

# **Analysis of Underlying assets, equity future instruments of BAJAJFINSV and TATACHEM**

**Group 20**

Under the Supervision of  
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**ECON F354:** Derivatives and Risk Management



**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE,  
PILANI - HYDERABAD CAMPUS**

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### Note:

- All the prices are in Indian Rupee (INR)
- Appropriate references have been cited wherever necessary.

## Abstract

The project's primary goals are to offer suggestions regarding BAJAJFINSV and TATACHEM. This is achieved by looking at the company's spot and future pricing over the course of a year, from November 1 to October 31, 2022. For the company described above, a brief introduction detailing the nature of business, ownership structure, influence on the market, and overall relevance is supplied.

This satisfies the qualitative analysis, and the comparison of returns provides a full quantitative study. On a graph, the returns on equity were calculated and aligned with daily, weekly, and monthly dates. The T-Bill rate for the same frequency was then subtracted from the returns to provide a more accurate representation of risk. The excess returns over the risk-free return are displayed here. To understand the excess return per unit of risk taken, the Sharpe Ratio was calculated.

The Mean Return, Maximum Return, Minimum Return, and Standard Deviation are presented in tabular fashion after this. Then, a similar process was used to comprehend the equity derivatives of such stocks. For the near-month, next-month, and far-month expiry periods, the clearing house provided the futures price on a daily, weekly, and monthly basis. The excess return over the risk-free return is displayed after the returns were realistically risk-adjusted by subtracting the T Bill rate for the same frequency. Frequency per month Far Month In terms of both equity and futures, futures contracts produced the highest return.

Additionally, a comparison between equities returns and futures returns has been made. The whole liquidity situation of futures and equity was then covered. Analysis of the discrepancy between futures price and spot price has also been provided, along with a note on contango and backwardation. As a result, this research aims to identify portfolio risk, identify returns from different financial instruments, and recommend the most effective investing approach.

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## Section-1

### **BAJAJ FINANCE LTD.**



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#### **Note:**

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- Each pricing is in Indian National Rupee (INR).
  - The conventions are as follows: Current month is referred to as Near month, and Middle month is referred to as Next month.
  - Where applicable, references have been cited appropriately.
  - The returns have been expressed as percentages, both unadjusted and adjusted.
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## **1. 1 Introduction to Underlying Equity Asset- BAJAJFINSV**

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### **1.1.1 Nature of Business**

Bajaj Finserv is currently involved in the consumer finance, life insurance, and general insurance businesses. Bajaj Finserv Ltd. intends to grow by entering the entire range of financial services and products market in India. With its headquarters in Pune, Bajaj Finserv Limited provides **non-bank financial services** in India. Lending, asset management, wealth management, and insurance are its main areas of focus.

### **1.1.2 Ownership**

The parent business, Bajaj Holdings and Investments Limited, owns a 39.29% stake in Bajaj Finserv. The former has been registered with the Reserve Bank of India as a Non-Banking Financial Company (NBFC) under Registration No. N-13.01952 dated 29 October 2009.

#### **Shareholding pattern**

<b>Holder's name</b>	<b>Number of Shares</b>	<b>% Share holding</b>
Total number of shares	159137444	100%
Promoters	96757514	60.8%
Foreign institutions	11749834	7.38%
Banks, MutualFunds	7039910	4.42%
Others	11586863	7.28%

General Public	26646928	8816.74%
Financial Institutions	5213983	3.28%
GDR	142412	0.09%

Table 1: Bajaj Finance Limited ownership details

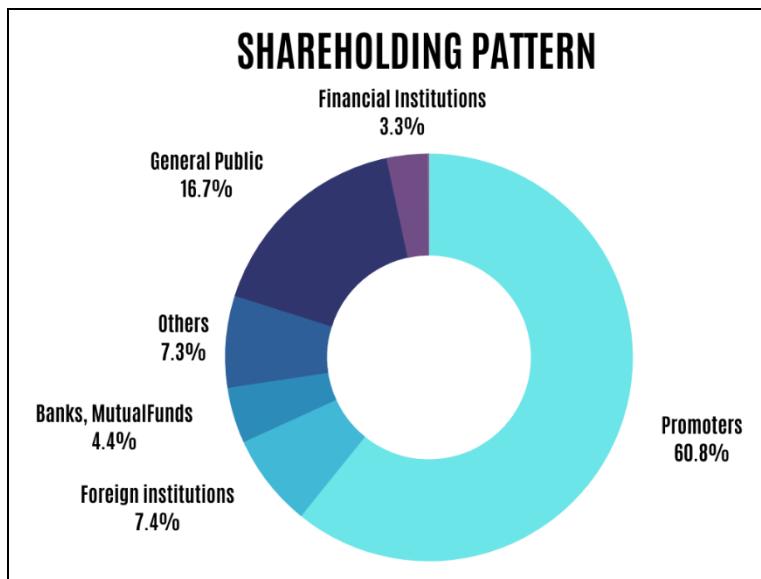


Figure 1: Bajaj Finance Ltd. Shareholding

### 1.1.3 Origin of Company

Following its demerger from Bajaj Auto Limited, Bajaj Finserv was established on April 30th, 2007 as a distinct company with the sole purpose of concentrating on the group's financial services sector. The demerger procedure was finished in February 2008. The shares in the consumer finance, life, and general insurance companies, along with their respective assets, and liabilities, were transferred to Bajaj Finserv Limited in connection with the wind power project. 800 crore rupees (the market value at the time) in cash and cash equivalent were also given to the corporation. The demerger made it possible for investors to hold distinct, specialized equities and to transparently compare the companies to others in their industries. The asset management affiliate of Allianz SE, Allianz Global Investors AG (AllianzGI), and Bajaj Finserv inked a contract on April 20, 2009, to establish an asset management joint venture company in India. In the evenly

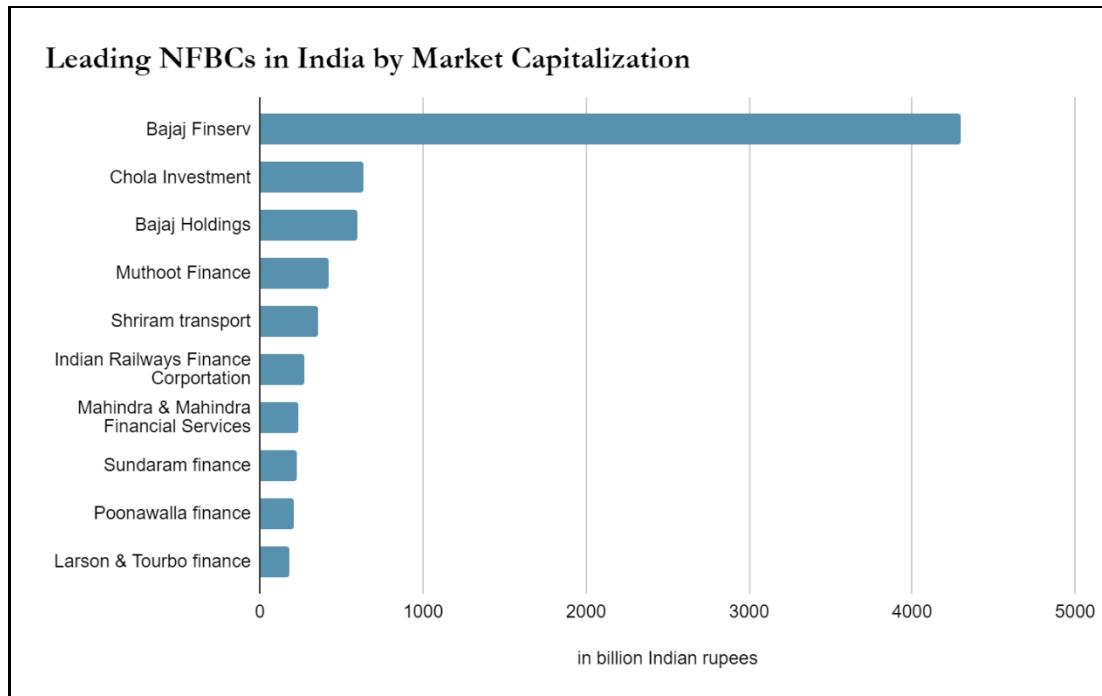
managed planned collaboration, AllianzGI and Bajaj Finserv will each own a 51% and a 49% stake. The Reserve Bank of India gave the company a Certificate of Registration dated 30 October 2009 under section 45-IA of the RBI Act 1934 to conduct the business of a Non-Banking Financial Institution (NBFC), according to an announcement made by Bajaj Finserv on November 10th, 2009.

## **Board Members**

- Sanjiv Bajaj – Chairman and Managing Director
- Rajiv Bajaj - Director
- Madhur Bajaj - Director
- Doveton Jagannathrao Balaji Rao – Independent Director
- Pramit Jhaveri – Independent Director
- Dr Naushad Forbes – Independent Director
- Manish Kejriwal - Director
- Radhika Vijay Haribhakti – Independent Director
- Anami Roy – Independent Director

### **1.1.4 Industry Significance**

Bajaj Finserv Ltd belongs to the non-banking finance sector and has made itself the biggest player in the industry. As of August, 2022, Bajaj Finserv had a market capitalization of 4300.48 billion Indian rupees. The business operates in consumer financing, life insurance, and general insurance, and it has about 20,154 professionals spread throughout 1,409 sites. In addition to offering financial services, it also engages in the production of wind energy, with a 65.2 MW installed capacity. The company's board of directors approved the partition of its equity shares in a ratio of 1:5 in the quarterly results for June 2022.



*Figure 2: Bajaj Finance Ltd. Market Capitalization*

### **1.1.5 Overall Greatness**

For the second year in a row in 2018, Bajaj Finserv soared onto Forbes Asia's Fab 50 list of the region's largest public firms. It had a 17% increase in sales to \$3.7 billion and a 19% increase in net profits to \$337 million for the fiscal year that ended on March 31. In that year, the stock price increased by double. Four of the eight Indian businesses that made the fab 50 list that year were in the finance industry. The three banks—HDFC Bank, IndusInd Bank, and Yes Bank—as well as the one non-banking financial institution, Bajaj Finserv, benefited from the fate of public sector banks that were cash-strapped and had a significant exposure to bad loans. The business did achieve some significant milestones in 2020, even during Covid-19. As of the 31st of March 2020, AUM increased by 27% YoY to Rs. 1,47,153 Crore. The number of customers surpassed 40 million, and the company's geographic reach increased to 2392 places in both urban and rural areas of India. Additionally, Bajaj Finserv unveiled its health technology products, including the Bajaj Finserv Health App during the Covid year. People's Bank of China invested shares in Bajaj Finance in September 2020 for a less-than-1% ownership stake. The first-ever digital health EMI network card was introduced by Bajaj Finserv at this time.

# Tata Chemicals Limited



## Note:

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## **1.2 Introduction to Underlying Equity Asset-TATACHEM**

### **1.2.1 Nature of Business**

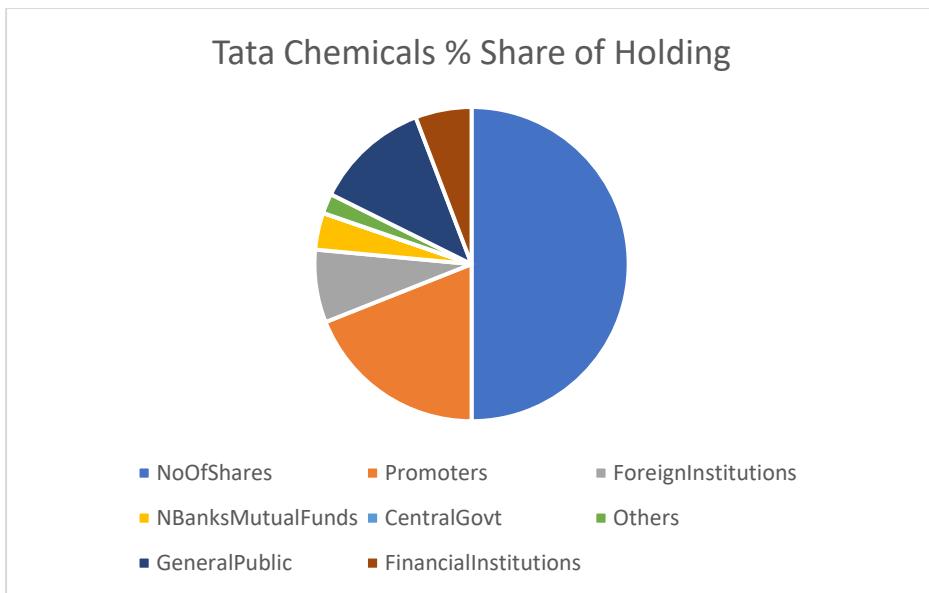
Tata Chemicals Limited manufactures chemical products. The Company offers basic and industrial chemicals, fertilizers, and other consumer products. Tata Chemicals serves glass, detergents, pharma, biscuit manufacturing, bakeries, and other industries worldwide.

### **1.2.2 Ownership**

The Shareholding Pattern page of Tata Chemicals Ltd. presents the Promoter's holding, FII's holding, DII's Holding, and Shareholding by general public etc.

Holder's Name	No of Shares	% Share Holding
NoOfShares	254756278	100%
Promoters	96748953	37.98%
ForeignInstitutions	38175710	14.99%
NBanksMutualFunds	19316651	7.58%
CentralGovt	71948	0.03%
Others	10422582	4.09%
GeneralPublic	60553926	23.77%
FinancialInstitutions	29466508	11.57%

*Table 2: Tata Chemicals Limited ownership details*



*Figure 3: Tata Chemicals Ltd. shareholding*

### **1.2.3 Origin of the Company**

The history of Tata Chemicals can be traced to the Okhamandal Salt Works set up in 1927. It became a part of the Tata Group in 1939 when then Chairman JRD Tata took it over.

Tata Chemicals has successfully evolved over the years, starting from industrial salt and soda ash to a range of science-based products.

The Basic Chemistry product range includes soda ash, sodium bicarbonate and other key ingredients to some of the world's largest manufacturers of glass, detergents, and other industrial products. Tata Chemicals currently is the world's third largest producer of soda ash with manufacturing facilities in India, United Kingdom, Kenya and the United States.

### **Board Members**

- Mr. N. Chandrasekaran – Chairman (Non-Executive)
- Ms. Vibha Paul Rishi – Independent Director
- Mr. S. Padmanabhan – Non-Independent Director
- Ms. Padmini Khare kaicker – Independent Director

- Dr. C.V Natraj – Independent Director
- Mr. K.B.S Anand – Independent Director
- Mr. Rajiv Dube – Independent Director
- Mr. R. Mukandan – Managing Director and CEO
- Mr. Zarir Langrana – Executive Director

## 1.2.4 Industrial Significance

Tata Chemicals Limited manufactures, sells, and distributes basic chemistry and specialty products in India, Europe, Africa, the United States, rest of Asia, and internationally. It offers dense and light soda ash; crushed refined soda; Portland and masonry cement under the Tata Shudh brand name; salt; pharmaceutical grade, food grade, and animal feed grade sodium bicarbonate, as well as technical and refined grade sodium bicarbonate; and allied chemicals, such as caustic soda, bromine-based products, and gypsum, as well as marine chemicals and nutrition solutions.

<b>Competition</b>		<b>Standalone</b>	<b>Consolidated</b>			
Name	Last Price	Market Cap. (Rs. cr.)	Sales Turnover	Net Profit	Total Assets	
Coromandel Int	929.60	27,331.15	19,088.26	1,412.45	6,298.05	
<b>Tata Chemicals</b>	<b>1,033.30</b>	<b>26,323.97</b>	<b>3,720.93</b>	<b>801.56</b>	<b>15,342.32</b>	
Chambal Fert	310.50	12,923.25	16,068.83	1,287.12	10,433.66	
Fert and Chem	169.95	10,996.99	4,424.80	353.28	1,994.60	
Deepak Fert	808.00	10,200.02	2,289.44	197.78	3,281.33	
GNFC	593.40	9,222.55	8,642.29	1,703.75	7,898.91	
Rashtriya Chem	136.05	7,505.72	12,812.17	683.13	6,817.99	
GSFC	136.70	5,447.19	8,995.63	890.90	11,671.53	
Paradeep Phosp	58.50	4,764.81	7,858.72	397.84	5,180.06	
Monsanto India	2,232.65	3,854.17	669.58	151.66	706.90	
NFL	61.45	3,014.60	15,857.09	108.20	5,451.10	
SPIC	68.70	1,399.01	1,874.92	140.43	916.17	
Krishana Phosch	408.05	1,209.41	319.36	29.46	289.82	
Madras Fert	63.75	1,027.02	2,302.16	162.05	1,229.51	
Mangalore Chem	84.85	1,005.60	2,895.58	87.86	2,024.69	
Zuari Agro Chem	168.90	710.36	83.01	-83.45	1,077.55	
Nagarjuna Fert	9.00	538.26	2,692.33	-669.91	1,389.26	
Zuari Ind.	145.80	434.21	610.42	15.30	4,400.84	
Bohra Industrie	142.30	203.45	--	-2.62	80.80	
Aries Agro	152.55	198.38	439.47	19.02	312.59	
Sikko Industrie	115.55	194.12	51.03	1.88	22.81	
Agro Phos India	39.90	80.89	116.06	5.84	59.72	
Deepak Fert-RE	13.55	0.00	--	--	-	

Table 3: Tata Chemicals Market Capitalization

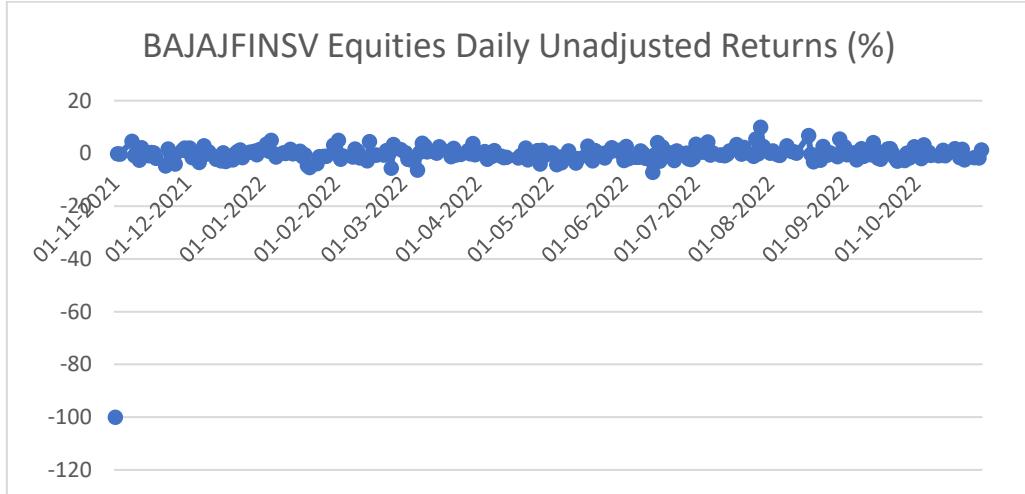
## **1.2.5 Overall Greatness of TATACHEM**

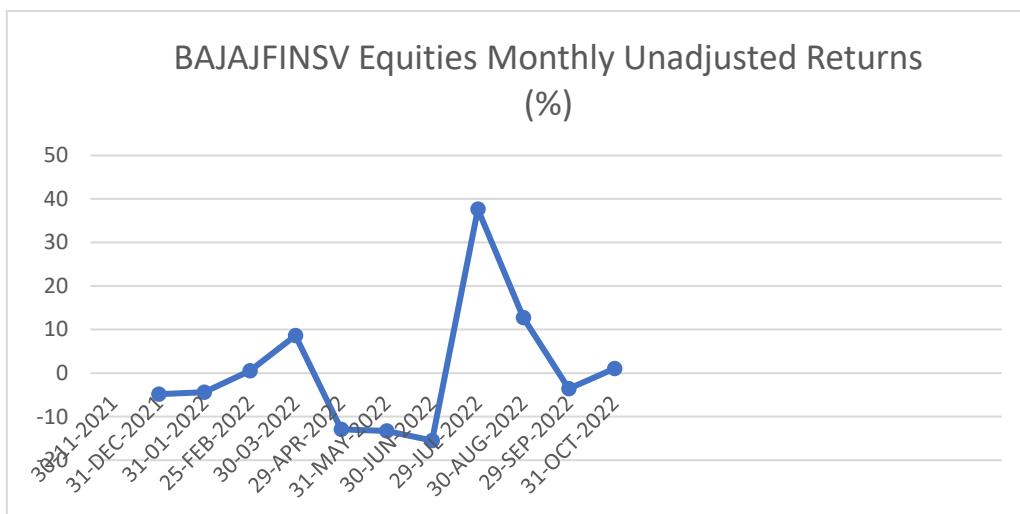
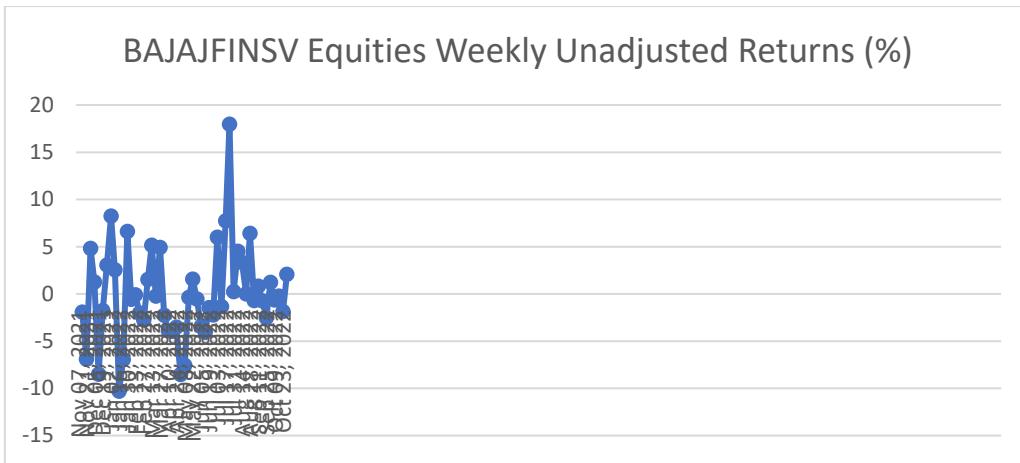
The consumer products division of Tata Chemical successfully merged with Tata Consumer Products Limited. completed the \$195 million purchase of the remaining 25% ownership in TCSAP from The Andover Group, Inc., a division of Owens-Illinois Inc. launched Tata Shudh Ordinary Portland Cement (Tasty Shudh OPC) and Portland Pozzolana Cement (PPC) in their new guises (OPC). Tata Chemicals Europe will invest £16.7 million to construct the nation's first carbon capture and utilisation facility on an industrial scale. For the purpose of using the Responsible Care logo for a period of three years, Tata Chemicals receives Responsible Care Certification from the Indian Chemical Council (ICC). Li-ion battery recycling operations were started, and the extracted metal salts were 99% pure.

