A Study on the Impact of Covid-19 on Indian Stock Market with Reference to Automobile Industry

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ABSTRACT

COVID-19 Pandemic has affected the securities market additional forcefully, not like any previous outbreaks like Spanish respiratory disease, etc. The Coronavirus has started during a region referred to as Hubei in China that diode to a world pandemic crisis. Volatility began to maneuver back in early March 2020 and by late Apr, fell sharply. This paper focuses on the impact of covid-19 principally on the car trade concerning the chosen firms. the information is collected from the NSE for the chosen amount and numerous applied mathematics tools like risk, return, Covariance, Correlation, and Paired t-test live} wont to measure the impact of COVID-19 on the chosen firms before and once the covid. From the analysis, it's found that the car trade encompasses a moderate impact on the securities market because of COVID-19, as few firms attained positive returns before the covid and few attained once the covid. Tata Motors and Ashok Leyland have negative returns before covid however it's managing to earn positive returns post the covid. This paper suggests the Individual investors whether or not to speculate within the industry or not with a basic plan on the securities market movements because of a world crisis. i.e COVID-19 Pandemic.

Keywords:Covid-19, Stock Market

CHAPTER-I : INTRODUCTION

INTRODUCTION

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OBJECTIVES:

1. To study the pre and post-impact of the lockdown on the Indian stock market regarding the selected companies of the Automobile industry.

2. To measure the significant difference between the risk and return of the selectedAutomobileCompanies in the stock market using Paired t-test technique.

3. To measure the risk, return, and correlation of the selected Automobilecompanies.

SCOPE OF THE STUDY:

This study covers the impact of covid-19 before and after the lockdown regarding the selected companies for a particular period.

RESEARCH METHODOLOGY:

This study involves the Secondary method of data collection from websites like NSE and other official government Gazettes. The study is conducted by using statistical tools such as Risk, Return, Correlation, Paired t-test for companies such as Bajaj Auto, Maruti Suzuki,Ashok Leyland, and Tata Motors.

LIMITATIONS:

1. This study covers a limited period that is from the first case of corona in India and the announcement of lockdown by the Indian government.

2. It is not possible to measure the exact volatility of the stock market but an estimate can be made based on the investor’s decision.

CHAPTER-II: REVIEW OF LITERATURE

1.Sarika Mahajan, Balwinder Singh (2008) examined the empirical relationship between volume and come and volume and volatility in lightweight of competitive hypotheses concerning market structure by victimization daily knowledge of sensitive index of the city securities market. The empirical relationship between come, volume, and volatility are examined by victimization the GARCH technique and husbandman relation check. The study provides proof of the positive impact of volume on come and volatility. correlational statistics between volatility and commerce volume. The study complete that there's wide heterogeneousness exists in expectations of traders within the exchange and as a result, additional volume of traders is required to chill down the volatility within the market.s

2.Ali Asghar AnvaryRastamy (2008) evaluated the connection among the amount of economic development, exchange potency level, market attraction to foreign investors, and therefore the nature of the knowledge. Associate in Nursing capitalist uses these attributes after they change securities. it's complete that there's a positive relationship between the amount of economic development and exchange potency level. Also, results confirmed that there's a positive relationship between the exchange potency level and its attractiveness to foreign investors. Investors in underdeveloped economies largely use quantitative (rather qualitative) and accounting (rather economic) info and accounting performance indicators were additional correlative to the foremost necessary indicator (share market price)

3.Dr. T. Mallikarjunappa (2008) examined the influence of political economy factors on equity market come. This paper complete that agriculture and equity market returns show production of stockman seeds and foundation seeds (negative), nonfood grain yield (negative), and therefore the food index of business staff (positive) area unit the many determinants of the equity returns. within the business sector index of business production, production of producing basic, capital, shopper and fossil oil, and different energy sources area unit important determinants of the equity market returns.

4.BhanupriyaMisra, Piyush Prasad Mishra (2008) examined the behavior of individual investors within the exchange. The research worker used the survey methodology to gather the

first knowledge from the main metros of the country and their prime location viz. New Delhi, Mumbai, Chennai, Kolkata, and Bhubaneshwar. It studies the connection between instructional qualification and investment within the share market, age-wise investment within the share market, nature of employment and investment, legal status and share market investment, annual income-wise investment, factors influencing investment choices. it's complete that the education qualification of used ladies doesn't have any correlation with their investment need for the share market. The used ladies area unit risk-averse. As typical Indian ladies, they like to require the recommendation of their husband/relatives for **5.T.Satanarayana cagy (2008)** created a comparative study of the Indian securities market with World Stock Markets. The study ended that Indian stock markets ar moving ahead and conveyancing to the globe at massive, that they're terribly robust. Foreign investors ar terribly engaging for his or her investment as Asian nation turning into a developed nation, from varied views. Yet, the market isn't serving to the common capitalist thanks to the high level of refined speculation within the market itself. Therefore, SEBI has to move heaven and earth to rationalize more securities market activities to change it to face international challenges creating any call on investment matters.

6.Kashmira P. Mody (2007) in her scholar analysis work an endeavor is formed and analyze the operations of the securities market as a channel of financial policy transmission within the Indian economy. consequently, the securities market channel of financial transmission primarily has 2 components of its operation i.e. the link between financial policy and therefore the securities market, and second, the link between the securities market and therefore the real economy. The researchers think about the primary path particularly the link between Indian market policy and therefore the securities market, specifically the metropolis exchange. The empirical result shows that there's a link between financial policy and therefore the stock market; additionally on attribute some measures to and analyze in some detail the stock market's response to financial policy actions in aggregates as diagrammatical by BSE Sensex.
7.Sindhu K. (2007) explored the impact of securities market development on the macroeconomy of the country, specifically within the post-reform amount. It tries to check the extent to that securities market development affects long economic process, company capital structure, and behavior of retail equity investors. The study conjointly explores the direction of relation between stock costs and major micro-economic variables. during this thesis, the author counseled that domestic capabilities within the securities market ought to be enlarged by permitting instituting like provident funds to take a position into the securities market. this level of participation of pension funds conjointly ought to be increased by permitting them to take a position in varied derivatives instruments. additional business enterprise incentives ought to be to securities market investment to draw in investors with high financial

gain.

8.Joydeep Biswas (2007) evaluated the impact of economic easement on the securities market in chosen rising Asian markets, in general, and therefore the Indian securities market specifically. To calculate composite index INDEX four major market development indicators ar thought of particularly size, liquidity and risk, and market integration. because the international equity markets have toughened their most explosive growth over the past decade, the rising equity market has toughened even additional rapid climb. It will see that the securities market indicators, capitalization, turnover quantitative relation, and price listed that measures the dimensions and activity of a securities market severally, have improved considerably throughout the last decade of easement. additionally, because the rising markets are becoming additional integrated with the globe capital markets, the diversification of risk is obtaining easier. As a results of that the rising markets in recent times ar enjoying a flush of foreign portfolio investments that successively profit the rising economies not solely by enhancing the liquidity of markets, increasing the domestic market size however conjointly by initiating the regulative changes for the sleek functioning of the social market.

9.MadusudanKarmarkar (2006) studied measures of the volatility of daily returns within the Indian securities market over the amount 1961 to 2005. The GARCH (1.1) model is calculable to envision whether or not volatility is foreseeable. it's found that volatility is persistent and is foreseeable. The GARCH model is additionally wont to take a look at the uneven volatility impact and therefore the result suggests the spatial property in volatility. it's conjointly ended that the social price related to high volatility was serious. real investors lost confidence.

10.Pranab Sen, Nikhil Bahel, and Shekhar Ranjan (2006) argue that with the recent economic reforms, AN economical and active debt market, notably in a very long non-public certificate of indebtedness, is crucial for the country to understand the complete advantages of the reform method and to attain its potentials. it's conjointly ended that depth and breadth in bond markets ought to increase in order that tiny capitalist will invest in debt securities for capital gains instead of merely hold them to maturity as financial gain instruments

11.Ross Levine and Sara Zervos (2006) studied the empirical relationship between varied measures of securities market development, banking development, and semipermanent economic process. it's ended that even when dominant for several factors related to growth, securities market liquidity and banking development ar each completely and robustly correlative with the contemporaneous and future rate of economic process, capital accumulation, and productivity

growth. conjointly during this paper author mentioned indicators of securities market development like size, liquidity indicators, international integration measures.

12.D. G. Parsuna (2006) in his article checked out Brazil, Russia, and China nations and their efforts towards investors' education and protection. It ended that investors ar the backbone of any capital market. the event of the monetary market is inextricably connected to Investors' confidence. Most of the rising markets ar in AN organic process stage, approach behind the developed markets. Retail investors and domestic institutional investors in these markets ar comparatively unsophisticated as compared to those of developed countries. there's still an extended thanks to go before investors will think about themselves utterly safe and therefore the efforts of regulators to make sure investors' protections ar commendable.

13.Sreejata Banerjee and Sandaresh Sankar (2006) studied the capital quality evaluation model to live securities market integration, the study shows that the Indian securities market affected towards bigger integration with the remainder of the planet over a minute. the foremost finding of this study is that because the level of integration will increase there's Associate in Nursing argument for transportation down the barriers any. The advantage that may be accumulated from this can be that the domestic market would become a lot of economical in allocating resources as miss-pricing comes down, resulting in useful and informational potency. At constant time, however, integration would build a lot of at risk of international monetary crises and convey regarding monetary and political economy instability through the precipitation of currency crises and liquidity that arises

14.Memchal, L. Jibon Kumar Sharma (2006) investigated the connection between a value amendment and commerce volume within the Indian securities market within the lightweight of economic relief and reforms. It terminated that in 2 days market and market there's no vital relationship between value changes and volume however in twenty days market and market a big relationship between the 2 variables. in an exceedingly market have high volume is in the midst of a increment. this could be attributed to the very fact that uncommon fluctuations especially security square measure nearly always coupled to uncommon interest by someone in this security. If Associate in Nursing capitalist is shopping for up massive quantities of a specific share, the value of that share is sure to go up steeply since demand will increase whereas offer remains constant, and any once this can be noticed by followers of the trend the market

15.Ashutosh Verma (2005) studied the weak-form potency of the city securities market. additionally to review industry-wise or sector-wise weak kind potency of city securities market. it's terminated that

the potency of the securities market is closely associated with the allocation of scarce capital resources. the govt. has allowable the participation of foreign institutional investors and it's aforesaid that this participation improves the potency of the markets. However, if markets square measure inefficient, profitable commerce opportunities might exist, which can be utilized by foreign institutional investors to earn excess profit at the value of different players within the market. SEBI must take steps to extend the informational potency of the securities market.

