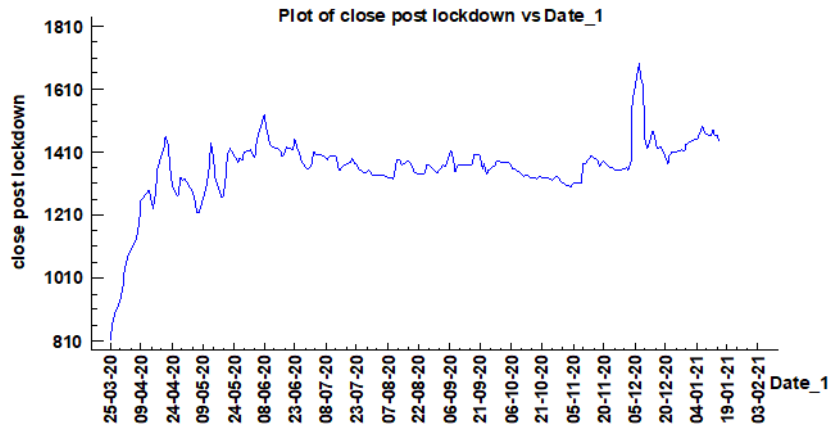


Figure: 6 Time series plot for variable ‘post-lockdown close’ (closing prices of IRCTC since listing)

In order to study the movement of the closing share prices of IRCTC, before and after the announcement of lockdown, following statistical methods were applied.

[Two Sample Comparisons - close pre lockdown & close post lockdown](#)

Sample 1: close pre lockdown

Sample 2: close post lockdown

Sample 1: 113 values ranging from 700.65 to 1951.95

Sample 2: 204 values ranging from 815.4 to 1691.55

Table: 7 Summary Statistics

	close pre lockdown	close post lockdown
Count	113	204
Average	1079.64	1361.0
Standard deviation	313.668	104.496
Coeff. of variation	29.053%	7.67785%
Minimum	700.65	815.4
Maximum	1951.95	1691.55
Range	1251.3	876.15
Std. skewness	6.21932	-12.5075
Std. kurtosis	2.16635	28.8525

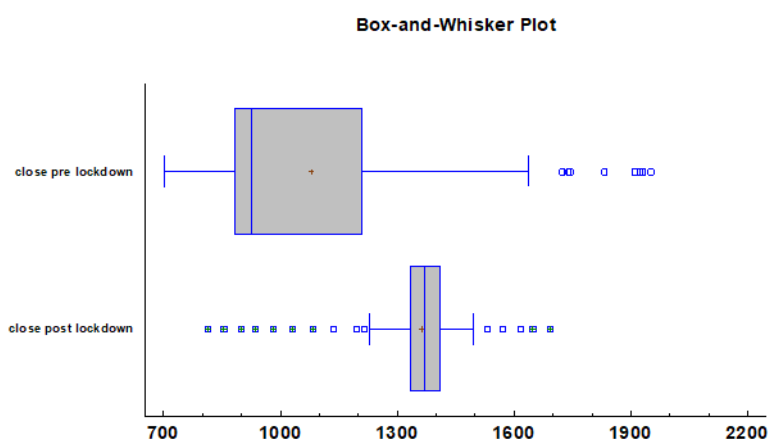


Figure: 7 Box and Whisker Plot for pre and post closing prices.

The average closing price of pre and post lockdown was calculated at 1079.64 and 1361 respectively, 26% higher than the pre lockdown average. The standard deviation was also lower in post lockdown closing prices and the range significantly narrower as compared to pre lockdown prices. In case of the post lockdown closing prices, there are also outliers. Of particular interest are standardised skewness and kurtosis values which indicate that the pre and post closing prices lack normality. Moreover there lies difference in the variances among two periods as well.

In order to validate this observation statistically, comparison of standard deviations for closing price of pre and post lockdown period for IRCTC shares was carried out.

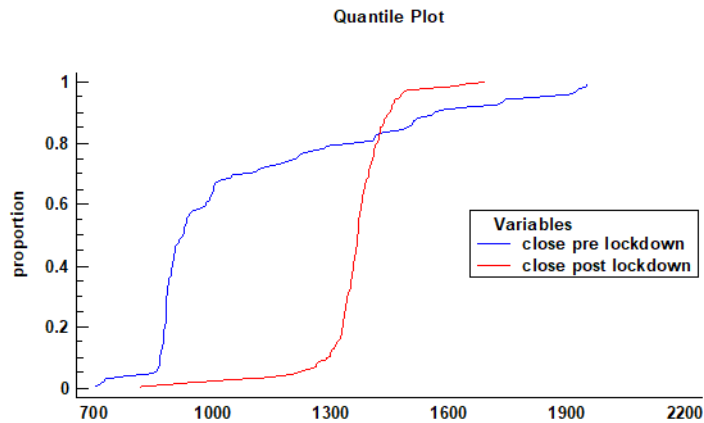


Figure: 8 Quantile Plot of Pre and post lockdown close prices of IRCTC.