### **1.3 Uadjusted Risk Returns for Underlying Equity Asset-BAJAJFINSV**

Returns (%)	Daily	Weekly	Monthly
Mean	-0.41553	-0.038	0.558073
Max	10.0323	17.9811	37.6504
min	-100	-10.294	-15.4805
Std.	6.814769	4.954147	15.13109
Sharpe Ratio	-0.06769	-0.00935	0.033718

Table: Unadjusted Returns on Underlying Asset Equity (%)

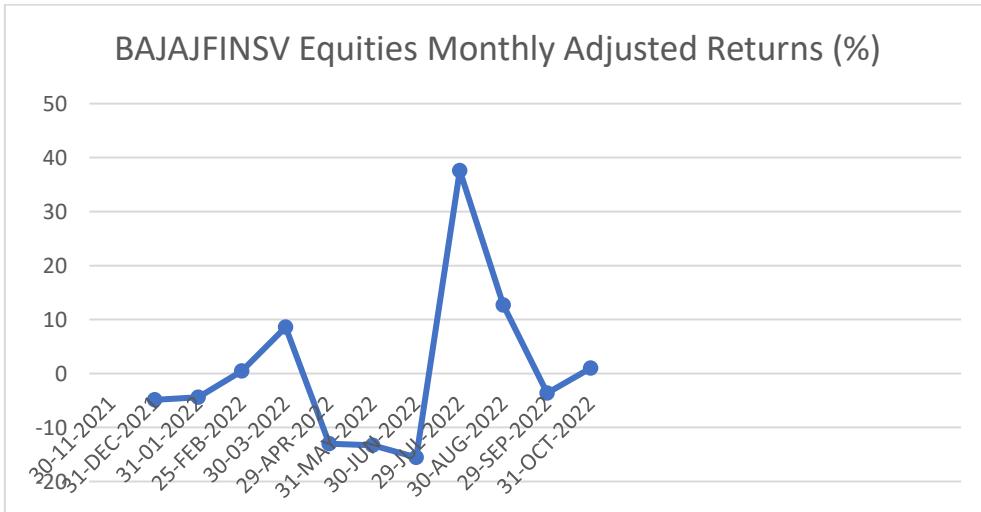
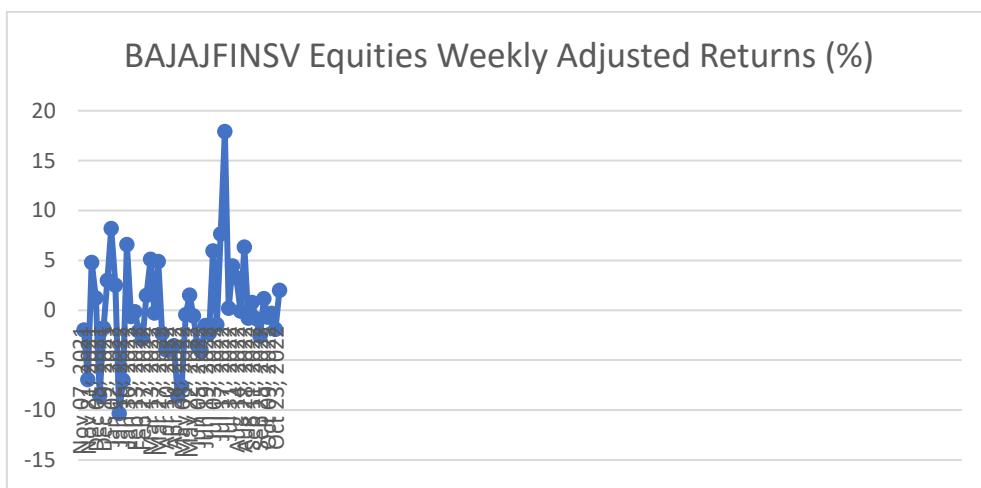
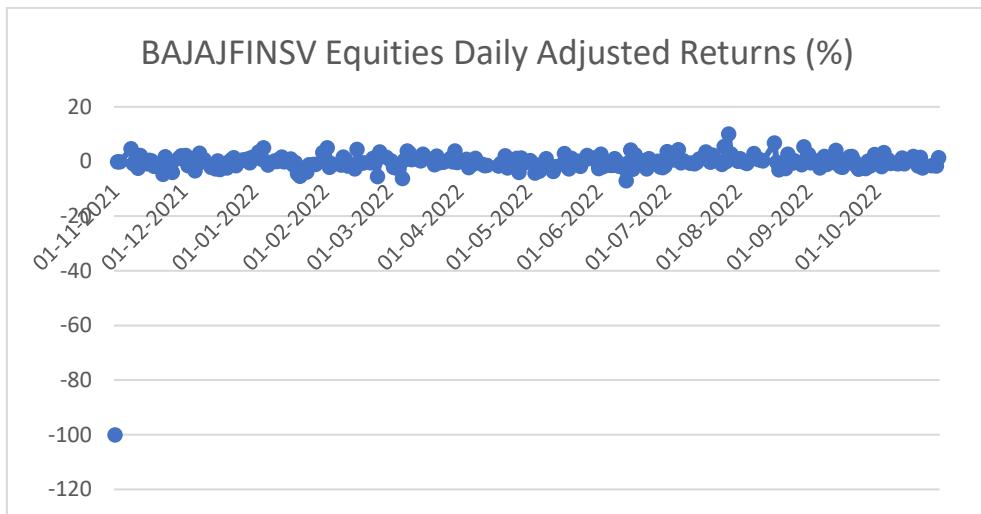




## 1.4 Adjusted Risk Returns for Underlying Equity Asset-BAJAJFINSV

X	Daily	Weekly	Monthly
Mean	-0.46137	-0.08484	0.510109
Max	9.9763	17.9251	37.5944
min	-100.064	-10.3313	-15.5319
Std.	6.815692	4.952403	15.12833
Sharpe Ratio	-0.06769	-0.00935	0.033718

Table: Adjusted Returns on Underlying Asset Equity (%)



## 1.5 Economic Interpretation

We adjust the returns to account for the risk involved in the investment, by using the **Sharpe ratio**:

$$\text{Sharpe ratio} = \frac{E(R_x - R_f)}{\sigma(R_x - R_f)}$$

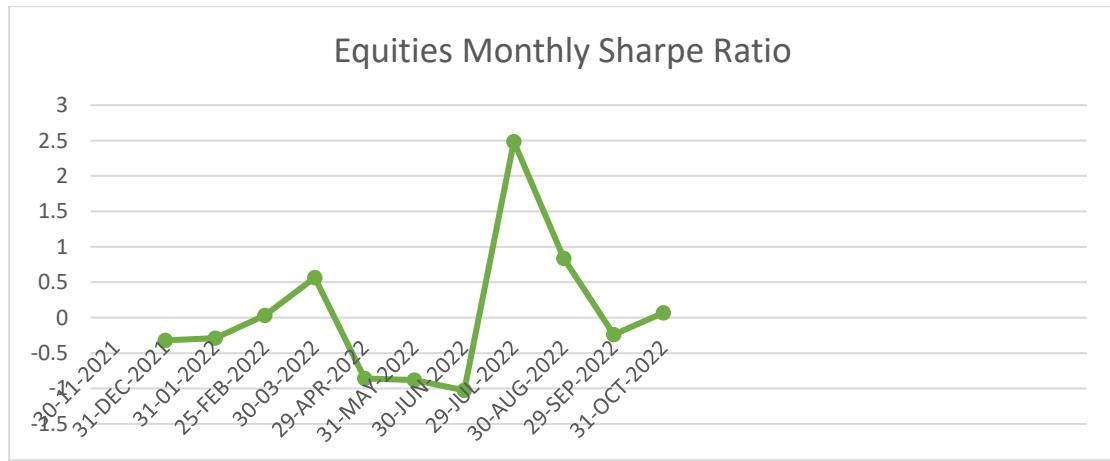
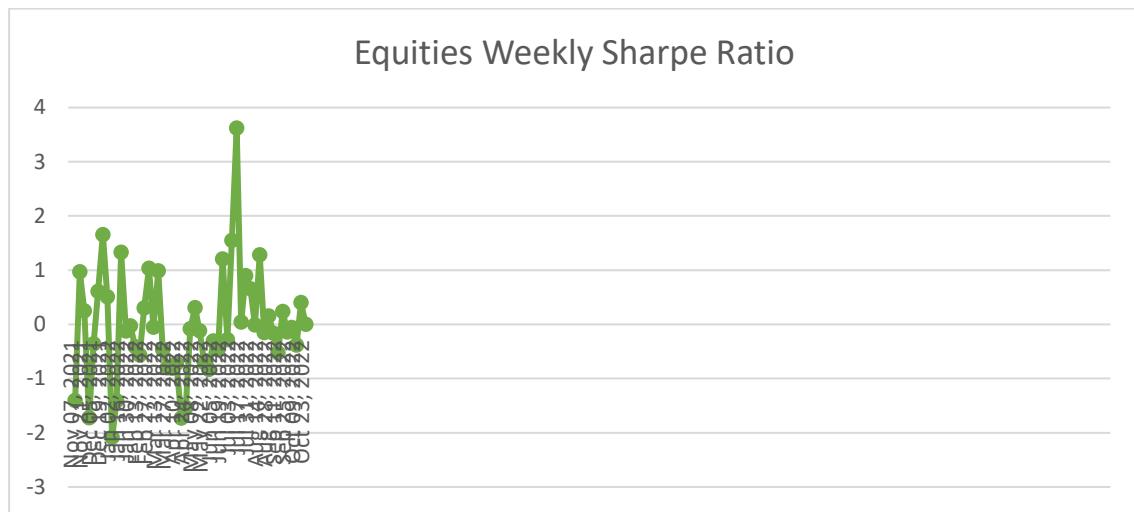
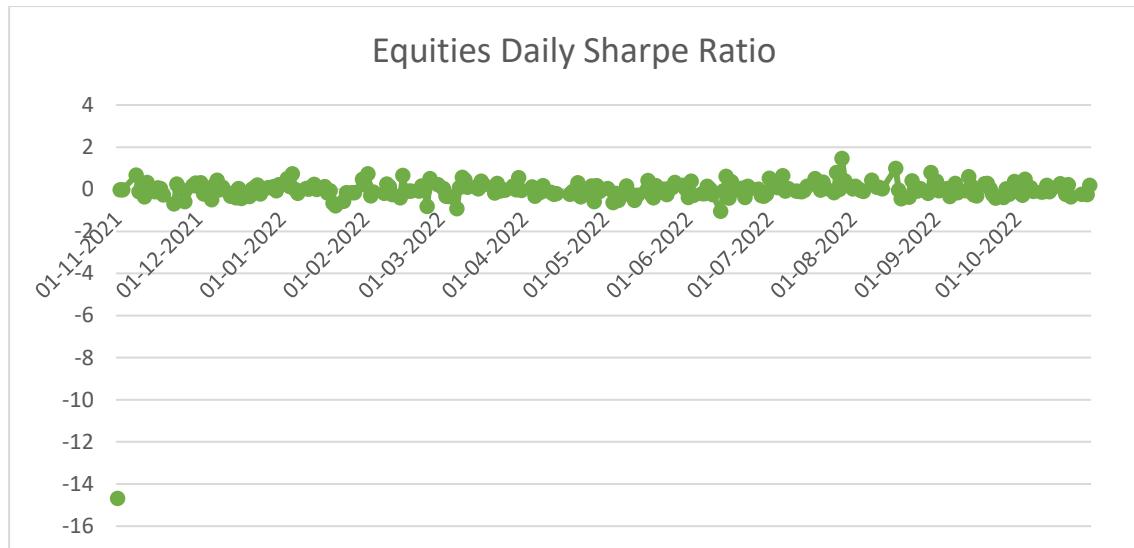
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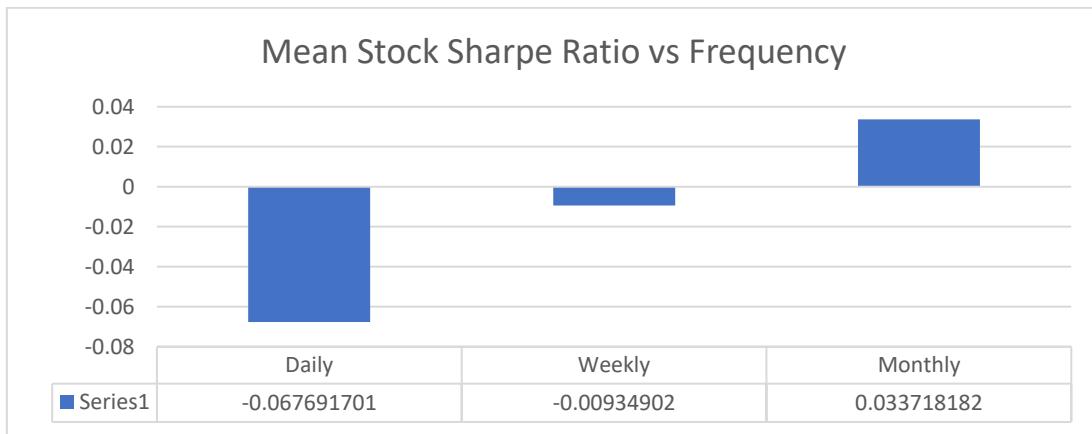
- $R_x$  denotes the risk-unadjusted returns
- $R_f$  denotes the T-bill rates
- $E$  is the expected value/mean function
- $\sigma$  is the standard deviation function

If the Sharpe ratio is negative, then it's more beneficial for the investor to invest in the risk-free assets, compared to the company's assets. The Sharpe ratio should be positive to make some profits.

X	Daily	Weekly	Monthly
Mean	-0.06769	-0.00935	0.033718
Max	1.4637	3.6195	2.485
min	-14.6815	-2.0861	-1.0267
Std.		1	0.998529
			1

Table: Sharpe Ratio for Equity





## Observations

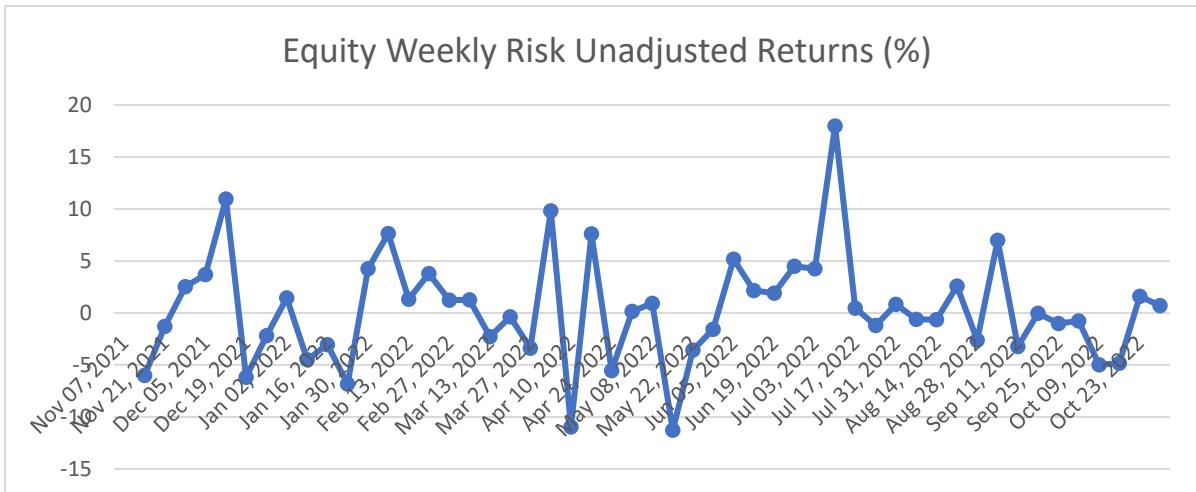
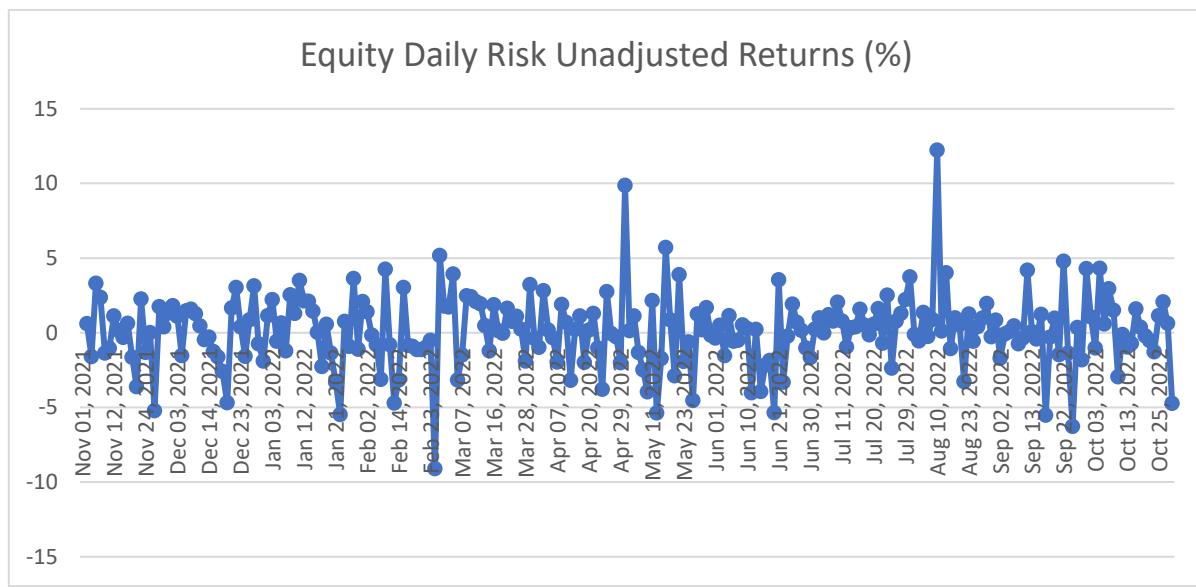
1. The only difference between the graphs for the risk-adjusted and risk-unadjusted returns is the low T-Bill rates.
2. Daily trading is where the risk-adjusted returns are lowest, and even negative, followed by the daily, weekly, and monthly returns.
3. Since the share price's standard deviation is higher than the average returns on equity shares over the course of the three-time horizons, the share price is quite erratic or volatile.
4. Order of Volatility: **Monthly > Daily > Weekly**
5. The Sharpe ratio is negative for daily and weekly returns but positive for monthly returns.

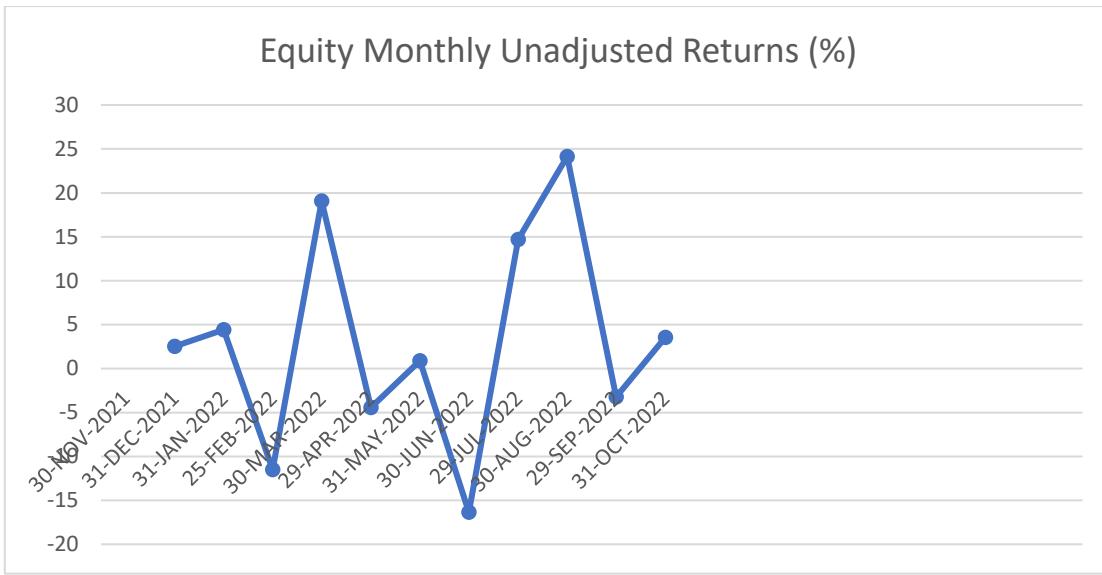
## Actions

1. The Investors should not invest in BAJAJFINSV stocks on a daily and weekly basis since it is discouraged to do so because these stocks have a negative Sharpe ratio.
2. Due to their favourable Sharpe ratios, BAJAJFINSV equities should be invested in cautiously on a monthly basis.

## 1.6 Unadjusted Risk Returns for Underlying Equity Asset-TATACHEM

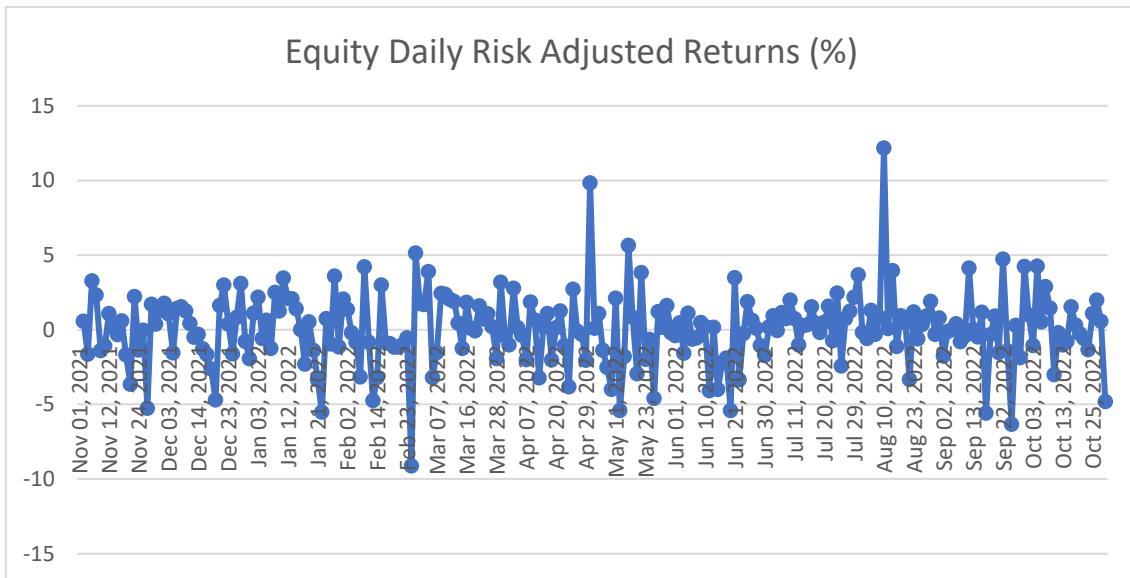
Returns(%)	Daily	Weekly	Monthly
Mean	0.121612	0.32952	3.067655
Max	12.2414	17.9652	24.14
min	-9.0846	-11.2564	-16.3574
Std.	2.408688	4.952403	12.35978
Sharpe Ratio	0.031463	0.053827	0.244336

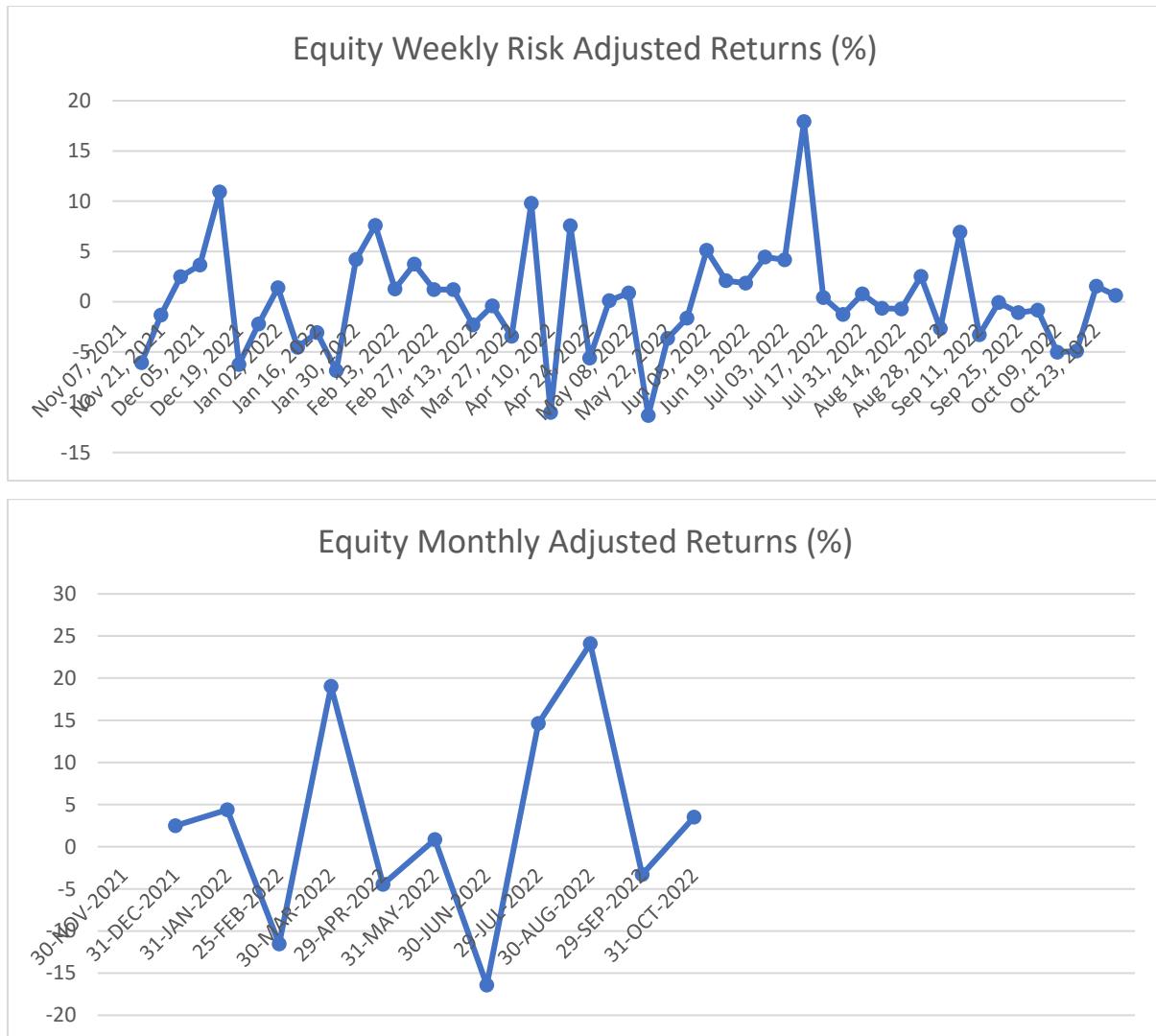




## 1.7 Adjusted Risk Returns for Underlying Equity Asset-TATACHEM

Returns(%)	Daily	Weekly	Monthly
Mean	0.075776	0.282682	3.019691
Max	12.1861	17.9129	24.0841
min	-9.122	-11.3056	-16.4088
Std.	2.408505	5.25089	12.35842
Sharpe Ratio	0.031463	0.053827	0.244336