16.Bawa Singh Goraya, Dinesh Kumar (2005) examined the varied measures taken by the govt. and SEBI for the protection of investors and to look at the notice of investors with these protection measures; it's terminated that the bulk of investors take services of brokers whereas creating their investment each in primary similarly as a secondary market. however they're a lot of hooked in to brokers within the secondary market. the bulk of investors expect that the administration of SEBI isn't adequate and that they demand a lot of offices of SEBI ought to be opened in varied elements of the country and power be suburbanized.

17.John O.K. OnohAbia State University, Nigeria, Thoretically there's Associate in Nursing inverse relationship between the securities market and gold costs. There are circumstances wherever the stock markets rise and gold costs fall. Gold costs may additionally rise in sympathy with the autumn available costs. the explanation lies within the perception of the market by investors. Investors UN agency foresee a pessimistic market, sometimes take positions in gold futures to safeguard their investments. within the u. s. someday within the Seventies, the economy was stagnant inflicting gold futures to become a a lot of engaging possibility for investors.

18.Kumaraswamy Naidu, Kamakshya G P. P. (2004) examined the result of reducing the settlement cycle of stock exchanges. It concludes that a reducing settlement cycle plays a key role in developing the stock market by providing investors bigger access to their funds because of faster netting off the dues. Secondly, it reduces the settlement risk significantly because the counterparties got to settle their transactions at a quicker rate. Thus, the method encompasses all the brokers, banks, depository, participants, fund managers, and investors. Therefore, the stock market regulators round the globe attempt to scale back the settlement cycle progressive.

19.Kamakshya Prasad Prusti (2004) studied the demutualization of stock exchanges. Demutualization could be a method of fixing the company structure of exchange to the standing of liability or corporation. it's an endeavor to segregate possession of the exchange from the membership of the exchanges. Exchanges have recognized the requirement for being competitive

by well transportation down their price of operation and being technologically economical even at the height of a storm.

20.T. R. Venkatesh, Ms. PurbaBasu (2004) examined the structural and operational changes of the stock market like the introduction of T+2 rolling settlement, on-line commerce system, and demutualization of stocks. It additionally examined the activities of the central listing authority and also the growth of the open-end fund trade in Asian nation. It concludes investors currently will take a acutely aware call relating to the material possession by-product market. However, it must be done to extend the arrogance and data base of the investors to stock exchange manipulation.

21.Malik Sarat Kumar (2004) studied the connection between completely different political economy indicators in Republic of India|Bharat|Asiancountry|Asian nation} and shows that there exists a relationship between securities market development and long growth in India. The study terminated that there's a relationship between securities market development and economic process in Asian nation. it's additionally found that the index of business production Associate in Nursingd bank credit square measure considerably coupled to securities market development indicators and also the securities market is an integral a part of the expansion method within the country. Thus, to realize sustained long economic process, policy initiatives ought to focus a lot of on securities market development.

22.Pallavi Mody (2003) in her academic degree analysis tries to know the individual capitalist, their demographic and economic profile the scale of their portfolios, investment preference for equity, and alternative saving instruments. The study found that equity investments still stay little for fewer than five-hitter of gross money assets of the owner sector in India. The equity markets remained slender, shallow, and volatile because the capitalist base remained little, amounting to solely twenty one million investors or seven.4% of the households in 2000-01. The study raises anxiety over the very fact that the economic agents – investors and company found equity less enticing.

23.Bharti Pathak (2003) studied the impact of reforms on the first market phase and secondary market phase of the govt. stock exchange for the amount 1990-91 to 1999-2000. The analysis reveals that the govt. stock exchange has earned breadth and debt however still some policy measures area unit required to form it a lot of vivacious these area unit: government securities are subject to many laws, that produce ambiguity. Hence, rather than such a large amount of acts, it's fascinating to possess one act and one regulator for control this market.

24.Harvinder Kaur (2002) in her study measures the extent of the volatility of the Indian exchange and its behavior over completely different|completely different} periods and different stocks. This

study additionally examines the impact of foreign institutional investment (FII) on exchange volatility. The study spans the amount Gregorian calendar month 1990 to December 2000. The sample population of the study consists of the 2 most distinguished market indices particularly Sensex and S & P CNX good and 142 individual stocks listed on animal disease. Following area unit vital observations of the study. when put next with alternative markets of the planet the volatility of the Indian market is sort of high as compared to major developed markets. it's found that Monday returns have the best volatility and Fri returns have rock bottom. However, there's no definite pattern within the weekday returns.

25.Renu Gupta (2002) studied the performance of the National exchange to guage the role of NSE within the development of the capital market. This analysis work additionally covers the role of NSE to guard investors, volatility, and liquidity of NSE. it's ended that market police investigation is critical for guaranteeing market integrity. A comparative study of NSE and animal disease showed that NSE displaces animal disease to the second position supported turnover at intervals the primary year of its operation i.e. in 1995-96. The magnitude relation of turnover to plug capitalization was higher in NSE as compared to animal disease. However, the market capitalisation of animal disease was usually beyond that of NSE.

26.MohdJavaid (2002) studied the operations of mercantilism available exchanges. It thought-about each the brokers and investors of the first and secondary market in metropolis. The study concludes that changes within the management of the stock exchanges area unit needed for delivery potency to the operation of the stock exchanges. Demutualization is that the best appropriate resolution to stay management free from the broker's abstract thought. there's a requirement for a statutory committee in every exchange of India like disciplinary action committee, defaults committee, and arbitration committee. There ought to be a separate body for the stock exchanges and strict implementation of rules and laws, that are obligatory by SEBI on the brokers.

27.L. M. Bhole, ShreeyaPattanaik (2002) mentioned the operating of the Indian exchange from each quantitative and qualitative views to search out out however way the goal of easement policy has been achieved. it's ended that the investment pattern on the market has modified, the real, long term, retail, small, individual investors have mostly deserted the market and therefore the institutional investors currently account for a significant a part of investments, FIIs have come back to dominate the market. A study urged that acutely aware efforts and appropriate policy measures have to be compelled to be undertaken to take a position in equities a reasonably long investment.

28. Prince Philip Maiyo, Subhash Chander (2001) examined the speculation of stochastic process available costs with special regard to non-specified shares listed on the urban center exchange. The analysis has been created victimization daily information of stock costs throughout the amount of 1-

1-1996 to 30-11-2000. It ended that the non-specific shares listed on the urban center exchange and market indices follow the stochastic process hypothesis and thence the previous share costs don't influence future costs

CHAPTER-III: Company Profile and Industry Profile

Industry Profile:

India's industry is one in every of the most important within the world. it's seen terribly high growth rates throughout the last 3 decades. Up to the year 1975 some, Republic of India was having three or four makers of cars, scooters, and business vehicles. geographic region Motors, Premier vehicles, and commonplace motors were manufacturing cars. The notable makes for two-wheelers were arthropod genus and Lambretta. The business vehicles were factory-made by Tata Motors and Ashok Leyland. the auto business has old terribly high growth rates throughout the last 3 decades. The order of the expansion rates was from nine to eighteen reckoning on the sort of auto. for instance, the typical growth of two-wheelers was concerning 100%, whereas the traveller vehicles grew at thirteen to eighteen. at the present Republic of India is that the third-largest country within the production of motorcars. the majority international vehicles firms like Suzuki, Honda, Hyundai, Ford, Toyota, Volvo, etc. have established their plants in Republic of India. this level of turnover of assorted varieties of vehicles place along involves thirty eight.3 billion USD that is almost V-E Day of India's gross domestic product. Employment-wise, this sector employs nineteen million individuals. The accelerated growth of the auto sector has benefitted the Indian economy by making monumental employment opportunities. Domestic vehicles production raised at a pair of.36% CAGR between FY16-20 with twenty six.36 million vehicles being factory-made within the country in FY20.

Overall, domestic vehicles sales raised at one.29% CAGR between FY16-FY20 with twenty one.55 million vehicles being sold-out in FY20.
In FY21, the whole traveller vehicles production reached twenty two,652,108.
In might 2021, the assembly of vehicles (passenger, three-wheeler, two-wheeler vehicles, and quadricycle) was 806,755 units.
Two-wheelers and traveller vehicles dominate the domestic Indian car market. railcar sales area unit dominated by little and mid-sized cars. Two-wheelers and traveller cars accounted for eighty.8% and 12.9% market share, severally, accounting for a combined sale of over twenty.1 million vehicles in FY20. Two-wheeler sales stood at 995,097 units, whereas traveller vehicle sales stood at 261,633 units in Apr 2021.

Overall, automobile export reached four.77 million vehicles in FY20, growing at a CAGR of half-dozen.94% throughout FY16-FY20. Two-wheelers created up seventy three.9% of the vehicles exported, followed by traveller vehicles at fourteen.2%, three-wheelers at ten.5%, and business vehicles at 1.3.

Bajaj Auto

Bajaj car restricted is associate degree Indian international two-wheeler and three-wheeler producing company based mostly in Pune, Maharashtra. It manufactures motorcycles, scooters, and car rickshaws. Bajaj car could be a a part of the Bajaj cluster. it absolutely was supported by Jamnalal Bajaj in Rajasthan within the Forties. the corporate has plants in Chakan (Pune), Waluj (near Aurangabad) and Pantnagar in Uttarakhand oldest plant at Akurdi (Pune) homes the R&D center 'Ahead'. Bajaj car is that the world's third-largest manufacturer of motorcycles and therefore the second-largest in Republic of India is that the world's largest three-wheeler manufacturer. The Forbes world 2000 list for the year 2012 hierarchical Bajaj car at one,416. In Dec 2020, Bajaj car crossed a market capitalisation market capitalisation large integer large integer (US$13.6 billion), creating it the world's most respected two-wheeler company.
Bajaj manufactures and sells motorcycles, scooters, auto-rickshaws, and cars. As of 2004, Bajaj car was India's largest businessperson of motorcycles. Bajaj is that the initial Indian two-wheeler manufacturer to deliver 4-stroke commuter motorcycles with flashy performance for the Indian market. Bajaj achieved this with the 150cc and 180cc neutron star.
Motorcycles made by Bajaj embrace the CT a hundred Platina, Discover, Pulsar, Avenger, and Dominar. In FY 2012–13, it sold-out around thirty seven.6 lakh (3.76 million) motorcycles that accounted for thirty first of the market share in Republic of India. Of these, around twenty four.6 lakh (2.46 million) motorcycles (66%) were sold-out in Republic of India, and therefore the remaining thirty fourth were export

Maruti Suzuki

Maruti Suzuki Republic of India restricted, at one time called Maruti Udyog restricted, is associate degree Indian automobile manufacturer headquartered in capital of India. it's a subsidiary of the japanese automotive manufacturer Suzuki Motor Corporation. Maruti Suzuki has three,598 sales retailers across one,861 cities in Republic of India. The complete Trust Report revealed by Trust analysis consultive, a complete analytics company, has hierarchical Maruti Suzuki within the thirty-Trust seventh position in 2013 and ninth position in 2019 among the foremost trusty brands of Republic of India.

