Report On

A STUDY ON MONTE CARLO SIMULATION FOR STOCK PRICE FORECASTING

RESEARCH DISSERTATION

for the Swiss School of Business and Management

DBA Program

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RESEARCH DISSERTATION

for the Swiss School of Business and Management

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Declaration

This is to declare that the report entitled "*A STUDY ON MONTE CARLO SIMULATION FOR STOCK PRICE FORECASTING*" is prepared for the fulfilment of the **Dissertation** of the **Doctor of Business Administration** (Global DBA) by me under the guidance of **Dr. Hrvoje Volarevic.**

I confirm that this dissertation truly represents my work. This work is not a replication of work done previously by any other person. I also confirm that the contents of the report and the views contained therein have been discussed and deliberated with the research guide / mentor.

Signature of the Student : 

Name of the Student (in Capital Letters): **Thangjam Ravichandra Singh**

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EXECUTIVE SUMMARY

The financial market may be a stochastic and sophisticated system that's challenging to model. Investors should be able to predict or simulate the probable outcomes of their portfolio or the interested investment strategy or the decision of choosing the asset class to yield the desired and expected return from the selected portfolio investments.

This research project will check the feasibility and capacity of Monte Carlo Simulation to forecast the futuristic prices of equity shares of selected corporates from the India's largest and oldest stock exchange National Stock Exchange (NSE). Five stocks of the banking sector, five stocks of the entertainment sector, and five stocks of the hotel sector were used as data set for the simulation and evaluates them over their past year data and predicted the data for the present year and further interpreted whether the business is strong for the future and what will be the forecasted present price.

Monte Carlo Simulation is a very important part of the firm as it states the stock price forecasting and tells us about efficient market hypothesis. Stock price forecasting will be taken for analysis purpose as it simplifies the fundamental hypothesis with respect to stock value anticipating is the Proficient Market Theory (EMH), which declares that the cost of a stock market as all data are accessible, and everybody has some level of admittance to the information. Time arrangement investigation covers countless forecasting strategies. It also allows the management to recognize problem relates areas so they can work on them.

The main parameters which determine the outcome of the simulations are the mean return of a stock, median return of the stock, standard deviation, and the percentiles returns. When these parameters were calculated and proved to be statistically significant for predictions for a month. By varying the assumptions regarding price distribution concerning the size of the current period time, the method could prove to be more accurate than what this study suggests. Monte Carlo Simulations proved to have the potential to become the best tool which will gives the accurate and effective stock price prediction model.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Since many years, multiple market experts and analyst have used different analysis techniques to predict the stock prices. They have applied many kinds of predictive analysis tools in the stock market to reach the desired goal of predicting the prices in the stock market. The theory of predicting the stock prices refers to the technique of market profit making for achieving sustainable and better returns in the market with the same risk. Therefore, the process of reliable price prediction is a daunting task for traders and investors as many factors including the economic, social, political, and psychological, and due to the formation of patterns of movement of bearings, they interact in a very complex way.

However, the theory of efficient market hypothesis (EMH) confirms that there are no effective or reliable market price forecasting methods. The process of reliable market prices prediction is usually a combination of two or more approaches: a basic analytical or fundamental approach and a technical analysis approach along with statistical calculations. Both the approach mentioned above has got their own merits and demerits. Bodie et all states that the fundamental analysis of a company shares prices typically revolves around the earnings, the interest rate, the expected yield / return, expected dividends or the risk assessments to determine the fair price of the share or the net present value of the shares. Do note that the fundamental analysis usually takes the historical prices which means to study the past prices, returns, earnings and analyze the company's financial statements (balance sheet, income statement, profit) to compute the intrinsic value. As per the theory, the expected return of the company stock investment is aligned over the holding period, and that for the undervalued or overvalued shares, its market price is equal to its base value.

Stock price forecasting or prediction is the process in which the value of the future stock can be forecasted, and other financial instruments traded on an exchange. The effective market theory sets that stock costs are a component of data and reasonable assumptions, and that recently uncovered data about an organization's possibilities is very quickly reflected in the current stock cost. This would suggest that all freely known data about an organization, which clearly incorporates its value history, would as of now be reflected in the current cost of the stock. A securities exchange expectation is an endeavor to estimate the future worth of an individual stock, a specific area or the market, or the market overall. These estimates for the most part utilize central investigation of an organization or economy, or specialized examination of graphs, or a mix of the two.

1.2 METHODS FOR STOCK PRICE FORECASTING

There are two basic methods for stock price forecasting:

- The first is essential investigation, which is separated into 'base up' and 'hierarchical' examinations. Base up assesses an organization's presentation utilizing pointers like value/profit (P/E) proportion, while hierarchical beginnings with the general economy and predicts what it will mean for singular stocks.

- The second is specialized investigation, which endeavors to discover designs in outlines and use past value patterns to anticipate future value activity. A few financial backers utilize both: the crucial investigation gives them a general view on a stock, and the specialized examination gives a passage cost to the exchange.

This research project will use the technical analysis approach to create the most reliable and efficient model for the prediction of stock returns using Monte Carlo Simulation. In particular, the simulations are used to estimate the corporates listed in National Stock Market (NSE) stock index. Forecasting the exchange yield rate can be a very important topic for investors, academics and professional in the stock market. Thus, when the returns on the securities market are predictable, investors can build its strategy after considering the outcome of technical analysis approach for their investment decision. Market Experts can make strategies on the plan of action for their investment portfolio based on the result of such forecasts of stock market prices.

The novelty of this research work stems from the lack of similar studies that use descriptive or technical analytic approaches to predict the performance of NSE stocks. From the research to be effective, primary data will be collected and analyze to predict the stock of NSE market. It seems very important to explore predicting the prices using technical analysis methods that can effectively predict the performance of the selected stock price from the NSE market.

Figure 1: Financial Markets in Digital Screen

Source: Google Images

1.3 MONTE CARLO SIMULATION

Monte Carlo Simulation, otherwise called the Monte Carlo Method or a numerous likelihood re-enactment, is a numerical strategy, which is utilized to assess the potential results of an unsure occasion. The Monte Carlo Method was concocted by John von Neumann and Stanislaw Elam during World War II to improve dynamic under questionable conditions. It was named after a notable club town, called Monaco, since the component of chance is center to the displaying approach, like a round of roulette.

Since its presentation, Monte Carlo Simulations have evaluated the effect of hazard in some genuine situations, for example, in man-made consciousness, stock costs, deals determining, project the executives, and valuing. They additionally give various benefits over prescient models with fixed sources of info, like the capacity to lead affectability investigation or ascertain the connection of sources of info. Affectability examination permits chiefs to see the effect of individual contributions on a given result and connection permits them to comprehend connections between any information factors.

The rationale behind using Monte Carlo Simulation over other methods is because of the efficient performance of extrapolating the data (predicting beyond known data points). It creates on random thousands of data representing potential pay-outs for possible outcome.

Consequently, the random modelling improves the reliability and validity as a prediction method.

The Monte Carlo method is a statistical method sufficient to solve any good mathematical or statistical problem. It can be a commonly used probabilistic method for approximating expectations. They also provide several advantages over predictive models with fixed inputs, such as the ability to conducts sensitivity analysis or calculate the correlation of inputs. Sensitivity analysis allows decision-makers to see the impact of individual inputs on a given outcome and correlation allows them to understand relationships between any input variables.

The Monte Carlo Simulation is based on the principle of Law of Large Numbers and the Central Limit Theorem. In addition, the first function of Monte Carlo is to reduce variability by averaging the outcomes over more samples, even if the convergence is slow. The law of large numbers is also very useful for modelling phenomena where there is significant uncertainty in the degrees of freedom of the sample, suggesting that the average sample size should approach the population average as the sample size increases.

1.4 APPLICATIONS

Monte Carlo methods are especially useful for simulating phenomena with significant uncertainty in inputs and systems with many coupled degrees of freedom. Areas of application include:

PHYSICAL SCIENCES: Monte Carlo methods are important in computational physics, chemical science, and related fields, and have diverse applications from complicated QCD calculations to designing heat shields and aerodynamic forms similarly as in modeling radiation transport for radiation dosimetry calculations. In statistical physics town, molecular modeling is an alternative to computational molecular dynamics, and Monte Carlo methods are accustomed to compute statistical field theories of straightforward particle and polymer systems. Quantum Monte Carlo methods solve the many-body problem for quantum systems. In radiation materials science, the binary collision approximation for simulating ion implantation is typically supported as a town approach to picking the following colliding atom. In experimental high-energy physics, town methods are used for designing detectors, understanding their behavior, and comparing experimental data to theory. Town methods are utilized in the ensemble models that form the idea of contemporary meteorology

ENGINEERING: Monte Carlo methods are widely employed in engineering for sensitivity analysis and quantitative probabilistic analysis current design. The requirement arises from the interactive, co-linear, and non-linear behavior of typical process simulations. For instance,

- In telecommunications, when planning a wireless network, the planning must be proved to work for an honest sort of scenarios that depend mainly on the number of users, their locations, and therefore the services they require to use. Monte Carlo methods are typically accustomed to generate these users and their states. The network performance is then evaluated and, if results aren't satisfactory, the network design goes through an optimization process.
- In reliability engineering, Monte Carlo Simulation is employed to compute system-level response given the component level response. for instance, for a transportation network subject to an earthquake event, town Simulation is wont to assess the k-terminal reliability of the network given the failure probability of its components, e.g., Bridges, roadways, etc.

CLIMATE CHANGE AND RADIATIVE FORCING: The inter-governmental panel on temperature change relies on town methods in probability density function analysis of radiative forcing. Probability density function (PDF) of ERF thanks to total GHG, aerosol forcing, and total anthropogenic forcing. The GHG consists of WMGHG, ozone, and stratospheric vapor. The PDFs are generated supported uncertainties. the mixture of the individual RF agents to derive total forcing over the commercial Era is done by Monte Carlo Simulations and supported the tactic in Boucher and Haywood (2001). PDF of the ERF from surface albedo changes and combined contrails and contrail-induced cirrus are included within the entire anthropogenic forcing, but not shown as a separate PDF. We currently don't have ERF estimates for a few forcing mechanisms: ozone, land use, solar, etc.

COMPUTER GRAPHICS: Path tracing occasionally cited as town ray tracing, renders a 3D scene by randomly tracing samples of possible light paths. Repeated sampling of any given pixel will eventually cause the type of the samples to converge on the proper solution of the rendering equation, making it one in every of the foremost physically accurate 3D graphics rendering methods alive

APPLIED STATISTICS: The standards for town experiments in statistics were set by Salkowski. In applied statistics, town methods are also used for a minimum of four purposes: to match competing statistics for little samples under realistic data conditions.

- To supply implementations of hypothesis tests that are more efficient than exact tests like permutation tests while being more accurate than critical values for asymptotic distributions.
- To produce a random sample from the posterior distribution in Bayesian inference.
- To produce efficient random estimates of the hessian matrix of the negative log-likelihood function which will be averaged to estimate the Fisher information matrix.

ARTIFICIAL INTELLIGENCE FOR GAMES: Monte Carlo methods are developed into a way called Mote-Carlo tree search that's useful for trying to find the simplest move in an exceedingly game. Possible moves are organized during a search tree and plenty of random simulations are accustomed to estimate the long-term potential of every move. A recording machine simulator represents the opponent's moves.

DESIGN AND VISUALS: Monte Carlo methods are efficient in solving coupled integral differential equations of radiation fields and energy transport, and thus these methods are employed in global illumination computations that produce photo-realistic images of virtual 3D models, with applications in video games, architecture, design, computer-generated films, and cinematic computer graphics.

LAW: A town approach was used for evaluating the potential value of a proposed program to assist female petitioners in Wisconsin achieve success in their applications forharassment and domestic abuse restraining orders. it was proposed to assist women to reach their petitions by providing them with greater advocacy thereby potentially reducing the danger of rape and physical assault.

FINANCE AND BUSINESS: Monte Carlo Simulation is usually accustomed to evaluate the chance and uncertainty that might affect the result of various decision options. Monte Carlo Simulation allows the business risk analyst to include the whole effects of uncertainty in variables like sales volume, commodity and labor prices, interest and exchange rates, further because of the effect of distinct risk events just like the cancellation of the contract or the change of law. Monte Carlo methods in finance are often accustomed to evaluate investments

in projects at a business unit or corporate level or other financial valuations. they'll be wont to model project schedules, where simulations aggregate estimates for worst-case, best-case, and possibly durations for every task to see outcomes for the general project.

1.5 ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

I. Monte Carlo is straightforward to resolve a posh financial problem.
II. Monte Carlo simulation may provide statistical sampling for the numerical experiments using a computer.
III. For optimization problems, town simulation often can reach global optimum and overcome local extreme.
IV. Monte Carlo simulation provides an approximate solution to several mathematical problems.
V. Monte Carlo is usually being attractive to cope with problems that have many dimensions because its rate of convergence doesn't rely upon the dimensionality of the matter
VI. The execution of Monte Carlo doesn't consume a lot of your time thanks to the increasing speed of programming
VII. Finally, Monte Carlo is free from the restrictions of solving newton's equations of motion.
VIII. This freedom allows generating trail configurations within the physical science ensemble of choice.

DISADVANTAGES:

I. Inappropriate inputs like standard deviations and correlations can result in wrong simulation results.
II. There are a variety of unknown factors that simulation can't truly account for during an investor's lifetime.

III. MCs is troubled from its ability to model the serial correlation between what comes out and what was just drawn because there are no thanks to controlling variables. So that, the user should be prepared to create the mandatory adjustments if the results that are generated seem out of line.

IV. Because newton's equations of motion don't solve, therefore no dynamical information will be gathered from a standard MC

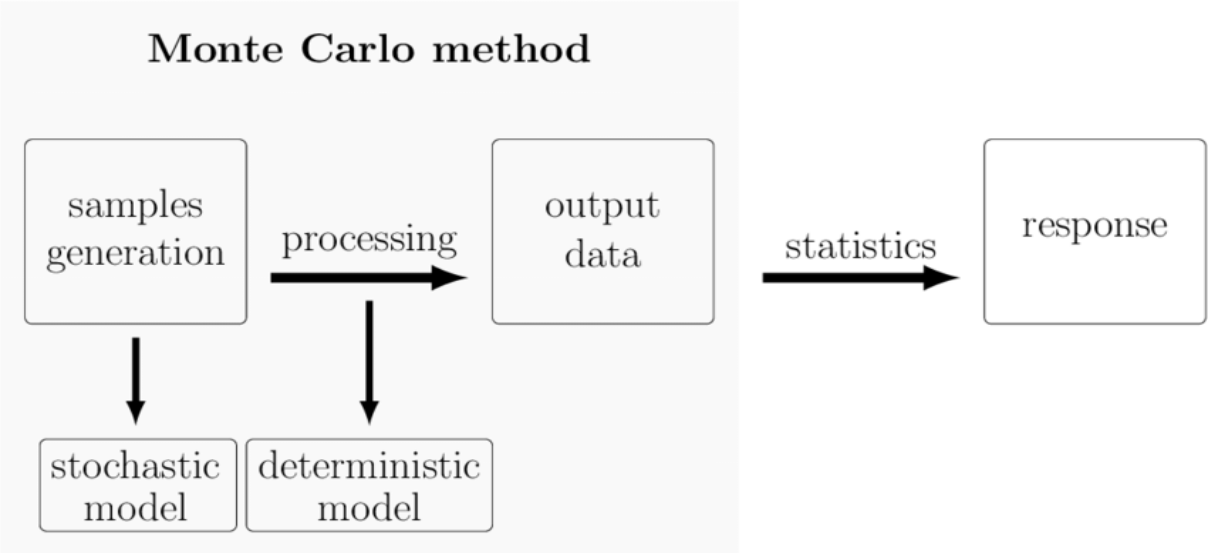
V. It is often expensive to live how one thing affects another, to require the initial measurements, and to make the model itself.

VI. To simulate something, a radical understanding is required and an awareness of all the factors involved. Without this, a simulation cannot be created.

1.6 BENEFITS OF MONTE CARLO SIMULATION

1. **Probabilistic Results**: Results show not only what could happen but how likely each outcome is possible.
2. **Graphical Results**: In Monte Carlo Simulation, it's easy to create graphs of different outcomes and their chances of occurrence.
3. **Sensitivity Analysis**: In Monte Carlo Simulation, it's easy to see which inputs had the biggest effect on results

Figure 2: Monte Carlo Methodology



Source: Google Images

1.7 STEP BY STEP INSTRUCTIONS TO UTILIZE MONTE CARLO TECHNIQUES

Monte Carlo methods include three essential advances:

- Set up the prescient model, recognizing both the reliant variable to be anticipated and the autonomous factors (otherwise called the information, hazard or indicator factors) that will drive the forecast.

- Indicate likelihood disseminations of the free factors. Utilize chronicled information or potentially the expert's emotional judgment to characterize a scope of likely qualities and allot likelihood loads for each.

- Run reproductions over and again, producing irregular upsides of the free factors. Do this until enough outcomes are assembled to make up a delegate test of the close to endless number of potential mixes.

1.8 GLOBAL OUTLOOK OF SECTORS DURING PANDEMIC

A series of sectoral briefs summaries the ILO's preliminary assessment of COVID-19's impact on particular social and economic sectors and industries. The briefs also include ILO constituents' policy responses and actions – governments, employers, and workers – as well as accessible ILO instruments and remedies at the sectoral level. ILO members at the national, sectoral, regional, and global levels, as well as international organizations and other partners in the struggle to develop decent work for women and men in certain social and economic sectors, are the intended audience. Here we are looking at some of the majorly impacted sectors.

Port Sector

Ports promote international trade and the global economy by providing critical infrastructure. They range in size from small wharves that handle a few hundred tons of cargo per year to huge international ports or multi-modal hubs that offer a wide range of logistical services, from warehousing to complete supply chain management. Ports had to respond to lower volumes, labor shortages, the introduction of occupational health and safety measures for dockers and shore staff, and the adoption of teleworking and remote operations for office workers during the COVID-19 pandemic. Cruise ship calls have come to a standstill in several places.

Meat Processing

The COVID-19 epidemic is still putting strain on the agri-food industry, both from a business and labor standpoint, with some sectors bearing a disproportionately heavy impact. One of them is the meat processing industry. As the pandemic's repercussions on our food systems continue to emerge, the lessons learned from outbreaks in processing plants in several key meat-producing countries are catalyzing reforms that will help the sector grow sustainably.

Construction

The COVID-19 pandemic has wreaked havoc on the construction industry, which is very susceptible to economic cycles. On the plus side, because to its ability to create jobs, construction has a lot of potential to drive recovery; in turn, recovery measures can help the sector's development towards sustainability and digitization. To foster a human-centered recovery of the construction sector from the crisis, tripartite cooperation and social discussion, as well as international labor norms, are essential.

Home Care

In several countries, the COVID-19 pandemic has brought attention to the already overworked and understaffed home and institutional-based care system. The challenges of recruiting, deploying, retaining, and protecting a sufficient number of well-trained and motivated care workers are highlighted in this brief. To ensure the sector's preparedness and resilience in times of crisis and beyond, long-term investment in health and social care systems, including workforce development and fair working conditions, is required. It's vital to ensure that caregivers, as well as their employers and other relevant stakeholders, get a chance to speak up.

Textile

Workers are being urged to stay at home, factories are closing, and global supply chains are coming to a halt, threatening the textiles, clothing, leather, and footwear industries' survival. Order cancellations have wreaked havoc on thousands of businesses and millions of people. We urgently require unity and coordinated action across industry supply networks. The ILO is dedicated to assisting governments in preserving the health and economic well-being of textile, clothing, leather, and footwear workers and firms.

Aviation

International travel has nearly come to a halt as a result of a combination of airline cancellations and limitations aimed at curbing the spread of COVID-19. The pandemic's impact on employment was immediate and profound. Cost-cutting initiatives could involve a variety of policies that affect employment and good work in the civil aviation industry. To assist the sector in recovering from this shock, the ILO has acquired expertise from prior crisis circumstances.

Health

The COVID-19 outbreak is bringing attention to many countries already overcrowded public health systems, as well as the difficulty of recruiting, deploying, maintaining, and protecting enough well-trained, supported, and motivated health workers. It emphasizes the critical importance of long-term investment in health systems, including the health personnel, as well as good working conditions, training, and equipment, particularly in the areas of personal protective equipment and occupational safety. Social dialogue is key to the development of resilient health systems, and so plays an important role in both crisis response and the development of a future that is prepared for health emergencies.

Education

As roughly 94 percent of all students have experienced school closures, teachers have had to adapt to a world of almost universal online education. Most instructors and their organizations have accepted this challenge, despite the fact that many teachers in underdeveloped nations lack the necessary skills and equipment to conduct successful distance education. As governments explore reopening schools as solitary confinement laws are reduced, the safety of students and staff must be prioritized, with social distance of students, access to personal protective equipment, and frequent virus testing being crucial.

Shipping

The majority of global trade is carried by ship, and fishing provides important food. The epidemic has an impact on sailors' and fishermen's safety and well-being, as well as their capacity to rejoin their vessels and return home, as well as the future of their jobs. Cruise ship crews, who are sometimes prevented from visiting ports, are particularly hard struck. As the globe strives to defend public health, the ILO is striving to protect these vital maritime workers.

Tourism

Tourism is an important source of employment and economic growth. COVID-19, on the other hand, has drastically altered this. The impact on tourism businesses and workers, the bulk of whom are young women, has never been seen before. In cooperation with governments, employers' and workers' representatives, and taking into account applicable ILO international labor standards, timely, large-scale, and, in particular, coordinated policy actions are required at both the international and national levels.

Many agricultural workers are unable to elevate themselves out of poverty and food insecurity despite their efforts to feed the world. As the epidemic spreads, the continuing operation of food supply systems is critical in avoiding a food crisis and lowering the global economic effect. To promote agribusiness and the livelihoods and working conditions of millions of agricultural workers in accordance with relevant international labor standards, coordinated policy actions are required.

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1.9 VIEW OF COVID-19 IN INDIA

The COVID-19 pandemic in India is part of the global coronavirus disease pandemic of 2019 (COVID-19), which is caused by the coronavirus 2 that causes severe acute respiratory syndrome (SARS-CoV-2). According to official estimates, India has the world's second-highest number of confirmed cases of COVID-19 infection (after the United States of America) and the third-highest number of COVID-19 deaths (after the United States and Brazil). However, these numbers show a significant under-reporting.

On 30 January 2020, the first instances of COVID-19 in India were recorded in three locations in Kerala, among three Indian medical students who had returned from Wuhan, the pandemic's

epicenter. On the 23rd of March, Kerala declared a state of emergency, followed by the rest of the country on the 25th. For the first time on June 10, India's recoveries surpassed active cases. In September, infection rates began to decline, as did the number of new and active cases. The number of cases recorded per day peaked in mid-September, with over 90,000 cases reported every day.

Timelines:

The WHO confirmed on January 12, 2020, that a novel coronavirus was the source of a respiratory ailment in a group of patients in Wuhan, Hubei, China, which had been reported to the WHO on December 31, 2019.

