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Statistical Analysis of Trend in BSE-Bankex during "Covid 19" Pandemic Outbreak: Pre and Post Study

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Abstract

In a growing world, India has also featured as one of the foremost economy with its own consumer demand as well Indian markets have come up with a hope for overseas multinational companies and other financial players from every corner of the world.A paradigm shift has been observed in last one decade especially as a consequence of economic reforms in early 1990s. Robust growth has been experienced by Indian stock market and foreign institutional investors have also shown their faith while investing here in volume. Banking is always there as a fundamental for any economy and also in case of Indian economy, role of banking as a backbone of the whole financial system is but natural an exciting affair for the economy of India. The BSE – Bankex is a barometer of movement in Indian banking sector so it was taken under the present study. The closing price of Bankex was highly affectedduring lockdown called due to Covid -19 pandemic. The time series analysis of BSE- Bankex was conducted using time series plots and 3 days moving average method. The mean prices were also compared. The mean prices were significantly less than the prices before lockdown.

Keywords: BSE- Bankex, Moving average, time series, lockdown, Covid -19, pandemic.

Introduction

India has emerged as one of the robust growing key economy in the world and has witnessed a paradigm shift since the last ten years. The Indian economy boasts a steady annual growth rate, thriving capital markets and intensifying foreign exchange reserves. Indian stock market is important in terms of its degree of development in volume of trade and the use of technology which in turn attracts the international investors. Stock market had led to the development of regulatory bodies and to the establishment of various indices. The Second channel next to the Stock market for savings and investment is the Banking Industry. Banking industry is the foremost part and pre-requisite for the hasty development of any economic system. The sound and effective banking system in India has provided a strong base to Indian economy too. Indian Banking industry always played an optimistic key role in anticipation of latest worldwide economic catastrophe which pressed its worldwide counterparts to tumble.

With an introduction of securitization bill and an advent of novel technologies, banking sector in India has realized real time growth in preceding years and one can easily experiences the level of growth in this sector to a great extent. Same can be visualized from the performance of various listed banks in Indian Stock Market. Impact of such a swift growth and a deeper impact on economy as a whole have forced BSE to introduce a distinct index namely "S&P BSE Bankex" on 1st of January year 2002. Both internal and external fiscal and monetary indicators affect "Bankex"and consequently economy and investors' decisions also. Volatility of market worldwide has affected share price of Banking stocks as well, however with strong fundamentals "S&P BSE Bankex" has shown the sign of recovery and long term growth is expected out of this industry. Business and all commercial activities have been affected to a great extent. Banking exercises are the same, with regards to the overwhelming impact "COVID 19" has put on Indian economy.

Objective of the study

To analyze and compare the trend of BSE Bankex pre and during lock down period.

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Review of literature

Jasuja, D. et al, (2020) has attempted study to illustrate an impact of COVID-19 on various business segments in India and break down danger during pandemic time frame along estimating instability. For this reason, shutting stock costs of BSE SENSEX and different other sectoral records have been taken for the time of second December to 28th April 2020. The relative investigation utilizes the essential clear, "ANOVA" and "CAPM model" in current examination. "Garch model" has been practicalfor scrutinize instability. Empirical analysis done by Mishra, A. K. et al, (2020) exclaimed that choice of time range depends simply on the accessibility of information. The investigation utilizes "stock returns", "swapping scale returns", and "FII net venture". An inclination of "COVID-19" is continued on increasing trend at a disturbing rate since lockdown in the country. Sensex dipped (−22.65%) during outbreak of pandemic. The motivation behind the examination led by Khan, A. An., and Javed, S. (2017) is to realize that how the National and International market, to be specific can impact the instability of "S&P BSE BANKEX" return in India and components influencing the unpredictability for the equivalent. The scientist distinguished and assessed the mean and difference segments of the day by day Bankex return utilizing "Garch (1, 1) model" by clarifying the instability structure of the residuals got under the most appropriate model for the pre-owned information arrangement. The method ML - ARCH (Marquardt) - Normal distribution has satisfied the criterion of model selection based on the three assumptions.These Null Hypotheses deals with the problems firstly, no serial correlation, secondly, the presence of no ARCH effect, thirdly, residual are normally distributed. Daily data period from 03rd May, 2012 to 08th January 2016, nearly 914 working days of all markets was chosen for estimating Arch-Garch model.