Maruti Suzuki Republic of India restricted could be a company. the corporate is engaged within the manufacture, purchase, and sale of cars, components, and spare elements (automobiles). the opposite activities of the corporate comprise the facilitation of pre-owned automobile sales, fleet management, and automobile funding.
Its service offerings embrace Maruti Finance, True Value, Maruti real elements, Maruti real Accessories, Maruti Suzuki car Card, and Maruti school. it's around 5 plants, placed in Palam Gurgaon Road, Gurgaon, Haryana, and Manesar Industrial city, Gurgaon, Haryana, with associate degree put in capability of over one.5 million vehicles per annum.

Tata Motors:

Tata Motors restricted (TML), a USF forty two billion organization, is India's largest automobile company by revenue. the corporate could be a leading world manufacturer of cars, utility vehicles, buses, trucks, and defense vehicles and is functioning towards developing sensible quality Solutions for sensible Cities. Tata Motors is additionally developing a sensible vary of EVs, to accelerate the adoption
of Electric Vehicles (EV) within the country, supporting the government's mission on electrical vehicles. Incorporated in Republic of India, within the year 1945, Tata Motors could be a a part of the USD a hundred billion Tata cluster and has operations across Republic of India, the UK, Asian nation, Thailand, African country, and Dutch East Indies. a pacesetter within the Indian business vehicle market, Tata Motors conjointly ranks amongst India's high traveller vehicle makers, with over nine million vehicles plying on Indian roads. the corporate has contend associate degree instrument in reworking the country into a destination for first automotive producing and continues to figure towards building the state. Tata Motors has invariably been at forefront of innovating technologies and providing merchandise and experiences line to the discerning wants of our customers across each traveller and business vehicle business. With its company complete identity – Connecting Aspirations, Tata Motors continues to form segment-defining merchandise which will stir up the imagination of customers- generation when generation; reiterating the company's promise of providing higher journeys.

Ashok Leyland

Ashok Leyland is associate Indian multinational automotive manufacturer, headquartered in metropolis. it's owned by the Hinduja cluster. it had been primarily based in 1948 as Ashok Motors and became

Ashok Leyland among the year 1955. Ashok Leyland is that the second-largest manufacturer of business vehicles in land, the third-largest manufacturer of buses among the globe, and additionally the tenth-largest manufacturers of trucks. With the corporate geographical point set in metropolis, its manufacturing facilities unit unfold across the country specifically Ennore (Tamil Nadu), Bhandara (Maharashtra), Hosur (two units), Alwar (Rajasthan), and Pantnagar (Uttarakhand).

Ashok Leyland together has manufacturing units unfold across the globe with a bus manufacturing facility in Ras Al Khaimah (UAE), one at municipality, uk, and a venture with the All teams cluster for the manufacture of high-press die-casting extruded metal elements for the automotive and telecommunications sectors. Ashok Leyland has recently been stratified as a result of the thirty fourth best complete in land. In 2019, the company was awarded the AON Best Employers for land award. A US $2.3 billion company, and a footprint that extends across fifty countries, the company is one in each of the foremost fully-integrated manufacturing companies. Ashok Leyland encompasses a product vary from 1T GVW (Gross Vehicle Weight) to 55T GTW (Gross Trailer Weight) in trucks, 9 to 80-seater buses, vehicles for defense and special applications, and diesel engines for industrial, genset, and marine applications. Ashok Leyland launched India's initial electrical bus and unit of measurement 6 compliant truck in 2016. In 2019, Ashok Leyland claimed to be among the high 10 world business vehicle makers.

CHAPTER-IV:DATA ANALYSIS AND INTERPRETATION

Table Number-1: Calculation of Risk and Returns of Bajaj Auto (Pre-Covid) from 01-04-2019 to 01-02-2020:

BAJAJ AUTO						
Date	**Op. Price**	**Cl. Price**	**Returns**	**Avg.returns**	**Deviations**	**Sq.Dev(R-r)2**
1-Apr-19	2497.5	2915.65	418.15	49.54	368.61	135873.3321
2-May-19	2989	3030.55	41.55	49.54	-7.99	63.8401
3-Jun-19	2945	3034.6	89.6	49.54	40.06	1604.8036
1-Jul-19	2838.4	2911.95	73.55	49.54	24.01	576.4801
1-Aug-19	2485.05	2537.65	52.6	49.54	3.06	9.3636
3-Sep-19	2775.3	2764.2	-11.1	49.54	-60.64	3677.2096
1-Oct-19	2945	2910	-35	49.54	-84.54	7147.0116
1-Nov-19	3250	3232.65	-17.35	49.54	-66.89	4474.2721
2-Dec-19	3163.1	3159.25	-3.85	49.54	-53.39	2850.4921
1-Jan-20	3183	3150.1	-32.9	49.54	-82.44	6796.3536
1-Feb-20	3173.6	3143.3	-30.3	49.54	-79.84	6374.4256

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Bajaj Auto (∑) = 544.95

Number of days (n) = 11

Average returns = Total returns/n

= 544.95/11

= 49.54

Variance **(σ2)** = ∑(R-r)2*1/(n-1)

= 169447.5841*1/ (11-1)

= 16944.758

Standard Deviation = √σ2

= √16944.758

= 130.172

Interpretation: The total return of Bajaj Auto (Pre-Covid) is 544.95 and the Square deviation is 130.172. The average return of Bajaj Auto is 0.49% and the Standard deviation is 1.307%.

Table Number-2: Calculation of Risk and Return of Maruti Suzuki (Pre-Covid) from 01-04-2019 to 01-02-2020:

Maruti Suzuki						
Date	**Op. Price**	**Cl. Price**	**Returns**	**Avg.returns**	**Devitions**	**Sq.dev(R-r)2**
1-Apr-19	6730.8	6840.7	109.9	26.64	83.26	6932.2276
2-May-19	6550	6683.25	133.25	26.64	106.61	11365.6921
3-Jun-19	6760	7022.9	262.9	26.64	236.26	55818.7876
1-Jul-19	6600	6507.85	-92.15	26.64	-118.79	14111.0641
1-Aug-19	5469.7	5572.6	102.9	26.64	76.26	5815.5876
3-Sep-19	6035	6049.7	14.7	26.64	-11.94	142.5636
1-Oct-19	6720	6782	62	26.64	35.36	1250.3296
1-Nov-19	7599.95	7618.85	18.9	26.64	-7.74	59.9076
2-Dec-19	7291	7139.35	-151.65	26.64	-178.29	31787.3241
1-Jan-20	7377	7311.7	-65.3	26.64	-91.94	8452.9636
1-Feb-20	6915	6812.65	-102.35	26.64	-128.99	16638.4201

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Maruti Suzuki (∑) = 293.1

Number of days (n) =11

Average returns = Total returns/n

= 293.1/11

= 26.64

Variance **(σ2)** = ∑(R-r)2*1/(n-1)

= 152374.8676*1/(11-1)

= 15237.486

Standard Deviation = √σ2

= √15237.486

= 123.440

Interpretation: The total returns of Maruti Suzuki (Pre-Covid) are 293.1 and the Standard deviation is 123.440. The average return of Maruti Suzuki is 0.266% and the Standard deviation is 1.234%.

Table Number-3: Calculation of Risk and Returns of Tata Motors (Pre-Covid)from

01-04-2019 to 01-02-2020:

Tata Motors						
Date	**Op. Price**	**Cl. Price**	**Returns**	**Avg.returns**	**Deviations**	**Sq.Dev(R-r)2**
1-Apr-19	176.35	187.35	11	-0.272	11.272	127.057984
2-May-19	211	207.3	-3.7	-0.272	-3.428	11.751184
3-Jun-19	170.5	174.5	4	-0.272	4.272	18.249984
1-Jul-19	163.7	168	4.3	-0.272	4.572	20.903184
1-Aug-19	135.5	129.55	-5.95	-0.272	-5.678	32.239684
3-Sep-19	113.05	112.65	-0.4	-0.272	-0.128	0.016384
1-Oct-19	118	115.3	-2.7	-0.272	-2.428	5.895184
1-Nov-19	175.2	175.05	-0.15	-0.272	0.122	0.014884
2-Dec-19	160.95	161.05	0.1	-0.272	0.372	0.138384
1-Jan-20	185.15	185.45	0.3	-0.272	0.572	0.327184
1-Feb-20	175.4	165.6	-9.8	-0.272	-9.528	90.782784

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Tata Motors (∑) = -3

Number of days (n) =11

Average returns = Total returns/n

= -3/11

= -0.27

Variance (σ2) = ∑(R-r)2*1/(n-1)

= 307.376824*1/(11-1)

= 30.737

Standard deviation = √σ2

= √30.737

= 5.54

Interpretation: The total returns of Tata Motors (Pre-Covid) are -3 and the Standard deviation is 5.54. The average return of Tata Motors is 0.0027% and the Standard deviation is 0.055%.

Table Number-4: Calculation of Risk and Return of Ashok Leyland (Pre-Covid) from 01-04-2019 to 01-02-2020:

Ashok Leyland						
Date	**Op.Price**	**Cl.Price**	**Returns**	**Avg.returns**	**Deviations**	**sq.Dev(R-r)2**
1-Apr-19	92.2	90.35	-1.85	-0.34	-1.51	2.2801
2-May-19	87.1	89.55	2.45	-0.34	2.79	7.7841
3-Jun-19	88.85	91.85	3	-0.34	3.34	11.1556
1-Jul-19	87.85	87.1	-0.75	-0.34	-0.41	0.1681
1-Aug-19	69.9	68.85	-1.05	-0.34	-0.71	0.5041
3-Sep-19	63.5	65.35	1.85	-0.34	2.19	4.7961
1-Oct-19	68	65.95	-2.05	-0.34	-1.71	2.9241
1-Nov-19	76.75	75.95	-0.8	-0.34	-0.46	0.2116
2-Dec-19	78.5	79.6	1.1	-0.34	1.44	2.0736
1-Jan-20	81.95	81.05	-0.9	-0.34	-0.56	0.3136
1-Feb-20	81.9	77.15	-4.75	-0.34	-4.41	19.4481

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Ashok Leyland (∑) = -3.75

Average returns = Total returns/n

= -3.75/11

= -0.3409

Variance (σ2) = ∑(R-r)2*1/(n-1)

= 51.6591*1/(11-1)

= 5.165

Standard Deviation = √σ2

= √5.165

= 2.272

Interpretation: The total returns of Ashok Leyland (Pre-Covid) are -3.75 and the Standard deviation is 2.272.The average return of Ashok Leyland is -0.0034% and the Standard deviation is 0.022%.