India announced its first incidence of COVID-19 on 30 January 2020 in Thrissur, Kerala, which grew to three instances by 3 February 2020, all of which were students returning from Wuhan. Apart from them, there was no discernible increase in transmissions in February. On the 4th of March, 22 new cases were announced, including 14 affected Italian tourists. After numerous people with travel records to affected countries, as well as their contacts, tested positive, transmissions escalated over the month. On March 12, a 76-year-old man with a history of travel to Saudi Arabia became India's first COVID-19 fatality.

By attending a Sikh celebration in Anandpur Sahib from March 10–12, a Sikh preacher with a history of travel to Italy and Germany became a super spreader. On March 27, almost 40,000 individuals in 20 villages throughout Punjab were isolated to prevent the spread of the disease. A Tablighi Jamaat religious assembly event in Delhi, which took place earlier in March, was designated as a COVID-19 hotspot on March 31.

Around 4,000 stranded pilgrims returned to Punjab on May 2nd from Hazur Sahib in Nanded, Maharashtra. Many of them, including 27 bus drivers and conductors who were part of the transportation arrangement, tested positive. Based on antibody tests, it was predicted in July 2020 that at least 57 percent of the residents of Mumbai's slums had been infected with COVID-19 at some point. In October 2020, a government commission on COVID-19 claimed that the epidemic has peaked in India and that it could be under control by February 2021. This prediction is based on the "Indian Supermodel," a mathematical simulation that assumes India achieves herd immunity. A novel SARS-CoV-2 strain, Lineage B.1.617, was discovered in the country that month.

1.10 SWOT ANALYSIS OF COVID-19 IN INDIA

India's quarantine was both historic and crucial in combating the virus's spread. Meanwhile, the administration took a number of steps to protect the country from Covid-19. However, appropriately identifying internal and external elements is critical for developing an efficient plan for combating covid-19 while reducing risks and increasing results. To examine India's current situation in combating the epidemic, a SWOT analysis was conducted. The reason behind having this analysis as part of our research as it could give an insight into India's ability to fight pandemic and see if the simulated results align to our SWOT results.

Strengths:

Institutional (Government and Governance) and Infrastructure

- Schools, train wagons, hotels, offices, and other existing infrastructure were turned into isolation wards.
- India is the world's leading producer and supplier of hydroxychloroquine, a potential treatment for covid-19.
- India was able to balance its supply and demand by quickly enacting steps such as establishing travel restrictions and a lockdown.
- A mandatory thermal screening check is required of all domestic and international travelers and offices.
- The leadership's open communication resulted in the masses following the necessary instructions to slow the development of covid-19.

Academicians and Practitioners

- The medical and health-care systems are progressively preparing for the new challenge.

Innovation and Economy Drivers

- To combat the situation, a massive repository of start-ups, intellectual property, and platforms has been created.

Weaknesses:

Institutional (Government and Governance) and Infrastructure

- Testing kits and relief items such as medical equipment, personal protective equipment, masks, and ventilators are in short supply.

- We are reliant on imports because we are unable to manufacture testing kits and relief material in-house.

Community and Civil Society

- Lack of awareness among certain segments of the population
- Isolation creates a psychological barrier: individuals are afraid of the quarantine circumstances.
- Disease susceptibility is high, while immunity is low (India ranks 135 out of 195 on UNDP Health Index)
- Incubation period is long, ranging from 1 to 14 days.

Academicians and Practitioners

- Infrastructure and specialists in emergency healthcare are in short supply:
  - 1:445 is the doctor-to-patient ratio.
  - The ratio of hospital beds to population is 0.7:1000.
  - Ventilators to population ratio 40000: 1.3billion

Innovation and Economy Drivers

- There aren't enough flexible work arrangements for employees.

Opportunities:

Institutional (Government and Governance) and Infrastructure

- Establish a strong third-tier governance framework (at the panchayat/gramin level) for monitoring and spreading knowledge.
- India has the potential to become a global leader (setting example for other nations on how to fight the crisis)
- For the current and future epidemics, standard operational standards and procedures in the form of an emergency preparedness and response plan are being developed.

Academicians and Practitioners

- Covid-19 vaccination and antidote development

Innovation and Economy Drivers

- Involve start-ups, small and medium-sized businesses, corporate R&D, and academic institutions in developing new solutions to combat covid.
- Investigate the ancillary industries that grew in prominence as a result of the covid-19 epidemic, such as video conferencing for working from home and schooling.

Threats:

Institutional (Government and Governance) and Infrastructure

- Failure to trace contacts could exacerbate the current situation and raise the chances of getting affected by the second wave of covid-19.

Community and Civil Society

- Coronavirus has reached epidemic level 3, or community transmission stage.
- Violations of lockdown protocols and social-distance norms
- Increased chances of infection spreading (high population density with 27.9 percent people lying below the poverty line)

Academicians and Practitioners

- Frontline workers have a higher risk of catching the disease.

Innovation and Economy Drivers

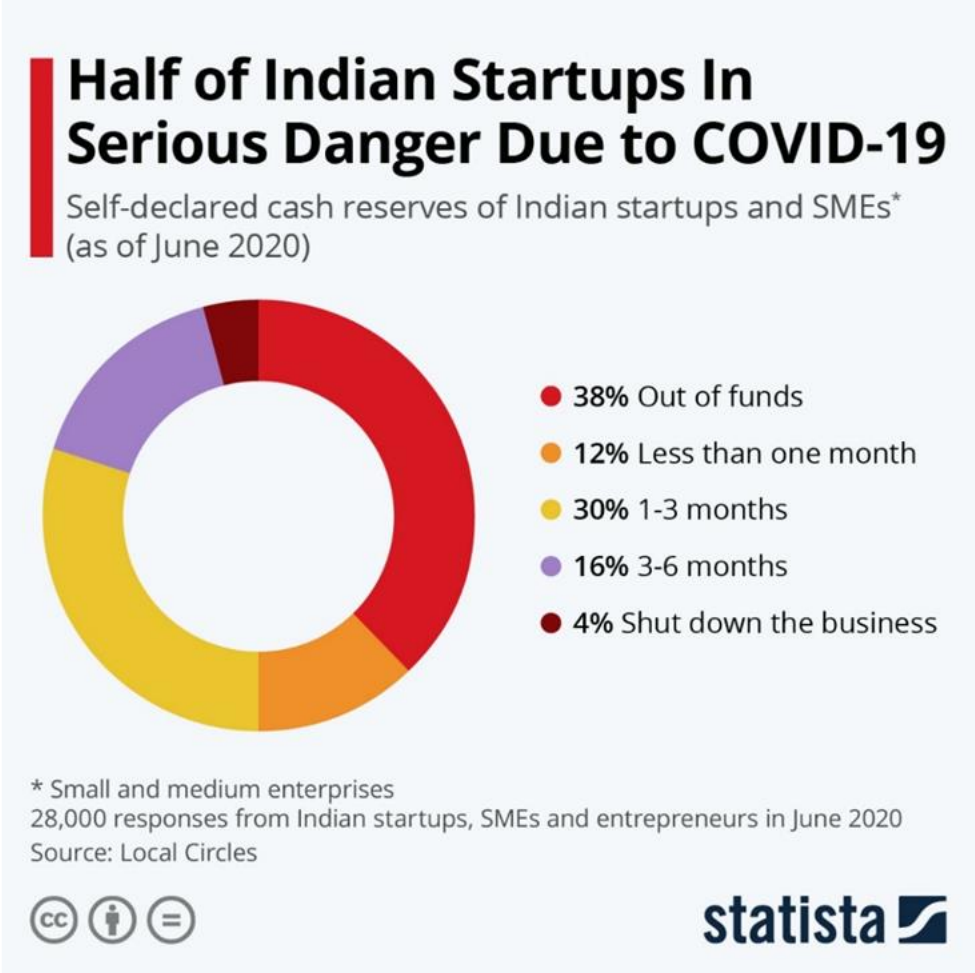
- The economy and overall growth of the country have slowed.
- Stock markets, as well as global, national, and local trade, are all affected.
- The global lockdown is driving a slowdown into recession, resulting in higher unemployment and poverty rates.

1.11 INDIAN START UPS HIT DURING PANDEMIC

According to a new survey, the COVID-19 pandemic has caused 38 percent of Indian startups and small and medium businesses to run out of money. Only 12% claimed they had less than a month's worth of cash. In April, 27% of companies indicated they were financially-strapped, while 20% said they had less than a month's worth of cash on hand.

While the situation for Indian startups and SMEs is not as bad as feared in April, it is developing. Around two-thirds of the companies said they were lowering expenditures across the board as a result of the crisis, including marketing, human resources, and operating budgets, as well as deferring tax payments. Similarly, a majority of businesses indicated they had not benefited from government assistance so far.

Figure 3: Indian Startups During Pandemic



Source: Local Circles

1.12 IMPACT ON INDIAN STOCK MARKET

The unprecedented COVID19 epidemic has put the world in peril and shifted the global landscape in unanticipated ways. The SARSCoV2 virus, which caused the COVID19 outbreak, first appeared in Wuhan, Hubei Province, China, in December 2019, and quickly spread around the world. This pandemic is not only a global health crisis, but it is also a major global economic depression. Many countries' economic operations are suddenly halted as tight quarantine rules are implemented to combat an unknown disease. Transportation between countries is limited, if not prohibited, which has hampered global economic activity. Most crucially, terror among consumers and businesses has stopped them from engaging in their customary purchase habits, resulting in market abnormality.

Uncertainty and risk are being created as a result of the epidemic, which is having a substantial economic impact on both established and rising economies such as the United States, Spain, Italy, Brazil, and India. The financial market has reacted with spectacular movement and has been badly affected as a result of this. The financial system, which includes both stock and bond markets, has been significantly impacted by the economic instability related with COVID19. The price of oil has dropped dramatically, but the price of gold has risen dramatically as a result of the epidemic. This epidemic is referred to by Firzli (2020) as "the larger financial catastrophe."

As a result of the pandemic, the global financial market risk has increased significantly (Zhang et al., 2020). Fear and uncertainty have caused enough losses for investors. For example, the global stock market lost nearly US$6 trillion in one week from February 24 to February 28 as a result of the pandemic's impact (Ozili & Arun, 2020). Since the COVID19 outbreak, the market value of standard & poor (S&P) 500 indices have dropped by 30%. Increased uncertainty, according to Azimili (2020), impacts the needed rate of return and consequently the present market value of stocks.

Although there is limited contemporary literature on the impact of COVID19 on the financial market, the empirical investigations that have been conducted so far have yielded promising results. In their investigation on financial markets and banks, Baret et al. (2020) discovered that the COVID19 pandemic has caused a drop in the share of oil, equities, and bonds around the world. Companies' productivity was negatively affected by social distancing measures, which resulted in a loss in revenue, greater operating costs, and cash flow problems. Since 1987, the Financial Times Stock Exchange 100 index in Europe has had a severe one-day drop (BBC News, 2020).

This unanticipated epidemic has had a negative impact on the financial markets of most developed and developing countries. In March 2020, the world's most powerful economy, the United States, hit the circuit breaker mechanism four times in ten days (Zhang et al., 2020). Europe and Asia's stock markets have also risen. On March 12, 2020, the leading index in the United Kingdom, the FTSE, fell by more than 10%. (Zhang et al., 2020). The stock market in Japan had plummeted more than 20% in December 2019, according to Vishnoi and Mookerjee (2020). From March 8, 2020 to March 18, 2020, the stock markets of Spain, Hong Kong, and China all dropped by 25.1, 14.75, and 12.1%, respectively (Shehzad et al., 2020). In his

research, he discovered that the COVID19 had a negative impact on stock returns in the S&P 500 and a negligible impact on the Nasdaq composite index. Georgieva (2020) noted that the COVID19 epidemic placed the entire world dangerously close to financial problems comparable to the Global Financial Crisis of 2007–2008.

The pandemic's severe effects gradually spread to emerging economies as well. When we look at the financial market of the emerging economy, we see a bleak picture, as this economy has been struck the hardest by the drop in oil prices. The outbreak of the COVID19 pandemic has heightened the urgency of this situation. Leading rising economies such as Brazil, Russia, and Mexico have increasingly tightened mobility restrictions, causing the emerging economies to enter a 1% recession by 2020 (Herfero). After ten years, the Coronavirus illness in South Korea caused KOSPI to fall below 1,600 for the first time in their history (So, 2020).

On March 22, 2020, the Indian government proclaimed a Janata Curfew and a lockdown program to preserve social distancing practices in order to limit epidemics. Various business operations were abruptly halted after the government adopted such a lockdown policy. As a result of the worldwide market disruption, India's financial market has seen significant volatility (Raja Ram, 2020). The Indian stock market is experiencing high volatility as a result of the global financial system's downturn. It's also been hit hard by the COVID19 pandemic.

In India, there are two major stock indices: the Sensex on the Bombay Stock Exchange (BSE) and the Nifty on the National Stock Exchange (NSE). The Sensex index fell to 13.2 percent on March 23, 2020, according to the Bombay Stock Exchange. It was their highest single after the Harshad Mehta Scam broke on April 28, 1991. (Mandal, 2020). Similarly, Nifty has dropped nearly 29% over the same time span. COVID19's influence on the Indian stock market has been dubbed a "black swan event" by some economists, referring to the occurrence of a highly unexpected event with catastrophic consequences. As a result of the government's lockdown strategy, factories have cut their labor force as well as output levels, disrupting the supply chain. People limit their consumption patterns as a result of the uncertainty that exists among mankind, resulting in demand-side shock. According to studies, the last pandemic merely had an effect on the demand chain. However, the COVID19 pandemic has had an impact on both the demand and supply chains.

Despite the numerous literatures on the impact of COVID19 on the entire economy's stock market, there has been little research, particularly in the situation of an emerging economy. This article seeks to evaluate the influence of COVID19 on India's two major stock markets in order to shed light on this issue. To make the analysis more meaningful in terms of volatility in stock index prices due to the advent of the pandemic and the Indian Government's lockdown policy, the Glosten–Jagannathan–Runkle (GJR) generalized autoregressive conditional heteroscedasticity (GJR GARCH) model is utilized. The study's main findings demonstrate how volatile the BSE Sensex and NSE Nifty are. COVID19 has shattered the financial market's backbone. To stimulate the stock market, the government must take appropriate policy measures. The situation would have been the worse if it hadn't been for some unusual policy support. As a result, liquidity injection measures are required. The Reserve Bank of India (RBI), India's central bank, has lowered its benchmark policy rate by 115 basis points in the last three months. Since its first announcement on March 27, 2020, it has declared a liquidity injection of roughly Rs 8 lakh crore in the financial markets. Despite the fact that this virus has brought the entire world to a standstill, the death rate is extremely low.

Liquidity will propel stock prices up throughout this recovery period, according to George (2020). Long-term investors should take advantage of the current turbulence. The RBI must decrease the rate to help the debt markets. At this time, there is a lot of uncertainty in the market. To balance their job and prevent risk, investors must transform their investment from a dark outlook to a bright one. In this regard, the pharmaceutical industry is currently appealing. Domestic policies will need to be created in order to maintain inclusive and sustainable growth. The highest authority must provide financial aid to the destroyed required sectors.

1.13 INDIAN ECONOMY OUTLOOK

When we look at the difficulties in developing markets, we see that they are mostly COVID-19-related. We expect India's GDP to fall in the full year 2020, but we believe that the government's actions, such as the Rs 20 lakh crore economic package, will be quite focused in terms of what it offers to the rural population. In addition, there are other long-awaited reforms on the way, such as a 10% increase in the national rural job guarantee scheme, public works, and the free rationing that is being seen in many countries. When it comes to the equities market, both internationally and in India, quality is crucial at this point. One issue to keep an eye on in India is what occurs with credit risk and credit crises, as well as how credit risk

aversion is manifested. Banks, non-banks, mutual funds, and ordinary investors are all still risk averse. As we examine the Indian financial industry and see what emerges, how credit risk is managed and how it bounces back will be key for us.

We like information technology, telecommunications, fast moving consumer goods, consumer durables, and insurance in general. Even globally, they are our favored sectors. Although valuations are stretched, demand has recovered in pharma, metals, cement, and oil and gas, just as it has in China. We consider a diverse strategy, but quality Indian equities, global equities with a US bias, and even gold remain relevant given the predicted rise in inflation.

Although the size of the Federal Reserve and European Central Bank balance sheets stabilized in July, liquidity remained abundant. In reality, the monetary base in the United States surged by about 23% year over year in June, and the global monetary base is estimated to have increased by around $8 trillion since the pandemic began. Central banks would like to "wait and see" how the situation develops at this point, but their next move, if any, is likely to be in the direction of more easing rather than tightening. Furthermore, we expect fiscal stimulus to operate as a powerful relay and support the recovery even if central banks remain unchanged.

From a fiscal standpoint, we expect mature markets to fare better than emerging markets. As a result, it's more of a risk spectrum debate. The fact is that a pandemic in emerging economies can cause challenges that are less likely to affect comparable industries in established markets. The impact of the budgetary reaction and the targeted package launched by the government remains to be seen. Investors will look at valuations and demand for sectors from the perspective of foreign funds, and there is now more value in developed markets.

Oil rebalances in the same way that gold does. Quarantine measures that are being eased, geopolitical concerns, a probable COVID-19 increase, and low interest rates all appear to be bullish for oil. Oil and gold prices appear to be mostly driven by concerns about the virus and the probability of a quick economic recovery. The OPEC+ group, according to our Investments Strategy team, will likewise stick to their production cutbacks agreement. They want to establish a pricing floor.

With a 46 percent drop in April, India's demand has already recovered by 23 percent year on year. Oil demand is increasing, although not at the same rate as it has been since May. Because

activities and industries have risen up, there was inevitable to be an initial robust bounce. However, we believe it will take time to restore air travel, for example. There may be incentives for non-OPEC suppliers as well as OPEC countries to reduce production, but overall inventory remains high. Everyone is dealing with an oversupply of oil, and additional increases in oil prices are unlikely in the next six to twelve months.

The current economic damage caused by the crisis should be mitigated, not countered, by a stronger rural sector. There are several high frequency data trends in India that imply the economy is normalizing, though the recovery will be slow. Support for the rural sector is a big part of the government's economic plan. When these large government efforts are combined, the goal is to increase rural households' disposable income levels and stimulate expenditure. As a result of the influx of migrant workers, the demand for government assistance and temporary work has increased significantly.

CHAPTER 2

LITERATURE REVIEW

2. LITERATURE REVIEW

The result outcomes display that the approaches Moving Average and MACD would possibly impact the return and the net profits of the investment portfolio. Whereas the stochastic process version with identify all possible cases for the net loss in the planned investment strategy. Also, the GARCH Model (Generalized Autoregressive Conditional Heteroskedasticity), Wavelet Decomposition Model, and Monte Carlo Model will usually result to predict the net profits and provides better and higher profits in stock / equity investments as compared to the alternative exiting techniques.

Predicting direction of stock price index movement using Artificial Neural Networks and Support Vector Machines

The research author Kara et al. (2011) proves the reliable and predictability of financial motion path with Artificial Neural Networks (ANN) and accurately assist the Neural Network through the network to predict the every-day price movement of Istanbul Securities Market (ISE) National 100 Index for the duration of January 2, 1997, to New Year's Eve, 2007.

Performing stock price prediction use of hybrid model

The scholar Tsao pan (2010) introduced a model for the hybrid version to strengthen the stock price prediction ability. The proposed version is the combination of Principal Component Regression Model with GRNN (General Regression Neural Network) to solve both multicollinearity and the problem at the same time. The research revolved around the duration of 2004 to 2008 for the share prices of Taiwanese and Chinese organizations. The analysis examines the most important ten (10) ratios: receivables turnover, stock turnover, fixed assets turnover, current ratio, net profit ratio, liquid ratio, debt ratio, return on asset ratio, long- term capital to fixed asset ratio and sales/shares. This study results in power of prediction using hybrid model is better than any individual existing techniques.

As per the multiple research which uses Monte Carlo to predict share prices, the scholar gets a very reliable and steady result (Boyle et al, 1997; Chen & Hong, 2007; Whiteside II PE, 2008). The random prediction using a large data set is its advantages to get the most accurate prediction. This observation is applied using the Monte Carlo Simulations to forecast stock market returns in ASE.

Challenges of project planning in the probabilistic approach using PERT, GERT and Monte Carlo

Wyrozebski, P. & Wyrozebska, A. (September 2013) the merits & shortcomings of these two methods Program Evaluation and Review Technique and Monte Carlo Simulation gives us the possible outcomes for assessing the budget or a strategy like the case study mentioned in the paper where the construction project is given. The technique of Monte Carlo Simulation was executed in MS Excel using the automated Add On "Risk for Excel". From the research, we found the result that this research gives better accuracy and extensiveness of Monte Carlo simulation in disparity against the famous PERT method. The Method of PERT do gives us the project estimates when executed in consideration of Monte Carlo technique.

A literature review and future perspectives on maintenance optimization

Sharma et al. (2011), the paper outlines important techniques used in various maintenance optimization models including the analytical hierarchy process, the Bayesian approach, the Galbraith information processing model, and genetic algorithms. There is an emerging trend towards uses of simulation for maintenance optimization which has changed the maintenance view.

Why the Monte Carlo method is so important today

Dirk et al. (2014), the start of electronic registering, individuals have been keen on completing irregular examinations on a PC. Such Monte Carlo methods are currently a fundamental fixing in numerous quantitative examinations. For what reason is the Monte Carlo strategy (MCM) so significant today? This article investigates the reasons why the MCM has advanced from a

'final retreat' answer for a main technique that penetrates a lot of contemporary science, account, and designing.

A Quantitative Risk Assessment of Waterborne Cryptosporidiosis in France Using Second-Order Monte Carlo Simulation

Pouillot et al (2004), the dangers of waterborne Cryptosporidium partum contamination and Cryptosporidiosis in immunocompetent and immunodeficient French Populaces is proposed. The model considers French specificities, for example, the French strategy for locust identification execution and faucet water utilization. The extent of infective locusts depends on writing survey and master information. The likelihood of contamination for a given number of ingested feasible locusts is displayed utilizing the dramatic portion reaction model applied on distributed information from exploratory diseases in immunocompetent human volunteers tested with the IOWA strain. Second-request Monte Carlo reproductions are utilized to portray the vulnerability and fluctuation of the danger gauges. Everyday hazard of disease and ailment for the immunocompetent and the immunodeficient populaces are assessed by the quantity of locusts saw in a solitary stock piling supply water test.