The study shows the significant result of ARCH and GARCH effect. The Bankex Return is also significantly affected by endogenous variable (SENSEX return). The NASDAQ composite and SSE composite Index are also statistically significant, In sum-up, the foreign market return volatility or outside shock can influence the volatility of BANKEX return. However, the FTSE 100 was not found statistically significant, revealing that volatility in FTSE return cannot transmit to S&P BSE BANKEX return in India.Birau, R. et al, (2015) has conducted a study with the main objective to examine the conduct of "S&P Bombay Stock Exchange (BSE) BANKEX Index" unpredictability designs utilizing "GARCH model". Bollerslev GARCH (1, 1) model fitted well on BANKEX money related arrangement. All things considered, the genuine distinction among Min and Max uncovers serious extent of unpredictability in Bombay Stock Exchange for open finished stocks. We considered information running from first Jan 2002 to a day ago of June 2014. Essential insights shows the mean and danger esteem in the BANKEX file (0.2013). The profits are more in last decade and BANKEX record have retained the worldwide budgetary emergency well. Stock changes are irregular and profoundly unpredictable since proof presence in year 2004 for down impact stuns and 2009 for positive stuns.

Research Methodology

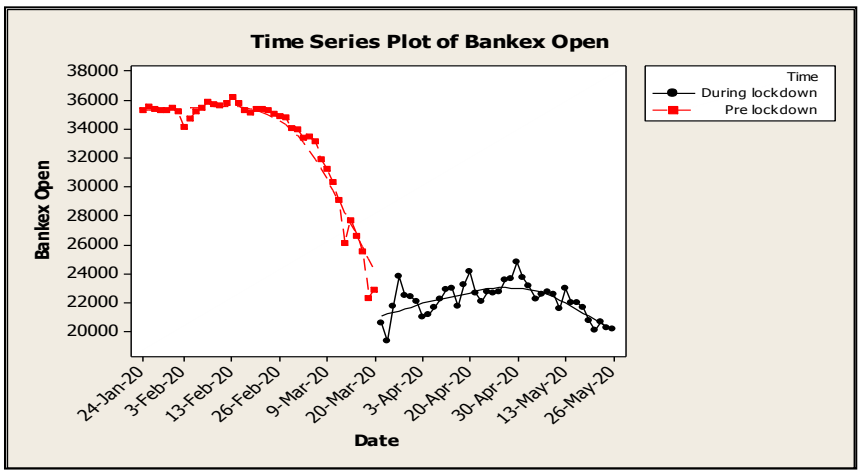
Data was extracted from website of Bombay Stock Exchange from date 24th January to 26th May, 2020. Time series analysis was done to analyze the trend of Bankex pre and during lockdown period. The analysis is done in the form of time series plots with three days moving average. Three day moving average was applied to test the consistency in daily price change. The residuals of three days moving average were also analyzed. Further the distribution of Bankex was compared using means before and during lockdown period."Two independent samples t test" was realistic to check the worth of varianceamongst means pre and during lockdown period.The assumption of homogeneity of difference was also tested using Levene's F test.