Table Number-5: Calculation of Risk and Returns of Bajaj Auto (Post-Covid) from 01-03-2020 to 01-04-2021

BAJAJ AUTO						
Date	**Op. Price**	**Cl. Price**	**Returns**	**Avg.returns**	**Deviations**	**Sq.Dev(R-r)2**
2-Mar-20	2920	2792.2	-127.8	-2.385	-125.415	15728.92223
1-Apr-20	2000	2051.1	51.1	-2.385	53.485	2860.645225
4-May-20	2550	2442.15	-107.85	-2.385	-105.465	11122.86623
1-Jun-20	2730	2758.3	28.3	-2.385	30.685	941.569225
1-Jul-20	2838.05	2842.05	4	-2.385	6.385	40.768225
3-Aug-20	2990	2917.45	-72.55	-2.385	-70.165	4923.127225
1-Sep-20	2947	2958.4	11.4	-2.385	13.785	190.026225
1-Oct-20	2940	2985.4	45.4	-2.385	47.785	2283.406225
2-Nov-20	2918	2843.7	-74.3	-2.385	-71.915	5171.767225
1-Dec-20	3175.1	3243.65	68.55	-2.385	70.935	5031.774225
1-Jan-21	3446	3481.25	35.25	-2.385	37.635	1416.393225
1-Feb-21	4064	4114.7	50.7	-2.385	53.085	2818.017225
1-Mar-21	3798.7	3814.05	15.35	-2.385	17.735	314.530225
1-Apr-21	3704	3743.05	39.05	-2.385	41.435	1716.859225

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Bajaj Auto (Post-Covid) = -33.4

Number of days (n) =14

Average returns = Total returns/n

= -33.4/14

= -2.385

Variance (σ2) = ∑(R-r)2*1/(n-1)

= 54560.67215*1/(14-1)

= 4196.974

Standard deviation = √ơ2

= √4196.974

= 64.784

Interpretation: The total returns of Bajaj Auto (Post-Covid) are -33.4 and the Standard deviation is 64.784. The Average return of Bajaj Auto is -0.0238% and the Standard deviation is 0.647%.

Table Number-6: Calculation of Risk and Return of Maruti Suzuki (Post-Covid) from 01-03-2020 to 01-04-2021

Maruti Suzuki						
Date	**Op. Price**	**Cl. Price**	**Returns**	**Avg.returns**	**Deviations**	**Sq.Dev(R-r)2**
2-Mar-20	6400.95	6285.15	-115.8	-38.5	-77.3	5975.29
1-Apr-20	4290	4246.35	-43.65	-38.5	-5.15	26.5225
4-May-20	5090	4886.3	-203.7	-38.5	-165.2	27291.04
1-Jun-20	5690	5793.6	103.6	-38.5	142.1	20192.41
1-Jul-20	5838.3	5803.1	-35.2	-38.5	3.3	10.89
3-Aug-20	6380	6165.2	-214.8	-38.5	-176.3	31081.69
1-Sep-20	6860.45	6905.65	45.2	-38.5	83.7	7005.69
1-Oct-20	6838.2	6796.3	-41.9	-38.5	-3.4	11.56
2-Nov-20	7044.9	6868.35	-176.55	-38.5	-138.05	19057.8025
1-Dec-20	7141.8	7101.7	-40.1	-38.5	-1.6	2.56
1-Jan-21	7654	7691.3	37.3	-38.5	75.8	5745.64
1-Feb-21	7265.2	7399.8	134.6	-38.5	173.1	29963.61
1-Mar-21	6977	7015	38	-38.5	76.5	5852.25
1-Apr-21	6950	6923.9	-26.1	-38.5	12.4	153.76

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Maruti Suzuki = -539.1

Number of days (n) =14

Average returns = Total returns/n

= -539.1/14

= -38.5

Variance (σ2) = ∑(R-r)2*1/(n-1)

= 152370.715*1/(14-1)

= 11720.82

Standard Deviation = √σ2

= √11720.82

= 108.262

Interpretation: The total returns of Maruti Suzuki (Post-Covid) are -539.1 and the Standard deviation is 108.262. The Average return of Maruti Suzuki is -0.385% and the Standard deviation is 1.082%.

Table Number-7: Calculation of Risk and Returns of Tata Motors (Post-Covid)from 01-03-2020 to 01-04-2021

Tata Motors						
Date	**Op. Price**	**Cl. Price**	**Returns**	**Avg.returns**	**Deviations**	**Sq.Dev(R-r)2**
2-Mar-20	133	125.4	-7.6	1.646	-9.246	85.488516
1-Apr-20	70.5	67.95	-2.55	1.646	-4.196	17.606416
4-May-20	87	83.9	-3.1	1.646	-4.746	22.524516
1-Jun-20	88.9	89.55	0.65	1.646	-0.996	0.992016
1-Jul-20	99	100.75	1.75	1.646	0.104	0.010816
3-Aug-20	103	113.05	10.05	1.646	8.404	70.627216
1-Sep-20	143.4	143.8	0.4	1.646	-1.246	1.552516
1-Oct-20	135.9	133.5	-2.4	1.646	-4.046	16.370116
2-Nov-20	133.65	132.85	-0.8	1.646	-2.446	5.982916
1-Dec-20	182.35	179.75	-2.6	1.646	-4.246	18.028516
1-Jan-21	184.95	186.5	1.55	1.646	-0.096	0.009216
1-Feb-21	293.6	322	28.4	1.646	26.754	715.776516
1-Mar-21	330	328.3	-1.7	1.646	-3.346	11.195716
1-Apr-21	306.75	307.75	1	1.646	-0.646	0.417316

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Tata Motors = 23.05

Number of days (n) = 14

Average returns = Total returns/n

= 23.05/14

= 1.646

Variance (σ2) = ∑(R-r)2*1/(n-1)

= 966.582324*1/(14-1)

= 74.352

Standard deviation = √σ2

= √74.352

= 8.62

Interpretation: The total return of Tata Motors is 23.05 and the Standard deviation is 8.62. The Average return of Tata Motors is 0.0164% and the Standard deviation is 0.0862%.

Table Number-8: Calculation of Risk and Return of Ashok Leyland (Post-Covid) from 01-03-2020 to 01-04-2021

Ashok Leyland						
Date	**Op.Price**	**Cl.Price**	**Returns**	**Avg.returns**	**Deviations**	**Sq.Dev(R-r)2**
2-Mar-20	71.5	73.9	2.4	1.56	0.84	0.7056
1-Apr-20	43.05	41.1	-1.95	1.56	-3.51	12.3201
4-May-20	50.05	49.3	-0.75	1.56	-2.31	5.3361
1-Jun-20	43.85	46.4	2.55	1.56	0.99	0.9801
1-Jul-20	47.55	48.2	0.65	1.56	-0.91	0.8281
3-Aug-20	49	49.3	0.3	1.56	-1.26	1.5876
1-Sep-20	67.9	68.8	0.9	1.56	-0.66	0.4356
1-Oct-20	75.4	76.25	0.85	1.56	-0.71	0.5041
2-Nov-20	79.8	81.8	2	1.56	0.44	0.1936
1-Dec-20	93.15	92.65	-0.5	1.56	-2.06	4.2436
1-Jan-21	95.7	99.1	3.4	1.56	1.84	3.3856
1-Feb-21	111.9	122.05	10.15	1.56	8.59	73.7881
1-Mar-21	130.7	129.65	-1.05	1.56	-2.61	6.8121
1-Apr-21	115.25	118.15	2.9	1.56	1.34	1.7956

Source: Calculated from the Secondary data Collected through NSE.

Total returns of Ashok Leyland = 21.85

Number of days (n) =14

Average returns = 21.85/14

= 1.56

Variance ($\sigma 2$) = $\sum$(R-r)2*1/(n-1)

= 112.9159*1/(14-1)

= 8.686

Standard Deviation = $\sqrt{\sigma 2}$

= $\sqrt{8.686}$

= 2.947

Interpretation: The total return of Ashok Leyland (Post-Covid) is 21.85 and the Standard deviation is 2.947. The average return of Ashok Leyland is 0.0156% and the Standard deviation is 0.0294%.

Table Number-9: Calculation of covariance and Correlation coefficient of Bajaj Auto and Maruti Suzuki (Pre-covid) from 01-04-2019 to 01-02-2020

	Bajaj Auto			Maruti Suzuki			
Date	Returns	Avg.returns	dx	Returns	Avg.returns	Dy	dx.dy
1-Apr-19	418.15	49.54	368.61	109.9	26.64	83.26	30690.4686
2-May-19	41.55	49.54	-7.99	133.25	26.64	106.61	-851.8139
3-Jun-19	89.6	49.54	40.06	262.9	26.64	236.26	9464.5756
1-Jul-19	73.55	49.54	24.01	-92.15	26.64	-118.79	-2852.1479
1-Aug-19	52.6	49.54	3.06	102.9	26.64	76.26	233.3556
3-Sep-19	-11.1	49.54	-60.64	14.7	26.64	-11.94	724.0416
1-Oct-19	35	49.54	-14.54	62	26.64	35.36	-514.1344
1-Nov-19	-17.35	49.54	-66.89	18.9	26.64	-7.74	517.7286
2-Dec-19	-3.85	49.54	-53.39	-151.65	26.64	-178.29	9518.9031
1-Jan-20	-32.9	49.54	-82.44	-65.3	26.64	-91.94	7579.5336
1-Feb-20	-30.3	49.54	-79.84	-102.35	26.64	-128.99	10298.5616

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 64809.0721/11

= 5891.73

Standard deviation of Bajaj Auto ($\sigma 1$) = 130.72

Standard deviation of Maruti Suzuki ($\sigma 2$) = 123.44

Correlation Coefficient = Covariance/$\sigma 1 * \sigma 2$

= 5891.73/(130.72)(123.44)

= 0.365

Interpretation: Here, the Standard deviation of Bajaj Auto (Pre-Covid) is 130.72 whereas the standard deviation of Maruti Suzuki is 123.44. The calculated Covariance for the equities of Bajaj Auto and Maruti Suzuki is 5891.73 and the Correlation Coefficient between the equities of Bajaj Auto and Maruti Suzuki is 0.365.