A Comparison of Approaches for the Analysis of Interaction Effects between Latent Variables Using Partial Least Squares Path Modelling

Henseler J. & Chin W (2010), a significance of the investigation of communication impacts between show just as dormant factors consistently increments. Specialists utilizing fractional least squares (PLS) to examine cooperation impacts between dormant factors need an outline of the accessible methodologies just as their reasonableness. This article presents 4PLS-based methodologies: an item marker approach (Chin, Marceline, and Newsfeed, 2003), a 2-stage approach (Chin et al., 2003; Hensley and Fusspot, in press), a crossover approach (Wold, 1982), and an orthogonal zing approach (Little, Bovaird, and Widaman, 2006), and contrasts them utilizing information identified with an innovation acknowledgment model. Through a broader Monte Carlo analyse, the various methodologies are looked at as far as their point gauge exactness, their measurable force, and their expectation precision. In light of the consequences of the investigation, the utilization of the orthogonal zing approach is recommendable under most conditions. Just if the orthogonal zing approach doesn't track down

a critical connection impact, the 2-stage approach ought to be moreover utilized for importance test, since it has a higher measurable force.

Accounting for uncertainty in a forest Sector model using Monte Carlo simulation

Maarit A. & Kallio I. (2010), huge scope backwoods are a models will in general have a huge number of boundaries, of which many have values that are obscure or not known precisely. Regardless of the wide utilization of such models in the strategy examinations, the effect of the general vulnerability on the outcomes and the circulation of the subsequent variable qualities has not been thought of. It would be significant for the clients of the outcomes to know the power of the model yields and ends made to varieties in model data sources. This investigation endeavors to efficiently represent the vulnerabilities in backwoods are a model examination. Monte Carlo re-enactment is applied to aspatial incomplete harmony model for the Finnish woods area to inspect how the vulnerability over the parametric information and yield value advancements influence the model projections. The emphasis is on the saw log market and sawn wood creation.

Integrating Stock Twits with Sentiment Analysis for better Prediction of Stock Price Movement

Batra R. & Daudpota M. S., (2018), early examination on Stock Market forecast were completely based on irregular's trolls and mathematical expectation however with the presentation of conduct money, individuals' conviction, and mind-set were like wise thought of while anticipated about stock development. Making it more productive we utilized the possibility of supposition investigation of Stock Tweets through AI models. We executed the thought by gathering supposition in formation and stock value market information and assembled a SVM models for forecast and in the last we estimated the expectation precision. Results showed that we have accomplished 75.22%.

Electricity price Forecasting Using Artificial Neural Network

Ranjbar et al. (2007), this paper proposes a far-reaching model for the versatile momentary power value determining utilizing Counterfeit Neural Organizations (ANN) in the rebuilt power markets. The model comprises: value reproduction, value gauging, and execution investigation. The elements affecting the power value determining, including time factors, load factors, save factors, and recorded value factor are talked about. We embraced ANN and proposed another definition for the MAPE utilizing the middle to consider the connection between these elements and market cost just as the presentation of the power value determining. The save factors are incorporated to upgrade the presentation of the anticipating interaction. The proposed model handles the value spikes all the more effectively due to considering the middle rather than the normal.

Dividend Innovations and Stock Price Volatility

West. D. K (1986), A standard productive business sectors model expresses that a stock value approaches the normal present limited worth of its profits, with a steady rebate rate. This is appeared to suggest that the change of the development in the stock cost is more modest than that of a stock value figure produced using a subset of the market's data set. The ramifications follow regardless of whether costs and profits require differencing to prompt stationary. The connection between the differences seems not to hold for some yearly U.S. financial exchange information. The dismissal of the model is both quantitatively and genuinely critical.

Valuation Ratios and the Long-Run Stock Market Outlook

Campbell. Y. J., & Shiller. J. R., (2001) this is a synopsis and understanding of a portion of the writing on stock value unpredictability that was animated by Leroy and Porter and Shiller. Apparently neither small-sample inclination, sane air pockets nor some standard models for expected returns enough clarify stock value unpredictability. This proposes a job for some nonstandard models for anticipated returns. One chance is a "prevailing fashions" model in which clamour exchanging by guileless financial backers is significant. As of now, notwithstanding, there is minimal direct proof that such trends assume a huge part in stock value assurance.

Ali et al. (2011) applies the specious neural network in designing the share prices of 7 (seven) Jordanian corporates listed in Amman exchange. The design was assessed by the stock exchange with the method of employment of questionnaire technique that was dispersed in the Amman trading exchange. A year's time was utilized for each company for instructing the channels in the neural network. The network proceeds exceedingly close by the authentic data aside from the previous month, where the certain value embraces a small drop. The majority appellant was willing to be contingent on substitute neural network technique, which they had a reliance that the approach is pertinent to any or all categories of the organizations.

Assaleh et al. (2011) makes use of the forecasting securities and the prediction models of the two most prime stocks of Dubai Stock market. Being more appropriate about the stocks they were Emaar properties (EMAAR) and Dubai Islamic Bank (DIB). These two companies are really captivating the market in its segment with EMAAR being the most sufficient and large company leading the property developer industry within the region and DIB being the first wholly equipped with features and facilities Islamic bank.

The reason for picking the selected stocks was the arising requirement for the adequate historical data, active volume transaction, and a special represented sector within the economy of the UAE. The research considers the daily closing prices for the duration of 2000 to 2006 (with about 2176 data series). The technique of Polynomial Classifiers (PC) and Artificial Neural Networks (ANN) has been brought in use as a method to forecast stock value from the historical price data. While in the stock price prediction, this is the primary time to use Polynomial technique. As of the results, both the models showed up to be efficient and accurate.

Atmeh and Dobbs (2006) look into the execution of fourteen (14) MA trading directives of prophesy as forward for daily general index of Amman stock exchange from the financial year 1992 to 2001. The research moves forward with the new and emerging bootstrap strategies such as: GARCH-M, Stochastic Random Process Model. As of the evaluation the outcomes put forward the idea that trading regulations can help predict market movements, with identified proof that the short run regulations would be profitable despite the transaction expenses incurred. Also, the returns are revealed that were caused by the bootstrap as t h e

trading profits are not including with individual who may be generated by stochastic process or AR method.

Dopke et al. (2008) gives evidence of the monthly superfluity stock returns of the ex-ante likelihood in Berlin, Germany. The macroeconomics data from the year of 1994 to 2005 was utilized for the research. This research also uses Recursive Modelling to helps predict the returns on stock in real time. The method of Sharpe, Treynor and Jenson's ratios are applied to align with the results of the stock returns.

Furthermore, the execution of the portfolio changing their strategies gave support to the foregoing real time macroeconomic data is alike because the execution holds up the revised macroeconomic data.

Giovanis (2011) in his research looks forward at the workings of various investment strategies that held the back of four (4) different prediction technique: MACD (Moving Average Convergence-Divergence, Generalized Autoregressive Condition Heteroskedasticity (GARCH), a stochastic process autoregressive model, and Monte Carlo Simulation algorithm advanced in MATLAB.

This research had four important stock exchange:

1. S&P 500 – USA
2. FTSE-100 index – UK
3. CAC – France
4. NIKKEI – Japan

The data ranges are as follows:

1. January 3, 1950 - S&P 500,
2. April 2, 1984 - FTSE 100, 2
3. November 6, 1990 - CAC and
4. January 4, 1984 - NIKKEI

CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH MOTIVATION

The main motivation to do the study is I wanted to understand how the Monte Carlo Simulation helps to research in the forecasting of the stock price. the various sorts of statistical approaches are used which is useful in understanding the analysis. The study shows how effectively and efficiently the exchange prediction may result in new knowledge which enables corporations in addition to individual investors to create a sustainable profit. As many of the new investors are confused on the technique and process to be used for stock price forecasting, I am very keen to seek the knowledge of price forecasting methodology. Thus, I have taken the Monte Carlo Simulation for the Stock Price Forecasting to prediction the profitability and future stock value of the companies listed in NSE.

3.2 SCOPE OF THE STUDY

There are many ways of using Monte Carlo simulation to model the variables. This study will concentrate on one among the more basic variations and can only use the expected level of return and volatility (calculated supported historical data) as input parameters.

The modifications to enhance the simulation will therefore mainly concentrate on calculating these parameters in a very way that better represents the information. To analyse the performance of the simulation, we'll carry out the test on 15 stocks. 5 Bank sector stocks, 5 Media and Entertainment sector stocks, and 5 hotel sector stocks.

3.3 PROBLEM STATEMENT

- To analyse the trend and growth of shareholders and investors wealth and value in the selected companies.
- To understand the various measures of shareholders and investors value and valuation of the companies.
- To analyse and interpret the trend between the company valuation and its shareholders value or the industry average.

3.4 RESEARCH OBJECTIVE

- To understand Monte Carlo Simulation as the best for equity Stock Price Forecasting techniques.
- For future Stock Price of the firm, Monte Carlo Simulation should predict.
- In this exploration, our goal is to fabricate a condition of-craftsmanship expectation model for price trend forecasting prediction, which centers on price trend prediction.

3.5 RESEARCH QUESTIONS

- How to use Monte Carlo random walk simulations to simulate possible future stock returns?
- How accurate is this Monte Carlo Simulation method?
- How to improve the accuracy and reliability for the simulation of the stock prices?

3.6 RESEARCH HYPOTHESIS

There are various ways of conducting the prediction using monte Carlo simulation to model the expected variables. This study research will investigate on one of the most fundamental input and considers only the expected returns and expected fluctuations (calculated from historical data) as inputs. Thus, modifications to improve simulation focus mainly on calculating these parameters to better represent the analysis.

- **H0:** The Monte Carlo Simulation of the selected companies has a positive impact on the shareholders' and investors wealth when it is higher.
- **H0:** The performance of the companies has a significant impact on the creation of shareholders' and investors value and wealth.
- **H1:** The Monte Carlo Simulation of the selected companies has a negative impact on the shareholders' and investors wealth when it is higher.
- **H1:** The performance of the companies has no significant impact on the creation of shareholders' and investors value and wealth.

3.7 METHODOLOGY PLANNED

A major part of the data for the research will be collected by using the secondary sources of information that is already available in the websites of the company.

The companies listed in NSE will be shortlisted first and then the data will be analyzed and then further shortlisted with the sufficient data and then the companies will be selected. Will be taking 15 companies that is (5 banking sector, 5 media and entertainment and 5 hotel) sector which will be used for the study. The forecasting technique that we use during this study is the Monte Carlo simulation. The tools such as Mean, Median Standard deviation, Percentile analysis has been planned to be used in the report for analysis.

For the purpose of our research, we have selected three sectors that have a mixed impact of COVID on its performances –

- Banking Sector
- Media & Entertainment Sector
- Hospitality Sector

In all of these sectors we have had mixed performance, while some organizations have performed externally well, some have slumped and been adversely affected. Due to this, it becomes a good mix to simulate the trends on Monte Carlo.

1. Banking Sector

COVID-19's exponential spread had caused a large drop in major indexes, suggesting its influence and ability to have a big impact on GDP growth. While COVID-19 was predicted to have a negative overall impact on credit growth in most sectors, the degree and form of the impact will likely vary depending on the duration and scope of the disruption. The COVID-19 pandemic has the potential to be one of the most catastrophic threats to the financial services industry in in a century. The impact of COVID-19 on banking will be a significant drop in demand, decreased incomes, and production shutdowns, all of which will harm banks' business. As enterprises race to deal with the impact of COVID-19 on financial services, the problem is exacerbated by staff shortages, a lack of digital maturity, and pressure on current infrastructure. In the wake of the novel coronavirus epidemic COVID-19, banks have their hands full. As the virus spreads around the world, borrowers and businesses risk job losses, slowed sales, and

decreased earnings. Customers of banking institutions are likely to seek financial assistance. Pandemics have a clear impact on financial systems because of their significant economic consequences. To manage the coronavirus's direct economic impact, banks must have a plan in place to protect personnel and customers from the virus's spread. Many institutions are already encouraging some workers to work from home. The goal of this article is to show how pandemic covid-19 affects the banking and financial sectors. According to the Indian bank, the coronavirus outbreak in India threatens a years-long clean-up of the country's financial system.

In the face of the epidemic, the Indian financial system has proven to be unexpectedly resilient, despite various pessimistic predictions. This is because corporate borrowers, who account for more than half of all loans, are in better financial position and banks are well-capitalized. This is encouraging news for loan growth and bank performance in the aftermath of the pandemic. We chose this sector to test this exact theory through Monte Carlo Simulation, we would like to test if indeed Monte Carlo can forecast real-life scenarios by simulating stock price patterns.

1.1 SBI

The State Bank of India (SBI), a Fortune 500 business, is an Indian multinational banking and financial services statutory organization with its headquarters in Mumbai. SBI has a strong history and legacy dating back over 200 years, making it the most trusted bank among Indians.

SBI, India's largest bank, serves over 45 crore customers through a vast network of over 22,000 branches, 62617 ATMs/ADWMs, and 71,968 BC outlets, all with an unwavering focus on innovation and customer centricity, which stems from the Bank's core values of Service, Transparency, Ethics, Politeness, and Sustainability.

SBI General Insurance, SBI Life Insurance, SBI Mutual Fund, SBI Card, and other subsidiaries have successfully diversified the Bank's business. It has a global presence, with 229 offices in 31 different countries, and operates across time zones. SBI continues to revolutionize banking in India as it strives to provide responsible and long-term banking solutions. SBI was quick to adapt to the impact of Covid-19 wave in the year 2020. On the business side of affairs, they were quick to assess the risk and business procedures in addition to quick adaption of digital technology. They even focused on their various customer portfolios who were likely to be impacted though job cut and salary reductions and formulated BCP plans to manage contingencies. The re-organization of global supply chains gives India with an opportunity to establish itself as a manufacturing base to fulfil global demand. To the degree that state

governments are successful in securing such business relocations from China, banks saw possibilities to grow their operations which SBI was focused on. In a word, the prognosis for the Bank's operations and the economy was contingent on how quickly the virus is eradicated and normalcy is restored, however adaptability and digitization were key to which SBI performed well, and thus considered in our portfolio.

SWOT analysis

Strengths

- In terms of market share, sales, and reserves, SBI is India's largest bank.
- SBI is one of the Fortune Global 500 companies.
- The bank has more than 22141 branches and 58555 ATMs, according to latest reports.
- The bank operates in 36 countries and engages in currency trading all over the world.
- SBI has a competitive advantage in terms of commercial banking services.
- SBI's vision and mission statements were recently changed, showing a move toward new-age banking services.
- The State Bank of India employs a total of 257252 people.
- SBI has 143306 crore rupees in revenue (20 billion US Dollars).
- The State Bank of India is owned by the Indian government.

Weaknesses

- In comparison to private banks, there is a dearth of suitable technology-driven infrastructure.
- Employees are unwilling to repair problems quickly since they have more job security, and the turnaround time for clients is long compared to private banks.
- On their leased houses, the banks pay a considerable fee.
- SBI has the largest workforce in the banking industry, which explains why the bank spends a significant portion of its profits on staff compensation.
- Despite its renovation, the bank nonetheless gives new-age clientele the impression of a conventional bank.
- SBI does not draw corporate payroll accounts, and all government payroll accounts have been transferred to private banks for convenience.

Opportunities

- SBI is in the process of merging with five other banks: the State Bank of Hyderabad, the State Bank of Patiala, the State Bank of Bikaner and Jaipur, the State Bank of Travancore, and the State Bank of Mysore.
- Mergers would result in a boost in market share, allowing it to keep its top status.
- Due to a substantial inflow of funds from the Asian economy, SBI intends to expand and engage in foreign enterprises.
- Because some banking functions have yet to be modernized, there is a greater chance to use new technology and applications to strengthen customer relationships.
- New horizons are being opened by the emergence of young and brilliant graduate and B school pools.

Threats

- Other private banks, including as HDFC, AXIS, and others, have increased the amount of FDI allowed in the banking sector to 49 percent, posing a significant challenge to SBI as citizens continue to flock to overseas banks for better banking services and technology.
- Other government banks are forming, including GNP, Andhra, Allahabad Bank, and Indian Bank.
- Customers prefer to borrow money from commercial banks and financial service providers rather than SBI since SBI has stringent verification procedures and takes a long time to complete.

1.2 Canara Bank

Canara Bank was formed in July 1906 in Mangalore, then a tiny port town in Karnataka, by Shri Ammembal Subba Rao Pai, a remarkable thinker and philanthropist. Over the course of its hundred-year history, the Bank has gone through numerous stages of its growth trajectory. Canara Bank grew at a breakneck pace, particularly following nationalization in 1969, achieving the status of a national player in terms of geographic reach and clientele categories. For the Bank, the 1980s were marked by commercial diversification. The Bank celebrated a century of service in the Indian banking market in June 2006.

Despite the pandemic impact, Canara bank shows resilience in performances. With effect from April 1, 2020, the former Syndicate Bank merged with Canara Bank to become the combined business. Canara Bank, for example, has completed a year of consolidated operations. The

Bank accomplished harmonization of all policies, products, and processes based on the 'Best of Two' principle during the past year, resulting in the best product suite for clients. From the first day (01.04.2020), the Bank has provided interoperable choices for all frequent transactions in CBS, which customers can complete at any branch. The bank has concentrated on maintaining business as usual. The bank has also taken several initiatives to improve operational efficiency, such as centralizing and digitizing business processes such as account opening through Central Processing Hubs, which are exclusively monitored by the Central Processing Wing, retail loan processing through RAH KYC updating through CKYC app, and forex transactions through the CPCFT Recovery Call Centre (RECC), which are based on analytics. Retail credit has partnerships with Fin-Tech and E-Commerce to generate leads, as well as a Document Management System to simplify processes and promote paperless banking. The combined entity has not only reported a much higher operating profit but also returned to positive profit in FY 2020-21. This performance encouraged us to add it to our portfolio for our analysis.

SWOT analysis

Strengths

- Schemes are inventive in nature - The bank's schemes are extremely innovative in character. It offers low-interest loans to persons living in rural areas, thereby contributing to the improvement of rural living standards by assisting farmers. It cooperated with UNEP to establish a solar lending program.
- Canara Bank, in compared to other public banks in India, articulates best practices and provides a positive banking experience for consumers, resulting in a stronger brand image in the minds of customers.
- Employment Generation - Banks employ around 40000 individuals in India, resulting in a large number of people being employed.

Weaknesses

- Poor marketing - As a state bank in India, the marketing focus is relatively low, resulting in poor market visibility despite providing excellent banking services and experiences to consumers. The bank does not have a marketing department that concentrates on enhancing the bank's market recognition.
- Poor Customer Service - The banking sector in India is fiercely competitive, and customer service is one of the few things that sets a bank apart. Canara Bank has failed to provide

excellent customer service. Customers are frequently dissatisfied with the way bank employees respond to inquiries and provide services. In addition, the online banking services aren't particularly well designed.

- Poor Client Base — The bank does not have a large number of high-income customers. As a result, low-income groups generate money, which does not enhance the bank's bottom line, and hence growth is gradual.

Opportunities

- Rural Banking - The bank can go deeper into rural financial because the majority of Indians live in rural regions, and by meeting their banking needs, the bank can increase its revenue.
- Social Banking - In the age of social media, banks are utilizing social channels to respond to the demands of clients while posing a new challenge and saving them time from having to visit a physical bank.

Threats

- Private Sector Banks are Increasing Their Competition - Private sector banks are developing novel investment packages and thereby gaining market share among retail consumers.
- Economic Crisis - As a result of the economic crisis, clients are not saving money in banks, reducing bank liquidity and making it difficult for them to operate efficiently.
- Changing Policies - Banking policies are governed by RBI laws and regulations, therefore any changes made by the RBI have a direct impact on the bank's operations.

1.3 Indian Bank

Indian Bank is a government-owned financial services and banking organization in India. It is owned by the Ministry of Finance of the Indian government. The bank was founded in 1907 and is based in Chennai, India. It employs 41,620 people and has 6,004 branches with 5,428 ATMs and cash deposit machines. It is one of India's best-performing public sector banks. On August 30, 2019, Finance Minister Nirmala Sitharaman announced the merger of Allahabad Bank with an Indian bank. With assets of 8.08 lakh crore (US$110 billion), the proposed merger will create the country's seventh largest public sector bank. On March 4, 2020, the Union Cabinet authorized the merger. On April 1, 2020, Indian Bank took possession of Allahabad Bank.

SWOT analysis

Strengths

- Competence in rural banking
- With 240 abroad correspondent banks in 70 countries, the bank has a strong international network.
- At all of our 1900+ locations, we use cutting-edge banking technology and core banking.
- It employs 22,000 people.
- Indbank Merchant Banking Services Ltd, IndBank Housing Ltd, and IndFund Management Ltd are three subsidiaries that provide a diverse range of banking services.

Weaknesses

- In India, it has a smaller foothold due to competition in both urban and rural areas.
- In comparison to the big banks, there isn't much advertising.
- In comparison to other large bank brands, there are fewer ATMs and branches.

Opportunities

- Retail banking and urban market banking
- Government rural projects that are beneficial
- More growth into rural markets that are currently underserved

Threats

- Economic downturns and volatile market conditions
- An extremely competitive climate exists.
- Governments and the Reserve Bank of India have imposed strict banking regulations.

1.4 ICICI Bank

The World Bank, the Government of India, and leaders from Indian business came together to form ICICI in 1955. The main goal was to establish a development financial institution that would provide medium- and long-term project funding to Indian companies. ICICI largely centered its business on project finance until the late 1980s, providing long-term funds to a variety of industrial ventures. With the liberalization of India's financial sector in the 1990s, ICICI transformed its business from a development financial institution that only provided project finance to a diversified financial services provider that offered a wide range of products and services through its subsidiaries and other group companies. As India's economy became

more market-oriented and integrated with the global economy, ICICI took advantage of new chances to offer a greater range of financial goods and services to a wider range of customers. As part of the ICICI group, ICICI Bank was founded in 1994.

In the late 1990s, the issue of universal banking, which in India entailed converting long-term lending institutions like ICICI into commercial banks, was hotly debated. With the conversion to a bank, ICICI gained the ability to accept low-cost demand deposits, offer a broader range of products and services, and earn non-fund-based income in the form of banking fees and commissions. The managements of ICICI and ICICI Bank came to the conclusion that merging ICICI and ICICI Bank would be the best strategic option for both entities, and would create the best legal structure for the ICICI group's universal banking strategy, after considering various corporate structuring alternatives in the context of the emerging competitive scenario in the Indian banking industry and the move towards universal banking. The amalgamated entity's access to low-cost deposits, increased potential for fee-based income, and ability to participate in the payments system and provide transaction-banking services would all provide value to ICICI shareholders. Through a large capital base and scale of operations, seamless access to ICICI's strong corporate relationships built up over five decades, entry into new business segments, higher market share in various business segments, particularly fee-based services, and access to ICICI and its subsidiaries' vast talent pool, the merger would enhance value for ICICI Bank shareholders.

The private sector lender posted a net profit of Rs 1,221 crore in the March quarter, much exceeding analysts' expectations. Bloomberg polled 16 analysts, and the average expectation for net profits for the fourth quarter of FY20 was 3,510 crores. ICICI Bank lost money because it elected to make more provisions than the Reserve Bank of India required (RBI). Well, not all banks could perform over expectations during the pandemic, so week a good mix in our portfolio which would simulate reality as much as possible.

SWOT analysis

Strengths

- In terms of total assets and market share, ICICI is the second largest bank.
- ICICI's total assets are Rs. 4062.34 billion, with a profit after tax of Rs. 51.51 billion with offices in 19 countries.