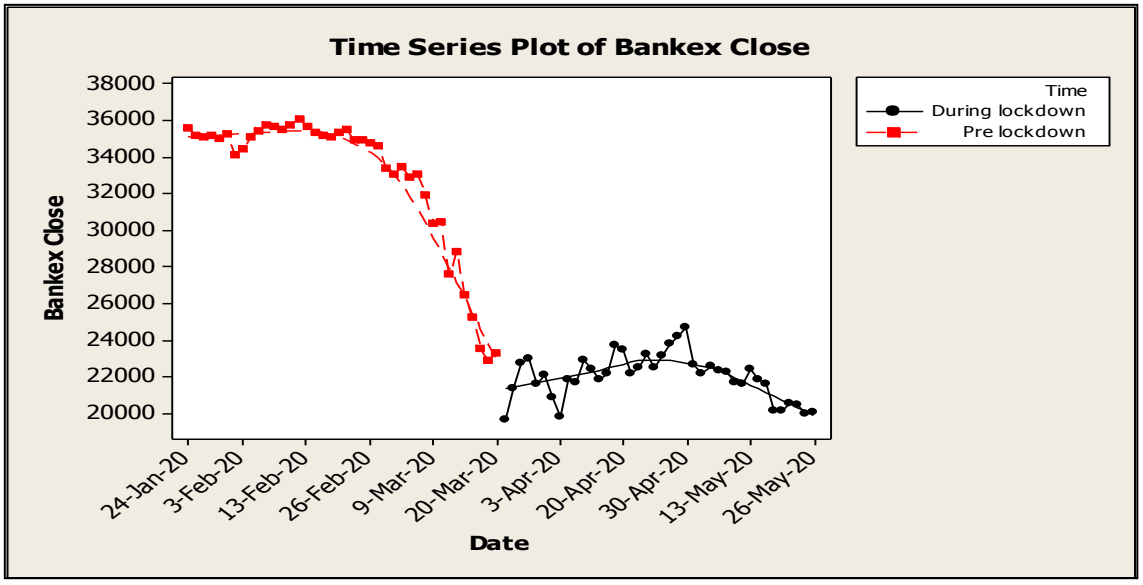
Results and discussion

To accomplish the objective of analyzing and comparing the trend of BSE Bankex pre and during lock down period, trend analysis was done and graphical presentation along with inferences drawn has been drafted as under:

Time Series trend for daily opening and Closing price of Bankex

For plotting the graphs, data for opening price ofBankex were taken from 24th January, 2020 to 26th May, 2020 comprising of 80 days in all. Out of which initial 40 days were considered as pre lockdown period dated 24th January to 20t March, 2020. Post to that was considered as period during the lockdown.