## 1.8 Economic Interpretation

We adjust the returns to account for the risk involved in the investment, by using the **Sharpe ratio**:

$$\text{Sharpe ratio} = \frac{E(R_x - R_f)}{\sigma(R_x - R_f)}$$

Here,

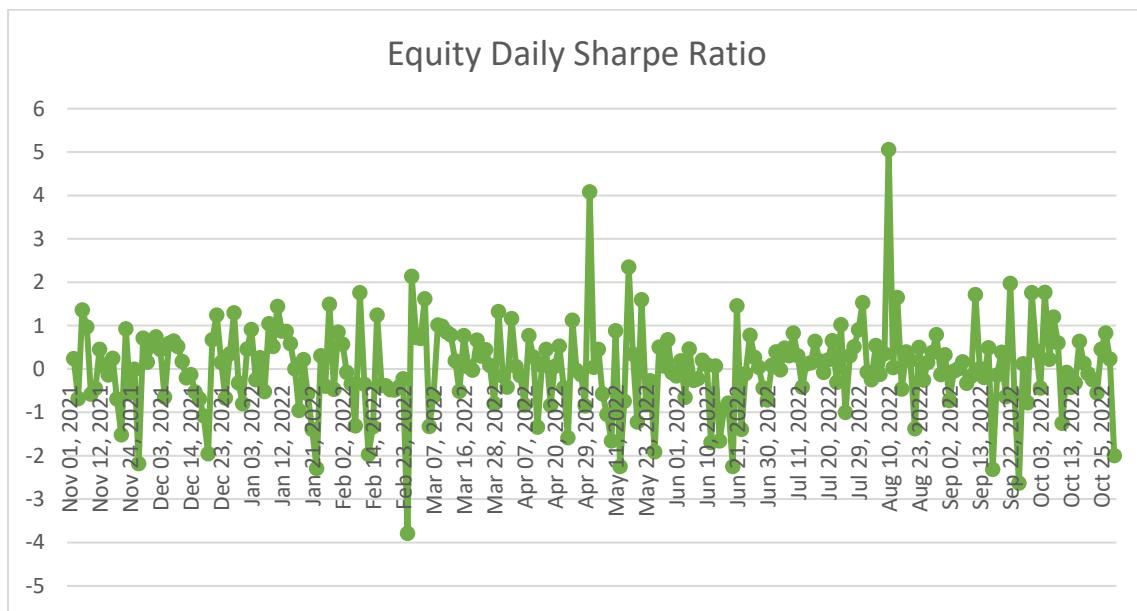
- $R_x$  denotes the risk-unadjusted returns
- $R_f$  denotes the T-bill rates

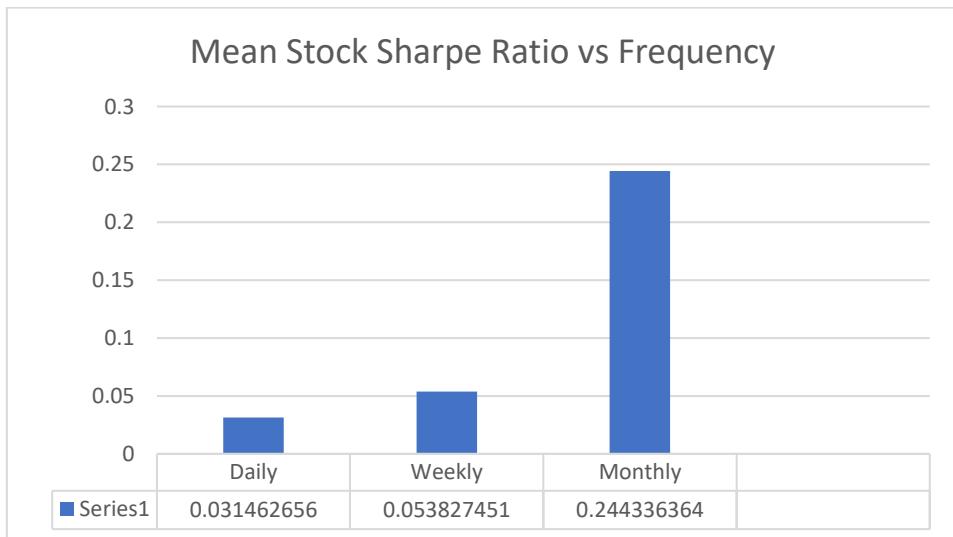
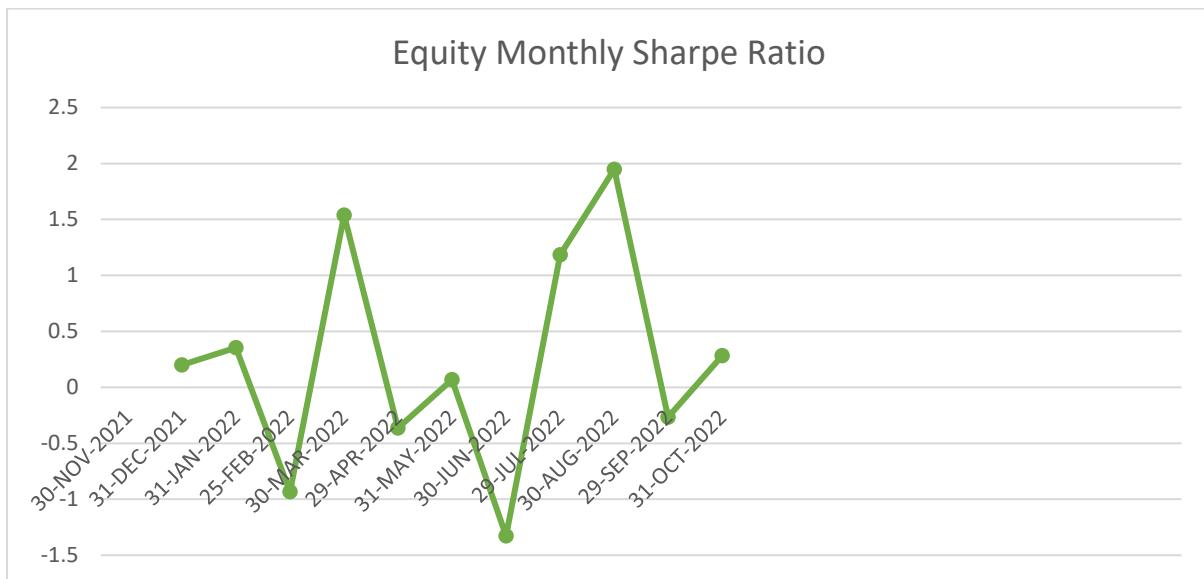
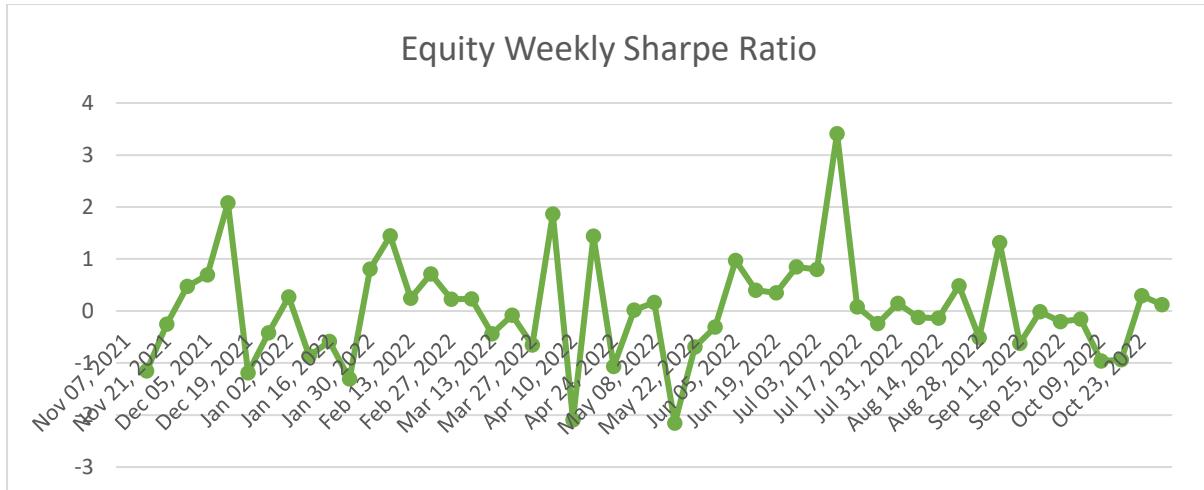
- $E$  is the expected value/mean function
- $\sigma$  is the standard deviation function

If the Sharpe ratio is negative, then it's more beneficial for the investor to invest in the risk-free assets, compared to the company's assets. The Sharpe ratio should be positive to make some profits.

Sharpe Ratio	Daily	Weekly	Monthly
Mean	0.031463	0.05383	0.24434
Max	5.0596	3.4114	1.9488
min	-3.7874	-2.1531	-1.3277
Std.	1	1	1

Table: Sharpe Ratio for Equity





## Observations

- 1.** Adjusted risk returns trend: **Monthly > Weekly > Daily.**
- 2.** The only difference between the graphs for the risk-adjusted and risk-unadjusted returns is the low T-Bill rates.
- 3.** Since the share price's standard deviation is higher than the average returns on equity shares over the course of the three-time horizons, the share price is quite erratic or volatile for both adjusted and unadjusted returns.
- 4.** Order of Volatility: **Monthly > Weekly > Daily.**
- 5.** The Sharpe ratio is highest for monthly returns followed by weekly and daily returns.

## Actions

- 1.** The investors can invest in TATACHEM at any frequency depending upon their goals. If someone is interested in Long-term investment then he/she can invest on monthly basis since it has the greatest rate of return, otherwise for more liquid option, one can opt for Daily and weekly equities too.
- 2.** Due to their favourable Sharpe ratios, TATACHEM equities should be invested in cautiously following the trend: **daily > weekly > monthly.** The monthly Sharpe ratio has the greatest value followed by small difference between weekly and daily Sharpe ratios

## SECTION-2

### **2.1 Futures Analysis**

#### **2.1.1 Introduction**

The National Stock Exchange of India Limited (NSE) introduced index futures on June 12th, 2000, which marked the beginning of the trade in derivatives. The Nifty 50 Index, a well-known benchmark, is the foundation for the futures contracts. On November 9 and June 4, 2001, respectively, trading in index futures and options (both based on the Nifty 50) on specific stocks began. More than 100 assets in three important indexes are accessible for futures and options contracts on individual securities, according to the Securities and Exchange Board of India (SEBI).

#### **Futures Contract Details:**

<b>Ticker Symbol- NSE</b>	BAJAJFINSV
<b>Instrument Type</b>	FUTSTK
<b>Underlying</b>	Bajaj Finserv
<b>Trading Cycle</b>	Near, Next and Far Month
<b>Lot Size</b>	500
<b>Expiry Date</b>	Last Thursday of Month or previous day if last Thursday is holiday.
<b>Daily Settlement Price</b>	Weighted average of prices in last half hours
<b>Final Settlement Price</b>	Closing price of underlying equity on the last trading day of contract

<b>Ticker Symbol- NSE</b>	TATACHEM
<b>Instrument Type</b>	FUTSTK
<b>Underlying</b>	Tata Chemicals
<b>Trading Cycle</b>	Near, Next and Far Month
<b>Lot Size</b>	500
<b>Expiry Date</b>	Last Thursday of Month or previous day if last Thursday is holiday.
<b>Daily Settlement Price</b>	Weighted average of prices in last half hours
<b>Final Settlement Price</b>	Closing price of underlying equity on the last trading day of contract

### 2.1.2 Overall Greatness of Equity Futures Contract

Investors use the equity futures instrument as a crucial tool to speculate on stock prices, realise profits, and lower portfolio risk through portfolio hedging.

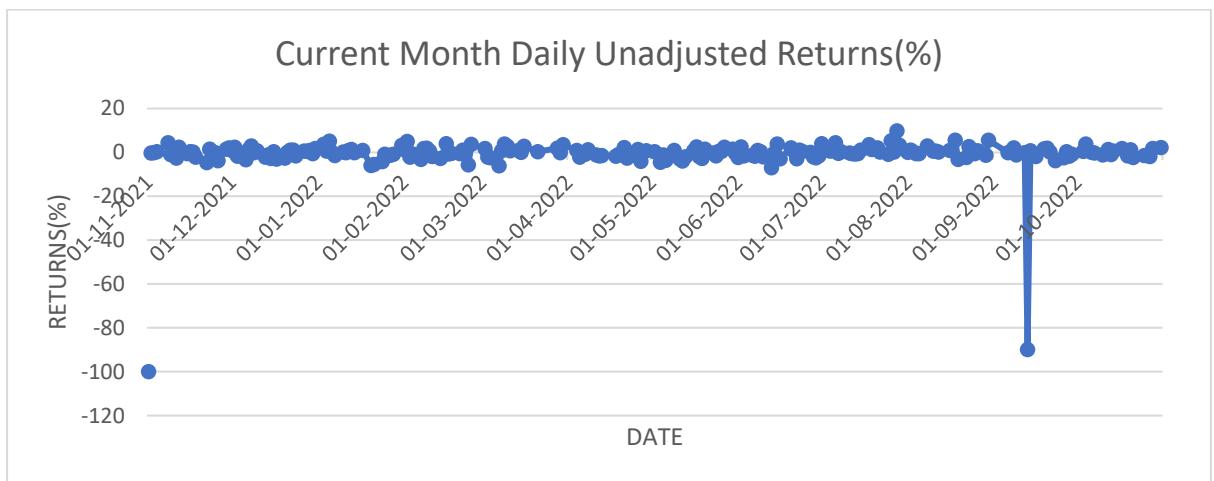
They play a big part in any investor's portfolio who wants to maximise profits or lower portfolio risk because they have more liquidity than equities stocks on the spot market. Moreover, investors can take advantage of arbitrage opportunities.

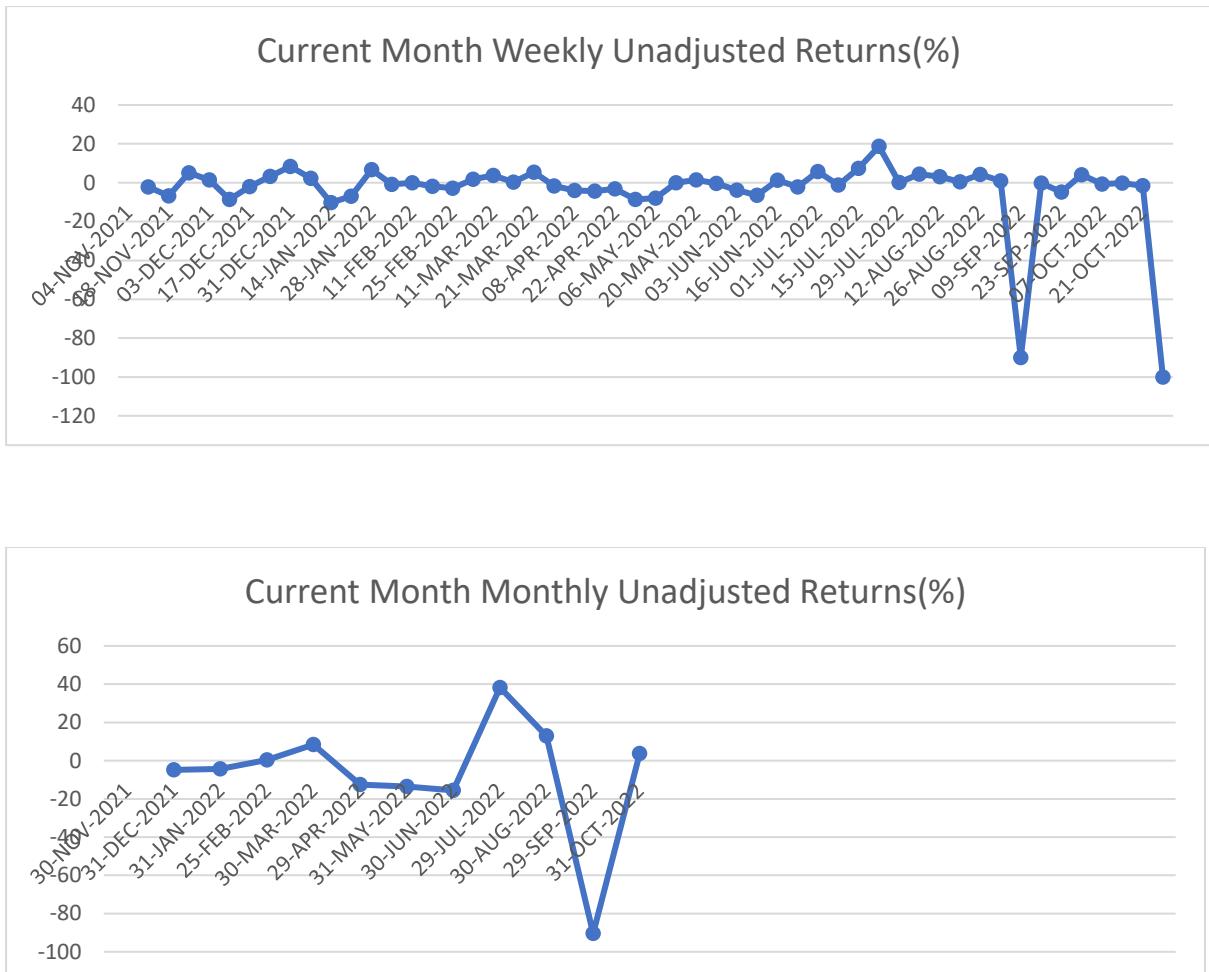
## 2.2 Unadjusted Risk Returns for Equity Futures Instrument-BAJAFINSV

### 2.2.1 Current/Near Month Futures:

X	Daily	Weekly	Monthly
Mean	-0.83934	-1.49188	-7.05852
Max	9.8665	8.3461	38.2655
min	-100	-10.1903	-90.416
Std.	9.207996	6.081643	31.56737

Table: Unadjusted Returns (%) For Current Month Futures

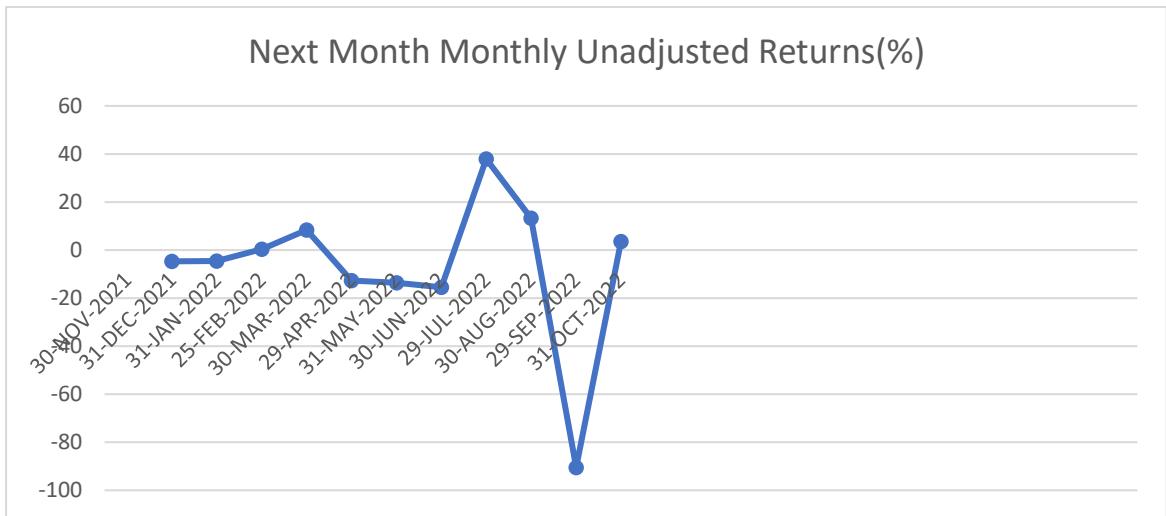
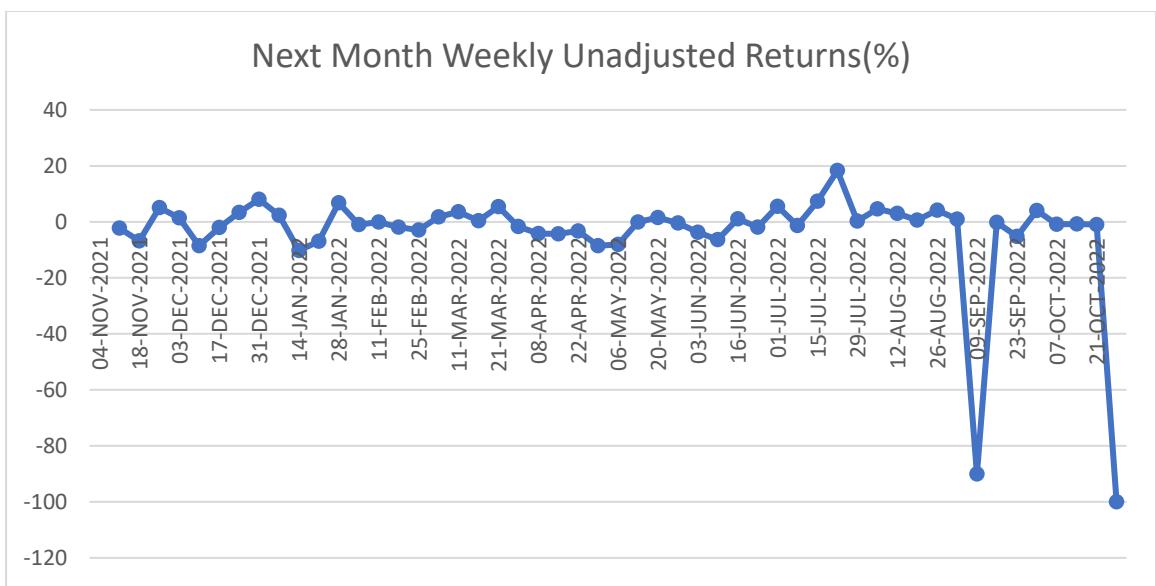
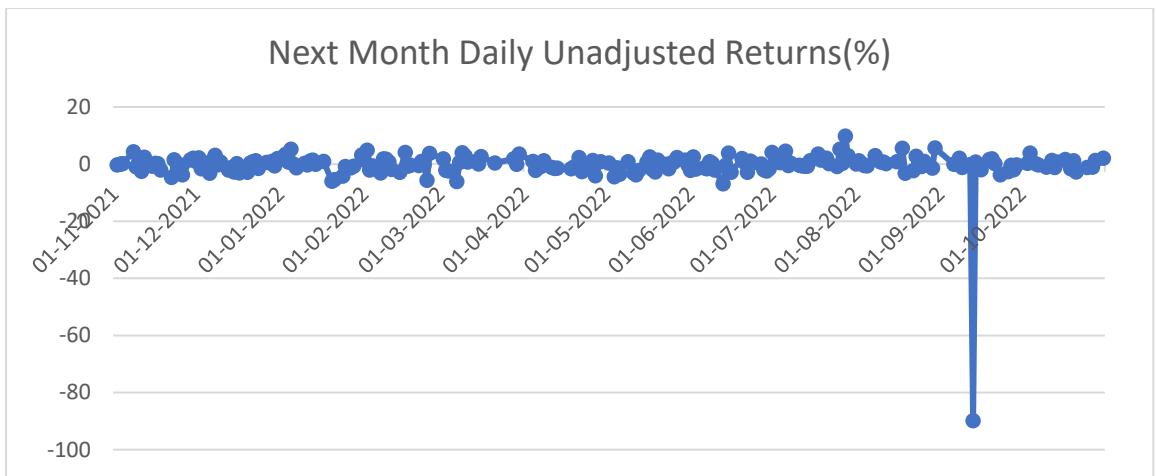