- According to financial observers, one of ICICI bank's primary strengths is its robust and transparent balance sheet.
- In several banking and financial services, ICICI Bank has a first mover advantage. ICICI Bank was the first bank in India to offer full mobile banking services as well as a jewelry card.
- The bank has roughly 2,567 branches and 8003 ATMs in India.
- ICICI Bank is the first bank in India to link lifestyle benefits to banking services for unique purchases and partnerships with industry leaders like Nakshatra, Asmi, and D'damas.
- Customers are drawn to ICICI Bank because of its long operating hours and other services offered at ATMs.
- In comparison to other Indian banks, ICICI's marketing and advertising tactics have a wide reach.

Weaknesses

- In terms of handling concerns, the ICICI section's customer service is not performing effectively.
- ICICI Bank has received numerous consumer complaints.
- In terms of recovering debts and loans, as well as credit payments, the ICICI bank has the strictest standards. They hire a third-party recovery management company.
- Them have also reported being assaulted and abused while recovering, and credit payment reminders are sent out much before the deadlines, which irritates customers.
- In comparison, bank service fees are greater.
- Because of the aggressive policies of the management to stay ahead in the race, the employees of ICICI are under a lot of stress.

Opportunities

- In the next three years, the banking sector is predicted to increase at a rate of 17%.
- Saving in banks and investing in financial products is becoming more popular in rural areas, where more than 62 percent of India's population still resides.
- According to data published in the Times of India in 2010, India has around 1500 business schools. This would provide a steady supply of qualified human resources in the financial products and banking services industries.
- ICICI Bank intends to open 1500 additional branches over the next four years.
- Because of its financial strength, ICICI may purchase small and non-performing banks.
- In the following years, ICICI Bank is predicted to boost its loans by 20%.

- ICICI bank has the smallest quantity of non-performing assets.

Threats

- The Reserve Bank of India (RBI) has permitted foreign banks to invest up to 74 percent in Indian banking.
- Government-owned banks are under pressure to upgrade their capabilities in order to reduce the number of customers who migrate to newer institutions.
- HDFC is ICICI's main competitor, while other up-and-coming banks such as AXIS and HSBC pose a serious threat.
- Microfinance organizations have a significant presence in rural areas.
- While client acquisition is strong on one hand, dissatisfied consumers are on the rise, prompting them to transfer banks.

1.5 HDFC Bank

HDFC Bank is one of India's top private banks, having been one of the first to acquire Reserve Bank of India (RBI) authorization to open a private sector bank in 1994. As of April 2021, HDFC Bank is India's largest private sector bank in terms of assets and market capitalization. On the Indian stock exchanges, it is the third largest firm by market capitalization. Wholesale banking, retail banking, treasury, auto loans, two-wheeler loans, personal loans, loans against property, consumer durable loan, lifestyle loan, and credit cards are among the goods and services offered by HDFC Bank. Payzapp and SmartBUY are two of the many digital goods available. With approximately 120,000 people, it is India's tenth largest employer. The Bank's distribution network had 5,500 branches in 2,764 cities as of 30 June 2019. In fiscal year 2017, the bank also installed 430,000 point-of-sale terminals and issued 23,570,000 debit cards and 12 million credit cards. As of March 21, 2020, it had 1,16,971 permanent employees.

Yes Bank received a 1,000-crore investment from HDFC (parent company of HDFC BANK) in March 2020. According to Yes Bank's rehabilitation plan, 75 percent of the company's entire investment will be locked in for three years. Yes Bank allotted 100 crore shares with a face value of 2 each to the Corporation on March 14 for a consideration of 10 per share (including an 8 premium), accounting for 7.97 percent of Yes Bank's post-issue equity share capital.

SWOT analysis

Strengths

- With 2,201 branches and 7,110 ATMs, HDFC Bank is India's second largest private banking industry.
- HDFC Bank is present in 1,174 cities across India and has over 800 locations where consumers may conduct telephone banking transactions.
- The bank's ATM card works with all Visa/Mastercard, Visa Electron/Maestro, Plus/cirus, and American Express cards, both domestic and foreign. This is one of the reasons why HDFC cards are so popular for shopping and online transactions.
- When compared to other private banks, HDFC Bank has a high level of client satisfaction.
- HDFC has a low attrition rate and is one of the greatest places to work in the private banking sector.

Weaknesses

- HDFC bank does not have a strong presence in rural areas, and while ICICI bank, its direct competitor, is expanding in the rural market, HDFC cannot take advantage of the first mover advantage. In terms of financial services, rural people are fiercely loyal.
- Like ICICI, HDFC lacks aggressive marketing initiatives.
- The bank caters mostly to high-net-worth individuals.
- Some of the bank's product categories are underperforming and have limited market reach.
- HDFC's stock price fluctuates frequently, forcing investors to be uncertain.

Opportunities

- Because HDFC bank has stronger asset quality parameters than government banks, profit growth is expected to be higher.
- Large and small businesses are expanding at a rapid rate. In terms of corporate salary accounts, HDFC has a strong reputation.
- When compared to government banks, HDFC Bank has improved its bad debt portfolio and has a high recovery rate of bad loans.
- HDFC has a lot of prospects in the international market.
- Due to the company's solid financial situation, there is more room for acquisitions and strategic alliances.

Threats

- The percentage of nonperforming assets (NPA) held by HDFC grew from 0.18 percent to 0.20 percent. Even though it's a minor difference, it's not a good omen for the bank's financial health.
- In India, the number of non-banking financial enterprises and new generation banks is growing.
- The HDFC is unable to increase its market share since ICICI poses a significant threat.
- To compete with private banks, government banks are attempting to modernize.
- Foreign banks can now invest in India at a rate of up to 74 percent, according to the Reserve Bank of India.

2. Hotel Sector

As the consequences of COVID-19 spread over the globe, governments and companies must prioritize the protection of their citizens. While this focus will continue, the consequences for economic development and corporate earnings will almost certainly result in a significant sell-off in equities markets around the world. We are pleased to see that, as the first to be affected by the severe weather, our hotel and leisure clients are moving promptly and remaining focused on understanding and quantifying the operational and financial impact on their businesses. On both revenue and supply chains, the impact is massive and unpredictable. Hotel, restaurant, theme park, and movie closures, not to mention the full disruption effect of the travel ecosystem, all have a huge influence on global tourism. Operators and investors are working together to address liquidity and working capital concerns while maintaining strong communication with their stakeholders.

While the hospitality industry is slowly rebounding, the COVID-19 situation continues to have a significant impact on how businesses operate in the hospitality industry. In the COVID-19 business environment, hospitality organizations are expected to make significant adjustments to their operations in order to maintain the health and safety of their employees and customers, as well as increase customer willingness to visit their establishment. This epidemic is also anticipated to have a considerable impact on hotel marketing and management researchers' study agendas. With the hotel business facing new hurdles in the COVID-10 age, scholars are required to redirect their research attention to developing solutions for the industry. Customers' feelings about patronizing a restaurant or hotel during a coronavirus outbreak will be one of

the key concerns that hospitality scholars will need to answer. Is it safe to say they're ready to return? If not, what will entice them back? All these factors make hospitality industry an interest sector for our research to test if Monte Carlo Simulation can simulate even fragile market conditions factoring downturns through trends.

2.1 Taj DVK

Taj Hotels is a premium hotel brand located in Nariman Point, Mumbai, and is a subsidiary of the Indian Hotels Company Limited. Jamsetji Tata, the Tata Group's founder, founded the company in 1903. It is now a part of the Tata Group, one of India's major economic giants. In 2010, the corporation employed approximately 20,000 individuals.

By 2020, the company will have a total of 100 hotels and hotel-resorts, with 84 in India and 16 in other countries such as Bhutan, Malaysia, Maldives, Nepal, South Africa, Sri Lanka, the United Arab Emirates, the United Kingdom, the United States, and Zambia. The extent to which Covid has bled the hospitality industry is beginning to become obvious. Taj parent Indian Hotels Company Ltd (IHCL), South Asia's largest hotel conglomerate, recorded a loss of Rs 720 crore in the pandemic-hit FY 2020-21, compared to a profit of Rs 354 crore the year before. The hospitality sector leader sponsored by the Tata Group has joined the list of enterprises such as Bajaj Auto, Borosil, Tata Motors, Tata Steel, and Tech Mahindra that have launched aid programs for the families of employees who have lost their struggle with Covid-19. IHCL, like its counterparts, had maintained some of its properties operational even throughout the pandemic's peak. These establishments catered to a diverse range of visitors, including hospital medical staff such as doctors and nurses, other healthcare workers, members of essential services, and quarantined visitors, to name a few. In addition to ama Stays and Trails, IHCL has Taj, Vivanta, SeleQtions, and Ginger as its principal hotel brands. Taj focused on its operational efficiencies during the pandemic and thus sustained the market pressure. Give this factor we chose Taj in our portfolio.

SWOT analysis

Strengths

- Catering to a wide range of customers: The Taj Group of Hotels offers something for everyone. Taj Vivanta caters to the upper upscale market, Taj to the luxury market, Gateway

to the upscale market, and Ginger to the economy market. This ensures that all customers, regardless of their financial status, pick a Taj Hotel for their stay.

- Business Philosophy: The Taj's business philosophy is built on the notion that no two people are alike. As a result of accurately segmenting the market, the hotel has been able to differentiate their offering not only to cater to various income classes, but also to various cultures.
- The Taj Group of Hotels offers a wide range of amenities at all of their properties. Rooms, spas, jacuzzis, multi-cuisine restaurants, swimming pools, pubs, resto cafés, fitness centers, and banquet halls are all available to guests at their hotels. Some of their hotels also include gigantic convention centers with the capability of hosting large-scale gatherings.
- Loyalty programs for customers: Unlike other hotel chains, the Taj Group offers customers the opportunity to earn points from all of their stays at any of the group's locations. The automatic upgrade to a higher-class hotel within the group is a crucial aspect of their reward program.
- Service Differentiation: The Taj research team has identified around 155 touch points in customer service from the time a customer enters their hotel until they leave, where a face-to-face interaction occurs. The hotel company has guaranteed that there is a noticeable service difference in each of these areas.
- Pay special attention to the business class: Taj Residency, a business class hotel, was launched when the hotel company identified the potential for expansion in business class travel. The hotel chain has also expanded into smaller towns and cities, which has helped the company's customer base grow.

Weaknesses

- Customer Relationship Management: Hotels must be on their toes when it comes to customer relationship management today. The key to today's success is a collection of client data that allows businesses to better understand them and provide customized services. This is proving to be prohibitively expensive for Taj.
- Growth is uneven between segments: While the economic and higher upmarket segments grew rapidly, the luxury segment remained stagnant. Luxury hotels, on the other hand, have higher maintenance and upkeep costs and lower profits. The hotel has been injecting money into their premium hotels from their medium segments.
- The high cost of maintenance: With a network of nearly 100 hotels across India and other properties in countries such as Bhutan, Malaysia, Maldives, Nepal, South Africa, Sri Lanka,

the United Arab Emirates, the United Kingdom, the United States, and Zambia, the cost of maintenance is becoming unaffordable.

Opportunities

- The Taj Group of Hotels is a well-established participant in the Indian industry, and the hotel chain is expanding into smaller towns and cities, a feat that global hoteliers find impossible.

Threats

- Oberoi, Sheraton, Radisson, Hilton, Wyndham Worldwide, and Intercontinental Hotels are the Taj Group of Hotels' primary competitors.

2.2 Royal Orchid

Chender K. Baljee founded the flagship hotel in Bangalore in 1973. Royal Orchid Hotels has 15 hotels in 2008, according to their website. By May 2015, the company had 28 hotels, 10 of which it owned and 18 of which it managed through joint ventures or contracts. The Hotel Royal Orchid Azure in Nairobi, Kenya, was the Royal Orchid Hotels' first hotel outside of India, which opened in 2015. Royal Orchid Hotels has 58 hotels under its umbrella as of October 26, 2019, with 3948 keys – just shy of 4000 – of which 47 are managed.

Lockdowns and limits imposed on various activities as a result of the Covid-19 pandemic have caused obstacles to Royal Orchid Hotels Limited and its subsidiaries in all of their operations. The corporation told the stock markets on Wednesday that the Central and State governments had issued lockdown rules that required the closure of hotels and the suspension of air traffic and other kinds of public transportation. Low occupancies and hotel closures have resulted as a result of this.

Royal Orchid Hotels Ltd is currently trading at Rs52.80 on the BSE, down Rs2.5 (4.42%) from its previous close of Rs55.30. "With the exception of several managed properties that were shut down owing to government limitations imposed by various state governments," the business added, "all of our hotels were running at minimum occupancies at minimum cost." Because our operations are now closed in most geographies and will progressively ramp up only when the pandemic is resolved, the business anticipates this will have an impact on sales volumes, revenue, and profitability in Q1 and Q2 FY21.

However, the company is confident in its ability to adapt to the changing business environment and respond appropriately to its consumers' needs. Given the trust in our brand, the company

does not anticipate any difficulties in assuming its position in the near future. However, revenues are projected to be lower during the lockdown's early phase and for some time after it is lifted, owing to decreased occupancies and limited F&B offtake as a result of reduced business and leisure travel. To keep a good mix in our portfolio we decided to include Royal Orchid.

SWOT analysis

Strengths

- Zero Promoter Pledge Organization
- Price is above the short-, medium-, and long-term moving averages, indicating strong momentum.

Weaknesses

- Companies with a short lifespan Over a 4.5-year period, the Nifty 500 has returned 53.9 percent.
- Risky Value (DVM) has returned -1.8 percent for the past 5.4 years.
- Inefficient use of capital to generate profits - RoCE has been dropping in the last two years, with the Nifty 500 returning -9.0 percent over the last 1.9 years.
- Inefficient use of shareholder capital - ROE has been dropping in the last two years, with the Nifty 500 returning -10.7 percent over 1.9 years.
- Inefficient asset uses to create profits - ROA has been dropping in the last two years, with the Nifty 500 returning -15.7 percent over 1.9 years.
- -Declining Cash Flow from Operations for the last two years -25.7 percent returns for the Nifty 500 over 1.9 years
- Revenue and profit growth have slowed.
- The promoter's stake in the company is shrinking.

Opportunities

- High Percentage of Deliveries
- Companies that have seen a 10% increase in share price in the last three months, as well as increased net profit growth
- Companies with Exciting Future Prospects
- Screener for Results: Stocks with forthcoming results that have seen positive price changes
- The 30-day SMA has crossed the 200-day SMA, and the current price is higher than the open.

- Over a 1.2-year period, the Nifty 500 returned 34.5 percent.
- Scores with a lot of momentum (Technical Scores greater than 50)
- Over 5.1 years, the Nifty 500 has returned 319.5 percent.
- Stocks with a low PE (PE = 10) are a good investment.
- Price strength as measured by the RSI Volume Shockers

  Threats
- The Trendline Valuation Score identifies stocks with high valuations. Over a 4.5-year period, the Nifty 500 has returned 177.2 percent.
- Companies According to the Annual Report, debt is increasing.
- Promoters are reducing their shareholding in a company that is experiencing poor growth. Non-Core Income is Increasing on a Quarter-over-Quarter Basis

2.3 Chalet Hotel

Chalet Hotels Limited, a subsidiary of the K Raheja Corp group, is an owner, developer, asset manager, and operator of high-end hotels and hotel-led mixed-use developments in India's important metro cities, including Mumbai, Hyderabad, Bengaluru, and Pune. Chalet focuses on maximizing returns on every square foot owned and operated, starting with pre-development and continuing through the asset's existence. The property includes seven fully operating hotels with a total of 2,554 rooms in the mainstream and luxury segments, as well as four commercial and retail spaces totaling 0.9 million square feet in close proximity to the hotels. The business proposal is an unmistakable option among stakeholders and consumers alike, thanks to its contemporary and well-planned designs, strategic locations, and long-standing experience in asset management. Chalet aims to construct properties that meet high standards, focusing on the luxury-upper upscale and upscale hotel segments with a low gross built-up area and per-key development cost. For hotels maintained by third parties, the Company uses an active asset management methodology, closely monitoring and exercising regular supervision. Due to its first-mover advantage in major, mixed-use developments in certain micro-markets, Chalet has constructed commercial spaces in close proximity to the hotels, giving it a competitive advantage in key metro areas.

The year 2020 has been a particularly difficult one for the hospitality and travel industries in general. Beginning in the first financial quarter, covid-19 caused restrictions wreaked havoc on the industry's operations and business from April to July 2020. With the lifting of travel

restrictions and the relaxing of lockdowns, the general mood has improved, resulting in a positive shift in travel, tourism, and hospitality, as well as other economic activity. People's perceptions of the situation have improved, and they are more capable of adapting to change while taking the required safeguards and feeling less fearful. This has brought a positive impact on the businesses.

SWOT analysis

Strengths

- Stocks in which Mutual Funds have increased their holdings in the last month Growth in Net Profit with growing Profit Margin (QoQ) FII / FPI or Institutions expanding their shareholding
- Strong Momentum: Near 52 Week High: Short, medium, and long-term moving averages are all above the current price.
- Last quarter, mutual funds increased their stock holdings.

Weaknesses

- Momentum Trap (DVM) has returned 197.0 percent for the past 5.4 years.
- Companies with a short lifespan
- Over a 4.5-year period, the Nifty 500 has returned 53.9 percent.
- Inefficient use of capital to generate profits - RoCE has been dropping in the last two years, with the Nifty 500 returning -9.0 percent over the last 1.9 years.
- Declining Cash Flow from Operations for the last two years -25.7 percent returns for the Nifty 500 over 1.9 years
- Revenue and profit growth have slowed.
- Companies having a low Piotroski score have bad financials.
- Companies who are unable to create net cash flow are experiencing a decline in their net cash flow.
- Stock commitments from high-ranking promoters

Opportunities

- The Delivery Percentage is Increasing Companies with a 10% increase in share price over three months and rising net profit growth compared to Prev Day Companies with a 10% increase in share price over three months and rising net profit growth
- The Delivery Percentage is Increasing In comparison to the day before and the month before, Massive Volumes

- Positive Third Resistance Breakout (LTP > R3)
- The 30-day SMA has crossed the 200-day SMA, and the current price is higher than the open.
- Over a 1.2-year period, the Nifty 500 returned 34.5 percent.
- Scores with a lot of momentum (Technical Scores greater than 50)
- Over 5.1 years, the Nifty 500 has returned 319.5 percent.
- Sales and profit growth have shifted from negative to positive, owing to strong price movement.
- Highest 52-Week Recoveries Low PE (PE = 10) stock with low PE (PE = 10) PE (PE = 10) stock with low PE (PE = 10)
- Price strength is shown by the RSI.
- Shockers with a lot of volume and a lot of gain

  Threats
- Companies with a large market capitalization have a reduced public shareholding.
- The Trendline Valuation Score identifies stocks with high valuations.
- Over a 4.5-year period, the Nifty 500 has returned 177.2 percent.
- A red flag has been raised. Coronavirus has had a tremendous influence on businesses.

2.4 Lemon Tree Hotel

The hotel chain Lemon Tree Hotels is founded in India. According to the Horwath Report, it is India's largest hotel chain in the mid-priced hotel sector and the third largest overall in terms of controlling interest in owned and leased rooms as of 30 June 2017. To date, the firm owns and runs 84 hotels in 52 cities across India, totaling 8300 rooms. Patanjali (Patu) Keswani founded Lemon Tree Hotels. In May 2004, this award-winning Indian hotel chain established its first hotel, which has 49 rooms.

Aurika Hotels and Resorts (upscale), Lemon Tree Premier (higher midscale), Lemon Tree Hotels (midscale), Red Fox by Lemon Tree Hotels (economy), Keys Prima (upper midscale), Keys Select (midscale), and Keys Lite (low-cost) are the company's seven brands (economy). Berggruen Hotels Private Limited was acquired by the firm in 2019 for Rs 605 crore in enterprise value. Berggruen Hotels owned 936 rooms and operated 975 rooms under the 'Keys' brand in 21 cities across India at the time of acquisition.

In India, the company's hotels may be found in major cities such as Ahmedabad, Aligarh, Alwar, Amritsar, Aurangabad, Baddi, Bandhavgarh, Bengaluru, Bhiwadi, Bhubaneswar, Calcutta, Chandigarh, Chennai, Coimbatore, Corbett, Dehradun, Delhi, Gangtok, Ghaziabad, Goa, Gurgaon, Hyderabad, Indore, Lemon Tree Hotels will operate 105 hotels with 10,500 rooms in 66 cities in India and abroad once the present pipeline is complete. Lemon Tree Hotels went public in early 2018, and on April 9, 2018, it was listed on the National Stock Exchange of India.

Revenue from operations climbed by 17% to Rs 176 crore in Q4 FY20, up from Rs 150 crore the previous fiscal quarter, but total expenses increased by more than 10% to Rs 112 crore, up from Rs 102 crore. EBITDA (earnings before interest, taxes, depreciation, and amortization) increased by 31% in Q4 FY20 to Rs 64 crore from Rs 49 crore in Q4 FY19. Following the directions issued by several state governments regarding the Covid-led lockdown, the company stated nearly 66% of its owned and leased rooms were functioning in April. Quarantine guests, doctors, nurses, healthcare workers, and corporate guests for business continuity planning accounted for over 33.4 percent of occupancy in the operational owned and leased hotels. In May, 78 percent of its rooms were operating, thanks to the partial lifting of lockdown in various states. The hotel occupancy rate was close to 40%. While all food and beverage outlets, as well as banquets, were closed, in-room dining was available. The hotel's operations were hampered by restrictions on personnel movement and the provision of raw materials and room amenities.

SWOT analysis

Strengths

- The Lemon Tree Hotel Group offers a diverse range of hotels ranging from mid-market to upscale.
- The hotel provides a warm and welcoming atmosphere, which customers like. India's cultural and geographical richness attracts tourists.
- The personnel at the hotel are incredibly pleasant (They have particular staff in yellow ribbons). This team is especially dedicated to resolving people's complaints.
- The Lemon Tree Group is dedicated to offering the most refreshing experience possible. They make their own shampoos and soaps.

Weaknesses

- There is no presence in two of the world's most populous metropolises, namely Mumbai and Kolkata.
- Because it is newer in the sector, it has a smaller market share.
- When compared to market leaders, the hospitality experience is less.

Opportunities

- MICE (Meetings, Incentives, Conferences, and Exhibitions)– The lemon tree may be found in major cities such as Bangalore, where meetings and conferences can be hosted.
- Government Support for Mid-Market Hotels is Growing the Lemon Tree collection of hotels are modest and economical, making them ideal for a weekend getaway.

Threats

- Terrorist threats, a slump in the economy, and political turmoil
- People are increasingly preferring well-furnished guest houses than hotels.
- Because of the substantial initial expenditure, changing patterns from the west may be difficult to implement by already established players.