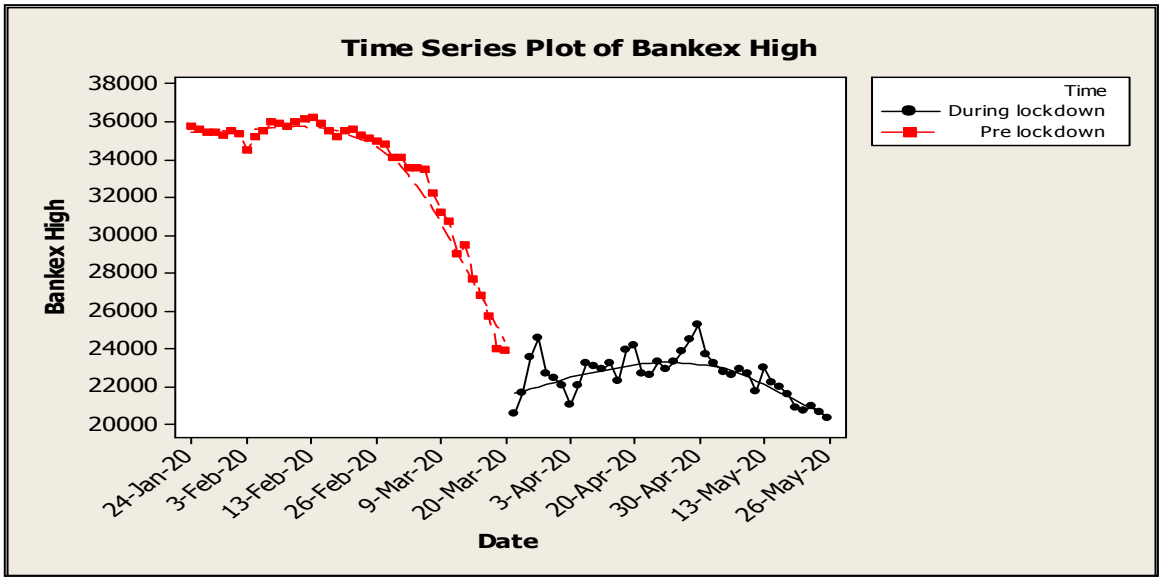


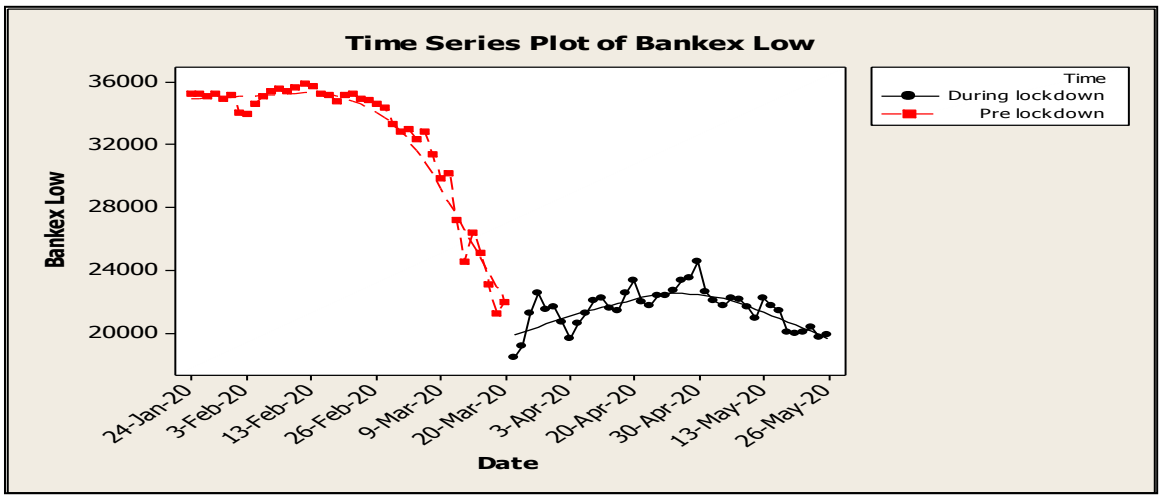


In the above graphs, time series plots in red colour markspre lockdown whereas black colour plots indicate during lockdown trend. Decreasing trend was observed in the trend of opening and closing prices of Bankex pre lockdown was observed. It was on diminishing state with a bare minimum volatility. On the other hand, during the lockdown period, much volatility was realized in this regard. Also the change in both daily opening and closing prices of Bankex werechanged with high dispersion but overall growth was stagnant. The CAGR was positive with less magnitude during lockdown period (0.05%) in comparison to before lockdown (- 1.09%).

Time Series trend for daily high and low prices of Bankex

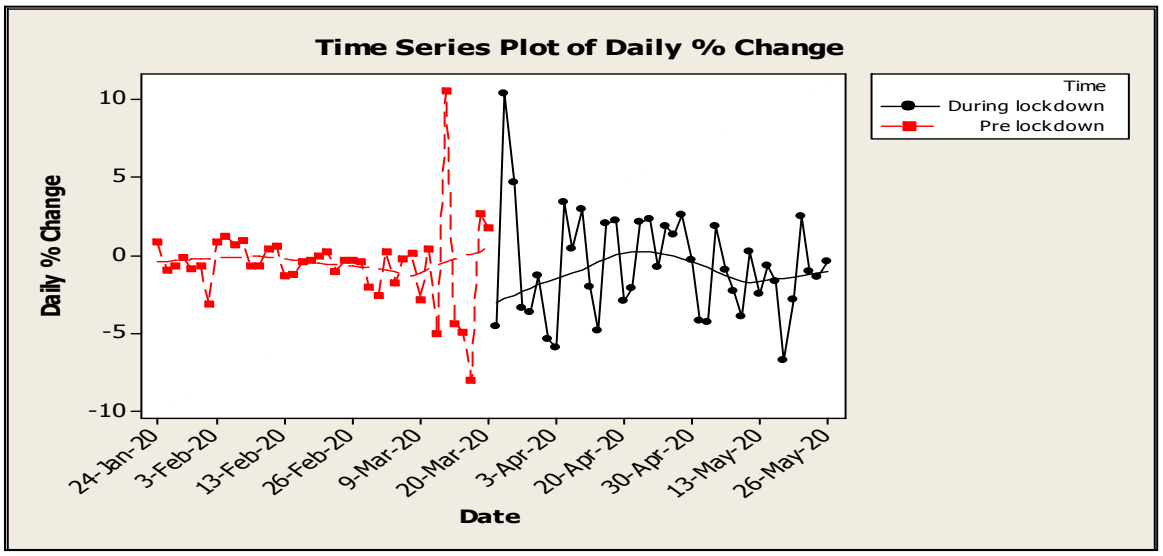
For plotting the graph, data for daily high and low prices of Bankex were taken.In the graphs below, decreasing trend was observed in the trend of highest and least prices of the day of Bankex pre lockdown was observed. It was on diminishing state with a bare minimum volatility. On the other hand, during the lockdown period, much volatility was realized in this regard. Also the change in highest and least prices of the day of Bankex was found identically stagnant.