### 2.2.2 Next Month Futures:

X	Daily	Weekly	Monthly
Mean	-0.40103	-1.49939	-7.0663
Max	9.7819	8.1063	37.9229
min	-89.8212	-10.2455	-90.4514
Std.	6.40735	6.073792	31.55619

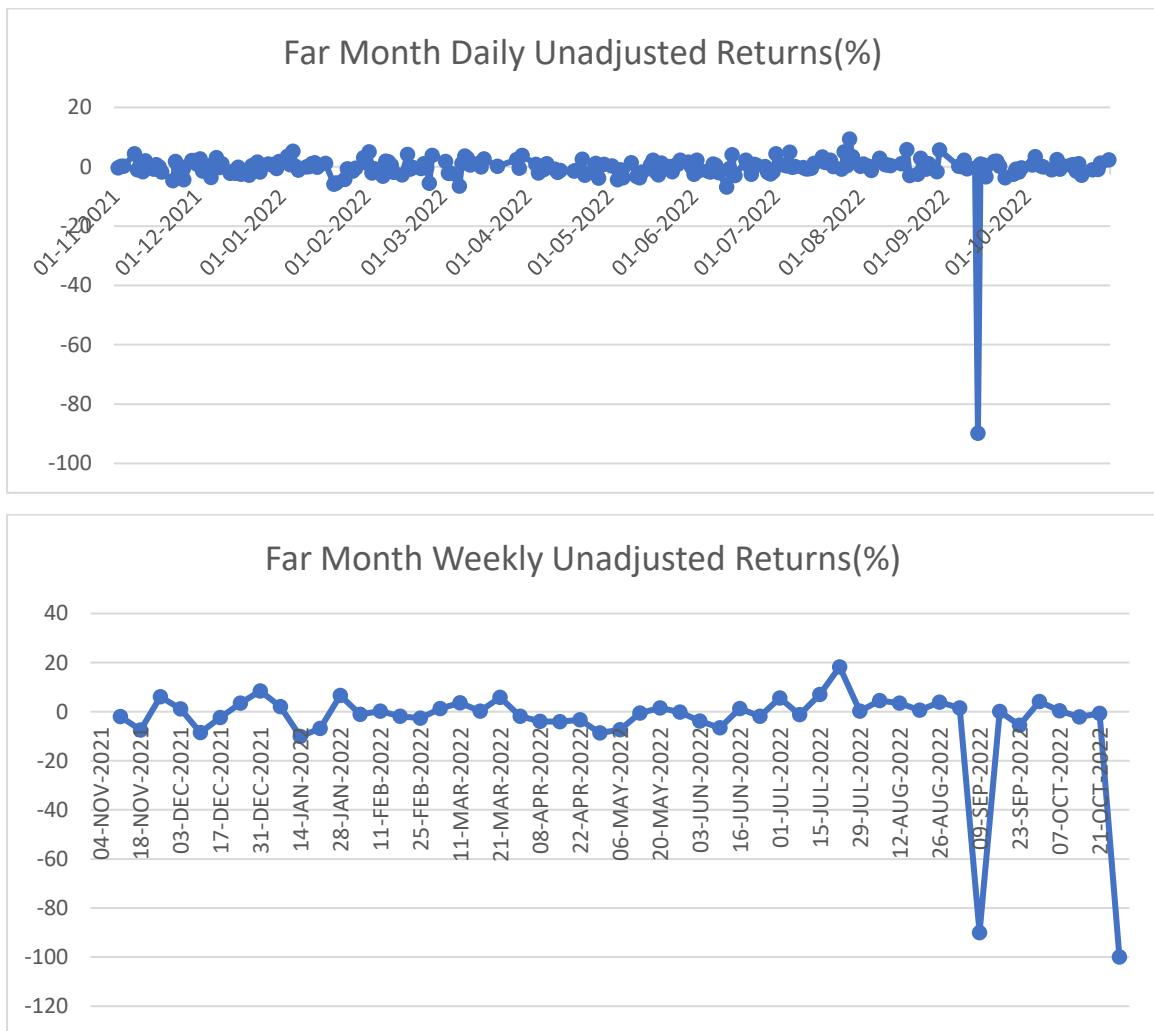
Table: Unadjusted Returns (%) For Next Month Futures

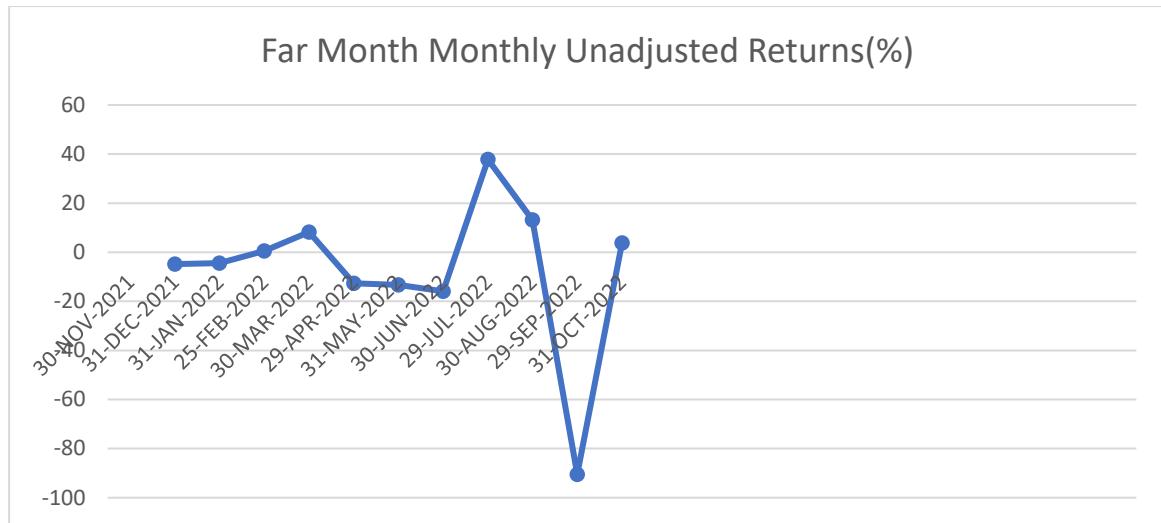


### 2.2.3 Far Month Futures:

X	Daily	Weekly	Monthly
Mean	-0.40104	-1.4527	-7.06969
Max	9.3433	8.43	37.7989
min	-89.8166	-10.0327	-90.4527
Std.	6.411439	6.231518	31.53996

Table: Unadjusted Returns (%) For Far Month Futures





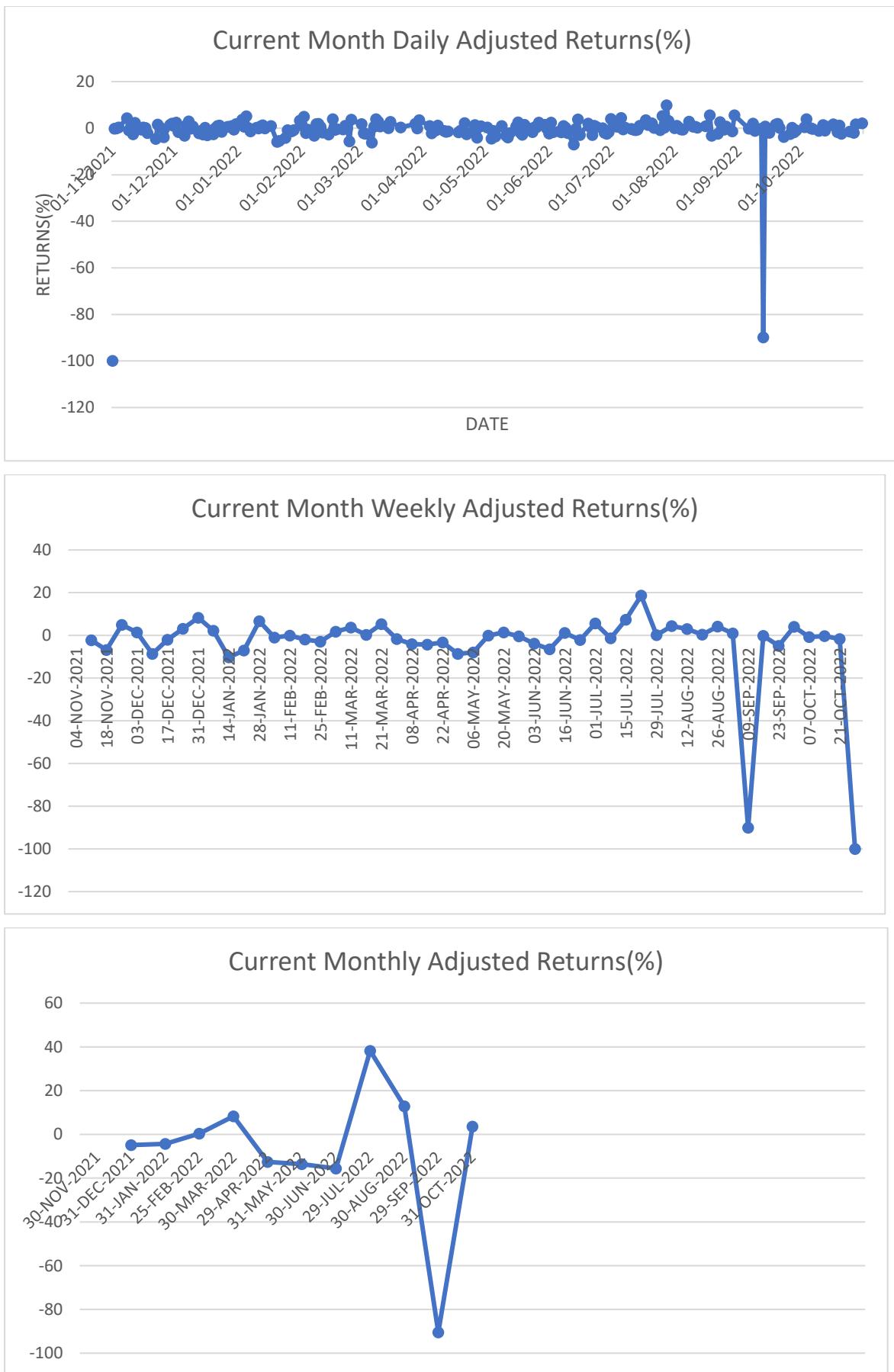
## 2.3 Adjusted Risk Returns for Equity Futures

Instrument- **BAJAJFINSV**

### 2.3.1 Current/Near Month Futures:

X	Daily	Weekly	Monthly
Mean	-0.88498	-1.52792	-7.10648
Max	9.8105	8.3101	38.2095
min	-100	-10.2276	-90.4769
Std.	9.20609	6.081947	31.56945

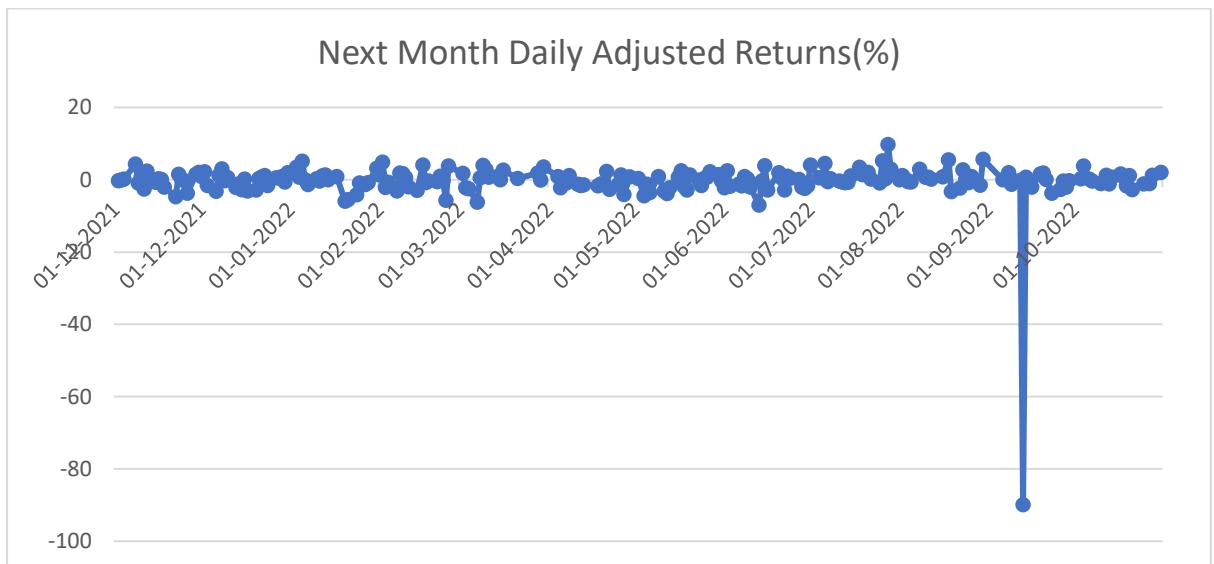
Table: Adjusted Returns for Current Month Futures

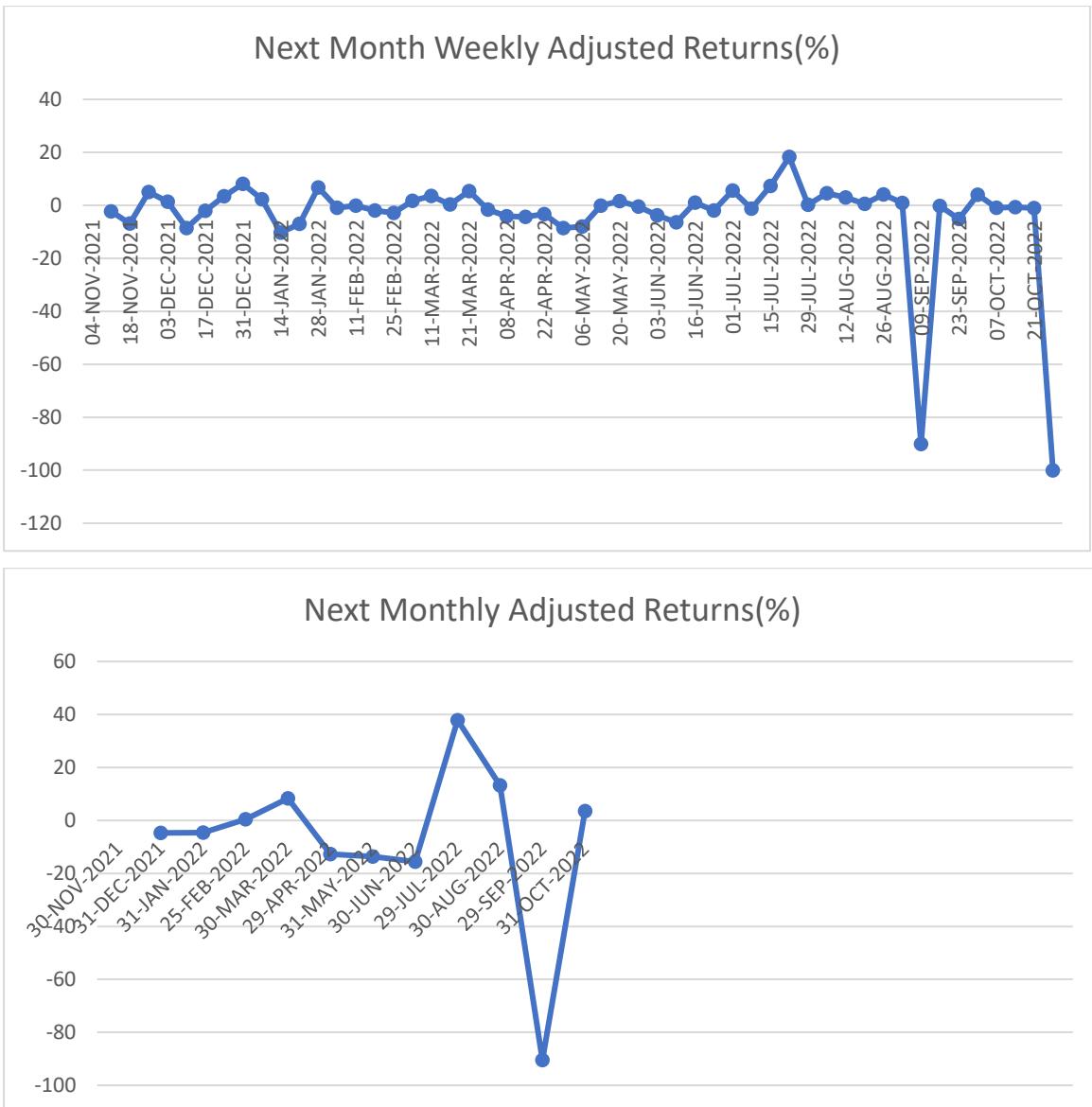


### 2.3.2 Next Month Futures:

Returns (%)	Daily	Weekly	Monthly
Mean	-0.44688	-1.53543	-7.11426
Max	9.7259	8.0703	37.8669
min	-89.8778	-10.2828	-90.5123
Std.	6.40777	6.074094	31.55827

Table: Adjusted Returns for Next Month Futures

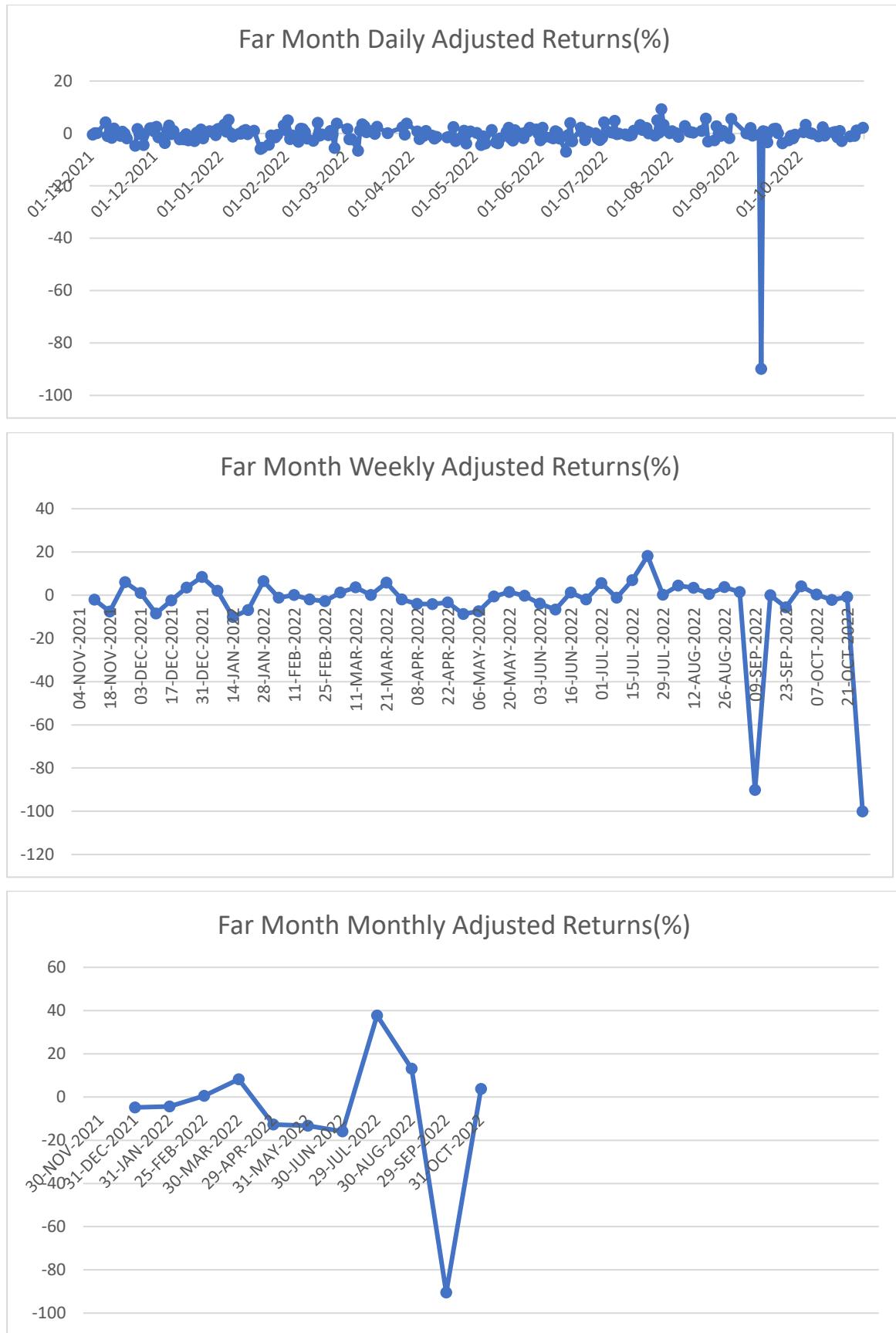




### 2.3.3 Far Month Futures:

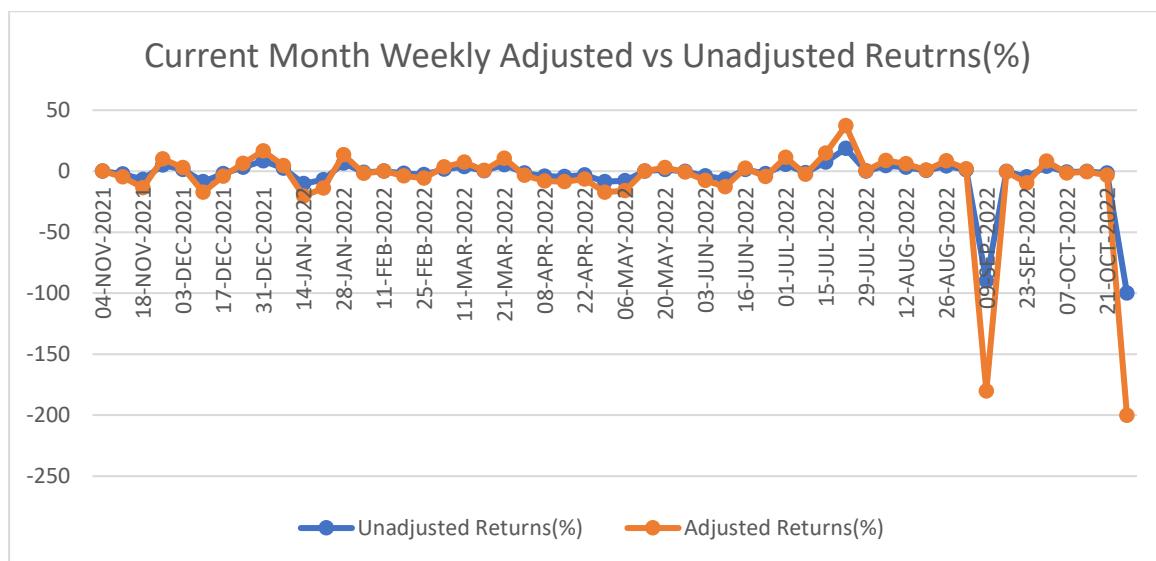
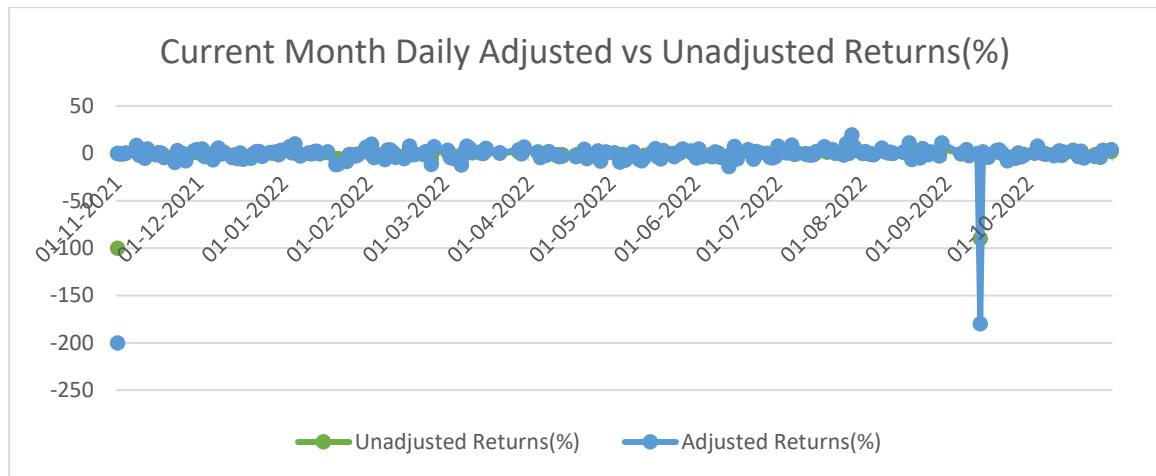
Returns (%)	Daily	Weekly	Monthly
Mean	-0.44689	-1.48874	-7.11765
Max	9.2873	8.394	37.7429
min	-89.8732	-10.07	-90.5136
Std.	6.411859	6.231806	31.54204