2.5 Asian Hotel

Asian Hotels (North) Ltd is a major operator in the Indian hospitality business, owning and operating the Hyatt Regency Hotels chain of deluxe hotels. The firm currently operates the Hyatt Regency Delhi, a five-star premium hotel in Delhi. The 5-Star Deluxe Hotel Hyatt Regency New Delhi is located in Bhikaji Cama Place. The hotel offers 508 rooms and suites and is well-equipped with amenities such as high-speed Internet, a swimming pool, a fitness center, a business center, boutiques, and restaurants that cater to a wide range of tastes. R S Saraf R K Jatia promoted Asian Hotels (North) Ltd, which was founded in 1980 as Asian Hotels Ltd. Three non-resident Indians, Chaman Lal Gupta, Sushil Gupta, and Shiv Jatia, and their Indian Associates During the Asian Games in 1982, the company set up their first-class room amenities for visitors. In 1983, the hotel began full-fledged commercial operations.

GJS Hotels Ltd, a subsidiary of the corporation, was established on December 9, 2002. In order to expand its geographic reach, they built two additional five-star deluxe hotels, the Hyatt Regency Kolkata and Hyatt Regency Mumbai. The former began full-fledged operations on January 1, 2003, while the latter began operations on April 1, 2003. Chillwinds Hotels Ltd, Vardhman Hotels Ltd, and Aria Hotels and Consultancy Services Pvt Ltd were all bought by

the firm during the 2007-08 financial year. In 2008, the company ventured into a new business division, electricity generating, and erected two wind turbine generators.

According to them, the pandemic caused significant changes in consumer travel and experiences, resulting in a new wave of trends influencing hotel operations and strategy. Vaccinations that are currently being administered have given travelers renewed hope, resulting in a boost to the hotel industry's real-estate revival. According to Ercan, pricing in 2019 reached an all-time high, owing to robust operational cash flow at the hotel level, which priced private equity out of the market. The 'reset' has opened up prospects for acquisition at "more opportunistic levels of price with an ultimate exit in five to seven years," according to the company.

According to Ercan, pricing in 2019 reached an all-time high, owing to robust operational cash flow at the hotel level, which priced private equity out of the market. The 'reset' has opened up prospects for acquisition at "more opportunistic levels of price with an ultimate exit in five to seven years," according to the company. Keeping these factors in mind we decided to include Asian Hotels in our portfolio.

SWOT analysis

Strengths

- Increased Profit Margin leads to an increase in Net Profit (QoQ)

Weaknesses

- Companies with a short lifespan Over a 4.5-year period, the Nifty 500 has returned 53.9 percent.
- Risky Value (DVM) has returned -1.8 percent for the past 5.4 years.
- Quarterly Net Profit Decrease (YoY)
- Debt-ridden businesses
- Piotroski Score is Low: Financially troubled businesses
- For the past two years, annual net profit has been falling.
- High Promoter Pledge Companies
- Stock commitments from high-ranking promoters
- Companies that have larger interest payments than revenues are referred to as zombies.

Opportunities

- Companies with Upcoming Results have a Rising Delivery Percentage Compared to Prev Day Companies.
- Stocks with a Low PE (PE = 10) and a High-Volume Shocker

Threats

- Stocks with Expensive Valuations According to the Trendline Valuation Score, the Nifty 500 has returned 177.2 percent over the last 4.5 years.

3. Media and Entertainment Sector

The global pandemic had an influence on the theatrical and home/mobile entertainment industries in 2020, as movie theatres and production companies were forced to close temporarily. Viewers were compelled to stay at home for their audiovisual pleasure while millions of people were confined. It will take a long time for the industry to return to normal. As the globe heals from COVID-19, production will gradually resume, and theatres will reopen to their full capacity. Streaming, on the other hand, is the new normal in the meanwhile. With people spending more time at home than ever before, streaming has become a popular way for them to escape reality. As a result, viewers are now consuming a larger range of information. As they work from home offices, consumers are now streaming material throughout the day, including music and podcasts.

The epidemic has had an impact on the type of content available, with consumers displaying a greater interest in overseas series and films. Even as the industry returns to normal, the greater demand in cultural content is likely to continue. Netflix CEO Reed Hastings confirmed the shift to international programming in June, claiming that Netflix members were consuming more diversified content from other countries and cultures. The majority of large streaming platforms understand the value of localization and are working hard to provide high-quality subtitles and dubbed material. This is due to the fact that they have a well-defined methodology for localizing content. Those who do not yet have such procedures in place are actively working on them.

The Indian Media and Entertainment (M&E) sector hit Rs 1.82 trillion (US$25.7 billion) in 2019, according to FICCI research (a growth of 9 percent over 2018). According to the report, India's M&E sector is predicted to reach Rs 2.4 trillion (US$34 billion) by 2022, with a CAGR of 10%. However, these forecasts were made before to the impact of Covid-19, and according

to CRISIL, the Indian M&E industry's income is expected to drop by 16 percent, or Rs 25,000 crore, to Rs 1.3 lakh crore in the current fiscal year. The M&E sector's profitability is projected to be significantly impacted by this overall decrease in revenue.

3.1 Balaji Telefilms

Ekta Kapoor and Shobha Kapoor founded Balaji Telefilms Private Limited on November 11, 1994, in Mumbai, India, with the goal of producing serials and other entertainment products. Balaji specializes in structured programming that can be adapted for languages both domestically and internationally. Balaji became a public limited company on February 29, 2000, and changed its name to 'Balaji Telefilms Ltd' on April 19, 2000. The corporation issued 28,00,000 equity shares of ten rupees each at a premium of 120 rupees each, totaling 36.40 crore. A book-built portion of 25,20,000 equity shares and a fixed-price portion of 2,80,000 equity shares were included in the offering. Nine Network Entertainment India Pvt. Ltd., a wholly owned subsidiary of Nine Broadcasting India Pvt. Ltd., and Balaji Telefilms Ltd. amalgamated in the same year. When Star India bought a 26 percent share in the company in 2000–04, the stock market value soared sixteen-fold to 571 crores.

Producer Ekta Kapoor has said that she has paused all administrative and production activity across Balaji Telefilms Limited, Balaji Motion Pictures Limited, and ALTBalaji in order to contain the spread of the new coronavirus. Ekta stated the safety and well-being of the company's employees, cast, and crew is of fundamental significance to her in a statement released on her official Twitter account. The COVID-19 epidemic and the government's subsequent lockdown had a negative influence on the whole media and entertainment industry, and as a result, the Group's business activities were also hurt in the current quarter.

Following the pandemic in 2020, the TV business, which accounts for the majority of Balaji Telefilms' operations and revenue, was affected by higher expenses and limitations. However, ALTBalaji, the production house's over-the-top (OTT) platform, performed well during this time. During the year, the site sold 4.7 million subscriptions and now has over 2.3 million active subscribers who watch 83 different episodes. In FY20, the firm sold 3.4 million subscriptions.

SWOT analysis

Strengths

- Teams with a lot of creativity
- Captive studios and recurring lead actors – Low-cost manufacturing
- For the Top 100 positions, the majority of the TRP
- From broadcasting to production to acquisition, we're looking into a variety of topics.
- Due to the production of popular movies and serials, the company has a strong brand presence.

Weaknesses

- Lack of scalability and viewers' changeable desires
- Adaptability to regional demands is slow.
- It's difficult to carve out a niche when there's a lot of competition.

Opportunities

- With the advent of FDI, new broadcasting companies are entering the market.
- Increasing Customer Awareness of Diverse Content Production in Regional Areas

Threats

- Regional networks are gaining popularity at a rapid rate.
- Interest is shifting away from mainstream entertainment and toward niche genres.
- Foreign networks are becoming more popular.

3.2 Inox Leisure

INOX Leisure Limited was established as a Public Limited Company on November 9, 1999. The company's operations span a wide range of industries, including industrial gases, engineering plastics, refrigerants chemicals, renewable energy, cryogenic engineering, and entertainment. It maintains a network of multiplexes in India and is a subsidiary of Gujarat Fluorochemicals Ltd. With 128 buildings, 512 screens, and 1,25,508 seats in 64 cities, it has a broad footprint across India. The company has signed a Memorandum of Understanding with the Pantaloon Group for privileged access to multiplex spaces in all Pantaloon Group-owned real estate developments. During the 2005-06 fiscal year, the business opened multiplexes in Indore, Darjeeling, and Kota. During the year, they issued 16500000 equity shares of Rs.10 each at a price of Rs.120 per share, which included a fresh issue of 12000000 equity shares of Rs.10 each and a sale of 4500000 equity shares of Rs.10 each by Gujarat Fluorochemicals Ltd.

The company won the ICICI Entertainment Retailer of the Year Award in 2005, as well as the TAAL Multiplexer Award in 2006.

As of March 31, 2018, the Company's total number of multiplex cinema theatres was at 123, with 492 screens and 121573 seats. During the fiscal year under review, 17 multiplex cinema theatres with a total of 77 screens were added, as well as 8 screens in an existing multiplex theatre. An agreement for a single 3-screen multiplex cinema was cancelled. As of March 31, 2019, the Company's total number of multiplex cinema theatres was at 139, with 574 screens and 135586 seats. During the year under review, the Company issued 6400000 equity shares of Rs 10 each to GFL Limited (formerly Gujarat Fluorochemicals Limited), the Company's Promoter, at a price of Rs 250 per share (at a premium of Rs 240 per share) on November 30, 2018 (Preferential Issue), raising Rs 160 crore.

During Pandemic, the corporation stated that retail customers were more vulnerable to the pandemic's immediate impact, and hence postponed their discretionary spending owing to a shift in priorities. The company said it has taken steps, including cutting costs across all functions and departments, engaging with business partners such as developers, distributors, and producers, and making representations to State and Central governments for support, in its disclosure to the exchanges about the material impact of the Covid-19 pandemic. The company's management thinks that these steps will provide enough liquidity to fund business operations for at least the next six months, according to the statement. These factors make it a choice in our portfolio.

SWOT analysis

Strengths

- With over 60 locations and approximately 250 screens scattered across India, it has the greatest multiplex screen capacity in the country.
- Market capitalization in India has one of the biggest market shares.
- INOX was also chosen after a countrywide competition to design, build, and run the famous multiplex in Goa that hosts the Indian Film Festival.
- Modern projection and audio systems, international-standard furnishings, stadium-styled high back seating with cup holder armrests, high levels of hygiene, a diverse theatre menu, and a variety of Hindi, English, and regional films
- Excellent customer service and top-of-mind brand recall are provided.

Weaknesses

- Low presence in Tier-2 towns, as well as piracy-affected margins
- Market share and profitability are being squeezed as competition grows.

Opportunities

- Creating strategic connections to achieve 100 percent digitization
- Prioritize emerging Tier-2 cities.
- Customers will be reached through more international collaborations and unique screenings.

Threats

- Real estate prices are increasing.
- DTH and VOD services are growing in popularity.
- Television and over-the-top (OTT) film releases early
- Increased online piracy has an impact on businesses.

3.3 Sun TV

Sun TV is a Tamil-language general entertainment pay channel in India that debuted on April 14, 1993. Sun TV Network is the flagship channel of the Sun Group, a media company based in Chennai. Kalanithi Maran established and owns the company. On December 11, 2011, Sun TV released its HD edition. All of their shows are available to watch on their own digital platform, Sun NXT. Sun TV went public on the Bombay Stock Exchange on April 24, 2006, after receiving $133 million in funding. [7] It is the world's most popular Tamil television channel, with broadcasts in the United States, the United Arab Emirates, Singapore, Malaysia, Sri Lanka, Australia, Canada, South Africa, Qatar, Hong Kong, Europe (the United Kingdom, France, Germany, Italy, Denmark, Austria, Switzerland, the Netherlands, and Ireland), and other countries.

Sun TV, a media company owned by Kalanithi Maran, reported that sales are close to 75% of pre-COVID levels. If things settle down and the market truly opens up, the entire fall could be limited to 15-20%. Meanwhile, the business allocated roughly Rs 250 crore in capital expenditure on digital, content creation to increase subscription income, and film production. Narayanan stated that the company will invest roughly Rs 100 crore in exclusive content for its OTT platform Sun NXT. "These investments will be substantially larger when things return to normal, because we are already producing that type of money in our streaming business. It was always the intention to make it a viable business rather than squander money only to make

a profit. We're re-evaluating the entire annual business strategy since no one expected everything to go apart so quickly. In terms of annualized spending, I believe this number will rise "he added in a new interview with Business Standard.

Investors have slammed Sun TV NSE 2.35 percent after the company lowered its FY21 annual payouts. The company's dividend payment ratio averaged 49 percent during the previous five years, but it has suddenly dropped to 13 percent this fiscal year. Sun Pharma was seriously impacted by Pandemic and thus we have decided to include the stock in our portfolio to make sure we have a diverse mix.

SWOT analysis

Strengths

- Brand recognition and a one-of-a-kind business model
- Strong distribution backbone with two verticals: one for promotions in South India and the other for promotions in other countries.
- With 20 channels and 43 FM radio stations in numerous Indian languages, it is India's second largest television network.
- The world's no. 1 Tamil channel, which broadcasts movies, news, serials, and shows 24 hours a day, has a strong brand reputation.
- South Africa, Australia, Europe, the United States, Canada, and Asia are among the nations where the company has a presence.
- The Karnataka Premier League's telecast rights were purchased for a five-year period (KPL)
- Forayed in radio broadcasting and print media.
- Reach, frequency, and patronage are competitive advantages.
- Have a bigger number of viewers
- Excellent political ties
- Owns a number of television and radio stations in several languages that broadcast in all Indian states.
- For revenue creation, he owns the Sun Risers, an IPL franchise based in Hyderabad.

Weaknesses

- They are only known in the south.
- There is a lack of active marketing and advertising.
- The quality of the content and the preferences of the viewers must be regularly examined.

- Constant necessity to keep track of programs that have been broadcast

Opportunities

- Increase the number of adverts and subscriptions to attract more customers.
- Increase viewership by launching services in other significant Indian markets at a lower cost.
- Through its companies, generate revenue through movie distribution and content trading.
- Participate in the creation, distribution, and acquisition of film content. Form a distribution venture with other broadcasting firms.
- Identify out-of-date technologies and replace them with the most recent developments.

Threats

- New entrants have increased competition, which has resulted in more innovation.
- Advertising revenue is the most important source of revenue, and it fluctuates a lot.
- Carriage fees have risen dramatically as stations fight for premium spots in prime-time slots.

3.4 Zee Entertainment

Zee Entertainment Enterprises (formerly Zee Telefilms) is a media corporation based in India. It has interests in broadcast, print, internet, film, mobile content, and allied companies, and is headquartered in Mumbai. The company was founded on December 15, 1991, under the name Zee Telefilms, which it used until 2006. As part of a distribution contract between Viacom International and Zee Telefilms, Zee Telefilms established a Nickelodeon-branded television block in 1999. In 2002, it was replaced by a new Cartoon Network block.

ETC Networks was purchased by the firm in 2002 for a majority (51%). They bought Integrated Subscriber Management Services Limited in 2006, and Taj Television, the owner of TEN Sports, in November of the same year. The company was renamed Zee Entertainment Enterprises in the same year. In February 2010, the company purchased a further 95% share in TEN Sports. Zee Motion Pictures and Zee Limelight (now Zee Studios) were established by Zee Networks in 2008 for the development, production, distribution, and marketing of major films in Indian languages such as Hindi, Malayalam, Tamil, Telegu, Kannada, Bengali, and Marathi.

From 2000 to 2005, the company was listed on the BSE Sensex as Zee Telefilms. In 2006, Zee News, a news and regional entertainment channel, was spun off as an independent entity.

In May 2011, Star Den formed a 50/50 joint venture with Zee Turner and Zee Entertainment Enterprises (ZEEL) in India, Nepal, and Bhutan to distribute and advertise all of the company's and ZEEL's channels, as well as affiliated channels and other third-party channels. It also owns Zee Music Company, a music label.

Sarthak TV, an Odia-language pay-television station, was purchased by Zee in 2015. It released Zee One, focused at the German market, a year later, on July 28, 2016. ZEE Entertainment Enterprises Ltd, a media and entertainment corporation, said on April 7 that it will provide financial assistance to approximately 5,000 daily wage earners who work directly or indirectly for the company in its whole production ecosystem.

ZEE Entertainment Enterprises Ltd (ZEEL) has taken this measure to ensure that the families of daily wage earners are not impacted during the ongoing hard phase, citing the unprecedented impact of the lockdown on all daily wage earners.

SWOT analysis

Strengths

- India's first private Hindi television channel
- Antakshari began the heritage of reality shows by launching the incredibly successful singing reality show Sa Re Ga Ma in HD quality, which was the first cooking show on television (Khana Khazana)

Weaknesses

- Despite being the oldest pvt channel, it is unable to adapt to changes in audience preferences.
- The number of people watching the show is steadily decreasing.
- The drama between SaaS and Bahu is the main theme of the shows.
- Previously, shows like Disney Hour were able to readily capture the attention of children.
- The expansion of Zee Network's regional channel took the spotlight away from the original Zee TV Channel, which had produced notable programs such as 'Phillips Top 10', 'Hum Paanch,' and 'Filmy Chakkar,' but was now unable to break the ground.
- TRP is given an excessive amount of weight.

Opportunities

- TRP, a shaky and dubious technique of assessing viewership, does not need to be given such a high priority.

- Make some great shows for kids, especially on weekends, because Zee Network does not have a kid's station.
- Can re-capture the audience by delivering authentic humor-based programming
- The 'Once a week show' method can be reintroduced to gain traction and produce high-quality content.
- The key is a creative renaissance.

  Threats
- Shows are similar across all GECs, and new networks like Colors have been able to take the top slot.

3.5 PVR

PVR Cinemas (Priya Village Roadshow) is an Indian film production and distribution firm. In 1995, the company was founded as a 60:40 joint venture between Priya Exhibitors Private Limited and Village Roadshow Limited. In June 1997, it commenced commercial operations. Ajay Bijli, the chairman and managing director of PVR Cinemas, started the company. Sanjeev Kumar Bijli, Ajay Bijli's brother, is the Joint Managing Director of PVR Ltd. Under PVR, the company also has a proactive CSR wing. The first PVR Gold Screen opened in Bengaluru's Forum Mall.

When Priya Village Roadshow decided to leave the partnership in 2003, ICICI Ventures invested 40 crores in PVR. [5] In 2012, the Kanakia group's CineMAX movie chain was purchased for 395 crore (US$52 million) by Cine Hospitality Private Ltd, a subsidiary of PVR Cinemas, establishing PVR India's largest cinema chain. [6] [7] PVR Cinemas purchased DT Cinemas from the DLF group in May 2016 for Rs 500 crore (US$66 million). [8] [9] PVR Cinemas just opened a Superplex in Noida, a new theatre concept. The theatre includes 15 screens, including IMAX, 4DX, Gold Class, a playhouse, and regular auditoriums.

PVR Cinemas has put a total of Rs. 48 crores into this new endeavor. In 2007, PVR opened its first "Gold Screen" in Indore. PVR Cinemas, in collaboration with HP India, recently opened Asia's first Virtual Reality (VR) Lounge at PVR ECX in Noida's Mall of India. In August 2018, PVR Cinemas announced the cash and stock acquisition of Chennai-based SPI Cinemas for 850 crores. PVR Cinemas reached the milestone of 800 screens in India in August of this year.

SWOT analysis

Strengths

- India's multiplex industry has a first-mover advantage.
- To produce a better-quality ambience, develop and operate cutting-edge multiplexes.
- Utilization of technologically advanced equipment such as Dolby stereo sound, Digital Cinema, and Xenon technology, among others.
- Exclusive rights to screen blockbusters were obtained from big distributors such as Warner Brothers, 20th Century Fox, and others.
- With more than 1500 screens in operation, it is the world's largest multiplex company.
- Brand equity is quite strong, and the mix of shopping and entertainment is very appealing.

Weaknesses

- Higher-priced ticket sales
- Customer retention in the long run
- Parking issues
- There is a lack of client input for service improvement.

Opportunities

- Develop a longer-term engagement with village road shows.
- Spending on entertainment by a growing family
- With almost 200 films released each year, there is a large film industry.
- To keep PVR loyalists, further deals are being made.
- Enter the film distribution business.
- Increase the number of screens in your business to reach a larger audience.
- Collaborate with franchises and networking sites.

Threats

- Similar multiplexes are posing a growing threat.
- Interference by the government in the entertainment tax
- Consumers are turning to alternative forms of entertainment.
- Piracy and the slowing economy may have an impact on the sector.
- Multiplexes' brand is being sabotaged by a movie.

3.8 EXPECTED OUTCOMES

Long-term earnings forecasting can be a very important topic for academia, research scholar, investors, and anyone interested in available exchanges. In this study, Monte Carlo simulations were presented as a technical analysis to support these sections in estimating stock prices, which will continue to be important for capital pricing, portfolio management, and other financial decisions. It is not used in current inventory analysis applications. This is because the method may not have been tested before and turned out to be better, for example, fundamental analysis or technical analysis. However, there are many questions that need to be answered. Investors need to be able to model the possible results of financial investments and financial decisions in order to make profitable and productive investments. This study examines the ability of Monte Carlo simulations to track market prices in the NSE. There are however many questions to be answered:

- The Monte Carlo analysis for the companies computed and analyzed.
- How the reporting effects the wealth maximization of the companies?
- How do companies compare and evaluate the financial performance?
- How useful is the analysis for the investors and predictors?

The Monte simulation allows analysts and advisors to convert investment chances into choices. The advantage of Monte Carlo is its ability to give some thought to a range of values for various inputs; this can be often also its greatest disadvantage within the sense that assumptions must be fair because the output is just nearly pretty much as good because of the inputs. Another great disadvantage is that Monte Carlo simulation tends to underestimate the probability of utmost bear events type of a financial crisis. Experts argue that a simulation like this is unable to give some thought to the behavioral aspects of finance and thus the irrationality exhibited by market participants. It is, however a useful gizmo for advisors.

3.9 LIMITATION OF THE STUDY

- The lack of previous studies in this research area makes the literature review smalland difficult to gather more research work.
- The sample size used the forecasting is for the duration of 30 days. Bigger sample size is difficult to find the significant relations from the data to ensure the representative distribution.
- Due to the COVID-19 situation, I had not got the access to the library, data, and documents.

CHAPTER 4

DATA ANALYSIS

4. DATA ANALYSIS

This chapter sets out the research methodology which will be accustomed to meet the target of the study. Included herein are the population of the study, the sample, the model, and data analysis to be adopted for the aim of this study.

4.1 POPULATION

The population of this study consists of NSE stocks.

4.2 SAMPLE

The sample of this study consisted of NSE stocks of five (5) banks sector, five (5) entertainment sectors, and five (5) hotel sector data set for the simulation.

4.3 DATA COLLECTION

To satisfy the objectives and hypotheses of the study, data is collected from secondary sources mainly from NSE stock because the sources of samples data for the sample period of one month each. Furthermore, this research only focuses on the knowledge available within the NSE website.