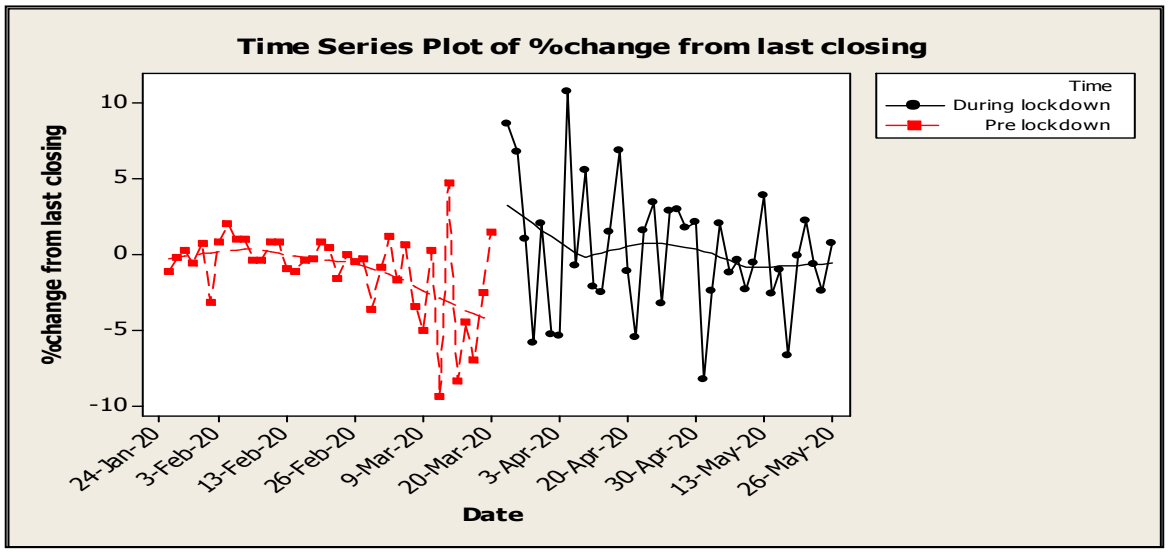




Time Series trend for percentage change in Bankex on daily basis and percentage change in Bankex from last closing price

The daily percentage change in price and percentage change in closing price with reference to last closing price were computed. For plotting the graph, data for percentage change in Bankex on daily basis was taken from 24th January, 2020 to 26th May, 2020 comprising of 80 days in all. Out of which initial 40 days were considered as pre lockdown period dated 24th January to 20thMarch, 2020.