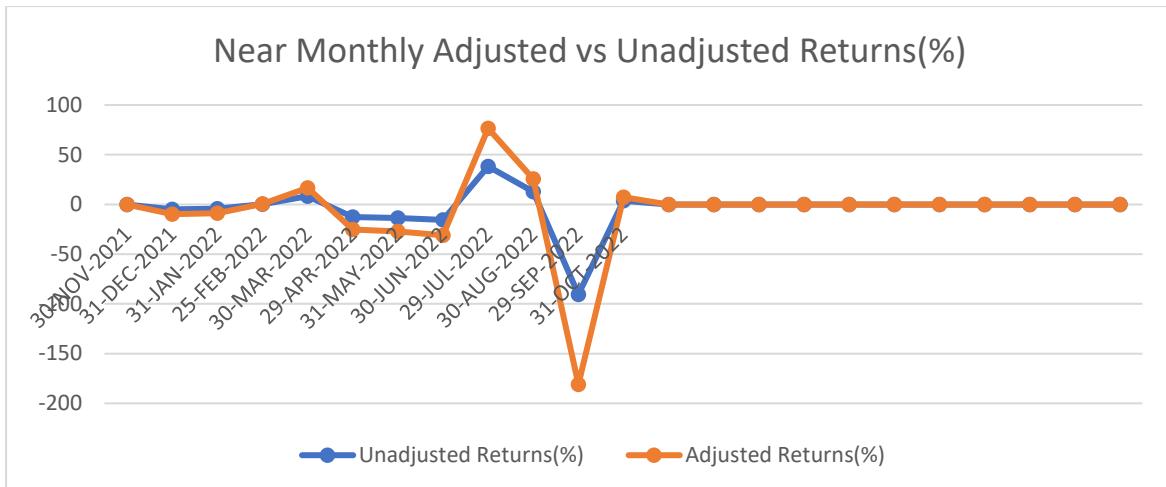
Table: Adjusted Returns for Far Month Futures



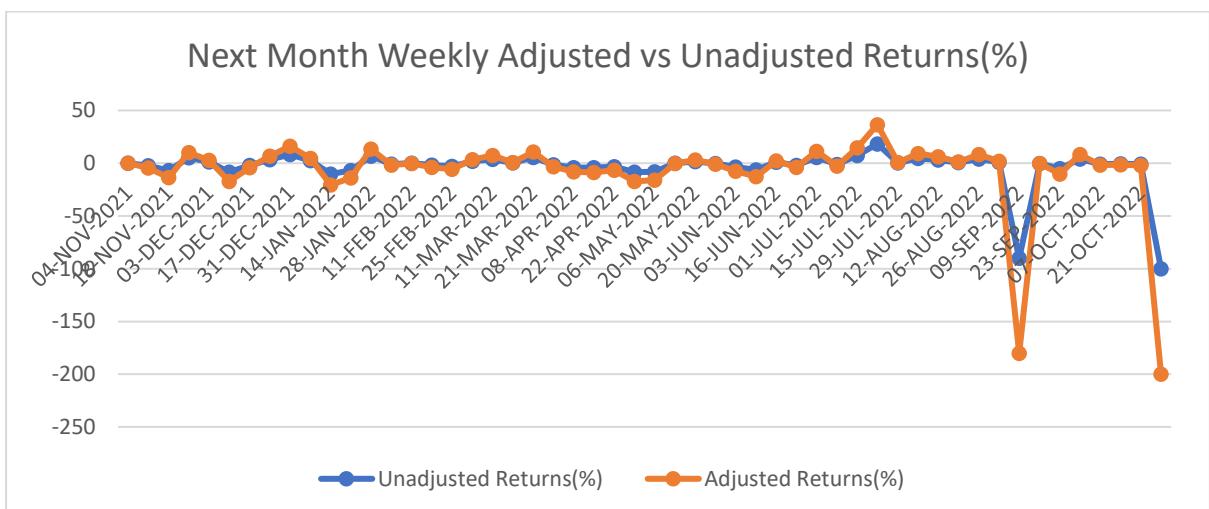
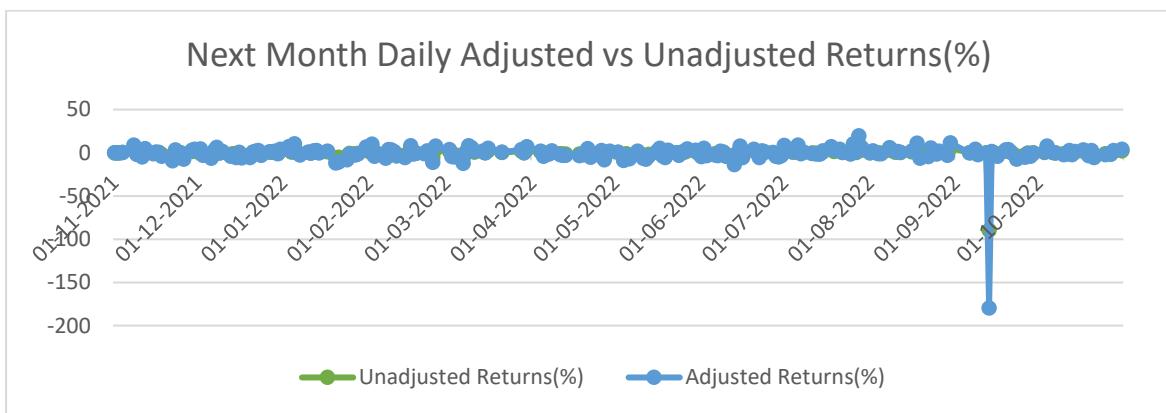
## 2.4 Risk-Adjusted v/s Unadjusted Returns for Equity Futures Instrument- BAJAFINSV

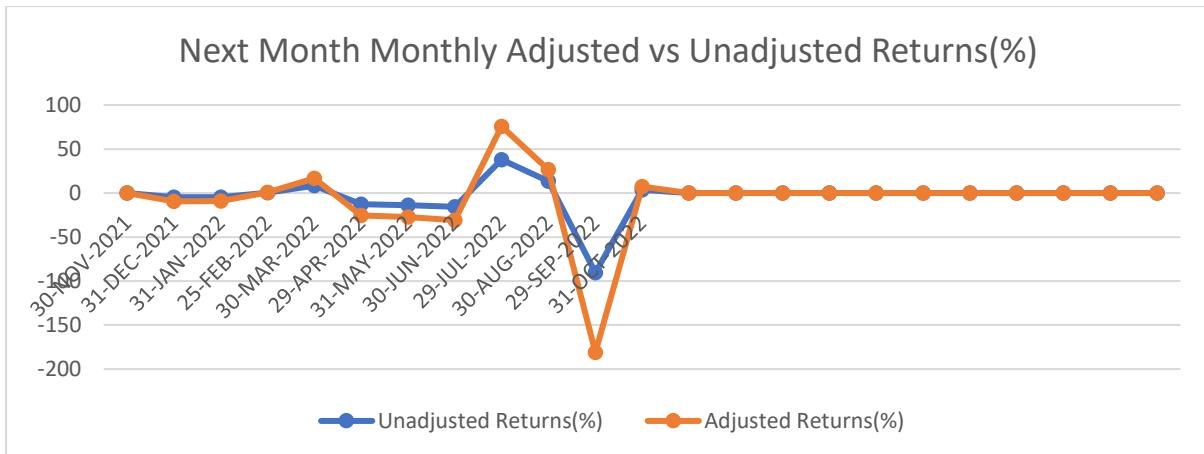
### 2.4.1 Near Month:



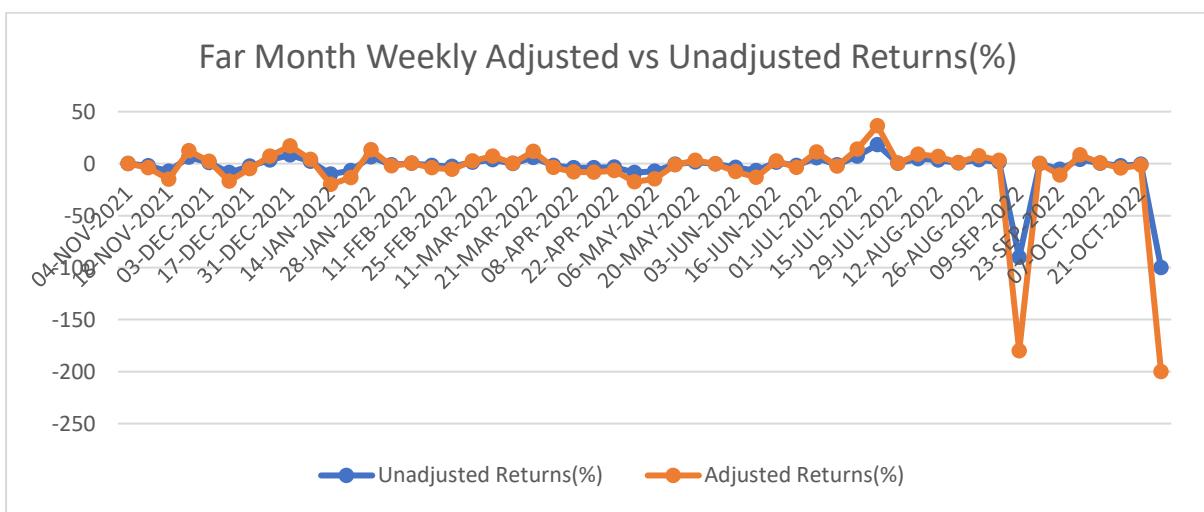
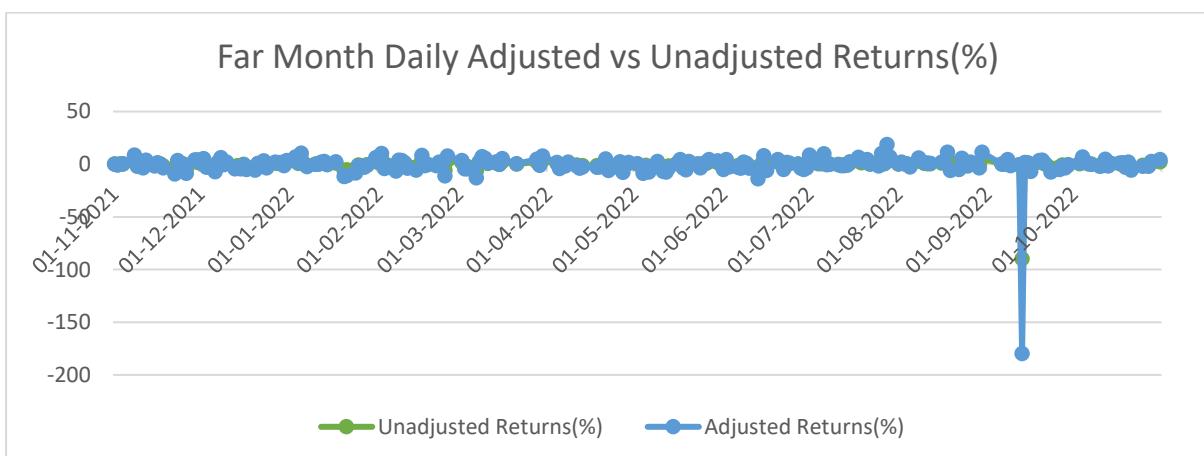


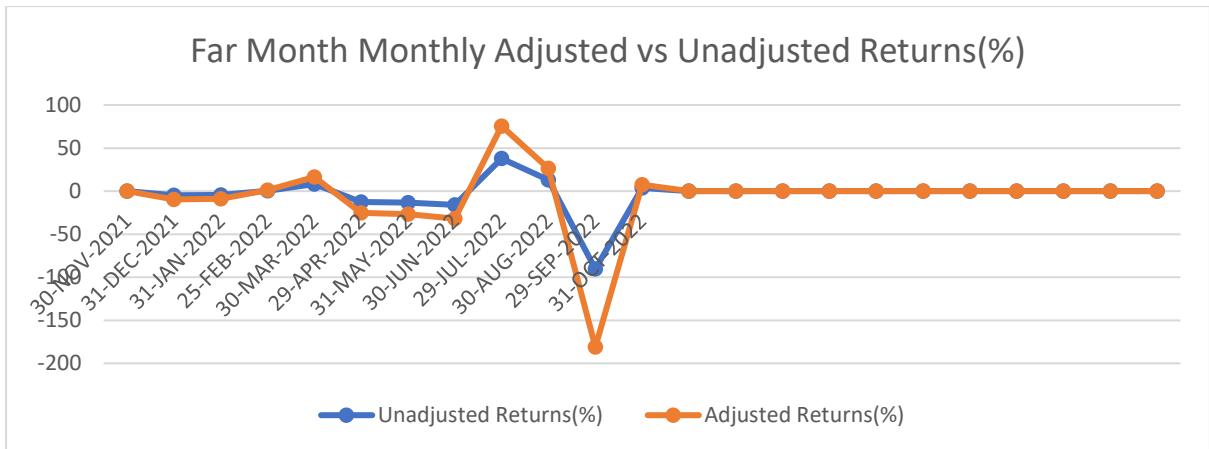
## 2.4.2 Next Month:





### 2.4.3 Far Month:





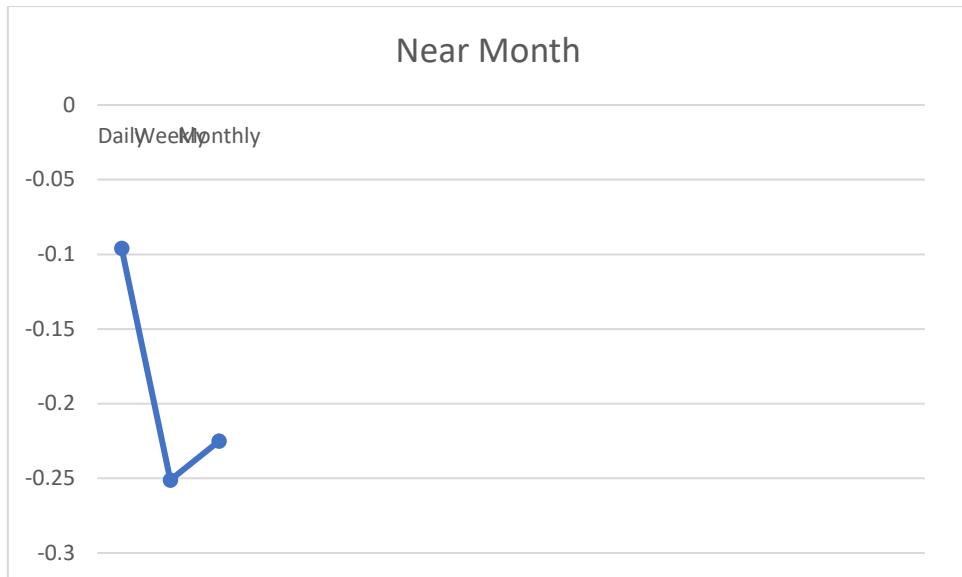
The risk-adjusted return, as previously established, is a measurement of how much return the portfolio generates over the risk-free return, or the return on T-bills. The Sharpe ratio often represents the risk-adjusted return, which is determined by the excess return over the risk-free rate in relation to the excess return's standard deviation.

The following tables and graphs show the trend in the Sharpe ratio for different future contract expiry dates and frequencies:

## Near Month

Sharpe Ratio	Daily	Weekly	Monthly
Mean	-0.09613	-0.25121	-0.22512
Max	1.0657	1.3664	1.2103
min	-10.8624	-1.6816	-2.866
Std.	1.000002	1.000006	1.000005

Table: Sharpe Ratio for Near Month Futures



## Next Month

Sharpe Ratio	Daily	Weekly	Monthly
Mean	-0.0697	-0.2528	-0.2254
Max	1.5178	1.3286	1.1999
min	-14.026	-1.6929	-2.8681
Std.	1	1	1

Table: Sharpe Ratio for Next Month Futures



## Far Month

Sharpe Ratio	Daily	Weekly	Monthly
Mean	-0.0697	-0.2389	-0.2257
Max	1.4485	1.347	1.1966
min	-14.017	-1.6159	-2.8696
Std.	1	1	1

Table: Sharpe Ratio for Far Month Futures



## 2.5 Economic Interpretations

### Observations

1. The mean risk-unadjusted returns trend: Daily > Weekly > Monthly.

The same can be observed for mean risk-adjusted returns.

2. However, the standard deviation follows the trend: Monthly > Daily > Weekly for both mean risk-unadjusted and mean risk-adjusted returns.  
This shows that monthly frequency returns are riskier to invest in since they are more erratic/volatile than daily and weekly frequency returns.
3. The negative Sharpe ratio implies that the return on the Futures is expected to be negative.

## **Actions**

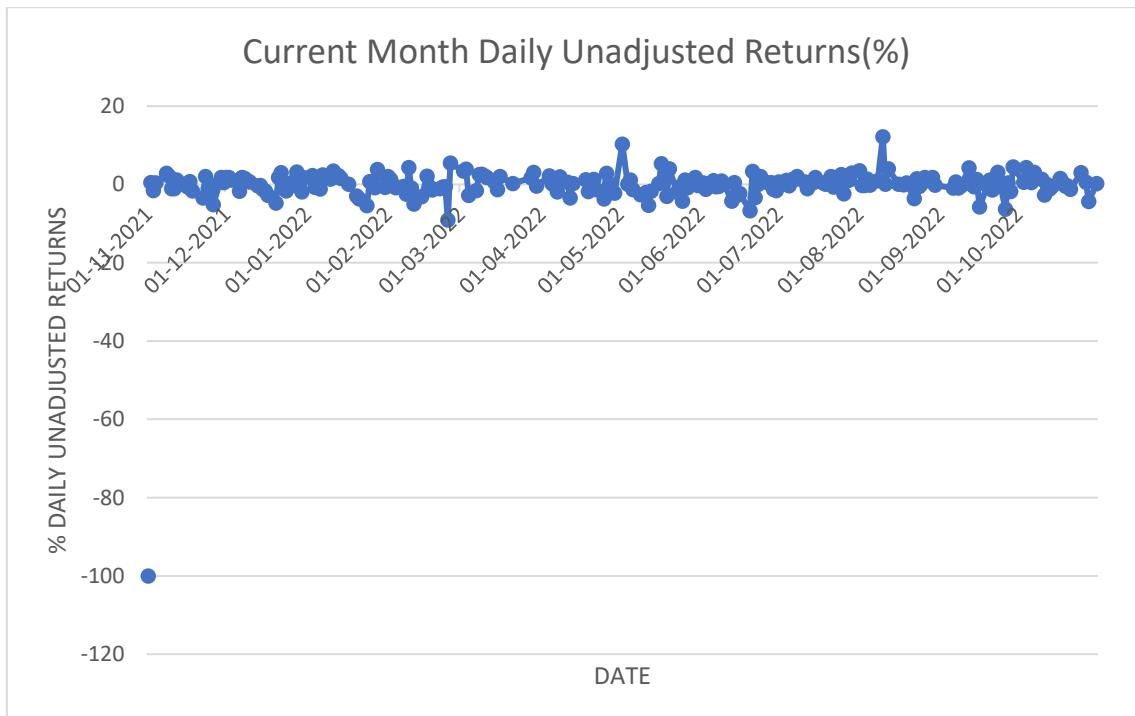
1. The Investors should not take long position in any of the near, next, or far months since there are negative mean returns to all of them.
2. However, one can take short position on Near daily basis since it has the lowest standard deviation as compared to daily and monthly.
3. Risk-averse investors can opt for investment in the spot market rather than the futures market.
4. Based on the Sharpe ratio calculation, it is advisable to invest long-term monthly basis in BAJAJFINSV shares in spot market.