4.4 FORECASTING TECHNIQUES

The forecasting technique that we use during this study is the Monte Carlo simulation Monte Carlo simulation is to model possible movements of asset price using excel. There are two kinds of assets price movement:

- Drift is a constant directional movement
- Random input which represents market volatility

By taking the starting price and annual volatility, we can determine the daily volatility and by analyzing the iteration, we will get the simulated price through which we can determine the mean price, median price, variance, and percentile price movement of a security.

To process the simulation, we must project by taking the starting price from the NSE portal, then seek for the annual volatility, then we have got to search out the daily volatility:

Daily volatility = Annual volatility/SQRT (252)

After finding daily volatility, we will be able to take any number of days to simulate the stock price and here we have taken 30 days each for all the sectors which can help to simulate the value for

DAY 1: STARTING PRICE*(1+NORM.INV (RAND (),0, DAILY

VOLATILITY) DAY 2: DAY 1 PRICE *(1+NORM.INV (RAND (),0, DAILY

VOLATILITY) DAY 3: DAY 2 PRICE *(1+NORM.INV (RAND (),0, DAILY

VOLATILITY)

.....

DAY 30: DAY 29 PRICE *(1+NORM.INV (RAND (),0, DAILY VOLATILITY)

But one simulated outcome is not that useful but if we do it 500 times to 1000 times and record all the outcomes, we can start to develop a range within which we expect the price to fall or rise over the next month.

So, we are going to collect 1000 30th day outcomes and then we will start the statistics from those 30^{th}-day outcomes. So first we are going to reference the ending price and to simulate it 1000 times so that each one of those numbers is the simulated outcome after 30 days. Now we can start calculating the statistics of what the price will look like after 30 days.

4.5 RELIABILITY AND VALIDITY OF KNOWLEDGE

Secondary data for the study is drawn from the NSE website as fairly accurate and reliable. Therefore, these data could also be considered reliable for the study. Necessary checking and cross-checking were done while scanning information and data from secondary sources. of these made to get valid data for this study.

4.6 MODE OF STUDY

Data collected on the variables of interest within the amount of study was analyzed through descriptive statistics. Further, mean price, median price, variance, and percentile were wont to explain the character and significance of the connection between changes within the response variable and changes within the predictor variables identified within the study.

Mean price: AVERAGE (1 to 1000) outcomes
Median price: median (1 to 1000) outcomes
Standard price: STDEV.S (1 to 1000) outcomes
Percentiles: PERCENTILE.EXC (1 to 1000 outcomes, percentile)

4.7 OBSERVATIONS AND ANALYSIS

Monte Carlo simulation is a significant aspect of many firms' decision-making processes. Simulation is used by companies like GM, Procter & Gamble, Pfizer, Bristol-Myers Squibb, and Eli Lilly to evaluate both the average return and the risk factor of new goods. At GM, the CEO uses this data to choose which products will be released.GM uses simulation for things like estimating net revenue, predicting structural and purchasing costs, and figuring out how vulnerable business is to various types of risk (such as interest rate changes and exchange rate fluctuations). Proctor and Gamble models and hedges foreign exchange risk using simulation. Sears employs simulation to figure out how many units of each product line should be ordered from suppliers this year, such as the number of pairs of Dockers trousers. Simulation is used by oil and medicine firms to value "actual choices," such as the value of a project's option to grow, reduce, or postpone. Monte Carlo simulation is used by financial planners to assess the best investment plans for their clients' retirement.

What happens when you use a RAND Function?

When you use the formula =RAND() in a cell, you receive a number that has an equal chance of being between 0 and 1. Thus, approximately 25% of the time, you should get a value less than or equal to 0.25; approximately 10% of the time, you should get at least 0.90, and so on.

After selecting the stocks, the Monte Carlo Simulation was run using an investment fund.

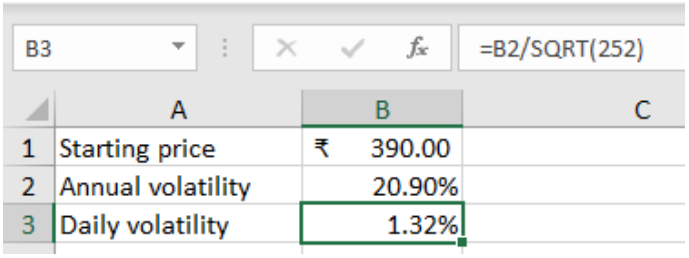
FV = Ci (1 + r)n for a lump sum (Ci), where r denotes the rate of return and n denotes the number of periods.

For a constant cash flow (where r denotes the rate of return and n denotes the number of periods), we utilize the NORM function to presume that the rate of return follows a normal distribution. We assign a random probability of getting a return % using INV in Microsoft Excel® and the RAND function; the mean of the function is selected as the average price of the selected stock, and the standard deviation is the stock's volatility.

One conceivable outcome of the price would be its value at the conclusion of the period. Because the future is unpredictable, this value cannot be considered the investment's outcome because there are many alternative outcomes and no way to know which ones will occur. As a result, we build many more simulation iterations or possible outcomes. We ran thousands of iterations for the purposes of the research.

To explain this better, we will take one example from our research. The stock we have chosen for this is State Bank of India. On 17th May 2020, the Stock Price of SBI closed at Rs.390, this will be our start price for Simulation. We also noted the Annual Volatility (risk factor) of the stock from NSE portal which will determine to what extend our stock prices will fluctuate, this is represented in the B2 Cell in Figure 1.0. However, we are talking about a 30-day period for this research and annual volatility would be very high for daily fluctuation, thus we convert the annual volatility into Daily Volatility by dividing the value by Square Root of 252 (there are 252 trading days in a year)

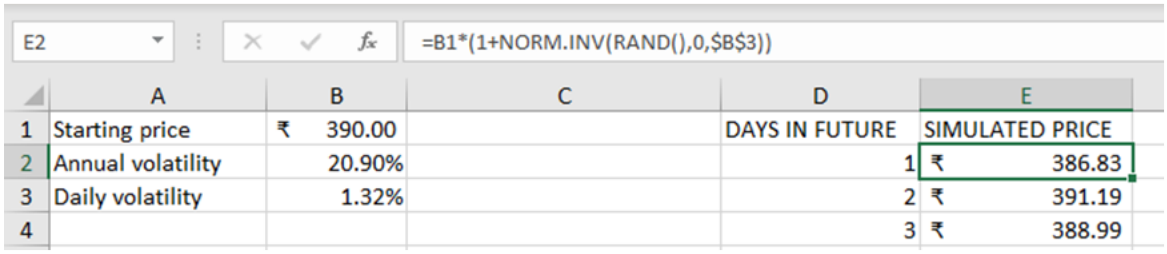
Figure 4. Excel Calculation Step-wise 1



Source: Prepared by author.

Now that the basic input points are ready, we begin with the steps to build the Simulation model. Each day's price is forecasted using the NORM.INV and RAND functions. In Figure 2.0 we have simulated Day 1 price on Cell E2. In the formula, we also have to factor in the daily volatility

Figure 5. Excel Calculation Step-wise 2



E2 | =B1*(1+NORM.INV(RAND(),0,B3))

	A	B	C	D	E
1	Starting price	₹ 390.00		DAYS IN FUTURE	SIMULATED PRICE
2	Annual volatility	20.90%		1	₹ 386.83
3	Daily volatility	1.32%		2	₹ 391.19
4				3	₹ 388.99

Source: Prepared by author.

The outcome is one of the N number of possibilities of Day 1 stock price. Now we apply the same logic for day 2, however we will consider Day 1 price instead of starting price and we continue the activity till 30th Day (Figure 3.0). While 30 days is a period we have chosen for our research, one can choose to do it for as many days as they wish to project.

Figure 6. Excel Calculation Step-wise 3

D	E
DAYS IN FUTURE	SIMULATED PRICE
1	₹ 382.10
2	₹ 377.03
3	₹ 371.49
4	₹ 375.16
5	₹ 372.69
6	₹ 375.36
7	₹ 369.71
8	₹ 377.85
9	₹ 374.03
10	₹ 376.26
11	₹ 372.28
12	₹ 369.92
13	₹ 371.58
14	₹ 371.44
15	₹ 368.39
16	₹ 361.63
17	₹ 362.81
18	₹ 361.20
19	₹ 370.66
20	₹ 373.26
21	₹ 373.65
22	₹ 369.05
23	₹ 368.73
24	₹ 367.67
25	₹ 367.85
26	₹ 370.73
27	₹ 370.87
28	₹ 369.41
29	₹ 367.60
30	₹ 360.62

Source: Prepared by author.

The price on the 30th day signifies one of the many possibilities that SBI stock can achieve and arriving at a conclusion from this one iteration is not appropriate. Hence, we create 1000 different iterations of the same stock and run the simulation multiple times till we arrive at a constant range. Now we calculate mean, median and standard deviation of all our 1000 iterations to arrive at a singular output which we use as a reference. We further calculate Percentiles which indicates our Confidence Level (Figure 4.0), for instance at 5 percentiles, we

are 95% confident that the stock price would be above Rs.346.13.

Figure 7. Excel Calculation Step-wise 4

5	Mean price	₹	392.02
6	Median price	₹	391.29
7	standard deviation	₹	29.08
8	percentiles		
9	5%	₹	346.13
10	25%	₹	371.33
11	75%	₹	412.75
12	95%	₹	440.25

Source: Prepared by author.

A) BANK SECTOR

1. STATE BANK OF INDIA

Table 1. Simulated Price Using Monte Carlo Model for State Bank of India

Starting price	**₹ 390.00**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**20.90%**	**1**	**₹ 386.01**
Daily volatility	**1.32%**	**2**	**₹ 386.25**
		3	**₹ 385.49**
Mean price	**₹ 392.45**	**4**	**₹ 397.97**
Median price	**₹ 390.48**	**5**	**₹ 397.51**
standard deviation	**₹ 27.94**	**6**	**₹ 397.06**
percentiles		**7**	**₹ 392.18**
5%	**₹ 348.44**	**8**	**₹ 400.00**
25%	**₹ 373.22**	**9**	**₹ 398.62**
75%	**₹ 408.08**	**10**	**₹ 397.95**
95%	**₹ 443.68**	**11**	**₹ 390.47**
		12	**₹ 390.55**
		13	**₹ 401.46**
		14	**₹ 405.60**
		15	**₹ 401.75**
		16	**₹ 398.85**
		17	**₹ 399.51**
		18	**₹ 393.63**
		19	**₹ 396.63**
		20	**₹ 400.82**
		21	**₹ 406.38**
		22	**₹ 410.24**

		23	**₹ 412.50**
		24	**₹ 421.68**
		25	**₹ 421.69**
		26	**₹ 426.26**
		27	**₹ 430.70**
		28	**₹ 419.66**
		29	**₹ 425.07**
		30	**₹ 426.61**

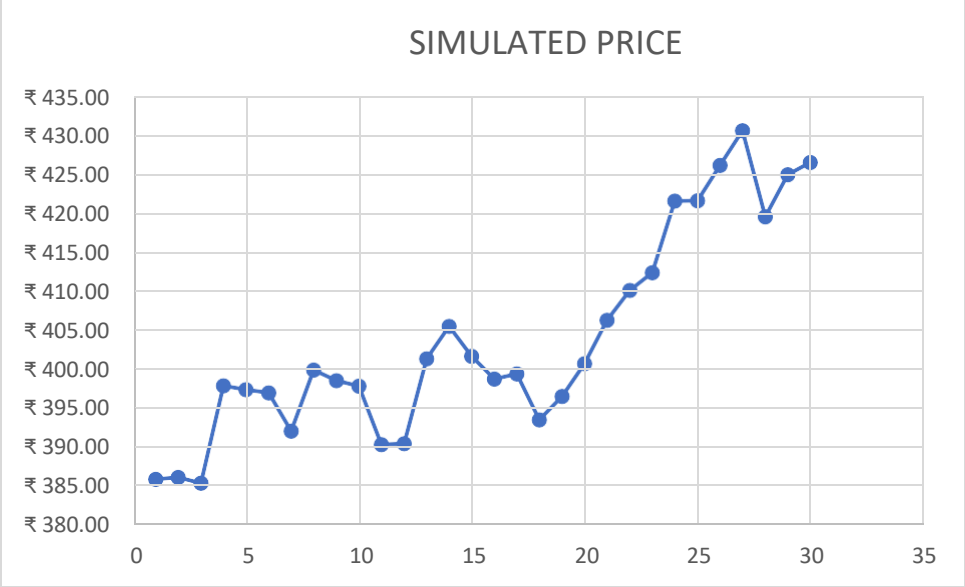


Chart 1. Simulated Price Using Monte Carlo Model for State Bank of India

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be close to the current starting price and the starting price is 390 and the mean price is 392.45, and with this, we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like there is no skewness, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 27 and know the percentiles which I was interested in

5% - ₹ 348.44

25% - ₹ 373.22

75% - ₹ 408.08

95% - ₹ 443.68

So, if we generate another simulation, 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

2. CANARA BANK

Table 2. Simulated Price Using Monte Carlo Model for Canara Bank

Starting price	**₹ 155.90**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**24.22%**	**1**	**₹ 152.75**
Daily volatility	**1.53%**	**2**	**₹ 157.08**
		3	**₹ 155.82**
Mean price	**₹ 155.76**	**4**	**₹ 154.00**
Median price	**₹ 155.23**	**5**	**₹ 155.27**
standard deviation	**₹ 12.91**	**6**	**₹ 158.87**
percentiles		**7**	**₹ 160.40**
5%	**₹ 135.12**	**8**	**₹ 160.72**
25%	**₹ 146.65**	**9**	**₹ 162.26**
75%	**₹ 164.40**	**10**	**₹ 161.16**
95%	**₹ 177.84**	**11**	**₹ 159.57**
		12	**₹ 159.81**
		13	**₹ 163.42**
		14	**₹ 165.38**
		15	**₹ 163.32**
		16	**₹ 161.48**
		17	**₹ 163.25**
		18	**₹ 163.89**

		19	**₹ 166.30**
		20	**₹ 173.45**
		21	**₹ 168.75**
		22	**₹ 170.22**
		23	**₹ 172.00**
		24	**₹ 166.84**
		25	**₹ 168.72**
		26	**₹ 168.73**
		27	**₹ 167.64**
		28	**₹ 166.01**
		29	**₹ 166.99**
		30	**₹ 169.34**

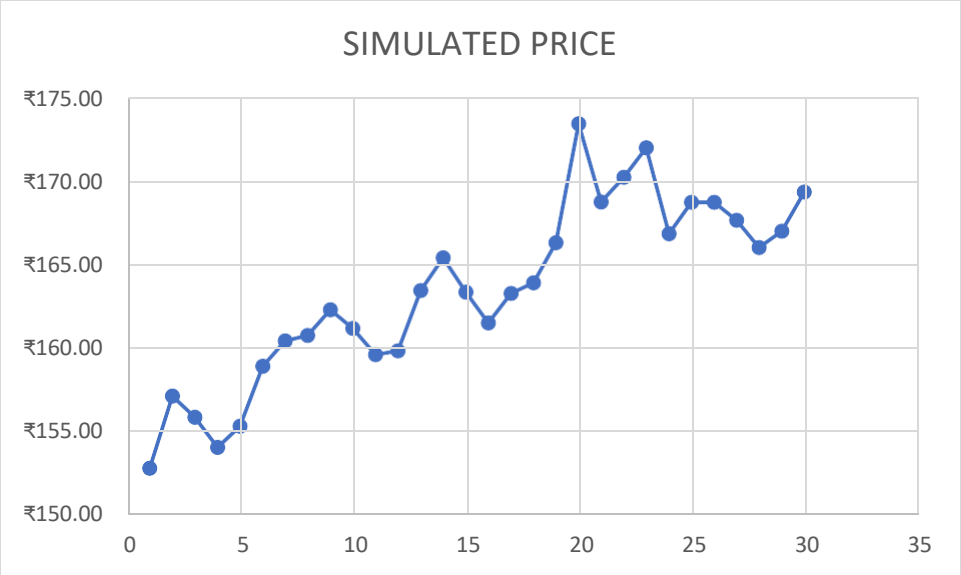


Chart 2. Simulated Price Using Monte Carlo Model for Canara Bank

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 155.90 and the mean price is 155.76, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it

could deviate from there around close to Rs 12 and know the percentiles which I was interested in

5% - ₹ 135.12

25% - ₹ 146.65

75% - ₹ 164.40

95% - ₹ 177.84

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

3. INDIAN BANK

Table 3. Simulated Price Using Monte Carlo Model for Indian Bank

Starting price	**₹ 128.00**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**29.62%**	**1**	**₹ 123.96**
Daily volatility	**1.87%**	**2**	**₹ 125.74**
		3	**₹ 127.42**
Mean price	**₹ 128.19**	**4**	**₹ 129.31**
Median price	**₹ 127.67**	**5**	**₹ 129.71**
standard deviation	**₹ 13.55**	**6**	**₹ 130.60**
percentiles		**7**	**₹ 133.00**
5%	**₹ 107.10**	**8**	**₹ 132.78**
25%	**₹ 118.44**	**9**	**₹ 132.50**
75%	**₹ 136.64**	**10**	**₹ 133.49**
95%	**₹ 152.20**	**11**	**₹ 133.47**
		12	**₹ 133.16**

		13	**₹ 139.46**
		14	**₹ 141.86**
		15	**₹ 140.41**
		16	**₹ 136.69**
		17	**₹ 140.97**
		18	**₹ 141.30**
		19	**₹ 135.86**
		20	**₹ 138.35**
		21	**₹ 141.03**
		22	**₹ 140.34**
		23	**₹ 140.87**
		24	**₹ 142.94**
		25	**₹ 146.00**
		26	**₹ 145.87**
		27	**₹ 144.51**
		28	**₹ 146.83**
		29	**₹ 144.54**
		30	**₹ 138.54**

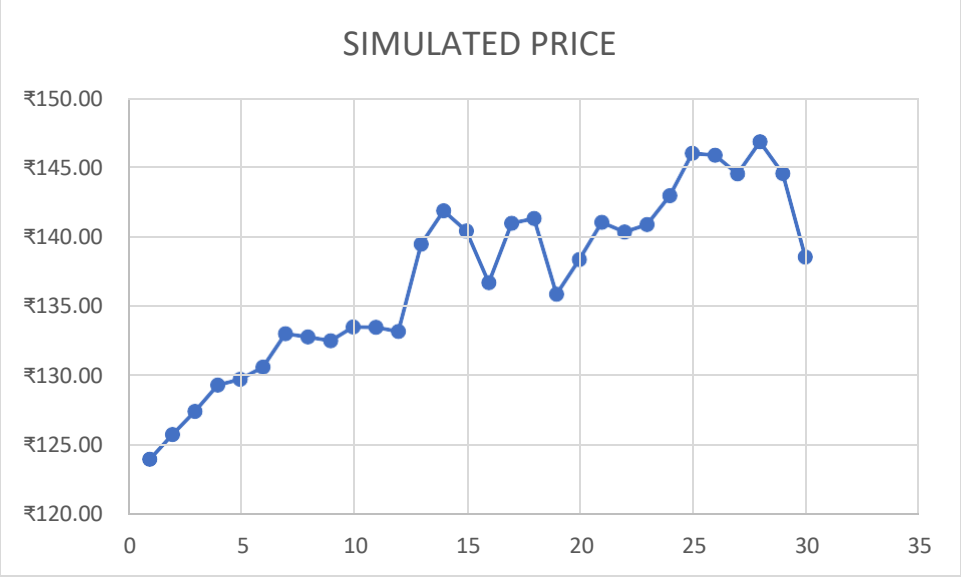


Chart 3. Simulated Price Using Monte Carlo Model for Indian Bank

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 128 and the mean price is 128.19, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 13 and know the percentiles which I was interested in

5% - ₹107.10

25% - ₹ 118.44

75% - ₹ 136.64

95% - ₹ 152.20

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

4. ICICI BANK

Table 4. Simulated Price Using Monte Carlo Model for ICICI Bank

Starting price	**₹ 628.00**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**17.04%**	**1**	**₹ 621.90**
Daily volatility	**1.07%**	**2**	**₹ 620.82**
		3	**₹ 624.36**
Mean price	**₹ 627.35**	**4**	**₹ 621.74**
Median price	**₹ 626.93**	**5**	**₹ 622.82**
standard deviation	**₹ 36.00**	**6**	**₹ 610.65**
percentiles		**7**	**₹ 620.29**
5%	**₹ 567.15**	**8**	**₹ 623.86**
25%	**₹ 603.39**	**9**	**₹ 626.29**

75%	**₹ 650.85**	**10**	**₹ 632.76**
95%	**₹ 688.22**	**11**	**₹ 636.52**
		12	**₹ 639.68**
		13	**₹ 642.05**
		14	**₹ 648.21**
		15	**₹ 636.02**
		16	**₹ 636.42**
		17	**₹ 648.40**
		18	**₹ 643.93**
		19	**₹ 643.17**
		20	**₹ 649.88**
		21	**₹ 661.27**
		22	**₹ 662.14**
		23	**₹ 663.09**
		24	**₹ 657.93**
		25	**₹ 647.15**
		26	**₹ 645.91**
		27	**₹ 628.28**
		28	**₹ 623.81**
		29	**₹ 620.50**
		30	**₹ 632.74**

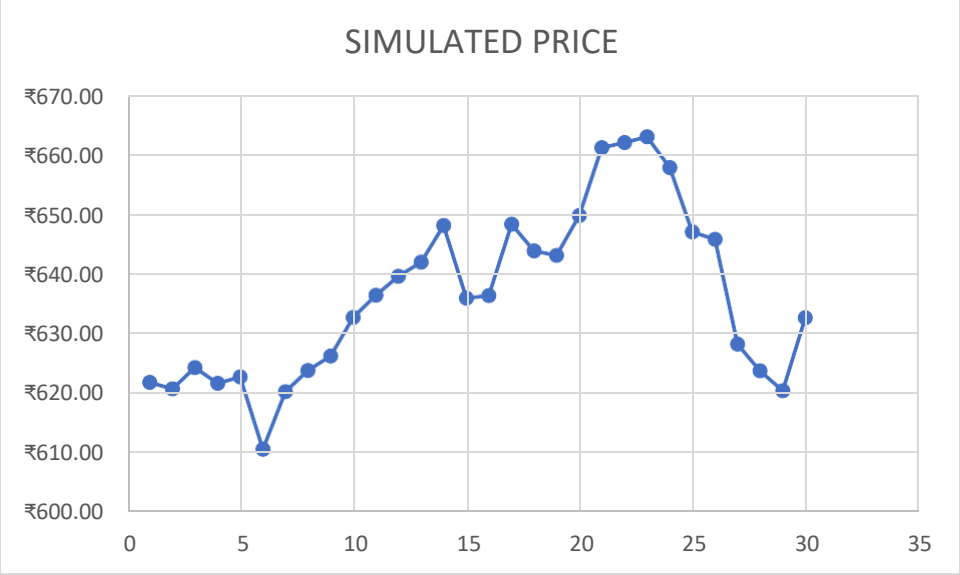


Chart 4. Simulated Price Using Monte Carlo Model for ICICI Bank

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 628 and the mean price is 627.35, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 36 and know the percentiles which I was interested in