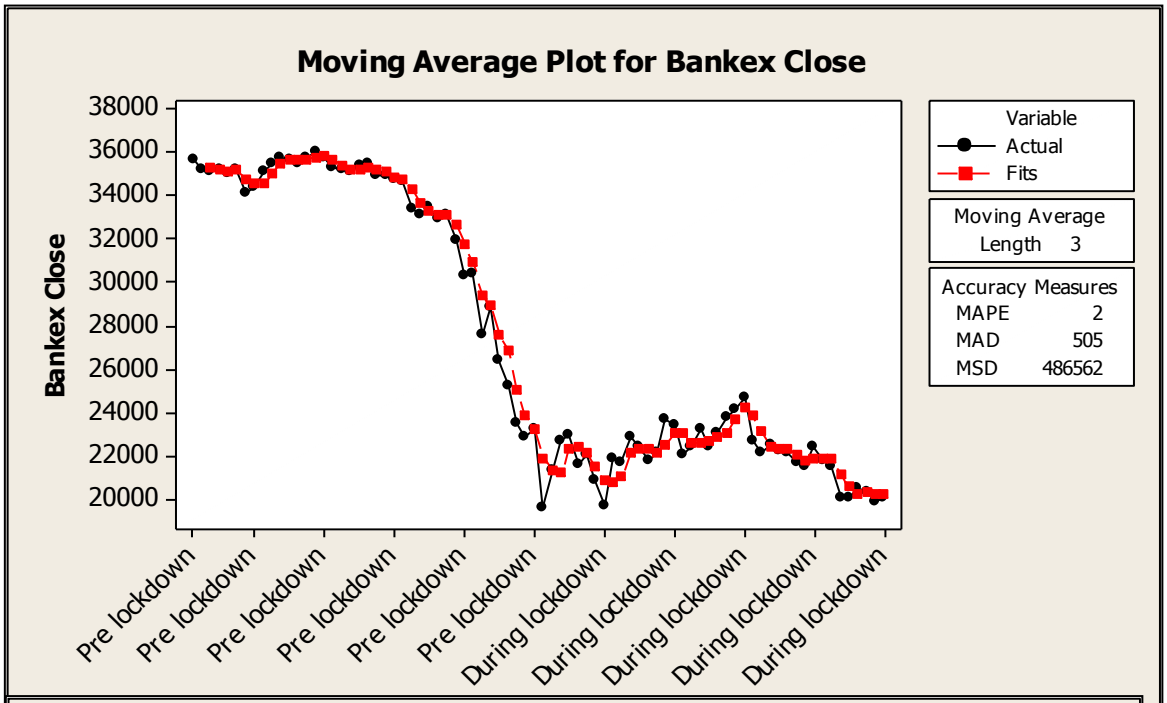


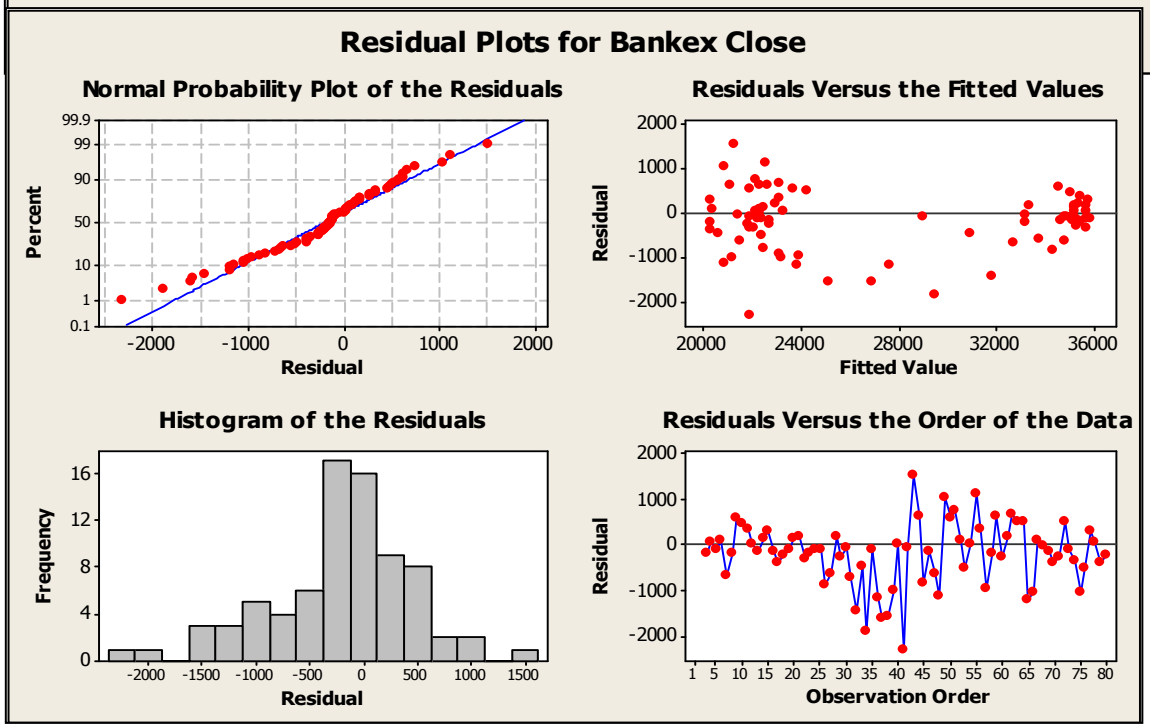


Percentage change in daily price of Bankex pre lockdown was not much volatile initially however much ups and down have been observed as lockdown approached. During the lockdown high variation was recognized in daily price change consequently higher uncertainty was observed in daily price due to poor inflow of income dropped on introduction of pecuniary measures like moratorium. Percentage change in Bankex from last closing for the pre lockdown period was less uncertain as compared to the lockdown period. During the lockdown period it has shown uncertainty on its peak initially and as the days passed, level of uncertainty gets lesser.

Moving Average Plot for closing price of Bankex

For plotting the graph, three days moving average was taken and plotted against the time.The graph below reflects that there is a steep change with diminishing rate in the moving average pre lockdown and then it gets stabilized during the lockdown period. Residual analysis was also considered for the current analysis demonstrating the normal behavior of residuals. Hence predictability for Bankex can be more précised. The mean absolute percentage error in 3 days moving average analysis is 2 units, that is a low value and it indicate the fit is quite similar to the actual values.





Comparison of closing price of Bankex before and during the lockdown

The opening, high, low and closing pricesof Bankex were compared before and during lockdown period using two independent samples t test. It is revealed from the tableof descriptive and t test given below that opening, closing, highest and lowest prices of Bankex pre lockdown and during the lockdown were found significantly different. These prices were found reduced during the lock down period as compared to pre lockdown period. On the other hand no significant difference was observed in Daily % Change and %change from last closing. Lockdown has affected all the prices of Bankex however daily percentage change and percentage change from last closing was not affected much as other determinant factors for Bankex were also in the picture accommodating the ill effects of lockdown.