On observing the quantile plots for the pre and post lockdown close prices, it indicates that there lies a difference between the means of two variables, as the two plots are not close together. Also there is a difference in the slope of the curve, which indicates that the standard deviations between the two variables are also different.

Table: 8 Comparisons of Standard Deviations

	close pre lockdown	close post lockdown
Standard deviation	313.668	104.496
Variance	98387.7	10919.3
Df	112	203

Ratio of Variances = 9.0104

95.0% Confidence Intervals

Standard deviation of close pre lockdown: [277.418, 360.91]

Standard deviation of close post lockdown: [95.2439, 115.754]

Ratio of Variances: [6.54432, 12.602]

F-test to Compare Standard Deviations

Null hypothesis:  $\sigma_1 = \sigma_2$  (Ho: There is no significant difference between the standard deviations of pre and post lockdown closing prices of IRCTC)

Alt. hypothesis:  $\sigma_1 \neq \sigma_2$  (H1: There is significant difference between the standard deviations of pre and post lockdown closing prices of IRCTC)

F = 9.0104 P-value = 0

As the calculated value of p is less than 0.05, we fail to accept the null hypothesis and infer that there is a significant difference between the standard deviations of pre and post lockdown closing prices of IRCTC.



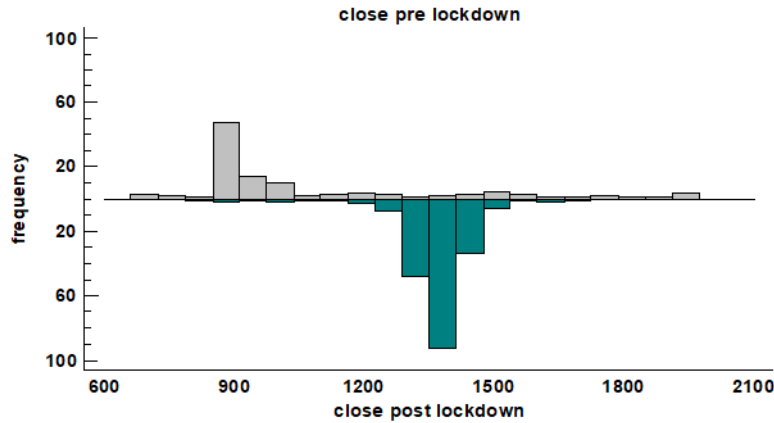


Figure: 9 Comparative histogram for pre and post lockdown closing prices of IRCTC

T test calculates whether the two variables are significantly different from each other, on the assumption that the variables are normally distributed and the variances of two variables are relatively equal.

Thus, in order to compare these variables, two methods can be applied:

- 1) t test without assuming equal sigmas. (non Parametric)
- 2) a non-parametric test Kolmogorov-Smirnov Test

Comparison of Means (t test, without assuming equal sigma) (non parametric method)

Comparison of Means

95.0% confidence interval for mean of close pre lockdown: 1079.64 +/- 58.4653 [1021.17, 1138.11]

95.0% confidence interval for mean of close post lockdown: 1361.0 +/- 14.4254 [1346.58, 1375.43]

95.0% confidence interval for the difference between the means

not assuming equal variances: -281.362 +/- 60.1629 [-341.525, -221.199]

t test to compare means

Null hypothesis: mean1 = mean2 (Ho: There is no significant difference between the pre and post lockdown closing prices of IRCTC)

Alt. hypothesis: mean1 NE mean2 (H1: There is a significant difference between the pre and post lockdown closing prices of IRCTC)

not assuming equal variances: t = -9.25506 P-value = 1.36351E-7

The t statistic, gives the p value of less than 0.05, therefore we fail to accept the null hypothesis, and infer that there is a significant differences between the pre and post lockdown closing prices of IRCTC at 95% confidence level.

To validate the result, Kolmogorov-Smirnov Test was carried out

Kolmogorov-Smirnov Test

Estimated overall statistic DN = 0.71599

Two-sided large sample K-S statistic = 6.10565

Approximate P-value = 0

Kolmogorov-Smirnov Test also gives the p value = 0 which indicate that there is a significant difference between the pre and post lockdown closing prices of IRCTC at 95% confidence level.

#### IV. CONCLUSION

The share prices of IRCTC have always been considered to be a safe and profitable investment instrument, for the investors, looking to its fundamental factors and its operational coverage throughout the country. The IPO was a huge hit, and the markets have always been favorable for IRCTC, until the rise of global pandemic, which had a huge downside risk for the company. Upon studying the Draft Red Hearing Prospectus submitted by IRCTC to SEBI before the issue, however covered an interesting point. Refereeing to the external risk which the company might face in future, IRCTC, had it covered in Point No. 40 of the DRHP document.(annexture:1) The pandemic did affect the IRCTC's operations and eventually its share prices, but it happened during the month prior to the announcement of the lockdown in the country. Since the announcement, the share prices recorded upward movement and have recovered to reach near high position on the NSE, India. The statistical studies also indicate the following and thus it is safe to infer that there has been a difference in the pre and post lockdown closing prices of IRCTC on NSE, India.

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