5% - ₹567.15

25% - ₹ 603.39

75% - ₹ 650.85

95% - ₹ 688.22

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

5. HDFC BANK

Table 5. Simulated Price Using Monte Carlo Model for HDFC Bank

Starting price	**₹ 1,458.95**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**12.99%**	**1**	**₹ 1,462.13**
Daily volatility	**0.82%**	**2**	**₹ 1,467.25**
		3	**₹ 1,468.53**
Mean price	**₹ 1,458.28**	**4**	**₹ 1,475.87**
Median price	**₹ 1,453.82**	**5**	**₹ 1,481.86**
standard deviation	**₹ 62.86**	**6**	**₹ 1,474.37**
percentiles		**7**	**₹ 1,468.70**

5%	**₹ 1,357.14**	**8**	**₹ 1,481.40**
25%	**₹ 1,415.58**	**9**	**₹ 1,456.20**
75%	**₹ 1,500.59**	**10**	**₹ 1,459.65**
95%	**₹ 1,562.97**	**11**	**₹ 1,446.68**
		12	**₹ 1,454.54**
		13	**₹ 1,464.33**
		14	**₹ 1,466.85**
		15	**₹ 1,466.00**
		16	**₹ 1,468.74**
		17	**₹ 1,474.66**
		18	**₹ 1,492.27**
		19	**₹ 1,483.51**
		20	**₹ 1,490.69**
		21	**₹ 1,498.45**
		22	**₹ 1,493.14**
		23	**₹ 1,493.89**
		24	**₹ 1,505.50**
		25	**₹ 1,503.42**
		26	**₹ 1,490.54**
		27	**₹ 1,479.82**
		28	**₹ 1,479.92**
		29	**₹ 1,456.77**
		30	**₹ 1,451.25**

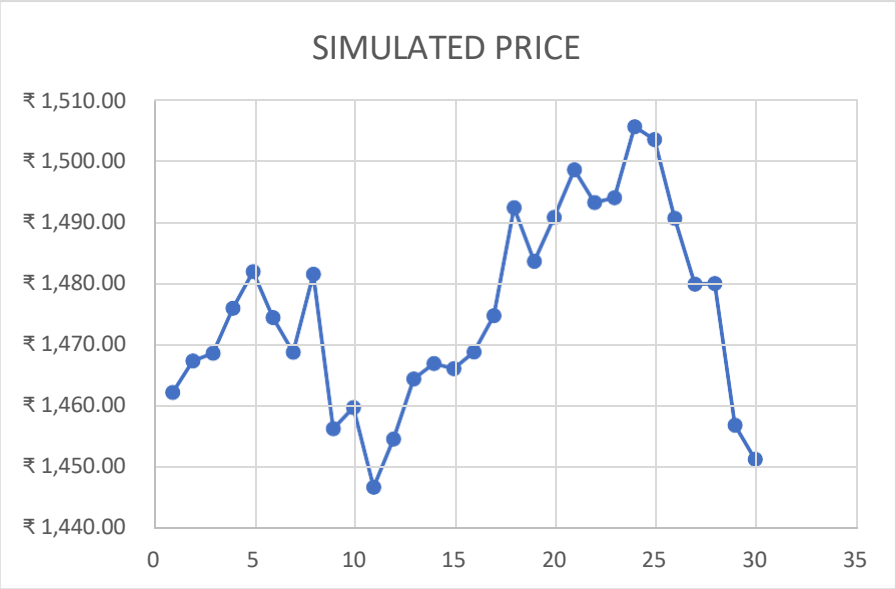


Chart 5. Simulated Price Using Monte Carlo Model for HDFC Bank

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 1458.95 and the mean price is 1458.28, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 62 and know the percentiles which I was interested in

5% - ₹ 1357.14

25% - ₹ 1,415.58

75% - ₹ 1,500.59

95% - ₹ 1,562.97

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

B) HOTEL SECTOR

1. TAJ GVK

Table 6. Simulated Price Using Monte Carlo Model for TAJ

Starting price	**₹ 119.00**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**18.83%**	**1**	**₹ 119.67**
Daily volatility	**1.19%**	**2**	**₹ 119.93**
		3	**₹ 122.26**
Mean price	**₹ 118.84**	**4**	**₹ 120.65**
Median price	**₹ 118.63**	**5**	**₹ 118.74**
standard deviation	**₹ 7.66**	**6**	**₹ 117.15**
percentiles		**7**	**₹ 116.92**
5%	**₹ 106.34**	**8**	**₹ 115.80**
25%	**₹ 113.84**	**9**	**₹ 114.14**
75%	**₹ 123.93**	**10**	**₹ 113.61**
95%	**₹ 131.71**	**11**	**₹ 114.86**
		12	**₹ 113.46**
		13	**₹ 114.79**
		14	**₹ 114.80**
		15	**₹ 114.95**
		16	**₹ 115.28**
		17	**₹ 111.73**
		18	**₹ 113.45**
		19	**₹ 113.87**
		20	**₹ 113.67**
		21	**₹ 115.27**
		22	**₹ 114.58**
		23	**₹ 115.37**
		24	**₹ 115.34**

		25	**₹ 115.05**
		26	**₹ 113.13**
		27	**₹ 109.91**
		28	**₹ 110.39**
		29	**₹ 112.42**
		30	**₹ 111.82**

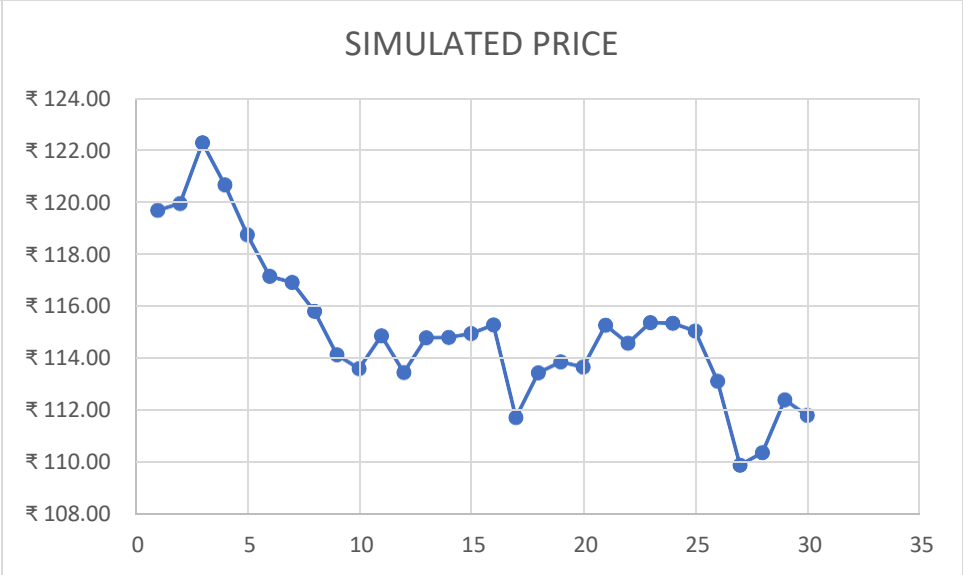


Chart 6. Simulated Price Using Monte Carlo Model for TAJ

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 119 and the mean price is 118.84, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 7 and know the percentiles which I was interested in

5% - ₹ 106.34

25% - ₹ 113.84

75% - ₹ 123.93

95% - ₹ 131.71

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

2. ROYAL ORCHID

Table 7. Simulated Price Using Monte Carlo Model for Royal Orchid

Starting price	**₹ 63.40**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**27.00%**	**1**	**₹ 62.87**
Daily volatility	**1.70%**	**2**	**₹ 62.05**
		3	**₹ 62.21**
Mean price	**₹ 63.30**	**4**	**₹ 60.13**
Median price	**₹ 63.18**	**5**	**₹ 62.27**
standard deviation	**₹ 5.94**	**6**	**₹ 60.81**
percentiles		**7**	**₹ 59.36**
5%	**₹ 53.94**	**8**	**₹ 57.14**
25%	**₹ 59.14**	**9**	**₹ 57.73**
75%	**₹ 67.24**	**10**	**₹ 58.98**
95%	**₹ 73.13**	**11**	**₹ 58.97**
		12	**₹ 59.18**
		13	**₹ 59.59**
		14	**₹ 60.71**
		15	**₹ 59.38**
		16	**₹ 60.07**
		17	**₹ 61.25**
		18	**₹ 62.38**
		19	**₹ 63.16**

		20	**₹ 64.01**
		21	**₹ 66.41**
		22	**₹ 67.42**
		23	**₹ 65.48**
		24	**₹ 65.24**
		25	**₹ 64.47**
		26	**₹ 64.71**
		27	**₹ 64.19**
		28	**₹ 62.76**
		29	**₹ 62.21**
		30	**₹ 62.68**

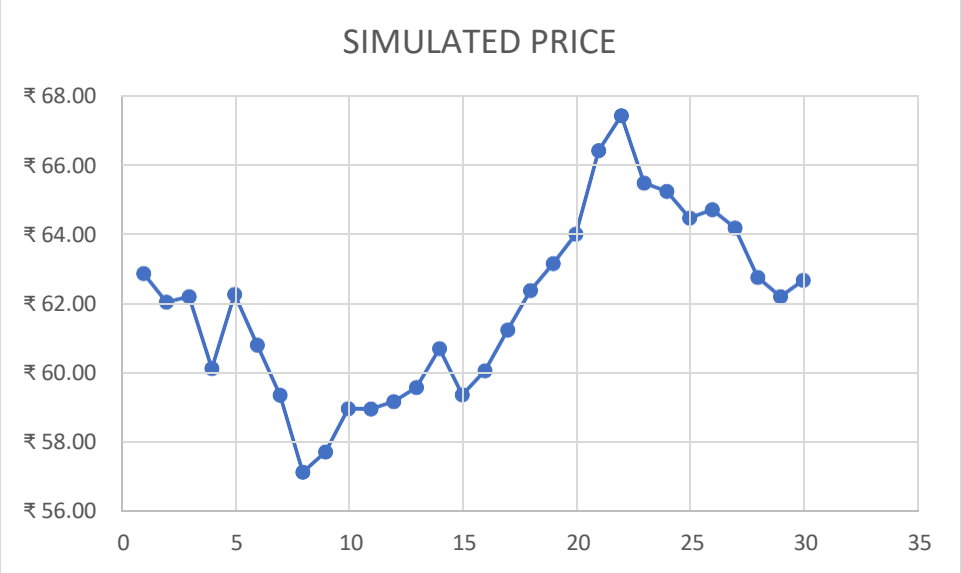


Chart 7. Simulated Price Using Monte Carlo Model for Royal Orchid

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 63.40 and the mean price is 63.30, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 5 and know the percentiles which I was interested in

5% - ₹ 53.94

25% - ₹ 59.14

75% - ₹ 67.24

95% - ₹ 73.13

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

3. CHALET HOTELS

Table 8. Simulated Price Using Monte Carlo Model for Chalet Hotels

Starting price	**₹ 149.80**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**24.14%**	**1**	**₹ 147.68**
Daily volatility	**1.52%**	**2**	**₹ 148.78**
		3	**₹ 148.30**
Mean price	**₹ 149.45**	**4**	**₹ 147.02**
Median price	**₹ 148.92**	**5**	**₹ 144.10**
standard deviation	**₹ 12.07**	**6**	**₹ 141.94**
percentiles		**7**	**₹ 142.99**
5%	**₹ 129.50**	**8**	**₹ 140.59**
25%	**₹ 140.90**	**9**	**₹ 145.25**
75%	**₹ 157.89**	**10**	**₹ 145.96**
95%	**₹ 169.35**	**11**	**₹ 141.21**
		12	**₹ 141.78**
		13	**₹ 140.36**
		14	**₹ 138.95**

		15	**₹ 140.96**
		16	**₹ 141.77**
		17	**₹ 138.84**
		18	**₹ 136.10**
		19	**₹ 139.44**
		20	**₹ 138.32**
		21	**₹ 136.65**
		22	**₹ 133.41**
		23	**₹ 136.04**
		24	**₹ 135.62**
		25	**₹ 133.76**
		26	**₹ 133.19**
		27	**₹ 132.74**
		28	**₹ 129.94**
		29	**₹ 130.44**
		30	**₹ 127.90**

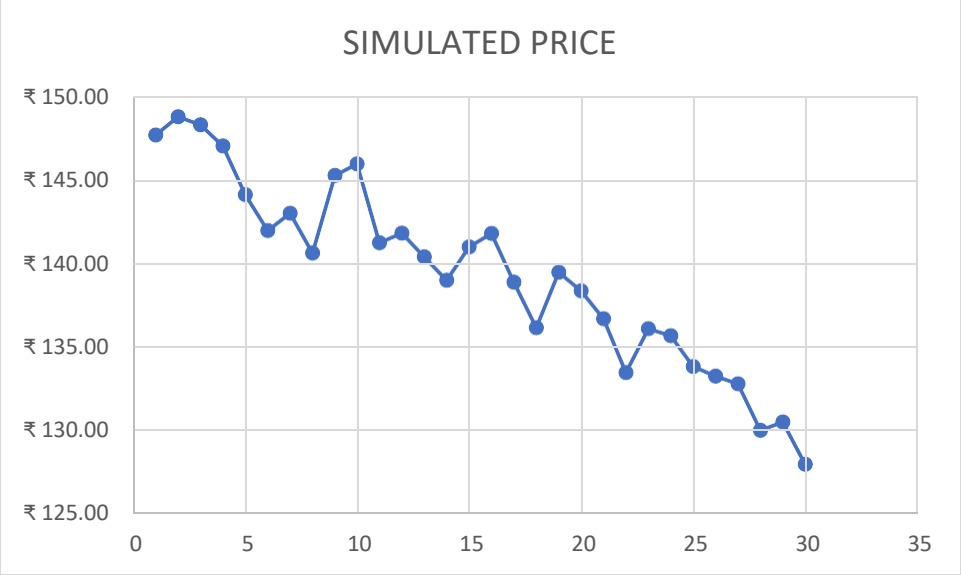


Chart 8. Simulated Price Using Monte Carlo Model for Chalet Hotels

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the

current starting price and the starting price is 149.80 and the mean price is 149.45, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 12 and know the percentiles which I was interested in

5% - ₹ 129.50

25% - ₹ 140.90

75% - ₹ 157.89

95% - ₹ 169.35

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

4. LEMON TREE HOTELS

Table 9. Simulated Price Using Monte Carlo Model for Lemon Tree Hotels

Starting price	**₹ 38.40**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**26.59%**	**1**	**₹ 39.57**
Daily volatility	**1.68%**	**2**	**₹ 39.01**
		3	**₹ 39.51**
Mean price	**₹ 38.49**	**4**	**₹ 38.88**
Median price	**₹ 38.24**	**5**	**₹ 38.17**
standard deviation	**₹ 3.40**	**6**	**₹ 38.54**
percentiles		**7**	**₹ 38.61**
5%	**₹ 33.13**	**8**	**₹ 38.90**

25%	**₹ 36.32**	**9**	**₹ 38.56**
75%	**₹ 40.61**	**10**	**₹ 39.17**
95%	**₹ 44.32**	**11**	**₹ 40.03**
		12	**₹ 39.56**
		13	**₹ 40.87**
		14	**₹ 41.44**
		15	**₹ 42.08**
		16	**₹ 40.91**
		17	**₹ 42.05**
		18	**₹ 42.16**
		19	**₹ 42.69**
		20	**₹ 43.85**
		21	**₹ 44.17**
		22	**₹ 43.78**
		23	**₹ 43.60**
		24	**₹ 44.31**
		25	**₹ 44.33**
		26	**₹ 43.88**
		27	**₹ 44.93**
		28	**₹ 44.60**
		29	**₹ 43.88**
		30	**₹ 44.00**

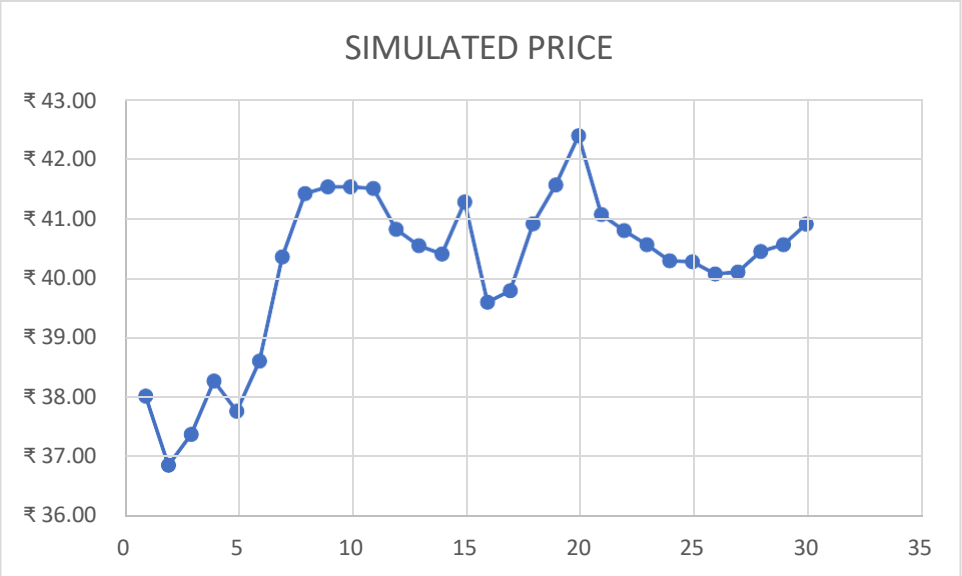


Chart 9. Simulated Price Using Monte Carlo Model for Lemon Tree Hotels

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 38.40 and the mean price is 38.49, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 3 and know the percentiles which I was interested in

5% - ₹ 33.13

25% - ₹ 36.32

75% - ₹ 40.61

95% - ₹ 44.32

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

5. ASIAN HOTEL

Table 10. Simulated Price Using Monte Carlo Model for Asian Hotels

Starting price	**₹ 66.55**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**21.22%**	**1**	**₹ 66.69**
Daily volatility	**1.34%**	**2**	**₹ 66.49**
		3	**₹ 68.06**
Mean price	**₹ 66.63**	**4**	**₹ 67.84**
Median price	**₹ 66.44**	**5**	**₹ 67.19**
standard deviation	**₹ 5.00**	**6**	**₹ 68.11**
percentiles		**7**	**₹ 70.18**
5%	**₹ 58.48**	**8**	**₹ 69.25**
25%	**₹ 63.17**	**9**	**₹ 69.25**
75%	**₹ 69.72**	**10**	**₹ 68.80**
95%	**₹ 74.95**	**11**	**₹ 68.82**
		12	**₹ 70.50**
		13	**₹ 71.00**
		14	**₹ 70.17**
		15	**₹ 70.57**
		16	**₹ 69.65**
		17	**₹ 69.79**
		18	**₹ 69.60**
		19	**₹ 69.55**
		20	**₹ 69.54**
		21	**₹ 69.01**
		22	**₹ 68.62**
		23	**₹ 68.37**
		24	**₹ 68.20**
		25	**₹ 68.72**
		26	**₹ 68.87**
		27	**₹ 68.01**

		28	**₹ 67.78**
		29	**₹ 66.66**
		30	**₹ 67.91**

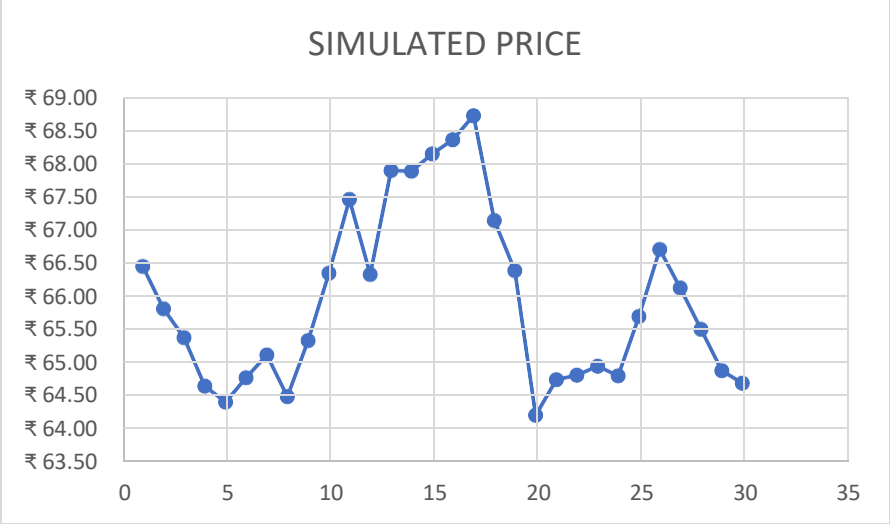


Chart 10. Simulated Price Using Monte Carlo Model for Asian Hotels

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 66.55 and the mean price is 66.63, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 5 and know the percentiles which I was interested in

5% - ₹ 58.48

25% - ₹ 63.17

75% - ₹ 69.72

95% - ₹ 74.95

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

C) MEDIA AND ENTERTAINMENT SECTOR

1. BALAJI TELEFILM

Table 11. Simulated Price Using Monte Carlo Model for Balaji Telefilm

Starting price	**₹ 56.50**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**21.27%**	**1**	**₹ 55.91**
Daily volatility	**1.34%**	**2**	**₹ 54.93**
		3	**₹ 54.84**
Mean price	**₹ 56.26**	**4**	**₹ 56.89**
Median price	**₹ 56.06**	**5**	**₹ 56.64**
standard deviation	**₹ 4.36**	**6**	**₹ 56.99**
percentiles		**7**	**₹ 56.62**
5%	**₹ 49.14**	**8**	**₹ 57.59**
25%	**₹ 53.37**	**9**	**₹ 56.04**
75%	**₹ 59.16**	**10**	**₹ 56.48**
95%	**₹ 63.63**	**11**	**₹ 57.18**
		12	**₹ 58.10**
		13	**₹ 58.63**
		14	**₹ 57.39**
		15	**₹ 56.91**
		16	**₹ 56.97**
		17	**₹ 56.31**
		18	**₹ 56.91**
		19	**₹ 57.82**
		20	**₹ 58.05**
		21	**₹ 58.91**
		22	**₹ 60.07**
		23	**₹ 60.19**
		24	**₹ 60.56**

		25	**₹ 60.72**
		26	**₹ 61.32**
		27	**₹ 62.64**
		28	**₹ 62.90**
		29	**₹ 63.63**
		30	**₹ 64.38**