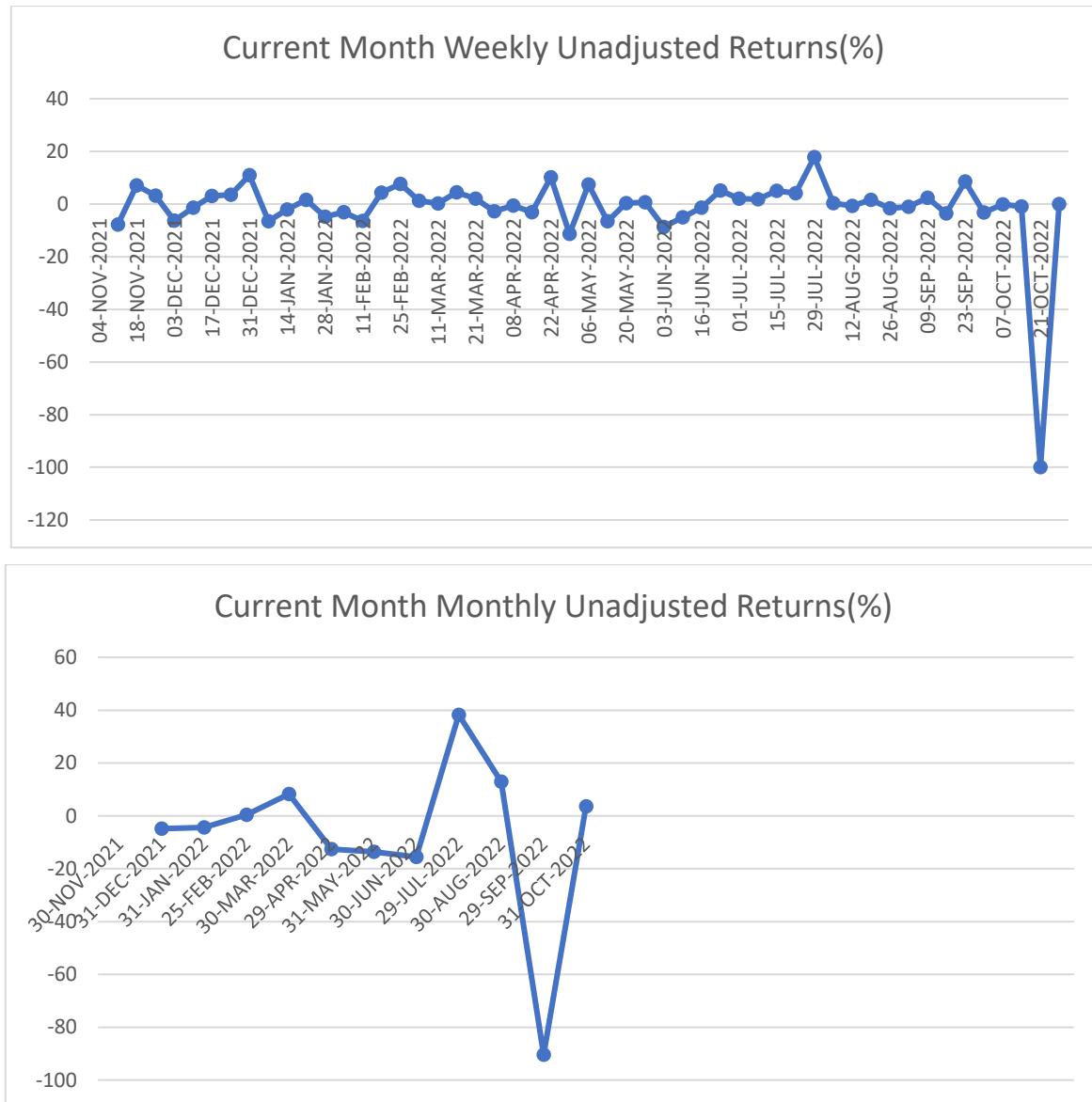
## 2.6 Unadjusted Risk Returns for Equity Futures Instrument - TATACHEMS

### 2.6.1 Near Month

Returns(%)	Daily	Weekly	Monthly
Mean	0.129839	0.482764	-6.24597
Max.	12.1688	10.9267	24.1524
Min.	-9.1214	-7.7733	-100
Std.	2.477245	5.92203	33.46284

Table: Unadjusted Returns for Current/Near Month Futures

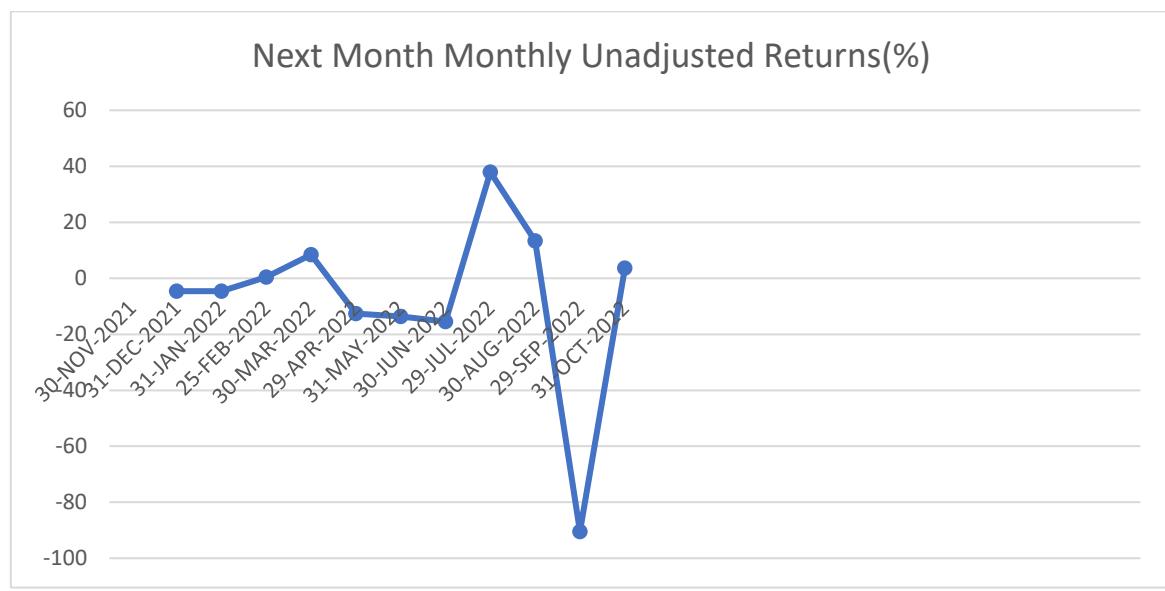
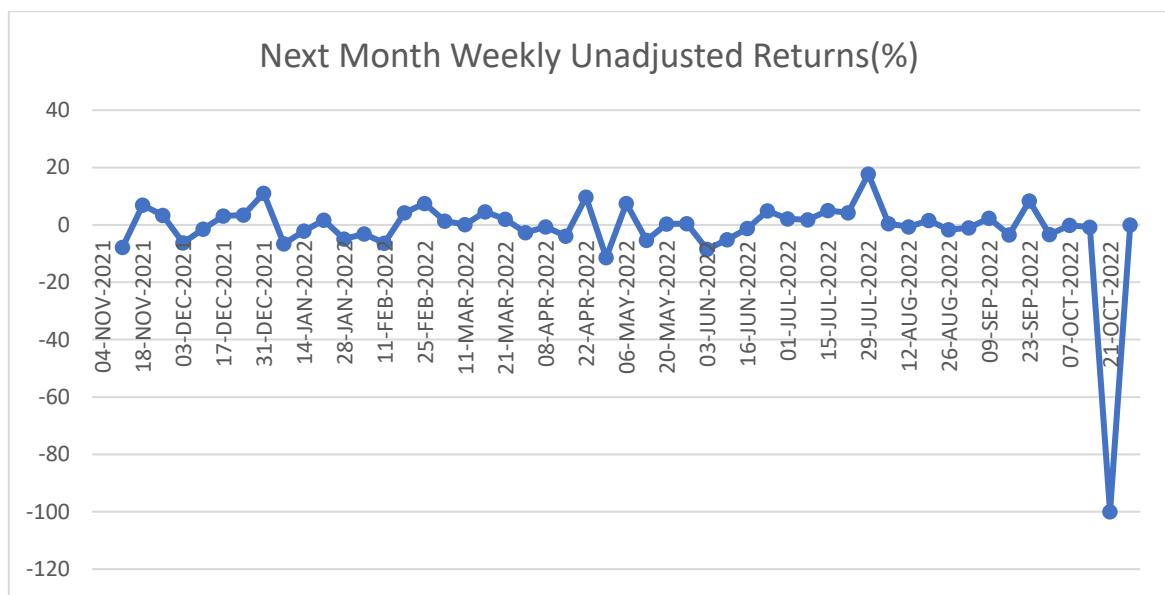
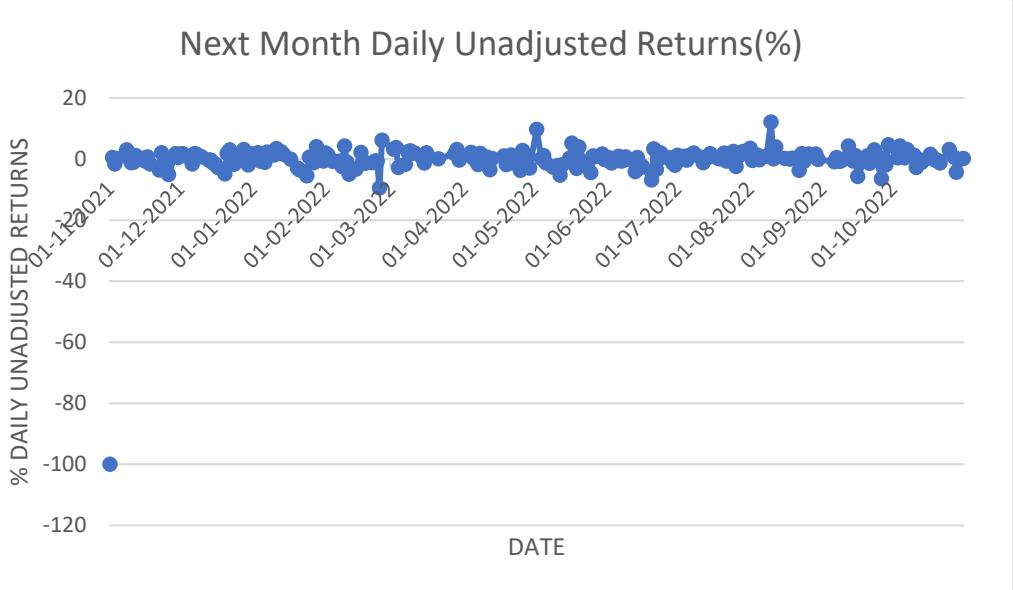




## 2.6.2 Next Month

Returns(%)	Daily	Weekly	Monthly
Mean	-0.31289	0.486009	-6.2214
Max.	12.1345	11.0135	24.3702
Min.	-100	-7.8068	-100
Std.	7.107987	5.931623	33.53069

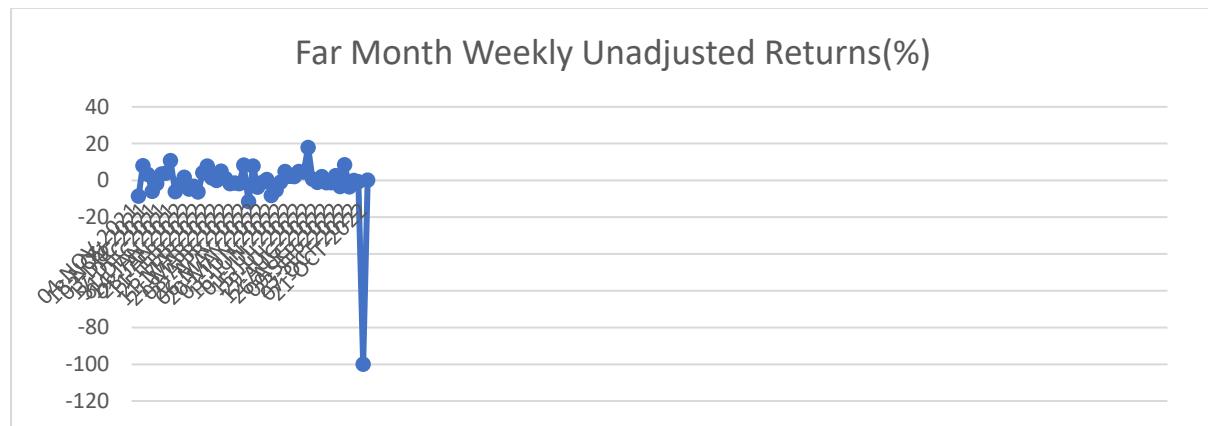
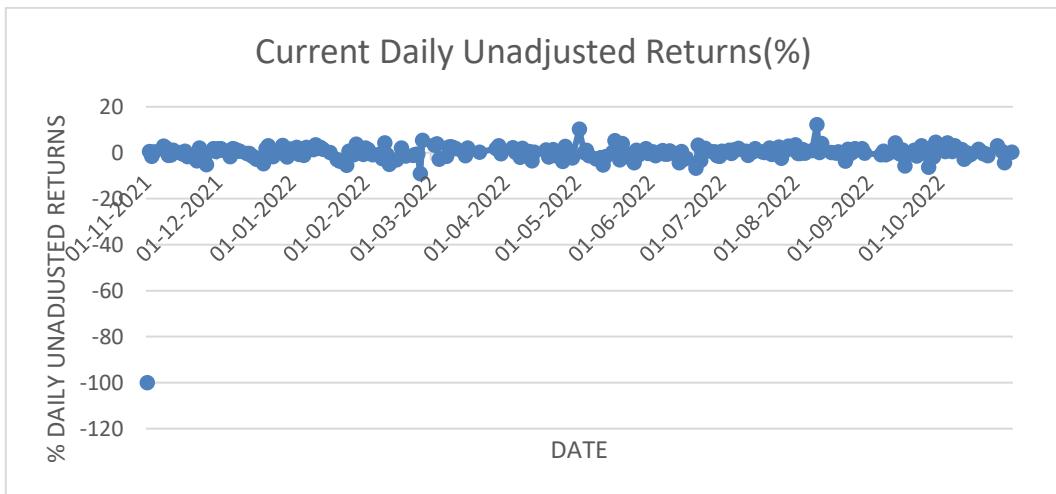
Table: Unadjusted Returns for Next Month Futures

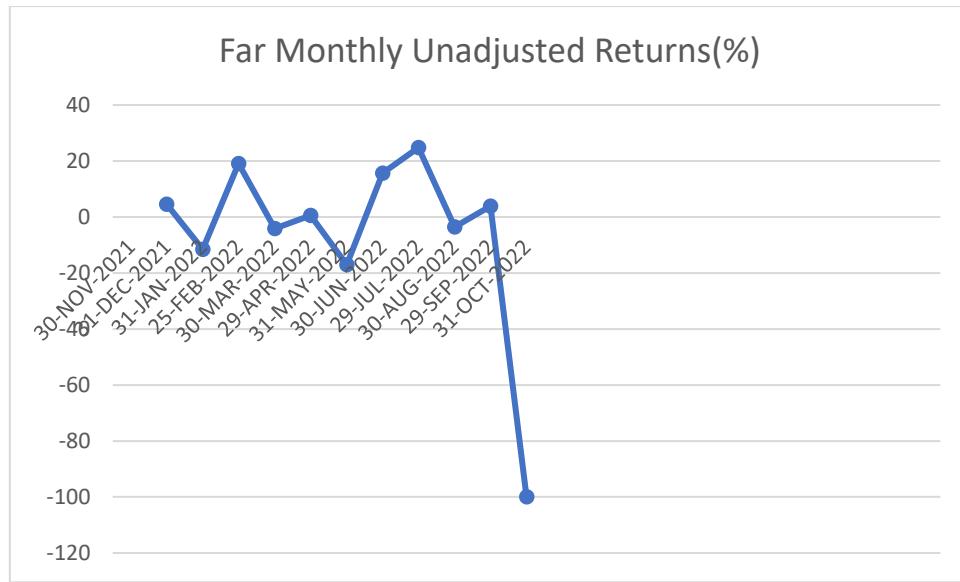


## 2.6.3 Far Month

Returns(%)	Daily	Weekly	Monthly
Mean	-0.30979	0.513064	-6.15895
Max.	12.2155	10.7459	24.7826
Min.	-100	-8.6649	-100
Std.	7.107464	6.089774	33.61017

Table: Unadjusted Returns for Far Month Futures



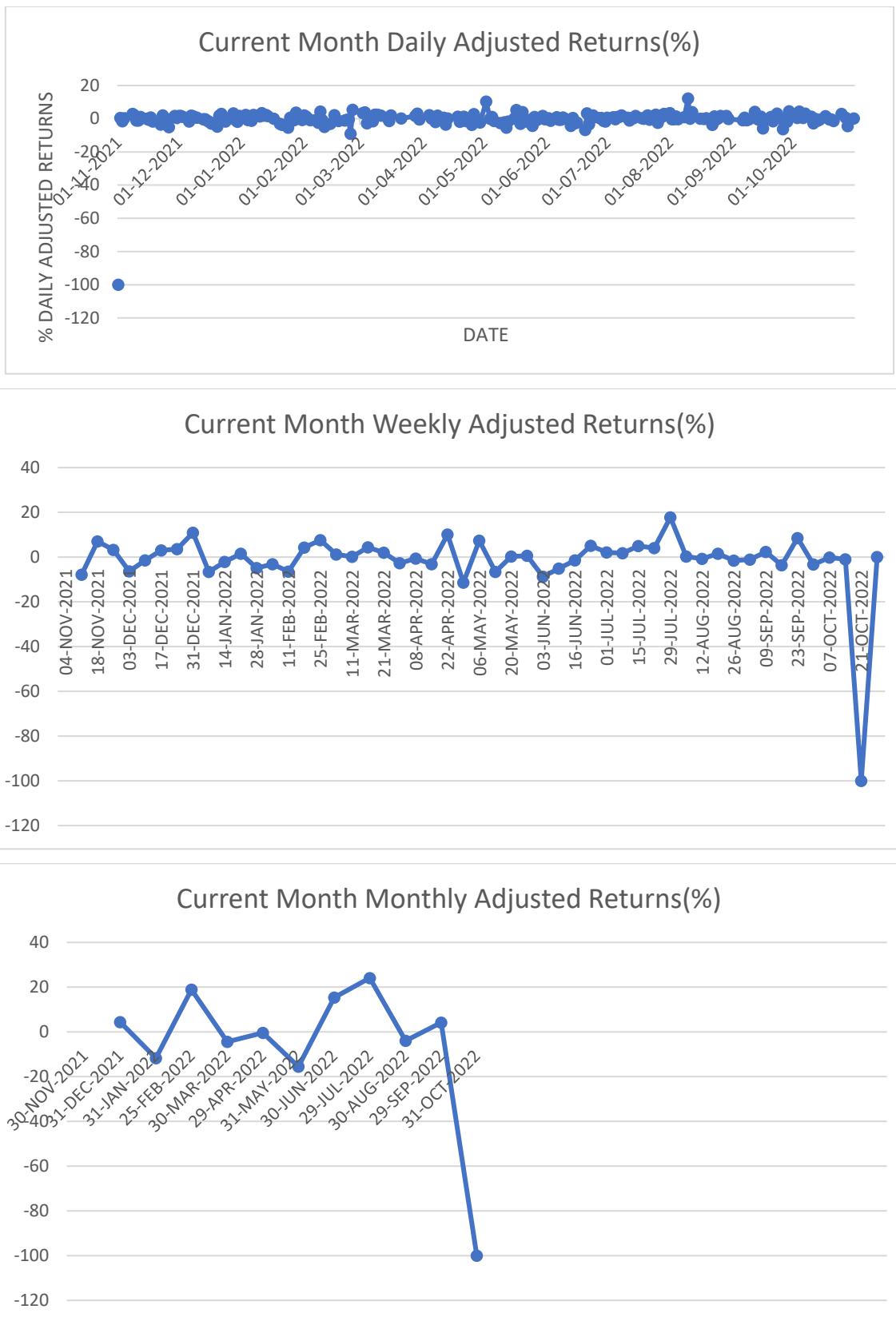


## 2.7 Risk-Adjusted Returns for Equity Futures Instrument - TATACHEM

### 2.7.1 Near Month

Returns(%)	Daily	Weekly	Monthly
Mean	0.083993	0.446727	-6.29394
Max.	12.1135	10.8907	24.0964
Min.	-9.1588	-7.8087	-100.064
Std.	2.477048	5.921889	33.46726

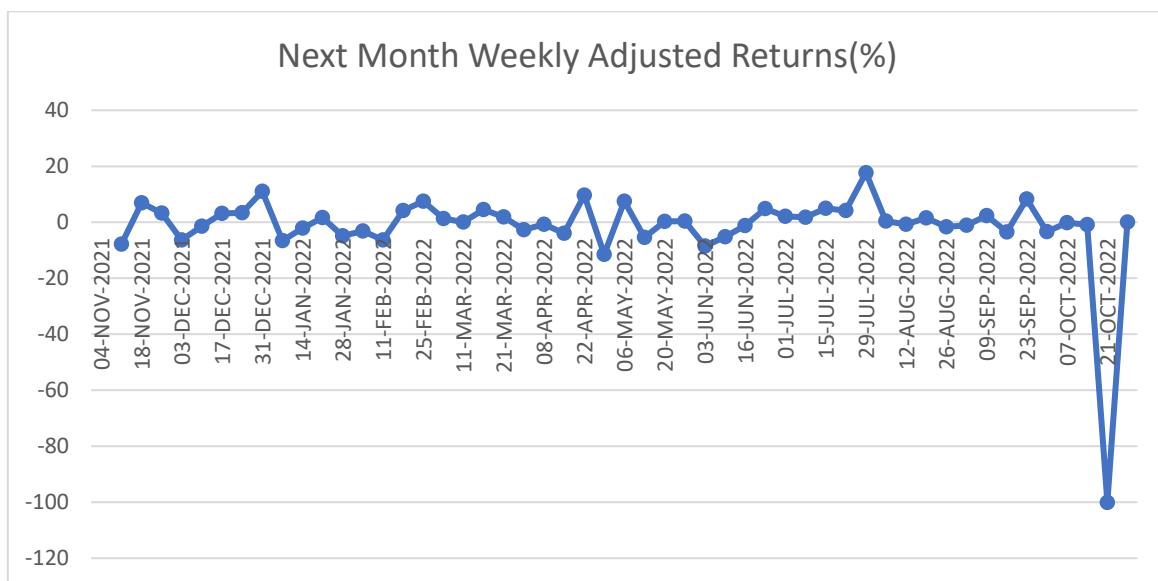
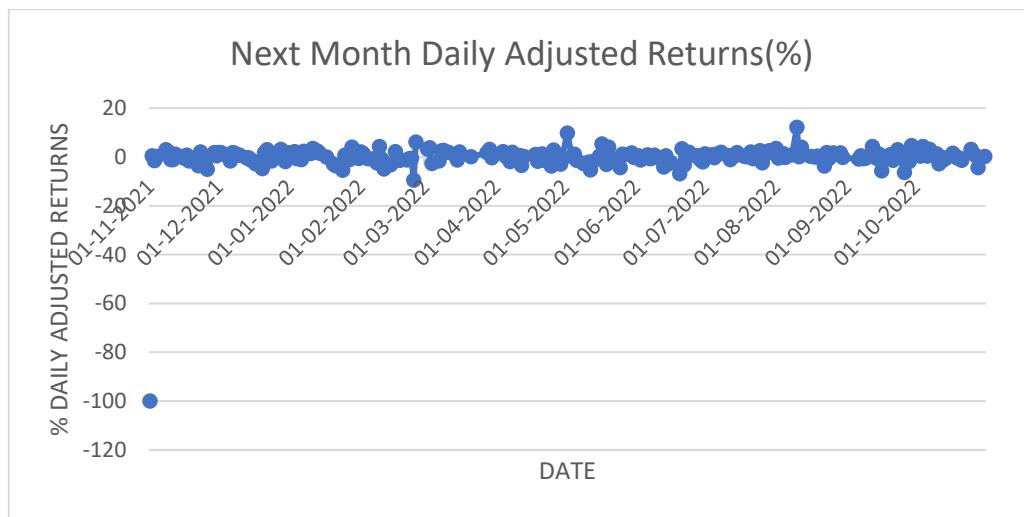
Table: Adjusted Returns for Near/Current Month Futures

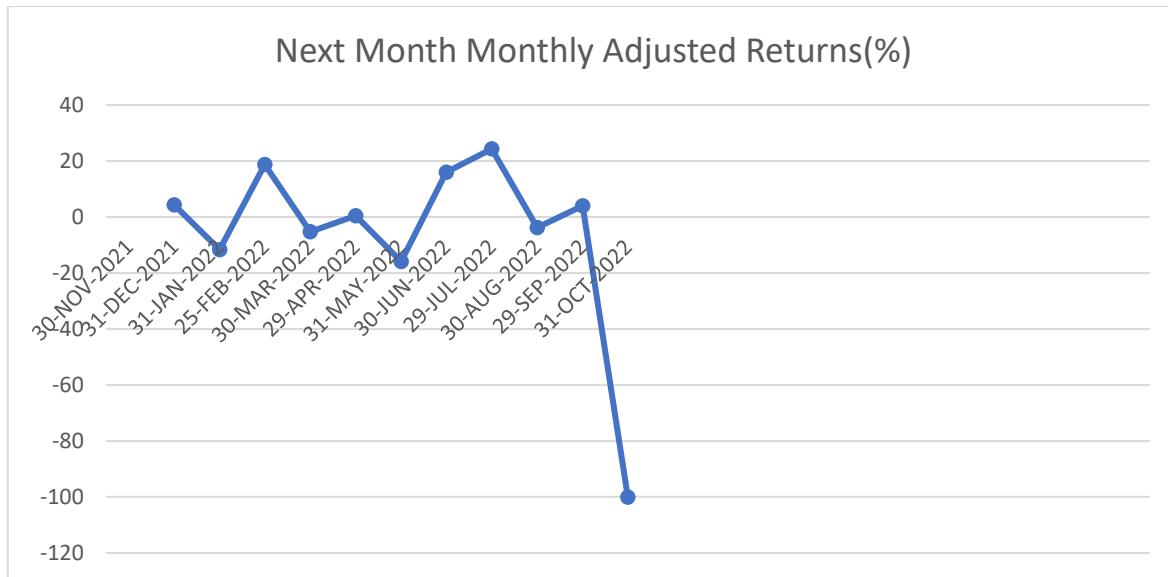


## 2.7.2 Next Month

Returns(%)	Daily	Weekly	Monthly
Mean	-0.35853	0.449973	-6.26936
Max.	12.0792	10.9775	24.3142
Min.	-100	-7.8422	-100.064
Std.	7.105053	5.93148	33.53508