Group Statistics

Price	Period	Mean	Std. Deviation	Std. Error Mean
Bankex Open	Pre lockdown	33166.40	3795.07	600.05
	During lockdown	22161.72	1206.86	190.82
Bankex High	Pre lockdown	33466.65	3505.76	554.31
	During lockdown	22582.67	1179.47	186.49
Bankex Low	Pre lockdown	32538.70	4217.54	666.85
	During lockdown	21516.46	1274.86	201.57
Bankex Close	Pre lockdown	32962.50	3862.26	610.68
	During lockdown	21982.54	1243.56	196.62
Daily % Change	Pre lockdown	-0.61	2.70	0.43
	During lockdown	-0.76	3.38	0.53
%change from last closing	Pre lockdown	-1.05	2.80	0.45
	During lockdown	0.14	4.19	0.67

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Bankex Open	Equal variances assumed	23.695	0.000	17.477	78	0.000	11004.682	629.663
	Equal variances not assumed			17.477	46.808	0.000	11004.682	629.663
Bankex High	Equal variances assumed	22.662	0.000	18.610	78	0.000	10883.981	584.840
	Equal variances not assumed			18.610	47.717	0.000	10883.981	584.840
Bankex Low	Equal variances assumed	26.285	0.000	15.822	78	0.000	11022.238	696.651
	Equal variances not assumed			15.822	46.068	0.000	11022.238	696.651
Bankex Close	Equal variances assumed	23.657	0.000	17.115	78	0.000	10979.960	641.550
	Equal variances not assumed			17.115	47	0.000	10979.960	641.550
Daily % Change	Equal variances assumed	4.657	0.034	0.222	78	0.825	0.152	0.684
	Equal variances not assumed			0.222	74.392	0.825	0.152	0.684
%change from last closing	Equal variances assumed	6.073	0.016	-1.475	76	0.144	-1.189	0.806
	Equal variances not assumed			-1.475	66.27	0.145	-1.189	0.806

Conclusion

Bankex also depends on macroeconomic issues as well. It was responded well by the foreign investors even during the lockdown period. Initially Indian markets have been also threatened by this outbreak and Bankex was also not an exception. Due to the strong fundamentals and domestic demand along with the trust of foreign investors has put Indian

markets in to right and constructive direction. The present study also reveals the same fact where prices of Bankex have shown volatility during lockdown but overall change in daily prices and percentage change from last closing was not found much deviated by the lockdown decision.

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