Table Number-10: Calculation of Covariance and Correlation Coefficient of Bajaj Auto and Tata Motors(Pre-covid) from 01-04-2019 to 01-02-2020

	Bajaj Auto			Tata Motors			
Date	Returns	Avg.returns	Dx	Returns	Avg.returns	Dy	dx.dy
1-Apr-19	418.15	49.54	368.61	11	-0.272	11.272	4154.972
2-May-19	41.55	49.54	-7.99	-3.7	-0.272	-3.428	27.38972
3-Jun-19	89.6	49.54	40.06	4	-0.272	4.272	171.1363
1-Jul-19	73.55	49.54	24.01	4.3	-0.272	4.572	109.7737
1-Aug-19	52.6	49.54	3.06	-5.95	-0.272	-5.678	-17.3747
3-Sep-19	-11.1	49.54	-60.64	-0.4	-0.272	-0.128	7.76192
1-Oct-19	35	49.54	-14.54	-2.7	-0.272	-2.428	35.30312
1-Nov-19	-17.35	49.54	-66.89	-0.15	-0.272	0.122	-8.16058
2-Dec-19	-3.85	49.54	-53.39	0.1	-0.272	0.372	-19.8611
1-Jan-20	-32.9	49.54	-82.44	0.3	-0.272	0.572	-47.1557
1-Feb-20	-30.3	49.54	-79.84	-9.8	-0.272	-9.528	760.7155

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 5174.5/11

= 470.409

Standard deviation of Bajaj Auto ($\sigma 1$) = 130.72

Standard deviation of Tata Motors ($\sigma 2$) = 5.54

Correlation coefficient = Covarinace/$\sigma 1 * \sigma 2$

= 470.409/(130.72*5.54)

= 0.649

Interpretation: Here, the Standard deviation of Bajaj Auto (Pre-Covid) is 130.72 whereas the Standard deviation of Tata Motors is 5.54. The calculated Covariance for the equities of Bajaj Auto and Tata Motors is 470.49 and the Correlation coefficient between them is 0.649.

Table Number-11: Calculation of Covariance and Correlation Coefficient of Bajaj Auto and Ashok Leyland(Pre-Covid) from 01-04-2019 to 01-02-2020

	Bajaj Auto			Ashok Leyland			
Date	Returns	Avg.returns	Dx	Returns	Avg.returns	dy	dx.dy
1-Apr-19	418.15	49.54	368.61	-1.85	-0.3409	-1.5091	-556.269
2-May-19	41.55	49.54	-7.99	2.45	-0.3409	2.7909	-22.2993
3-Jun-19	89.6	49.54	40.06	3	-0.3409	3.3409	133.8365
1-Jul-19	73.55	49.54	24.01	-0.75	-0.3409	-0.4091	-9.82249
1-Aug-19	52.6	49.54	3.06	-1.05	-0.3409	-0.7091	-2.16985
3-Sep-19	-11.1	49.54	-60.64	1.85	-0.3409	2.1909	-132.856
1-Oct-19	35	49.54	-14.54	-2.05	-0.3409	-1.7091	24.85031
1-Nov-19	-17.35	49.54	-66.89	-0.8	-0.3409	-0.4591	30.7092
2-Dec-19	-3.85	49.54	-53.39	1.1	-0.3409	1.4409	-76.9297
1-Jan-20	-32.9	49.54	-82.44	-0.9	-0.3409	-0.5591	46.0922
1-Feb-20	-30.3	49.54	-79.84	-4.75	-0.3409	-4.4091	352.0225

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= -212.836/11

= -19.348

Standard deviation of Bajaj Auto ($\sigma 1$) = 130.72

Standard deviation of Ashok Leyland ($\sigma 2$) = 2.272

Correlation Coefficient = Covariance/($\sigma 1 * \sigma 2$)

= -19.348/(130.72*2.272)

= -0.065

Interpretation: Here, the Standard deviation of Bajaj Auto (Pre-Covid) is 130.72 whereas the Standard deviation of Ashok Leyland is 2.272. The Calculated Covariance for the equities of Bajaj Auto and Ashok Leyland is -19.348 and the Correlation coefficient is -0.065.

Table Number-12: Calculation of covariance and correlation coefficient of Maruti Suzuki and Tata motors (Pre-covid) from 01-04-2019 to 01-02-2020

	Maruti Suzuki			Tata Motors			
Date	Returns	Avg.returns	Dx	Returns	Avg.returns	Dy	dx.dy
1-Apr-19	109.9	26.64	83.26	11	-0.272	11.272	938.50672
2-May-19	133.25	26.64	106.61	-3.7	-0.272	-3.428	-365.45908
3-Jun-19	262.9	26.64	236.26	4	-0.272	4.272	1009.30272
1-Jul-19	-92.15	26.64	-118.8	4.3	-0.272	4.572	-543.10788
1-Aug-19	102.9	26.64	76.26	-5.95	-0.272	-5.678	-433.00428
3-Sep-19	14.7	26.64	-11.94	-0.4	-0.272	-0.128	1.52832
1-Oct-19	62	26.64	35.36	-2.7	-0.272	-2.428	-85.85408
1-Nov-19	18.9	26.64	-7.74	-0.15	-0.272	0.122	-0.94428
2-Dec-19	-151.65	26.64	-178.3	0.1	-0.272	0.372	-66.32388
1-Jan-20	-65.3	26.64	-91.94	0.3	-0.272	0.572	-52.58968
1-Feb-20	-102.35	26.64	-129	-9.8	-0.272	-9.528	1229.01672

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 1631.07132/11

= 148.27

Standard deviation of Maruti Suzuki ($\sigma 1$) = 123.44

Standard deviation of Tata Motors ($\sigma 2$) = 5.54

Correlation Coefficient = Covariance/$\sigma 1 * \sigma 2$

= 148.27/(123.44*5.54)

= 0.216

Interpretation: Here, the Standard deviation of Maruti Suzuki (Pre-Covid) is 123.44 whereas the Standard deviation of Tata Motors is 5.54. The Calculated Covariance between the equities of Maruti Suzuki and Tata Motors is 148.27 and the Correlation coefficient between them is 0.216.

Table Number-13: Calculation of Covariance and Correlation coefficient of Maruti Suzuki and Ashok Leyland (pre-covid) from 01-04-2019 to 01-02-2020

	Maruti Suzuki			Ashok Leyland			
Date	Returns	Avg.returns	dx	Returns	Avg.returns	Dy	dx.dy
1-Apr-19	109.9	26.64	83.26	-1.85	-0.3409	-1.5091	-125.64767
2-May-19	133.25	26.64	106.61	2.45	-0.3409	2.7909	297.537849
3-Jun-19	262.9	26.64	236.26	3	-0.3409	3.3409	789.321034
1-Jul-19	-92.15	26.64	-118.8	-0.75	-0.3409	-0.4091	48.596989
1-Aug-19	102.9	26.64	76.26	-1.05	-0.3409	-0.7091	-54.075966
3-Sep-19	14.7	26.64	-11.94	1.85	-0.3409	2.1909	-26.159346
1-Oct-19	62	26.64	35.36	-2.05	-0.3409	-1.7091	-60.433776
1-Nov-19	18.9	26.64	-7.74	-0.8	-0.3409	-0.4591	3.553434
2-Dec-19	-151.65	26.64	-178.3	1.1	-0.3409	1.4409	-256.89806
1-Jan-20	-65.3	26.64	-91.94	-0.9	-0.3409	-0.5591	51.403654
1-Feb-20	-102.35	26.64	-129	-4.75	-0.3409	-4.4091	568.729809

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 1235.9279/11

= 112.36

Standard deviation of Maruti Suzuki($\sigma 1$) = 123.44

Standard deviation of Ashok Leyland ($\sigma 2$) = 2.272

Correlation coefficient = Covariance/$\sigma 1 * \sigma 2$

= 112.36/(123.44*2.272)

= 0.4006

Interpretation: Here, the Standard Deviation of Maruti Suzuki (Pre-Covid) is 123.44 whereas the standard deviation of Ashok Leyland is 2.272. The Calculated Covariance for the equities of Maruti Suzuki and Ashok Leyland is 112.36 and the Correlation coefficient between them is 0.4006.

Table Number-14: Calculation of Covariance and Correlation coefficient of Tata Motors and Ashok Leyland (Pre-Covid) from 01-04-2019 to 01-02-2020

	Tata Motors			Ashok Leyland			
Date	Returns	Avg.returns	dy	Returns	Avg.returns	dy	dx.dy
1-Apr-19	11	-0.272	11.272	-1.85	-0.3409	-1.5091	-17.010575
2-May-19	-3.7	-0.272	-3.428	2.45	-0.3409	2.7909	-9.5672052
3-Jun-19	4	-0.272	4.272	3	-0.3409	3.3409	14.2723248
1-Jul-19	4.3	-0.272	4.572	-0.75	-0.3409	-0.4091	-1.8704052
1-Aug-19	-5.95	-0.272	-5.678	-1.05	-0.3409	-0.7091	4.0262698
3-Sep-19	-0.4	-0.272	-0.128	1.85	-0.3409	2.1909	-0.2804352
1-Oct-19	-2.7	-0.272	-2.428	-2.05	-0.3409	-1.7091	4.1496948
1-Nov-19	-0.15	-0.272	0.122	-0.8	-0.3409	-0.4591	-0.0560102
2-Dec-19	0.1	-0.272	0.372	1.1	-0.3409	1.4409	0.5360148
1-Jan-20	0.3	-0.272	0.572	-0.9	-0.3409	-0.5591	-0.3198052
1-Feb-20	-9.8	-0.272	-9.528	-4.75	-0.3409	-4.4091	42.0099048

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum$dx.dy/n

= 35.889/11

= 3.263

Standard Deviation of Tata Motors (σ1) = 5.54

Standard deviation of Ashok Leyland (σ2) = 2.272

Correlation coefficient = Covariance/σ1*σ2

= 3.263/(5.54*2.272)

= 0.259

Interpretation: Here, the Standard deviation of Tata Motors (Pre-Covid) is 5.54 whereas the Standard deviation of Ashok Leyland is 2.272. The Calculated Covariance for the equities of Tata Motors and Ashok Leyland is 3.263 and the correlation coefficient between them is 0.259.