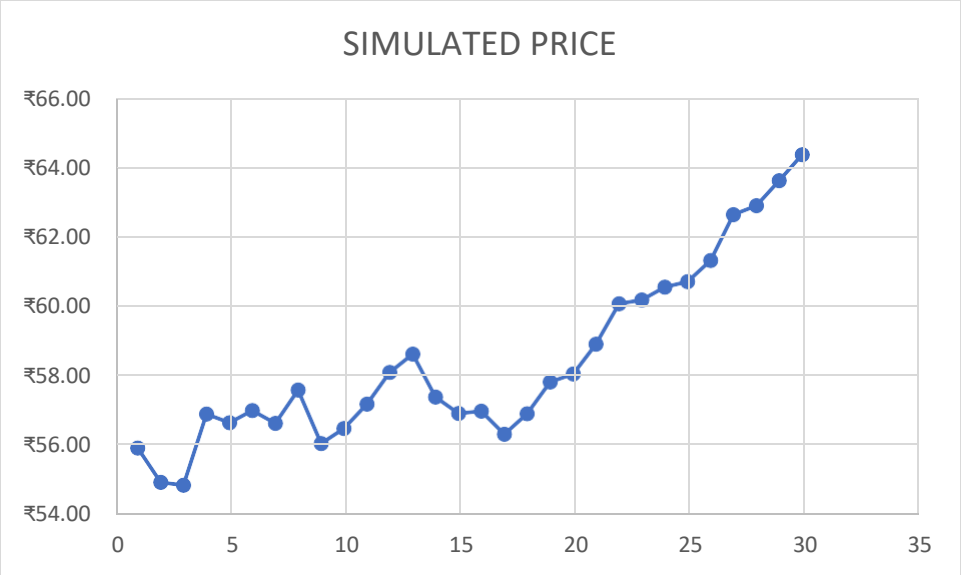


Chart 11. Simulated Price Using Monte Carlo Model for Balaji Telefilm

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 56.50 and the mean price is 56.26, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 4 and know the percentiles which I was interested in

5% - ₹ 49.14

25% - ₹ 53.37

75% - ₹ 59.16

95% - ₹ 63.63

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

2. INOX LESIURE

Table 12. Simulated Price Using Monte Carlo Model for Inox

Starting price	**₹ 282.90**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**21.88%**	**1**	**₹ 287.84**
Daily volatility	**1.38%**	**2**	**₹ 284.27**
		3	**₹ 288.17**
Mean price	**₹ 282.32**	**4**	**₹ 286.79**
Median price	**₹ 281.70**	**5**	**₹ 292.37**
standard deviation	**₹ 21.98**	**6**	**₹ 294.32**
percentiles		**7**	**₹ 289.94**
5%	**₹ 247.70**	**8**	**₹ 291.57**
25%	**₹ 266.24**	**9**	**₹ 292.94**
75%	**₹ 296.77**	**10**	**₹ 295.61**
95%	**₹ 318.11**	**11**	**₹ 288.06**
		12	**₹ 283.65**
		13	**₹ 286.63**
		14	**₹ 285.39**
		15	**₹ 285.14**
		16	**₹ 285.82**
		17	**₹ 284.62**
		18	**₹ 286.56**
		19	**₹ 285.27**

		20	**₹ 286.18**
		21	**₹ 287.70**
		22	**₹ 287.57**
		23	**₹ 292.72**
		24	**₹ 298.87**
		25	**₹ 309.17**
		26	**₹ 311.16**
		27	**₹ 311.21**
		28	**₹ 313.63**
		29	**₹ 313.13**
		30	**₹ 312.10**

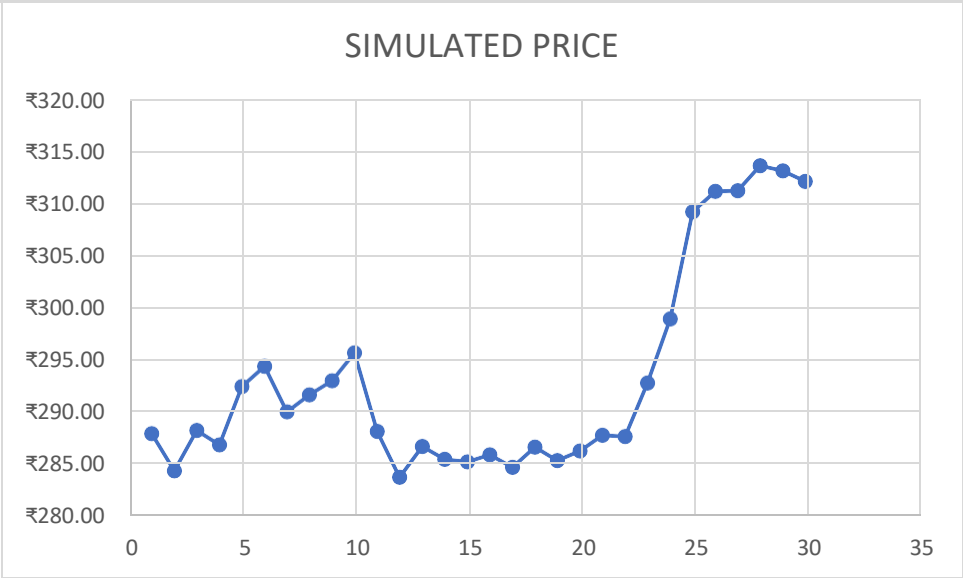


Chart 12. Simulated Price Using Monte Carlo Model for Inox

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 282.90 and the mean price is 282.32, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it

could deviate from there around close to Rs 21 and know the percentiles which I was interested in

5% - ₹ 247.70

25% - ₹ 266.24

75% - ₹ 296.77

95% - ₹ 318.11

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

3. SUN TV

Table 13. Simulated Price Using Monte Carlo Model for Sun TV

Starting price	**₹ 530.00**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**17.87%**	**1**	**₹ 521.66**
Daily volatility	**1.13%**	**2**	**₹ 518.49**
		3	**₹ 512.46**
Mean price	**₹ 529.79**	**4**	**₹ 522.31**
Median price	**₹ 528.97**	**5**	**₹ 531.38**
standard deviation	**₹ 33.93**	**6**	**₹ 531.94**
percentiles		**7**	**₹ 533.73**
5%	**₹ 473.97**	**8**	**₹ 535.00**
25%	**₹ 507.02**	**9**	**₹ 530.16**
75%	**₹ 552.77**	**10**	**₹ 532.09**
95%	**₹ 585.70**	**11**	**₹ 531.19**
		12	**₹ 517.52**

		13	**₹ 518.18**
		14	**₹ 512.50**
		15	**₹ 519.35**
		16	**₹ 530.76**
		17	**₹ 531.57**
		18	**₹ 526.42**
		19	**₹ 526.96**
		20	**₹ 523.34**
		21	**₹ 525.69**
		22	**₹ 529.63**
		23	**₹ 533.24**
		24	**₹ 531.38**
		25	**₹ 526.90**
		26	**₹ 525.42**
		27	**₹ 517.48**
		28	**₹ 517.71**
		29	**₹ 518.95**
		30	**₹ 525.23**

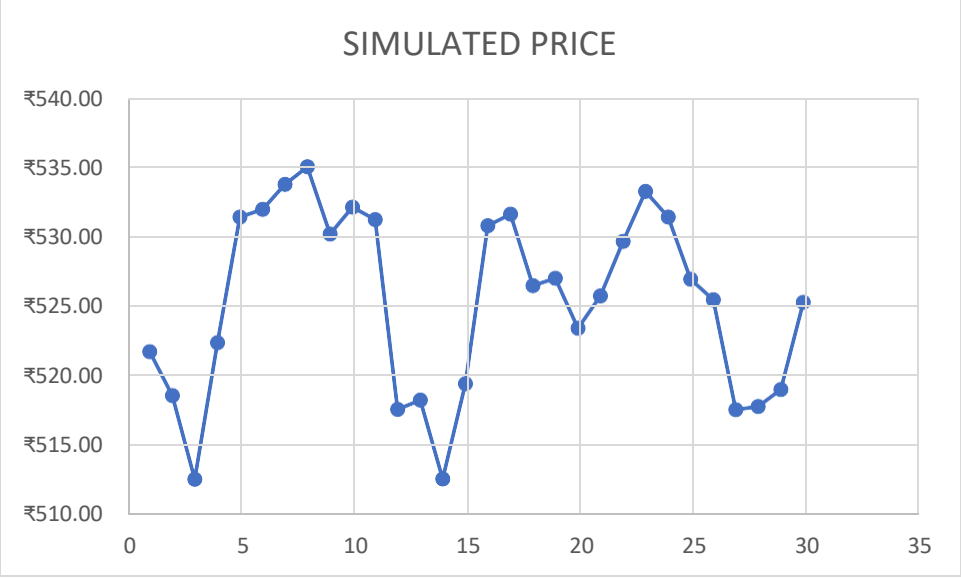


Chart 13. Simulated Price Using Monte Carlo Model for Sun TV

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 530 and the mean price is 529.79, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 33 and know the percentiles which I was interested in

5% - ₹473.97

25% - ₹ 507.02

75% - ₹ 552.77

95% - ₹ 585.70

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

4. ZEE ENTERTAINMENT

Table 14. Simulated Price Using Monte Carlo Model for Zee Entertainment

Starting price	**₹ 190.00**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**25.47%**	**1**	**₹ 193.75**
Daily volatility	**1.60%**	**2**	**₹ 199.26**
		3	**₹ 195.04**
Mean price	**₹ 189.79**	**4**	**₹ 204.22**
Median price	**₹ 188.83**	**5**	**₹ 203.17**
standard deviation	**₹ 16.61**	**6**	**₹ 199.21**
percentiles		**7**	**₹ 199.55**

5%	**₹ 161.65**	**8**	**₹ 203.15**
25%	**₹ 178.36**	**9**	**₹ 203.75**
75%	**₹ 200.05**	**10**	**₹ 199.55**
95%	**₹ 218.84**	**11**	**₹ 200.97**
		12	**₹ 199.72**
		13	**₹ 199.78**
		14	**₹ 198.53**
		15	**₹ 205.30**
		16	**₹ 202.50**
		17	**₹ 202.36**
		18	**₹ 203.95**
		19	**₹ 204.75**
		20	**₹ 205.37**
		21	**₹ 206.35**
		22	**₹ 208.04**
		23	**₹ 209.36**
		24	**₹ 214.47**
		25	**₹ 218.13**
		26	**₹ 219.20**
		27	**₹ 219.17**
		28	**₹ 219.95**
		29	**₹ 218.82**
		30	**₹ 214.02**

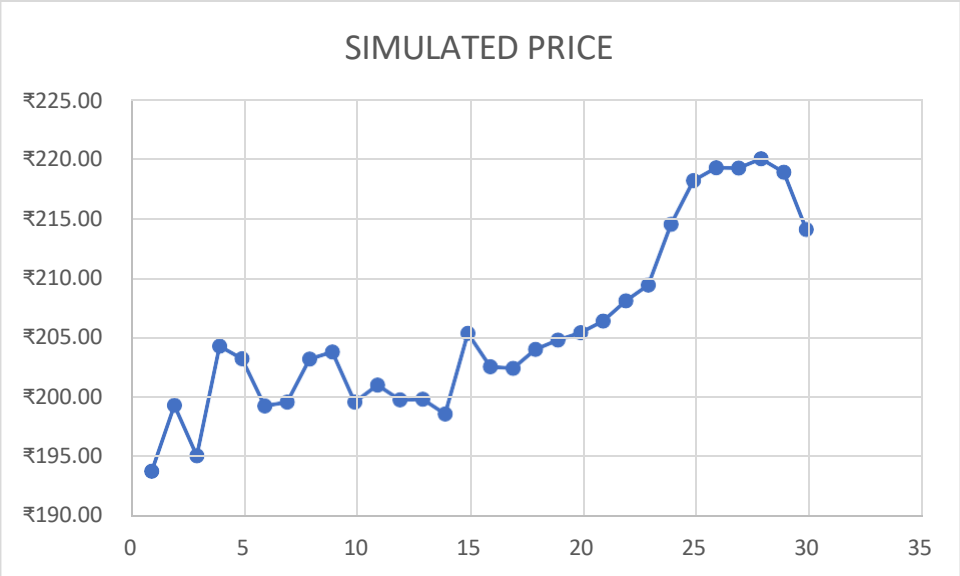


Chart 14. Simulated Price Using Monte Carlo Model for Zee Entertainment

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 190 and the mean price is 189.79, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 16 and know the percentiles which I was interested in

5% - ₹ 161.65

25% - ₹ 178.36

75% - ₹ 200.05

95% - ₹ 218.84

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

5. PVR

Table 15. Simulated Price Using Monte Carlo Model for PVR

Starting price	**₹ 1,181.40**	**DAYS IN FUTURE**	**SIMULATED PRICE**
Annual volatility	**25.44%**	**1**	**₹ 1,172.15**
Daily volatility	**1.60%**	**2**	**₹ 1,182.68**
		3	**₹ 1,159.81**
Mean price	**₹ 1,183.73**	**4**	**₹ 1,176.86**
Median price	**₹ 1,180.20**	**5**	**₹ 1,170.04**
standard deviation	**₹ 99.91**	**6**	**₹ 1,147.42**
percentiles		**7**	**₹ 1,156.46**
5%	**₹ 1,022.17**	**8**	**₹ 1,164.75**
25%	**₹ 1,115.96**	**9**	**₹ 1,166.55**
75%	**₹ 1,250.03**	**10**	**₹ 1,209.11**
95%	**₹ 1,350.06**	**11**	**₹ 1,226.55**
		12	**₹ 1,199.47**
		13	**₹ 1,182.70**
		14	**₹ 1,195.75**
		15	**₹ 1,222.81**
		16	**₹ 1,208.97**
		17	**₹ 1,228.35**
		18	**₹ 1,221.93**
		19	**₹ 1,204.63**
		20	**₹ 1,220.16**
		21	**₹ 1,244.56**
		22	**₹ 1,232.92**
		23	**₹ 1,217.19**
		24	**₹ 1,222.50**
		25	**₹ 1,246.70**
		26	**₹ 1,239.27**
		27	**₹ 1,285.29**

		28	**₹ 1,312.08**
		29	**₹ 1,294.41**
		30	**₹ 1,282.25**

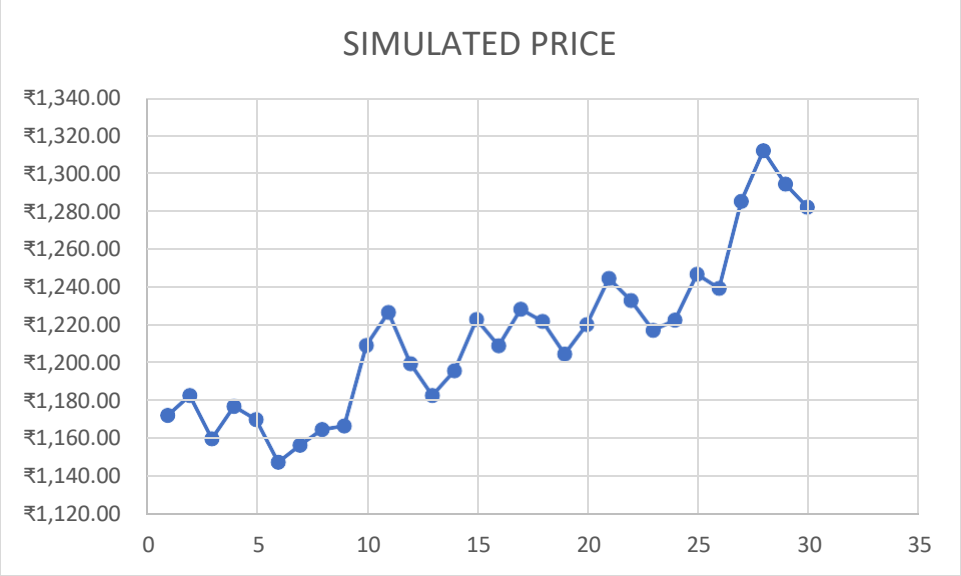


Chart 15. Simulated Price Using Monte Carlo Model for PVR

After simulating we can calculate the statistics about what the price will look like in 30 days now since we expect the price moving to be 0 the mean price should be pretty close to the current starting price and the starting price is 1181.40 and the mean price is1183.73, and with this we can find out whether is there any skewness in the distribution by calculating the median so in this simulated outcome it looks like it is positively skewed, and standard deviation so while we expect the price in a month to be above where it is known. and we also expect that it could deviate from there around close to Rs 99 and know the percentiles which I was interested in 5% - ₹ 1022.17

25% - ₹ 1115.96

75% - ₹ 1250.03

95% - ₹ 1350.06

So, if we generate another simulation 1000 outcome simulation all these numbers should stay reasonably close to where they are known and they are not going to be exact but if I generate a few different integrations of these 1000 outcomes obviously that's not everything that can happen but it is a pretty good representation of what can happen.

CHAPTER 5

FINDINGS

&

CONCLUSION

5.1 FINDING

To urge an insight into the effectiveness of the Monte Carlo Simulation model in predicting the stock prices, we forecasted the stock prices of 15 stocks from NSE. Prediction of share prices through technical analysis relies more on the past behavior pattern of share prices. It is very helpful for predicting share price movements over the future. When the share price movements don't exhibit any discernible pattern, when the fluctuations within the share price movements, are very small, and when the share price makes a stochastic process around the mean. The above analysis shows that prediction using town simulation works rather well.

- The persistence in the quality of prediction of 1 or other methods leads us to the possible generalization of results.
- It is very that Monte Carlo is seen as a method of higher quality in predicting stock price with interruption of 30 days. Monte Carlo Simulation model is created to explain stochastic process pattern, and weak form market efficiency assumes that future securities prices are random and not influenced by past events.
- It is feasible that assumptions about days' stock prices reflect all the information of past prices being satisfied with your time lag.
- We assume that market interruption appears because of information imperfection or another process of market information absorption, after what they're being included within the value.

Monte Carlo methods are a broad category of computational algorithms that obtain numerical results by repeated random sampling. The basic idea is to employ randomness to solve problems that are in principle deterministic. The randomness helps factor in the erratic and random nature of the stock market which is not factored in the other ratio-based stock price forecasting.

Some advantages we fond while using Monte Carlo Simulation is:

- When random variables are present, a Monte Carlo simulation is a model used to forecast the likelihood of various outcomes.
- Monte Carlo simulations can be used to show how risk and uncertainty affect prediction and forecasting models.

- Monte Carlo simulations are used in a range of industries, including banking, engineering, supply chain, and science.
- A Monte Carlo simulation is based on giving many values to an uncertain variable in order to generate different outcomes, which are then averaged to obtain an estimate.
- Monte Carlo simulations are based on the assumption that markets are completely efficient.

A normal distribution, or bell curve, will be formed by the frequencies of different outcomes created by this simulation. The most likely return is in the middle of the curve, which means that the actual return has an equal probability of being greater or lower than that value. The probability that the actual return will be within one standard deviation of the most probable ("anticipated") rate is 68 percent, 95 percent for two standard deviations, and 99.7% for three standard deviations. Even yet, there's no guarantee that the most likely event will occur, or that actual movements will not exceed the most speculative estimates. Importantly, Monte Carlo simulations omit anything that isn't built into the price movement (macro trends, company leadership, hype, cyclical factors), implying that markets are totally efficient.

5.2 SUGGESTIONS

- The Monte simulation allows analysts and advisors to convert investment chances into choices.
- The advantage of Monte Carlo is its ability to give some thought to a range of values for various inputs; this can be often also its greatest disadvantage within the sense that assumptions must be fair because the output is just nearly pretty much as good because of the inputs.
- Another great disadvantage is that Monte Carlo simulation tends to underestimate the probability of utmost bear events type of a financial crisis.
- Experts argue that a simulation similar to the town is unable to give some thought to the behavioral aspects of finance and thus the irrationality exhibited by market participants.
- It is, however a useful gizmo for advisors.

5.3 CONCLUSION

Monte Carlo simulation is a computer-assisted mathematical technique for incorporating risk into quantitative analysis and decision-making. Professionals in a variety of sectors, including finance, project management, energy, manufacturing, engineering, research and development, insurance, oil and gas, transportation, and the environment, employ the technique. For each given course of action, it provides the decision-maker with a range of probable outcomes as well as the probabilities that they will occur. It depicts the extreme outcomes—the implications of going for broke and the most conservative decision—as well as all possible outcomes for middle-of-the-road selections.

Monte Carlo simulation is a risk analysis technique that involves creating models of probable outcomes by substituting a set of values—a probability distribution—for any factor with inherent uncertainty. It then repeats the process, using a different set of random values from the probability functions each time. A Monte Carlo simulation could take thousands or tens of thousands of recalculations to complete, depending on the amount of uncertainty and the ranges provided for them. Monte Carlo simulation generates probabilistic distributions of alternative outcomes.

There are also ways to use probabilities that aren't Monte Carlo simulations, such as deterministic modelling with single-point estimates. A "best guess" estimate is assigned to each uncertain variable in a model. For each input variable, scenarios (such as best, worst, or most likely case) are chosen, and the results are recorded. Monte Carlo simulations, on the other hand, take a sample from each variable's probability distribution to generate hundreds or thousands of different outcomes. The data is evaluated to determine the likelihood of various outcomes. It's worth noting that the Monte Carlo simulations used here assume a normal return distribution. However, history has demonstrated that this is not the case. The Cauchy distribution is the most exact, although being comparable. Nonetheless, a normal distribution is precise enough for most purposes across thousands of trials.

Non-institutional traders have increased their use of advanced trading techniques as a result of the development of open source software and statistical tools. This is evidenced by the numerous posts on Medium about how to set up personal algorithmic trading systems. But one question that keeps coming up as these tools become more widely used is how will they alter

market structure. Will it become increasingly difficult to discover excess returns if more investors adopt strict investment strategies? Will there be any unintended effects, like there were with the Flash Crash? Will individuals continue to flock to low-cost market tracking ETFs in order to keep up with the market without having to worry about actively managing their money? It's an unsettled subject, but the convergence of data science and finance is a fascinating place to be right now.

Predicting the longer-term returns may be a very critical subject to academicians, investors, policymakers, and all others who have an interest in available exchange. This study has introduced the Monte Carlo Simulation as a technical approach that would help these parts in forecasting the stock prices which successively are going to be vital within the calculations of the price of capital, portfolio management, and other financial decisions.

Through this scientific research, we utilized the gained knowledge from theory and applied it practically to conduct this evaluation study. This research gave me an opportunity that helped me in gaining more relevant information and learn some new things.

CHAPTER 6

LEARNING OUTCOMES

6.1 LEARNING OUTCOMES

It helped me to know the overall functioning of Monte Carlo Simulation in forecasting the stock price. How it is done to predict the price and how it helps the investors and corporations to make a sustainable profit.

It also gave me practical exposure to the various functional areas of which we only had theoretical knowledge so far.

6.2 SCOPE FOR FUTURE RESEARCH

The Monte Carlo method is not used in today's applications regarding the stock analysis. This is because the method may have been tried before, and not proven to be superior for example fundamental analysis and technical analysis. There are however many questions to be answered.

- How would the quality of the simulations change if the stocks are categorized and treated differently?
- How would the simulations behave if the parameters were not assumed to be constant, but variables instead?
- Would it be beneficial to add more parameters to the simulations, such as inflation and current rates?
- Is the method more accurate of other types for instruments such as indices?

We do believe that this report showcases that the method has the potential to be improved and thereby becoming a powerful tool that will extend our abilities to predict and model stock prices.

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