Table: Adjusted Returns for Next Month Futures

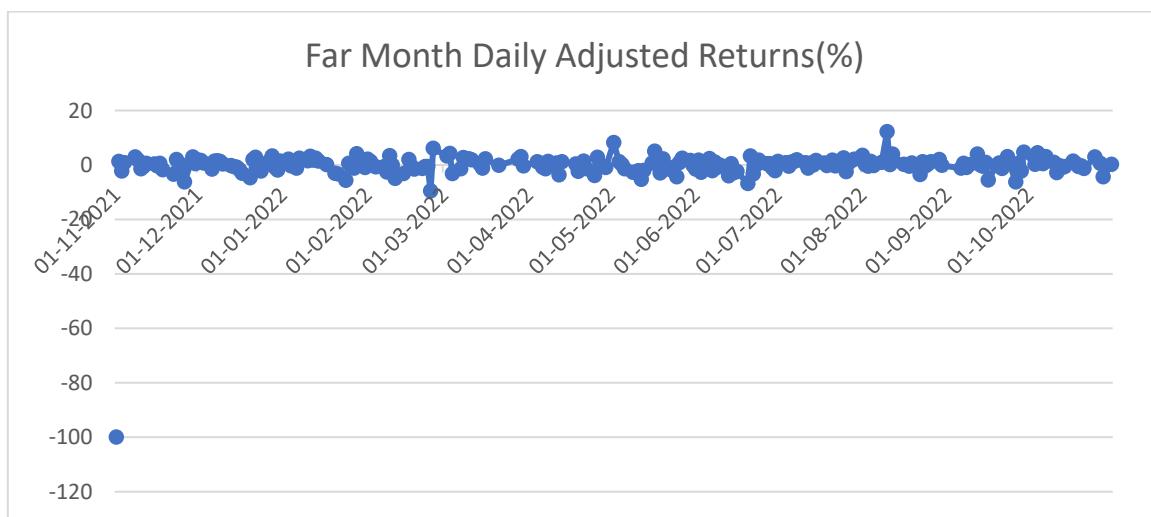


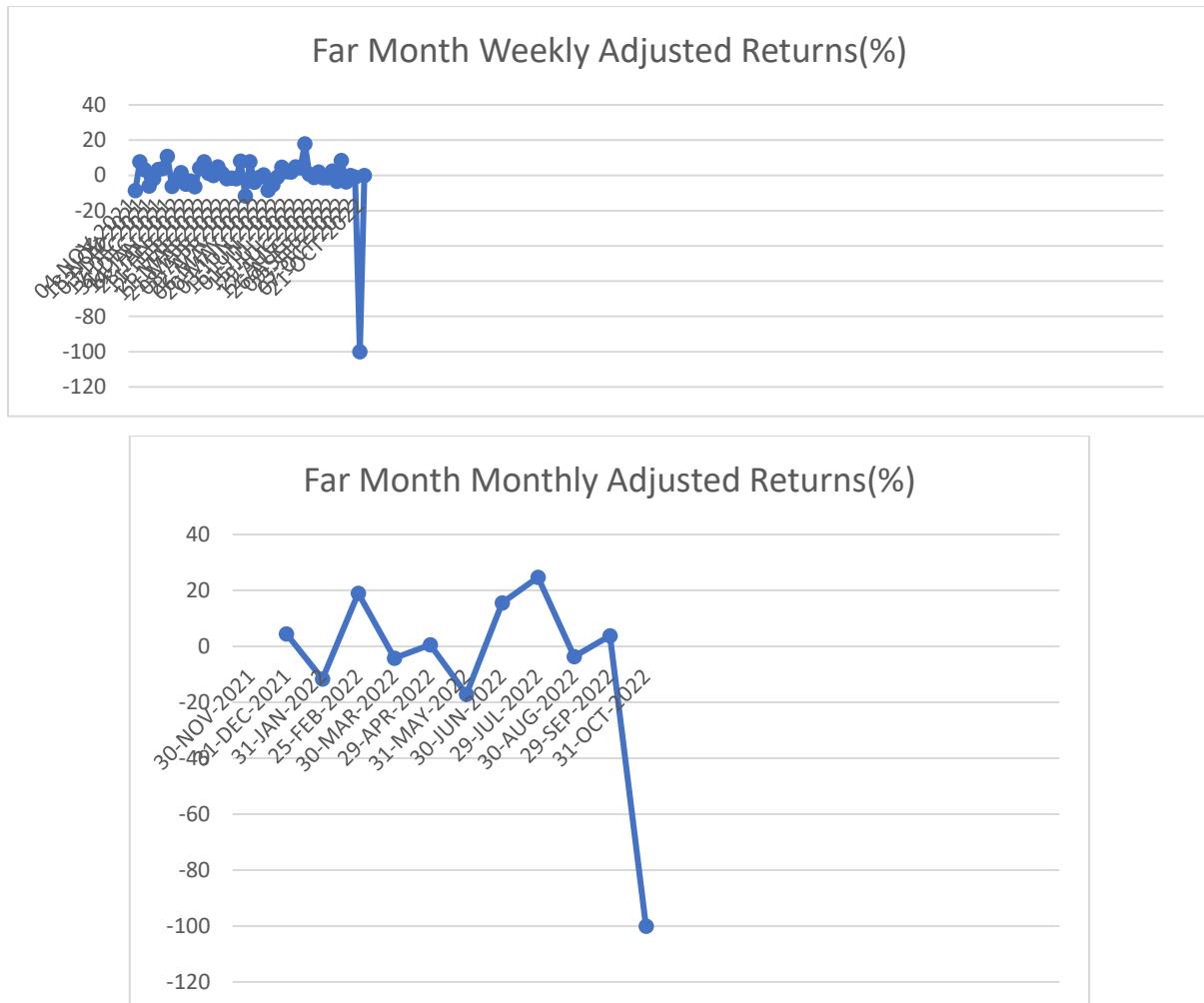


### 2.7.3 Far Month

Returns(%)	Daily	Weekly	Monthly
Mean	-0.35543	0.477027	-6.20692
Max.	12.1602	10.7099	24.7266
Min.	-100	-8.7003	-100.064
Std.	7.104534	6.089639	33.6146

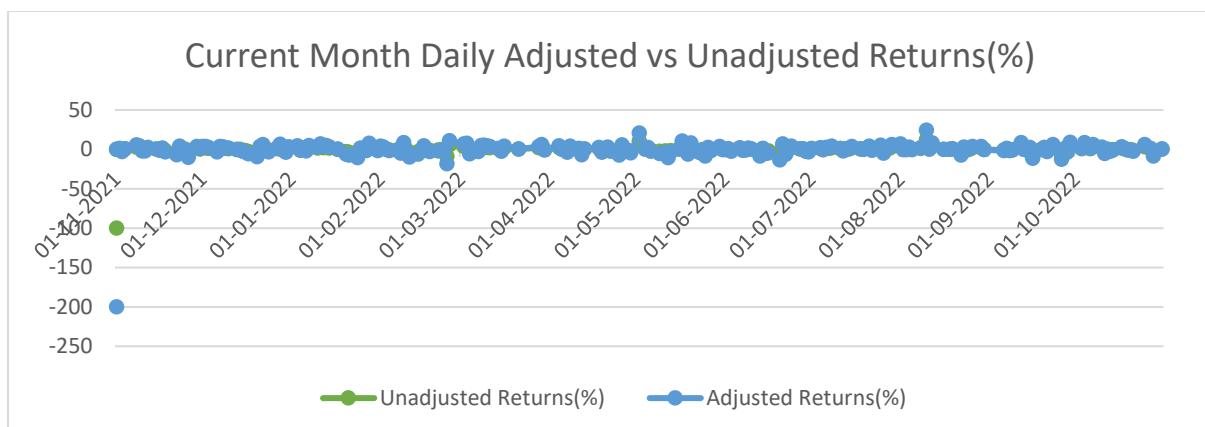
Table: Adjusted Returns for Far Month Futures

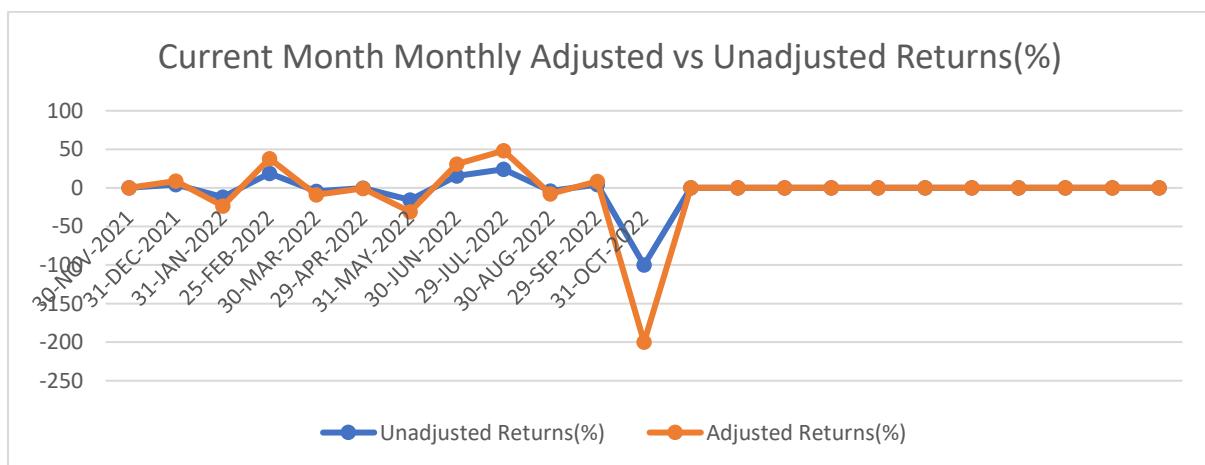
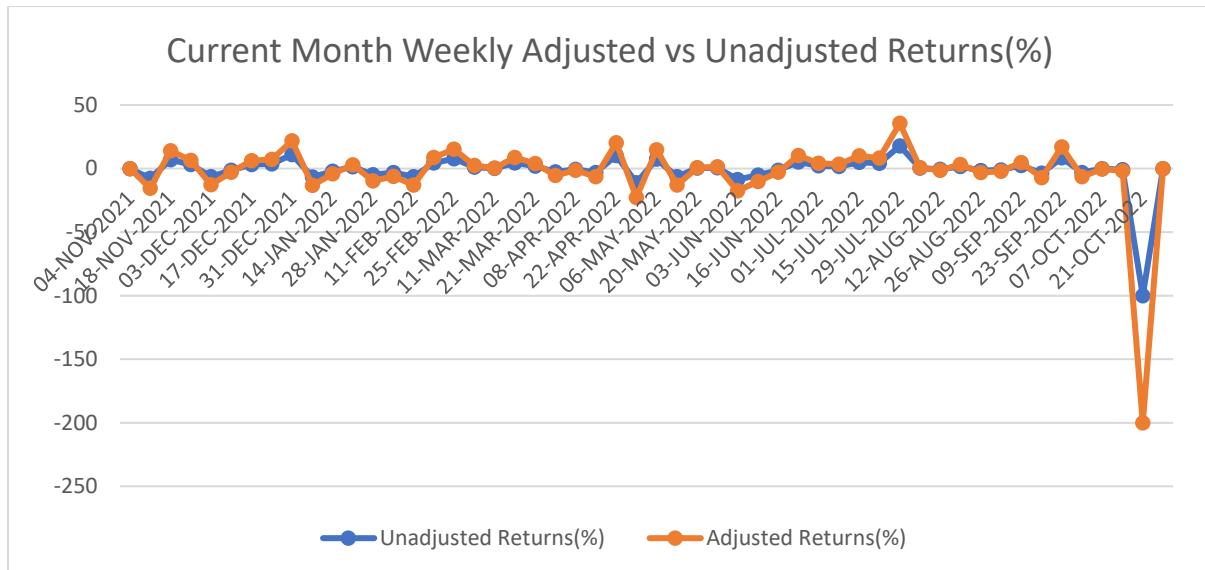




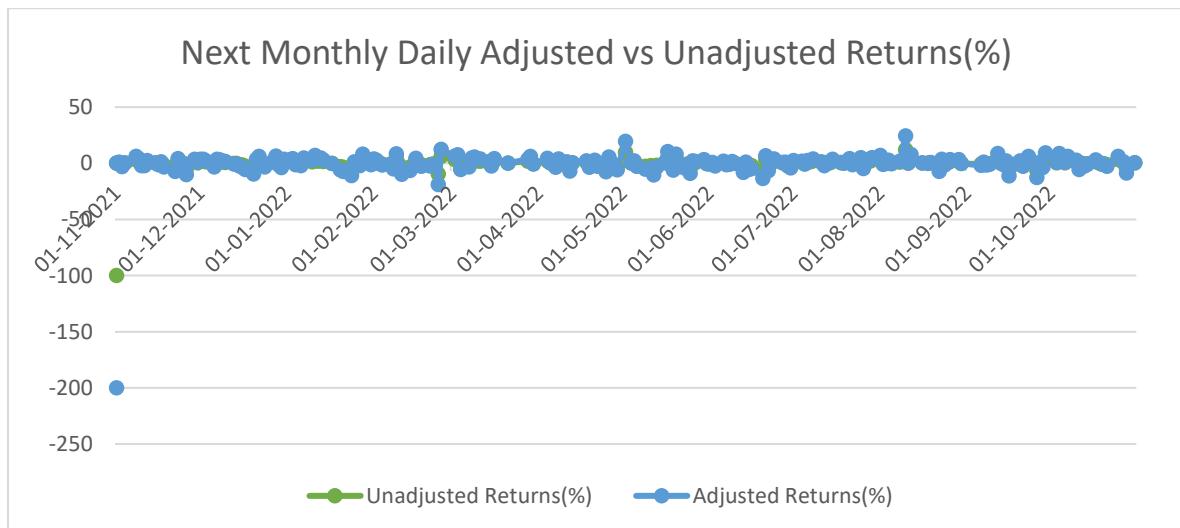
## 2.8 Risk-Adjusted v/s Unadjusted Returns for Equity Futures Instrument - TATACHEM

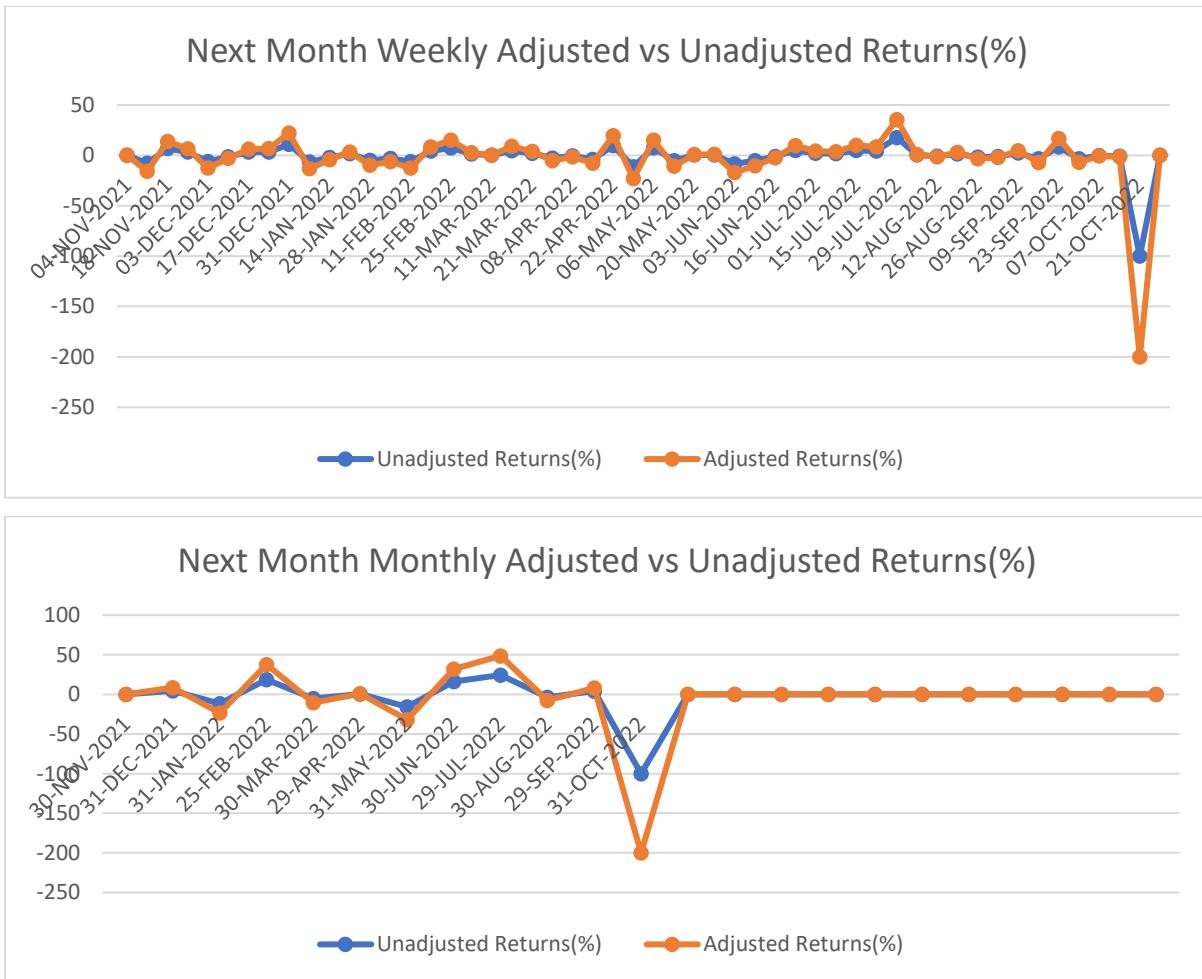
### 2.8.1 Near Month



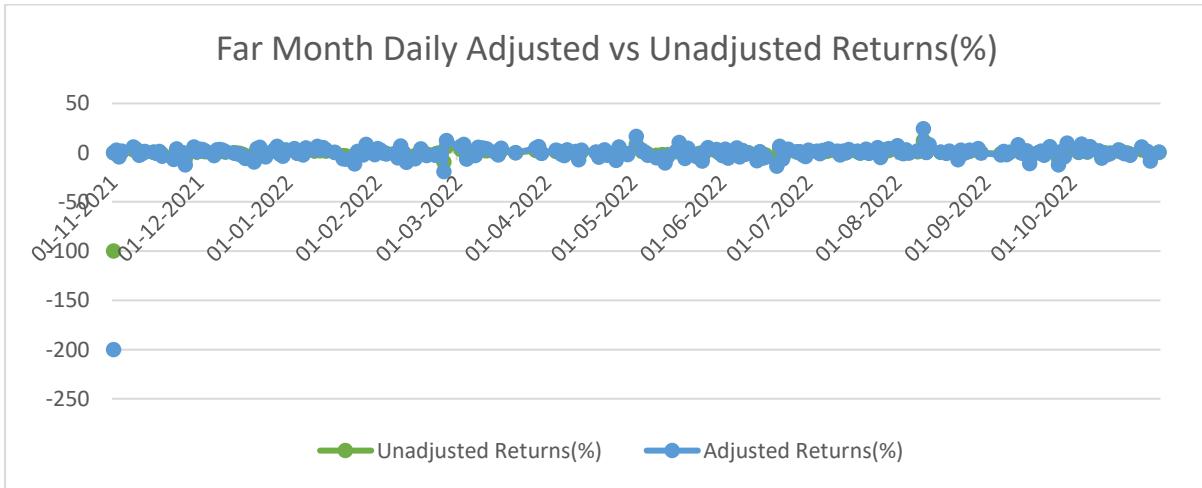


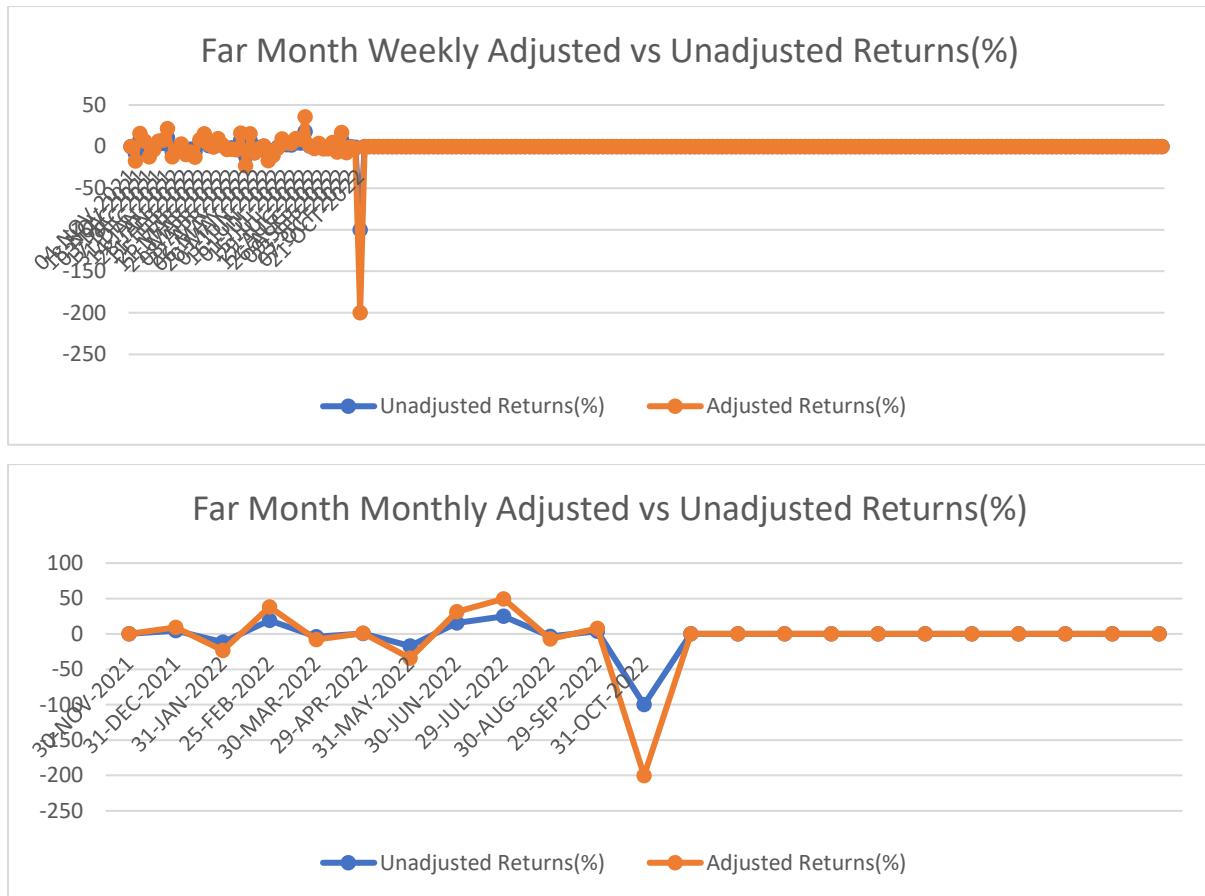
## 2.8.2 Next Month





### 2.8.3 Far Month





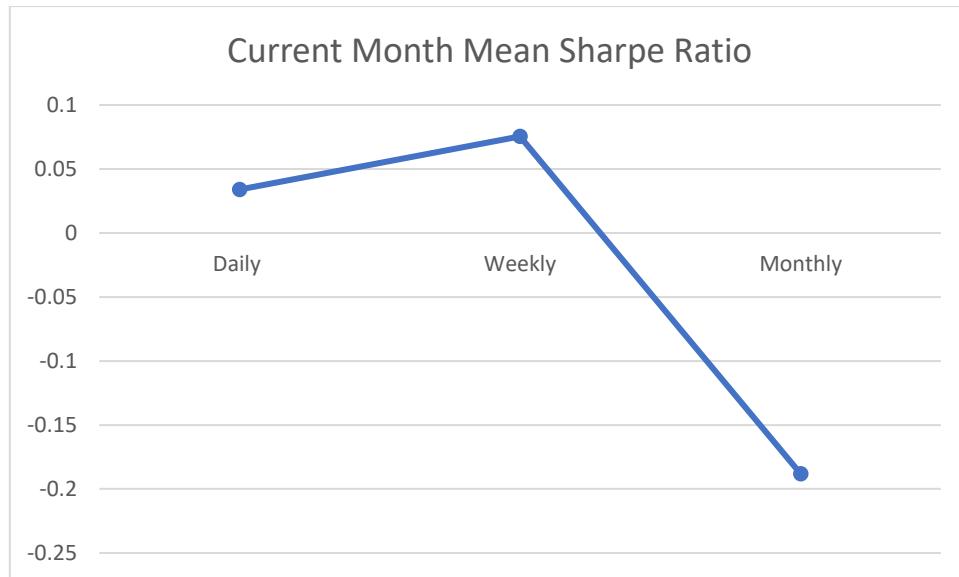
The risk-adjusted return, as previously established, is a measurement of how much return the portfolio generates over the risk-free return, or the return on T-bills. The Sharpe ratio often represents the risk-adjusted return, which is determined by the excess return over the risk-free rate in relation to the excess return's standard deviation.