Table Number-15: Calculation of Covariance and Correlation coefficient of Bajaj Auto and Maruti Suzuki (post-Covid) from 01-03-2020 to 01-04-2021

	Bajaj Auto			Maruti Suzuki			
Date	Returns	Avg.returns	Dx	Returns	Avg.returns	dy	dx.dy
2-Mar-20	-127.8	-2.385	-125.415	-115.8	-38.51	-77.29	9693.325
1-Apr-20	51.1	-2.385	53.485	-43.65	-38.51	-5.14	-274.913
4-May-20	-107.85	-2.385	-105.465	-203.7	-38.51	-165.19	17421.76
1-Jun-20	28.3	-2.385	30.685	103.6	-38.51	142.11	4360.645
1-Jul-20	4	-2.385	6.385	-35.2	-38.51	3.31	21.13435
3-Aug-20	-72.55	-2.385	-70.165	-214.8	-38.51	-176.29	12369.39
1-Sep-20	11.4	-2.385	13.785	45.2	-38.51	83.71	1153.942
1-Oct-20	45.4	-2.385	47.785	-41.9	-38.51	-3.39	-161.991
2-Nov-20	-74.3	-2.385	-71.915	-176.55	-38.51	-138.04	9927.147
1-Dec-20	68.55	-2.385	70.935	-40.1	-38.51	-1.59	-112.787
1-Jan-21	35.25	-2.385	37.635	37.3	-38.51	75.81	2853.109
1-Feb-21	50.7	-2.385	53.085	134.6	-38.51	173.11	9189.544
1-Mar-21	15.35	-2.385	17.735	38	-38.51	76.51	1356.905
1-Apr-21	39.05	-2.385	41.435	-26.1	-38.51	12.41	514.2084

Source: Calculated from the Secondary data Collected through NSE.

Covarinace = $\sum dx.dy/n$

= 68311.42/14

= 4879.38

Standard deviation of Bajaj Auto ($\sigma 1$) = 64.784

Standard deviation of Maruti Suzuki ($\sigma 2$) = 108.262

Correlation Coefficient = Covariance/$\sigma 1 * \sigma 2$

= 4879.38/(64.78*108.26)

= 0.695

Interpretation: Here, the Standard deviation of Bajaj Auto (Post-Covid) is 64.784 whereas the Standard deviation of Maruti Suzuki is 108.262. The Calculated Covariance for the equities of Bajaj Auto and Maruti Suzuki is 4879.38 and the correlation coefficient between them is 0.695.

Table Number-16: Calculation of Covariance and Correlation coefficient of Bajaj Auto and Tata Motors(Post-Covid) from 01-03-2020 to 01-04-2021

	Bajaj Auto			Tata Motors			
Date	Returns	Avg.returns	Dx	Returns	Avg.returns	dy	dx.dy
2-Mar-20	-127.8	-2.385	-125.415	-7.6	1.646	-9.246	1159.587
1-Apr-20	51.1	-2.385	53.485	-2.55	1.646	-4.196	-224.423
4-May-20	-107.85	-2.385	-105.465	-3.1	1.646	-4.746	500.5369
1-Jun-20	28.3	-2.385	30.685	0.65	1.646	-0.996	-30.5623
1-Jul-20	4	-2.385	6.385	1.75	1.646	0.104	0.66404
3-Aug-20	-72.55	-2.385	-70.165	10.05	1.646	8.404	-589.667
1-Sep-20	11.4	-2.385	13.785	0.4	1.646	-1.246	-17.1761
1-Oct-20	45.4	-2.385	47.785	-2.4	1.646	-4.046	-193.338
2-Nov-20	-74.3	-2.385	-71.915	-0.8	1.646	-2.446	175.9041
1-Dec-20	68.55	-2.385	70.935	-2.6	1.646	-4.246	-301.19
1-Jan-21	35.25	-2.385	37.635	1.55	1.646	-0.096	-3.61296
1-Feb-21	50.7	-2.385	53.085	28.4	1.646	26.754	1420.236
1-Mar-21	15.35	-2.385	17.735	-1.7	1.646	-3.346	-59.3413
1-Apr-21	39.05	-2.385	41.435	1	1.646	-0.646	-26.767

Source: Calculated from the Secondary data Collected through NSE.

Covarinace = $\sum dx.dy/n$

= 1810.851/14

= 129.35

Standard deviation of Bajaj Auto ($\sigma 1$) = 64.784

Standard deviation of Tata Motors ($\sigma 2$) = 8.62

Correlation Coefficient = Covariance/$\sigma 1 * \sigma 2$

= 129.35/(64.784*8.62)

= 0.232

Interpretation: Here, the Standard deviation of Bajaj Auto (Post-Covid) is 64.78 whereas the standard deviation of Tata Motors is 8.62. The Calculated Covariance between the equities of Bajaj Auto and Tata Motors is 129.35 and the correlation coefficient between them is 0.232.

Table Number-17: Calculation of Covariance and Correlation Coefficient of Bajaj Auto and Ashok Leyland (Post-covid) from 01-03-2020 to 01-04-2021

	Bajaj Auto			Ashok Leyland			
Date	Returns	Avg.returns	dx	Returns	Avg.retutns	dy	dx.dy
2-Mar-20	-127.8	-2.385	-125.415	2.4	1.56	0.84	-105.349
1-Apr-20	51.1	-2.385	53.485	-1.95	1.56	-3.51	-187.732
4-May-20	-107.85	-2.385	-105.465	-0.75	1.56	-2.31	243.6242
1-Jun-20	28.3	-2.385	30.685	2.55	1.56	0.99	30.37815
1-Jul-20	4	-2.385	6.385	0.65	1.56	-0.91	-5.81035
3-Aug-20	-72.55	-2.385	-70.165	0.3	1.56	-1.26	88.4079
1-Sep-20	11.4	-2.385	13.785	0.9	1.56	-0.66	-9.0981
1-Oct-20	45.4	-2.385	47.785	0.85	1.56	-0.71	-33.9274
2-Nov-20	-74.3	-2.385	-71.915	2	1.56	0.44	-31.6426
1-Dec-20	68.55	-2.385	70.935	-0.5	1.56	-2.06	-146.126
1-Jan-21	35.25	-2.385	37.635	3.4	1.56	1.84	69.2484
1-Feb-21	50.7	-2.385	53.085	10.15	1.56	8.59	456.0002
1-Mar-21	15.35	-2.385	17.735	-1.05	1.56	-2.61	-46.2884
1-Apr-21	39.05	-2.385	41.435	2.9	1.56	1.34	55.5229

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 377.029/14

= 26.931

Standard deviation of Bajaj Auto ($\sigma 1$) = 64.784

Standard deviation of Ashok Leyland ($\sigma 2$) = 2.947

Correlation Coefficient = Covariance/$\sigma 1 * \sigma 2$

= 26.931/(64.784*2.947)

= 0.141

Interpretation: Here, the Standard deviation of Bajaj Auto (Post-Covid) is 64.784 whereas the standard deviation of Ashok Leyland is 2.947. The Calculated Covariance for the equities of Bajaj Auto and Ashok Leyland is 26.931 and the correlation coefficient between them is 0.141.

Table Number-18: Calculation of Covariance and Correlation Coefficient of Maruti Suzuki and Tata Motors (Post-Covid) from 01-03-2020 to 01-04-2021

	Maruti Suzuki			Tata Motors			
Date	Returns	Avg.returns	dx	Returns	Avg.returns	dy	dx.dy
2-Mar-20	-115.8	-38.51	-77.29	-7.6	1.646	-9.246	714.6233
1-Apr-20	-43.65	-38.51	-5.14	-2.55	1.646	-4.196	21.56744
4-May-20	-203.7	-38.51	-165.19	-3.1	1.646	-4.746	783.9917
1-Jun-20	103.6	-38.51	142.11	0.65	1.646	-0.996	-141.542
1-Jul-20	-35.2	-38.51	3.31	1.75	1.646	0.104	0.34424
3-Aug-20	-214.8	-38.51	-176.29	10.05	1.646	8.404	-1481.54
1-Sep-20	45.2	-38.51	83.71	0.4	1.646	-1.246	-104.303
1-Oct-20	-41.9	-38.51	-3.39	-2.4	1.646	-4.046	13.71594
2-Nov-20	-176.55	-38.51	-138.04	-0.8	1.646	-2.446	337.6458
1-Dec-20	-40.1	-38.51	-1.59	-2.6	1.646	-4.246	6.75114
1-Jan-21	37.3	-38.51	75.81	1.55	1.646	-0.096	-7.27776
1-Feb-21	134.6	-38.51	173.11	28.4	1.646	26.754	4631.385
1-Mar-21	38	-38.51	76.51	-1.7	1.646	-3.346	-256.002
1-Apr-21	-26.1	-38.51	12.41	1	1.646	-0.646	-8.01686

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 4511.342/14

= 322.238

Standard deviation of Maruti Suzuki($\sigma 1$) = 108.262

Standard deviation of Tata Motors ($\sigma 2$) = 8.62

Correlation Coefficient =Covariance/$\sigma 1 * \sigma 2$

= 322.238/(108.262*8.62)

= 0.345

Interpretation: Here, the Standard deviation of Maruti Suzuki(Post-Covid) is 108.262 whereas the standard deviation of Tata Motors is 8.62. The Calculated Covariance for the equities of Maruti Suzuki and Tata Motors is 322.238 and the correlation coefficient between them is 0.345.

Table Number-19: Calculation of Covariance and Correlation coefficient of Maruti Suzuki and Ashok Leyland (Post-covid)from 01-03-2020 to 01-04-2021

	Maruti Suzuki			Ashok Leyland			
Date	Returns	Avg.returns	dx	Returns	Avg.retutns	dy	dx.dy
2-Mar-20	-115.8	-38.51	-77.29	2.4	1.56	0.84	-64.9236
1-Apr-20	-43.65	-38.51	-5.14	-1.95	1.56	-3.51	18.0414
4-May-20	-203.7	-38.51	-165.19	-0.75	1.56	-2.31	381.5889
1-Jun-20	103.6	-38.51	142.11	2.55	1.56	0.99	140.6889
1-Jul-20	-35.2	-38.51	3.31	0.65	1.56	-0.91	-3.0121
3-Aug-20	-214.8	-38.51	-176.29	0.3	1.56	-1.26	222.1254
1-Sep-20	45.2	-38.51	83.71	0.9	1.56	-0.66	-55.2486
1-Oct-20	-41.9	-38.51	-3.39	0.85	1.56	-0.71	2.4069
2-Nov-20	-176.55	-38.51	-138.04	2	1.56	0.44	-60.7376
1-Dec-20	-40.1	-38.51	-1.59	-0.5	1.56	-2.06	3.2754
1-Jan-21	37.3	-38.51	75.81	3.4	1.56	1.84	139.4904
1-Feb-21	134.6	-38.51	173.11	10.15	1.56	8.59	1487.015
1-Mar-21	38	-38.51	76.51	-1.05	1.56	-2.61	-199.691
1-Apr-21	-26.1	-38.51	12.41	2.9	1.56	1.34	16.6294

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 2027.649/14

= 144.832

Standard deviation of Maruti Suzuki ($\sigma 1$) = 108.262

Standard deviation of Ashok Leyland ($\sigma 2$) = 2.947

Correlation Coefficient = Covariance/$\sigma 1 * \sigma 2$

= 144.832/(108.262*2.947)

= 0.454

Interpretation: Here, the Standard deviation of Maruti Suzuki(Post-Covid) is 108.262 whereas the standard deviation of Ashok Leyland is 2.947. The calculated Covariance for the equities of Maruti Suzuki and Ashok Leyland is 144.832 and the correlation coefficient between them is 0.454.