The following tables and graphs show the trend in the Sharpe ratio for different future contract expiry dates and frequencies:

## Near Month

Sharpe Ratio	Daily	Weekly	Monthly
Mean	0.033908	0.075445	-0.18806
Max.	4.8903	1.8391	0.72
Min.	-3.6975	-1.3186	-2.9899
Std.	1	1.000009	0.999997

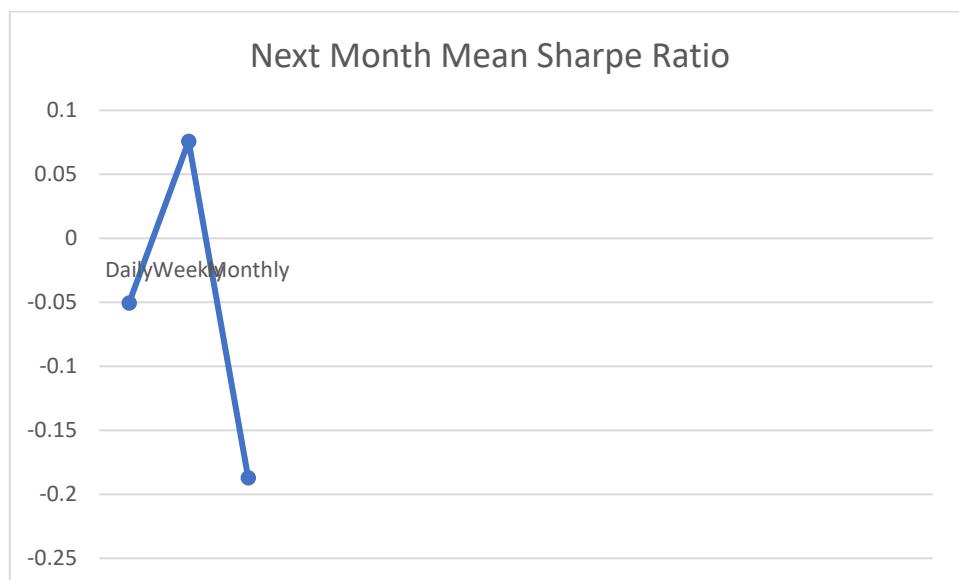
Table: Sharpe Ratio for Near Month Futures



### Next Month

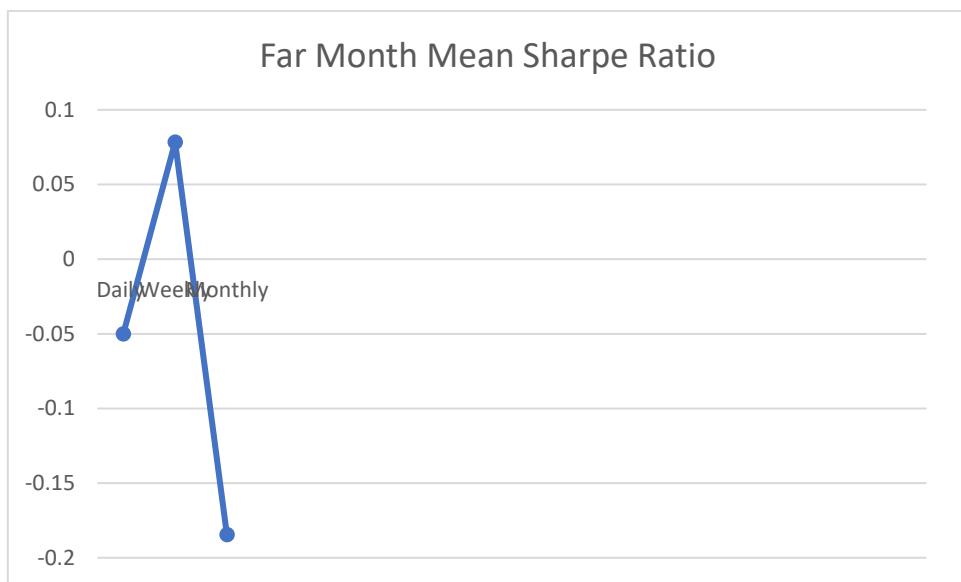
<b>Sharpe Ratio</b>	<b>Daily</b>	<b>Weekly</b>	<b>Monthly</b>
Mean	-0.0505	0.0759	-0.18696
Max.	1.7001	1.8507	0.725
Min.	-14.075	-1.3221	-2.9839
Std.	1	1	1

Table: Sharpe Ratio for Next Month Futures



## Far Month

<b>Sharpe Ratio</b>	<b>Daily</b>	<b>Weekly</b>	<b>Monthly</b>
Mean	-0.05	0.0783	-0.1846
Max.	1.7116	1.7587	0.7356
Min.	-14.08	-1.429	-2.9768
Std.	1	1	1



## 2.9 Economic Interpretation

- **Observations**

- The mean risk-unadjusted returns trend: Weekly > Daily > Monthly.  
The same can be observed for risk-adjusted returns.
- However, the standard deviation follows the trend:  
Monthly > Weekly > Daily for both risk-unadjusted and risk-adjusted returns. This shows monthly frequency returns are the riskiest to invest in since they are much

more volatile in nature as compared to daily and weekly returns.

- The negative Sharpe ratio implies that the returns on the Futures are expected to be negative.

- **Actions**

- The investors should take long position in Far month Weekly contract for maximum returns.
- The investors can also invest in Near month Daily contract since its return is not much but it is positive and also has lesser standard deviation than weekly contracts.
- The investors should not take a long position in any of the Monthly contracts unless they are long term traders (2-3 years or more)
- Risk-averse investors can opt for investment in the spot market rather than the futures market.
- Based on the Sharpe ratio calculations, it is advisable to invest in Weekly Futures contracts.

## Section-3

### **3.1 Comparison of Unadjusted and Adjusted Returns- BAAJFINSV**

#### **3.1.1 Unadjusted Returns**

		Equity Futures		
Frequency	Equity Shares	Near-month	Next month	Far Month
Daily	-0.4155	-0.8393	-0.401	-0.401
Weekly	-0.038	-1.4919	-1.4994	-1.4527
Monthly	0.5581	-7.0585	-7.0663	-7.0697

Table: Unadjusted Returns of BAJAJFINSV

#### **3.1.2 Adjusted Returns**

		Equity Futures		
Frequency	Equity Shares	Near-month	Next month	Far Month
Daily	-0.4614	-0.885	-0.4469	-0.4469
Weekly	-0.0848	-1.5279	-1.5354	-1.4887
Monthly	0.5101	-7.1065	-7.1143	-7.1177

Table: Adjusted Returns of BAJAJFINSV

- 1 Unadjusted Daily return on an average almost the same for the Next month and Far Month's Futures contract; Meanwhile Unadjusted weekly return on an average almost the same for the Near and Next month's Futures contract.
- 2 Unadjusted Weekly return on an average is better for Far month Futures contract as compared to Near and Next months Futures contract;

Meanwhile the Unadjusted weekly returns on an average are same for Near and Next months.

- 3 Unadjusted Monthly returns on an average almost the same for the Next and Far month's Futures contract. While the returns on all the Future's contract are negative in nature, the monthly return in case of Equity shares is positive. This implies, it's better to take long position for BAJAJFINSV share in spot market.
- 4 Adjusted monthly Equity share returns are better than adjusted Near, Next and Far month's Futures contract.
- 5 Adjusted monthly Near month Futures contract is better than Next and Far Month Futures contract.
- 6 The volatility Daily Futures contract is greater than weekly and monthly Futures contract.

### **3.2 Liquidity Position-BAJAJFINSV**

Month	Near	Next	Far
Average No. of Contracts	6327.885	1909.7345	40.2876
Average Open Interest	1352499.668	366795.022	10132.522

- For Equity shares, Average daily volume traded: 3144686.073
- It can be observed that the number of Near month Futures are far greater than Next and Far month combined. This shows that people prefer Near month contracts more than Next and Far contracts since Near month Futures contract has better liquidity.

### 3.3 Comparison of Unadjusted and Adjusted Returns-TATACHEM

#### 3.3.1 Unadjusted Returns

Frequency	Equity Futures			
	Equity Shares	Near-month	Next month	Far Month
Daily	0.1216	0.1298	0.1298	-0.3098
Weekly	0.3295	0.4828	0.486	0.5131
Monthly	3.0677	-6.246	-6.2214	-6.159

Table: Unadjusted Returns of TATACHEM

#### 3.1.2 Adjusted Returns

Frequency	Equity Futures			
	Equity Shares	Near-month	Next month	Far Month
Daily	0.0758	0.084	-0.3585	-0.3554
Weekly	0.2827	0.4467	0.45	0.477
Monthly	3.0197	-6.2939	-6.2694	-6.2069

Table: Adjusted Returns of TATACHEM

- 1 Unadjusted Daily return on an average almost the same for the Near month and Next Month's Futures contract. Meanwhile Unadjusted return on an average almost the same for the Near and Next Month weekly and monthly Futures contract.
- 2 Unadjusted weekly return on an average is better than both Daily and Monthly Futures contract for Near, next and Far months.
- 3 Unadjusted Monthly Equity shares returns are better than all the Futures contract.

- 4 Adjusted Daily return on an average almost the same for next and far month's Futures contract.
- 5 Adjusted Weekly return on an average almost the same for near and next month's Futures contract.
- 6 For a monthly contract, Equity share returns are better than Futures contract.

### 3.4 Liquidity Position-TATACHEM

Month	Near	Next	Far
Average No. of Contracts	3597.327	933.7345	27.2389
Average Open Interest	5475135	1122980	45931.4

- For Equity shares, Average daily volume traded: 1670516.494.
- It can be observed that the number of Near month Futures are far greater than Next and Far month combined. This shows that people prefer Near month contracts more than Next and Far contracts since Near month Futures contract has better liquidity.

## Section-4

### 4.1 Contango and Backwardation

The phrases "contango" and "backwardation" are used to explain how the futures market is acting in relation to the discrepancy between the spot price and the futures price of a commodity or underlying asset.

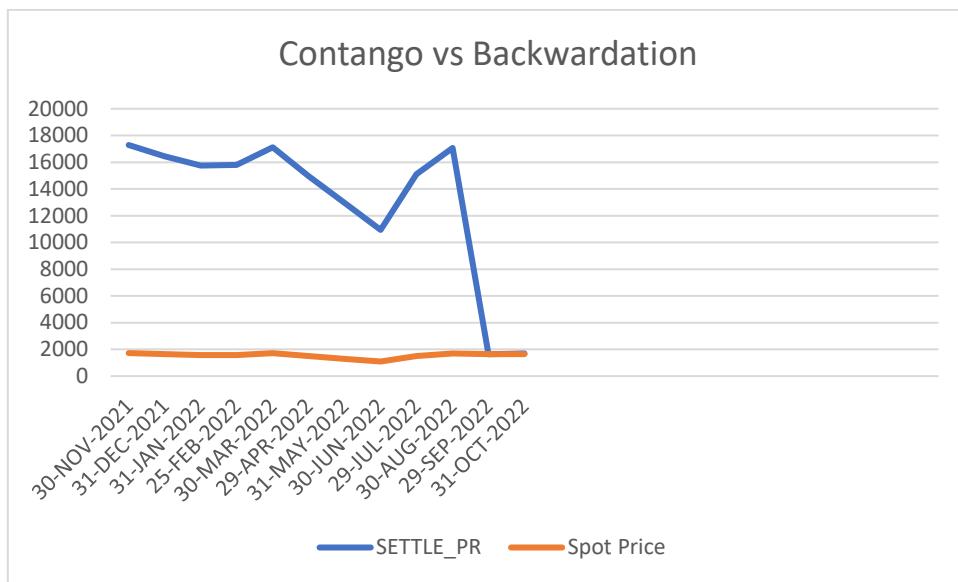
**Contango** is a state in which a commodity's futures price or underlying asset's spot price is higher than the other, i.e., **futures price > spot price**. Investors will pay more for the stock or commodity in the future when the market or commodity displays a contango behaviour. It may be speculative for futures prices to be higher than spot pricing.

**Backwardation** occurs when a commodity's futures price or underlying asset's spot price is lower, or when the futures price is greater than the spot price, i.e., **Spot price > futures price**.

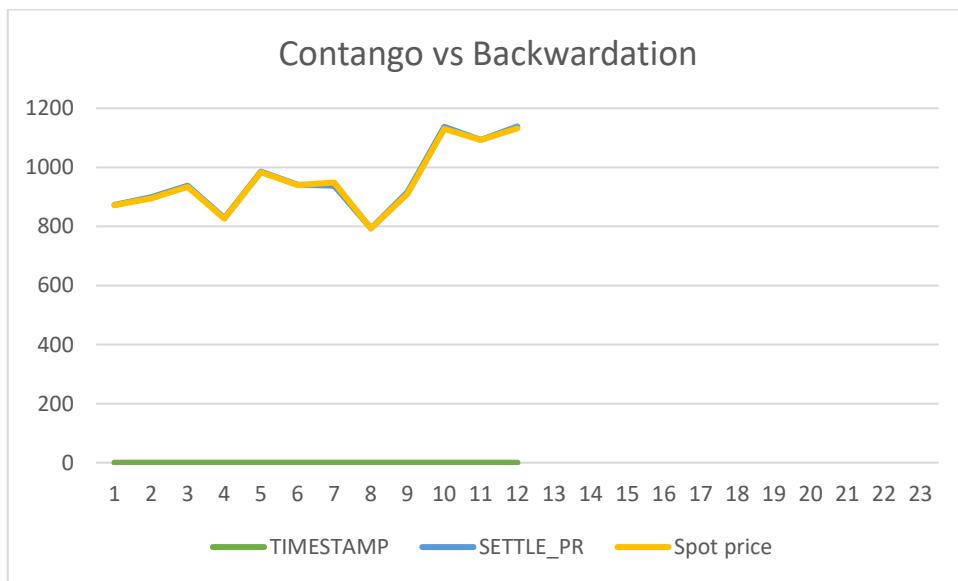
Backwardation can happen when there is a greater demand for an asset right now than there will be when contracts through the futures market mature in the future.

Investors can short the asset and purchase a futures contract to realise a profit if they believe the current price is too high.

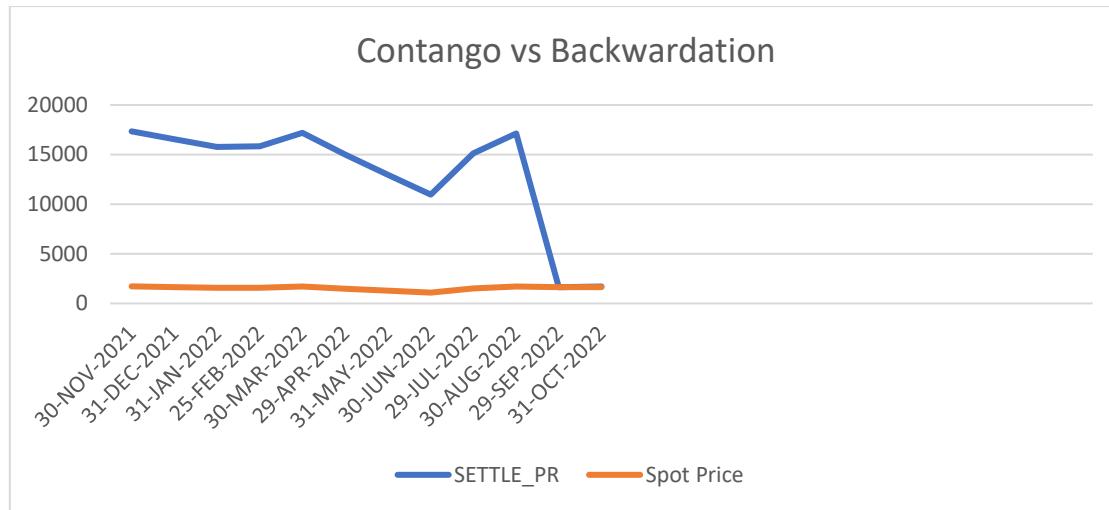
#### 4.1.1 Near Month - BAJAJFINSV



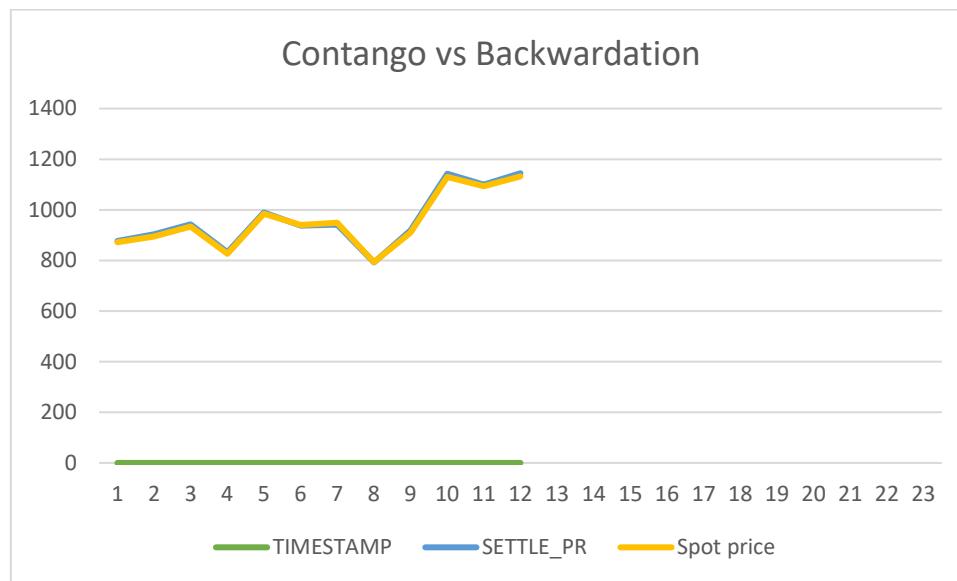
#### 4.1.2 Near Month - TATACHEM



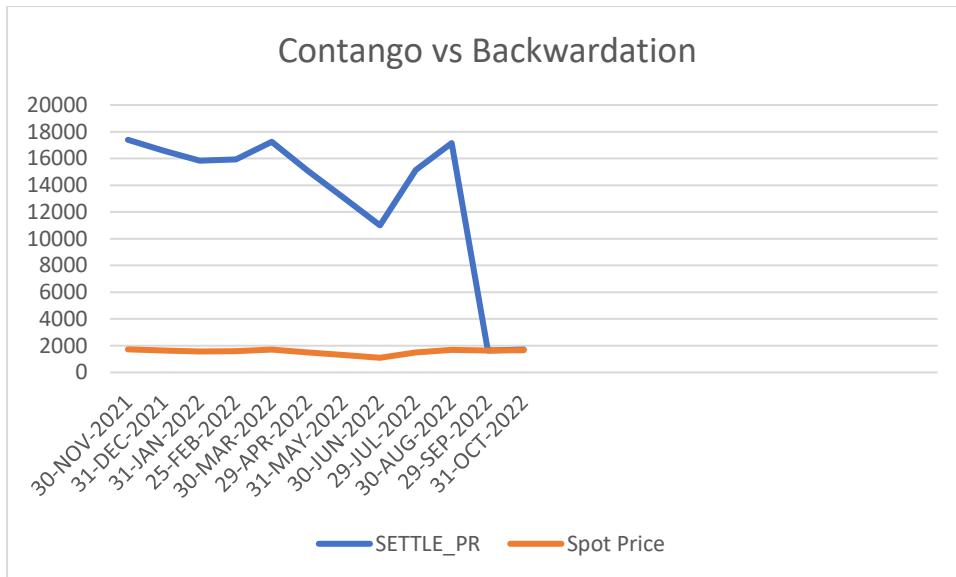
#### 4.1.3 Next Month - BAJAJFINSV



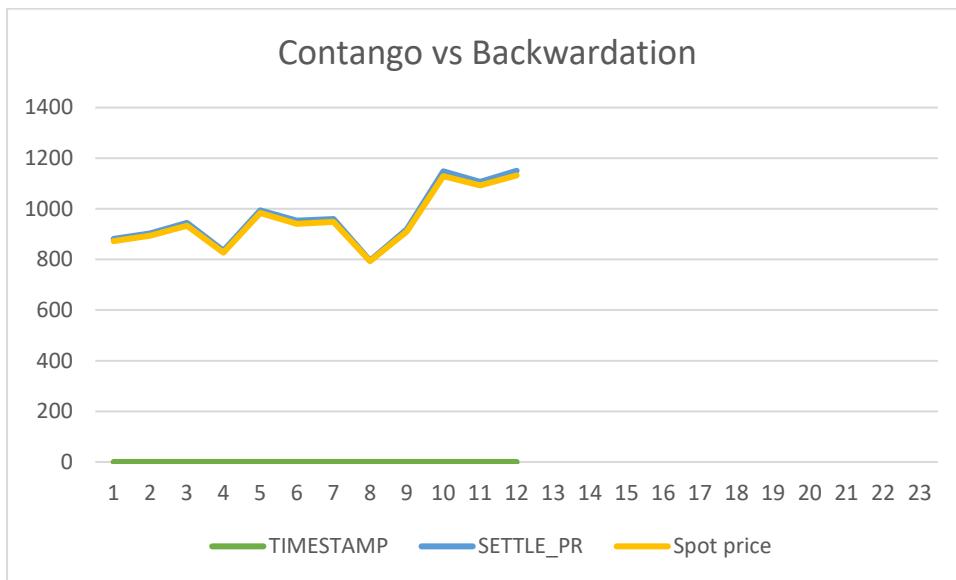
#### 4.1.4 Next Month – TATACHEM



#### 4.1.5 Far Month – BAJAJFINSV



#### 4.1.6 Far Month - TATACHEM



## 4.2 Significance of Frequency

Economic theories like the Random Walk Theory presuppose that a stock price or market's previous movements cannot be used to forecast its future course.

It considers technical analysis, which is an unreliable examination of stock price, volume, and return frequency.

However, investors place a high priority on realizing maximum returns. The Sharpe ratio is used to calculate the standard deviation across that time period using the frequency of the duration.

## **Section-5**

### **5.1 Conclusion - BAJAJFINSV**

According to the aforementioned data, monthly investments in underlying equity have produced the highest returns, but far-month monthly futures contracts have had the worst results. The monthly underlying equity contracts are the safest to invest in, while the far month monthly futures contracts are the riskiest of all.

Except for monthly equity assets, all underlying equities assets and equity futures have negative mean returns at all frequencies. Having such instruments is not advantageous for an investor.

### **5.2 Conclusion - TATACHEM**

According to the aforementioned data, monthly investments in underlying equity have produced the highest returns, but monthly futures contracts have had the worst results. The monthly underlying equity contracts are the safest to invest in, while the far monthly futures contracts are the riskiest of all.

All the monthly Equity futures have negative mean returns in near, next and far months.

Having such instruments is not advantageous for an investor.

## **Section-6**

### **6.1 References**

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