Table Number-20: Calculation of Covariance and Correlation Coefficient of Tata Motors and Ashok Leyland (Post-Covid) from 01-03-2020 to 01-04-2021

	Tata Motors			Ashok Leyland			
Date	Returns	Avg.returns	Dx	Returns	Avg.retutns	dy	dx.dy
2-Mar-20	-7.6	1.646	-9.246	2.4	1.56	0.84	-7.76664
1-Apr-20	-2.55	1.646	-4.196	-1.95	1.56	-3.51	14.72796
4-May-20	-3.1	1.646	-4.746	-0.75	1.56	-2.31	10.96326
1-Jun-20	0.65	1.646	-0.996	2.55	1.56	0.99	-0.98604
1-Jul-20	1.75	1.646	0.104	0.65	1.56	-0.91	-0.09464
3-Aug-20	10.05	1.646	8.404	0.3	1.56	-1.26	-10.589
1-Sep-20	0.4	1.646	-1.246	0.9	1.56	-0.66	0.82236
1-Oct-20	-2.4	1.646	-4.046	0.85	1.56	-0.71	2.87266
2-Nov-20	-0.8	1.646	-2.446	2	1.56	0.44	-1.07624
1-Dec-20	-2.6	1.646	-4.246	-0.5	1.56	-2.06	8.74676
1-Jan-21	1.55	1.646	-0.096	3.4	1.56	1.84	-0.17664
1-Feb-21	28.4	1.646	26.754	10.15	1.56	8.59	229.8169
1-Mar-21	-1.7	1.646	-3.346	-1.05	1.56	-2.61	8.73306
1-Apr-21	1	1.646	-0.646	2.9	1.56	1.34	-0.86564

Source: Calculated from the Secondary data Collected through NSE.

Covariance = $\sum dx.dy/n$

= 255.128/14

= 18.223

Standard deviation of Tata Motors ($\sigma 1$) =8.62

Standard deviation of Ashok Leyland($\sigma 2$) =2.947

Correlation coefficient = Covariance/$\sigma 1 * \sigma 2$

= 18.223/(8.62*2.947)

= 0.717

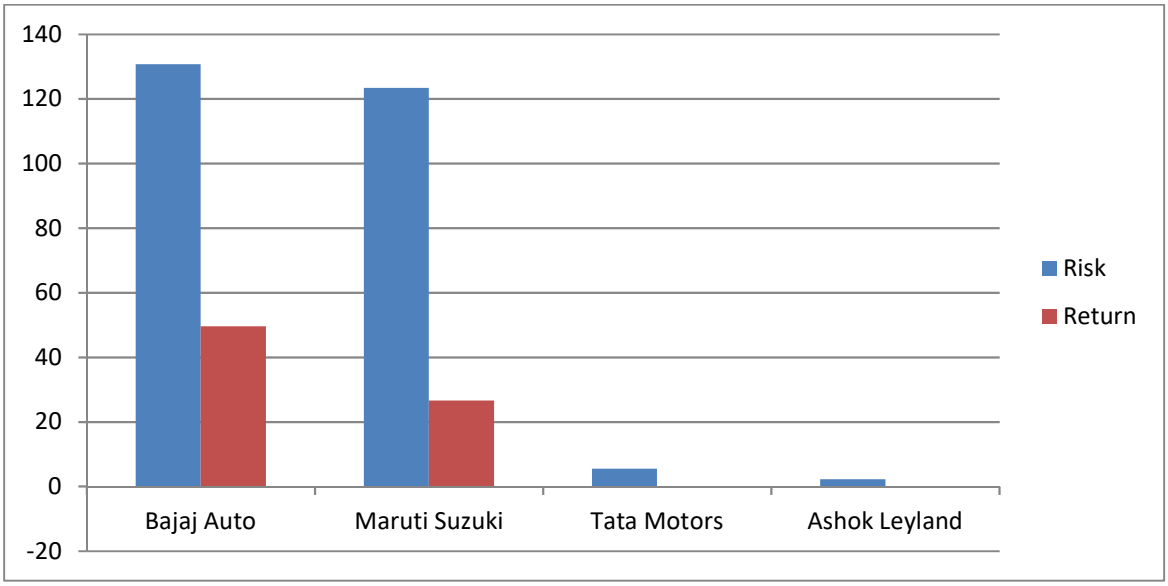
Interpretation: Here, the Standard deviation of Tata Motors(Post-Covid) is 8.62 whereas the standard deviation of Ashok Leyland is 2.947. The Calculated Covariance for the equities of Tata Motors and Ashok Leyland is 18.223 and the correlation coefficient between them is 0.717.

Table Number-21: Comparison of Risk and Return of Individual Companies(Pre-Covid) from 01-04-2019 to 01-02-2020

	Risk	Return
Bajaj Auto	130.72	49.54
Maruti Suzuki	123.4	26.64
Tata Motors	5.54	-0.27
Ashok Leyland	2.272	-0.3409

Source: Calculated from the Secondary data Collected through NSE.

Graph Number-1: Comparison of Risk and Return of Individual Companies(Pre-Covid) from 01-04-2019 to 01-02-2020



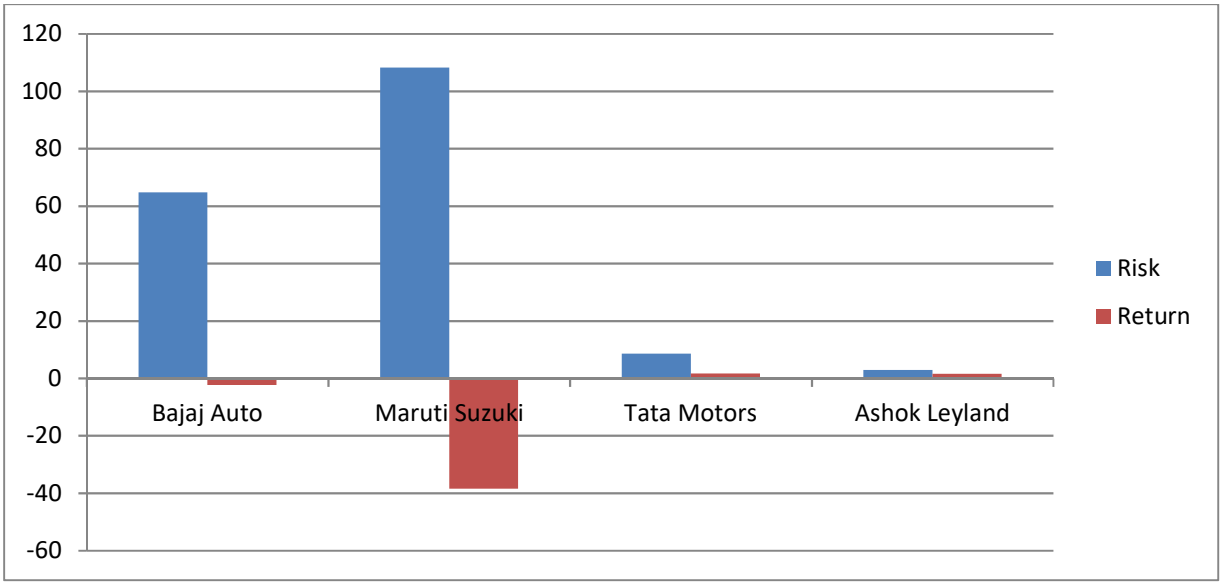
Interpretation: Here, the risk is higher for both Bajaj Auto and Maruti Suzuki compared to Tata Motors and Ashok Leyland. The Return is Higher for Bajaj Auto followed by Maruti Suzuki and there are negative returns for Tata Motors and Ashok Leyland.

Table Number-22: Comparison of Risk and Return of Individual Companies (Post-Covid) from 01-03-2020 to 01-04-2021

	Risk	Return
Bajaj Auto	64.784	-2.385
Maruti Suzuki	108.262	-38.5
Tata Motors	8.62	1.646
Ashok Leyland	2.947	1.56

Source: Calculated from the Secondary data Collected through NSE.

Graph Number-2: Comparison of Risk and Return of Individual Companies (Post-Covid) from 01-03-2020 to 01-04-2021



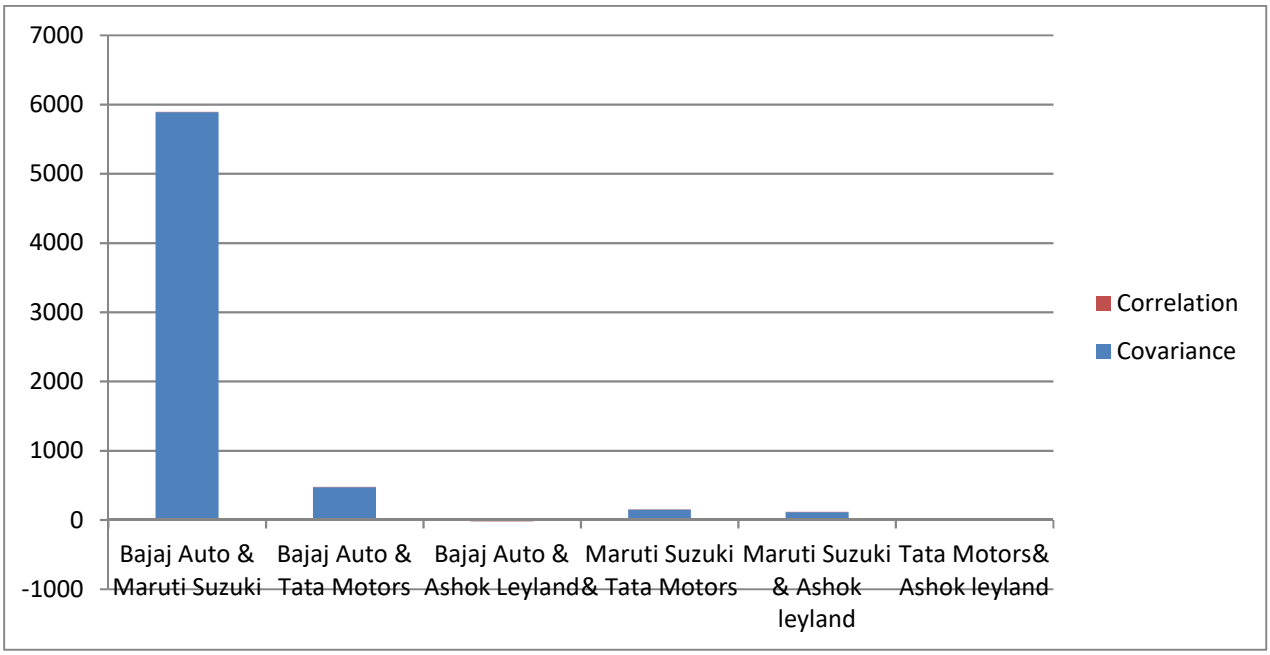
Interpretation: Here, the risk is Higher for Maruti Suzuki followed by Bajaj Auto, and lower risk for Tata Motors and Ashok Leyland. The return is higher for Tata Motors and Ashok Leyland whereas there are negative returns for Bajaj Auto and Maruti Suzuki.

Table Number-23: Comparison of Covariance and Correlation Coefficient of Various Companies (Pre-Covid) from 01-04-2019 to 01-02-2020

	Covariance	Correlation
Bajaj Auto & Maruti Suzuki	5891.73	0.365
Bajaj Auto & Tata Motors	470.409	0.649
Bajaj Auto & Ashok Leyland	-19.348	-0.065
Maruti Suzuki & Tata Motors	148.27	0.216
Maruti Suzuki & Ashok leyland	112.36	0.4006
Tata Motors& Ashok leyland	3.263	0.259

Source: Calculated from the Secondary data Collected through NSE.

Graph Number-3: Comparison of Covariance and Correlation coefficient of Various companies (Pre-Covid) from 01-04-2019 to 01-02-2020



Interpretation: Here, there is a higher correlation for Bajaj Auto and Tata Motors is 0.649 and a lower correlation i.e negative correlation is -0.065 between Bajaj Auto and Ashok Leyland.

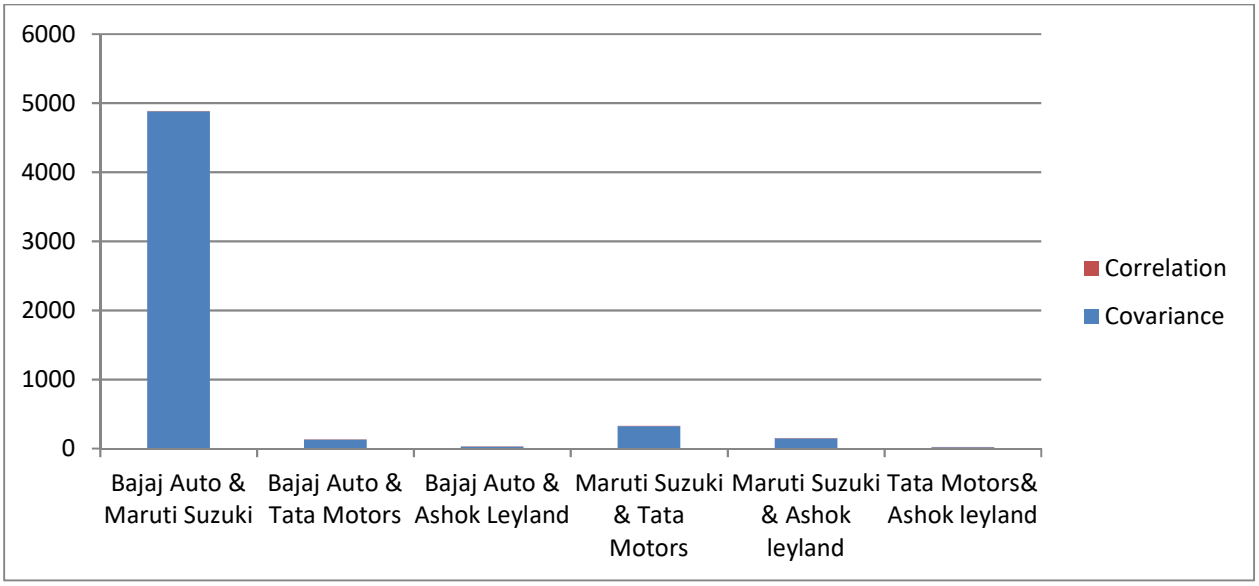
There is a higher Covariance of Bajaj Auto and Maruti Suzuki 5891.73 and lower of -19.348 between Bajaj Auto and Ashok Leyland.

Table Number-24: Comparison of Covariance and Correlation Coefficient of Various Companies (Post-Covid) from 01-03-2020 to 01-04-2021

	Covariance	Correlation
Bajaj Auto & Maruti Suzuki	4879.38	0.695
Bajaj Auto & Tata Motors	129.35	0.232
Bajaj Auto & Ashok Leyland	26.931	0.141
Maruti Suzuki & Tata Motors	322.238	0.345
Maruti Suzuki & Ashok leyland	144.832	0.454
Tata Motors& Ashok leyland	18.223	0.717

Source: Calculated from the Secondary data Collected through NSE.

Graph Number-4: Comparison of Covariance and Correlation Coefficient of Various Companies (Post-Covid)from 01-03-2020 to 01-04-2021



Interpretation: Here, there is a Higher correlation between Bajaj Auto and Maruti Suzuki is 0.695, and a lower correlation coefficient of 0.141 for Bajaj Auto and Ashok Leyland.There is a higher Covariance of 4879.38 for Bajaj Auto and Maruti Suzuki and Lower of 18.223 for Tata Motors and Ashok Leyland.

Table Number-25: Calculation of SignificantImpact of return using Paired T-test:

Before	49.54	26.64	-0.27	-0.3409
After	-2.385	-38.5	1.646	1.56

X	Y	d=Y-X	di- $\bar{d}$	(di- $\bar{d}$)2
49.54	-2.385	-51.925	-23.612975	557.5726
26.64	-38.5	-65.14	-36.827975	1356.3
-0.27	1.646	1.916	30.228025	913.7335
-0.3409	1.56	1.9009	30.212925	912.8208

Source: Calculated from the data collected through NSE.

$\sum d = -113.248$

$\sum (di-\bar{d})2 = 3740.427$

Null Hypothesis: There is no significant difference of return before and after Covid-19.

Alternative Hypothesis: There is a significant difference of return before and after covid-19.

Level of Significance : $t(\alpha\% , n-1) = t(5\%, 4-1) = 3.182$

Level of Significance is assumed as 5%.

$n = 4$

$\bar{d} = \sum di/n$

$= -113.248/4$

$= -28.312$

$S = \sqrt{\sum(di-\bar{d})2/n}$

$= \sqrt{3740.427/4}$

= √935.107

= 30.579

tcal= $\bar{d}/(s/(\sqrt{n}-1))$

= -28.312/(30.579/(√4-1))

= -28.312/(30.579/1.732)

= -28.312/17.655

tcal = -1.604

LOS: t(α%,n-1) = t(5%, 3) = 3.182

tcal<t(5%, 3)

Hence, the **Null hypothesis is accepted**

There is no significant differencein returns before and after Covid.

Table Number-26: Calculation of Significant Impact of Risk using Paired T-test:

Before	130.72	123.4	5.54	2.272
After	64.784	108.262	8.62	2.947

X	Y	d=Y-X	di- $\bar{d}$	(di- $\bar{d}$)2
130.72	64.784	-65.936	-46.606	2172.119
123.4	108.262	-15.138	4.192	17.57286
5.54	8.62	3.08	22.41	502.2081
2.272	2.947	0.675	20.005	400.2

Source: Calculated from the data collected through NSE.

∑d = -77.319

$\sum(di-\bar{d})2 = 3092.1$

Null Hypothesis: There is no significant difference between risk before and after Covid

Alternative Hypothesis: There is a significant difference between risk before and after Covid

Level of Significance:$t(\alpha\% , n-1) = t(5\%, 4-1) = 3.182$

Level of Significance is assumed as 5%.

$n = 4$

$\bar{d} = \sum di/n$

$= -77.319/4$

$= -19.33$

$S = \sqrt{\sum(di-\bar{d})2/n}$

$= \sqrt{3092.1/4}$

$= 27.803$

$tcal = \bar{d}/(s/(\sqrt{n-1}))$

$= -19.33/(27.803/(\sqrt{4-1}))$

$= -19.33/(27.803/1.732)$

$= -19.33/16.05$

$= -1.204$

$tcal = -1.204$

LOS: $t(\alpha\%,n-1) = t(5\%, 3) = 3.182$

$tcal < t(5\%, 3)$

Hence**, Null hypothesis is accepted**

There is no significant difference in risk before and after Covid.

CHAPTER-V: FINDINGS, SUGGESTIONS, AND CONCLUSIONS

Findings:

Pre-Covid:

1. It is Observed that the Risk is higher for Bajaj Auto 130.72 followed by Maruti Suzuki 123.4.

2. The Return is Higher for Bajaj Auto i.e 49.54 followed by Maruti Suzuki i.e 26.64.

3. There is a higher correlation for Bajaj Auto and Tata Motors i.e 0.649 and lower for Bajaj Auto and Ashok Leyland i.e -0.065.

Post-Covid:

1. It is Observed that the returns are higher for Tata Motors i.e 1.646 and lower for Maruti Suzuki i.e -38.5.

2. There is a higher risk for Maruti Suzuki i.e 108.62 and lower for Ashok Leyland i.e is 2.947.

3. There is a higher Correlation of 0.717 for Tata Motors and Ashok Leyland and a lower of 0.141 for Bajaj Auto and Ashok Leyland.

Pre and Post Covid:

It is Observed that there is no significant difference between Risk and Return before and after Covid-19 using Paired T-Test.

Suggestions:

1. It is suggested to invest in Tata Motors and Ashok Leyland, as it has good returns for the Post - Covid period.

2. As there is a lower risk for Ashok Leyland, for the investors who do not want to bear the risk, it is a better option to invest in Ashok Leyland.

3. For the investors who invested in Bajaj Auto and Maruti Suzuki, it is better to withdraw the funds and invest elsewhere as it has no good returns post the covid period.

4. For Tata Motors and Ashok Leyland investors (pre-covid period) it is better to hold the investments as it is giving positive returns post-covid period.

5. As it is observed that there is no significant change in the Risk and returns of the automobile industry, it is suggested for the existing investors to hold the investment.

Conclusion:

India has a robust stock market that responds to the global situation very quickly. There was almost a 53days gap between the recording of the first case in India and the announcement of lockdown by the Indian Government.On Observing and Analyzing the data of the selected automobile companies for the selected period, it can be stated that pre the covid period, Bajaj Auto and Maruti Suzuki has higher returns, and Tata Motors and Ashok Leyland has negative returns. On holding the investments it is identified that the Bajaj Auto and Maruti Suzuki got negative returns to post the covid and the Tata Motors and Ashok Leyland got positive returns.There is not much significant difference between the risk and return of the selected automobile industries. However, the automobile industry has a considerable impact on the industry because of the Covid-19.

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