

An Analysis Report on
Underlying Assets
&
Deliverable Equity Futures

Submitted in the partial fulfillment of
FIN F311: Derivatives and Risk Management

Under the Supervision of
Dr. Thota Nagaraju
Assistant Professor
Department of Economics and Finance
BITS Pilani, Hyderabad Campus

By
Group 26



GROUP 26

AUTHORS

Name	Id. No.	Contributed
ANSHUL AVINASHE	2020A1PS2536H	YES
ANEESH VAIDYA	2020A4PS2266H	YES
PARIMI NAXITH ABHIRAM	2020A4PS0850H	YES



The Siemens logo is shown in a bold, blue, sans-serif font.

ABSTRACT

The objective of the portfolio analysis report is to analyze the equity and derivatives of companies Bharat Electronic Limited and Siemens from diverse sectors of the Indian Market. The selected time frame for both the companies is from 1st November 2021 to 31st October 2022 which is a duration of 12 months i.e. one year.

Each company's report begins with a brief introduction explaining the nature of the business, the pattern of ownership giving the shareholding pattern, a brief history of the company explaining the major milestones achieved, the influence of the company and its importance to the industry and concluding it with the greatness of the company, this gives the background analysis of the companies .

A table showing the mean returns for the three frequencies—daily, weekly, and monthly—formed the basis of the analysis. By contrasting the returns, a detailed study is given. Following that, the returns on equity were calculated and graphed against dates for each of the three frequencies. The returns were then risk-adjusted by subtracting the T-Bill rate for the same frequency in order to have a clearer picture. This demonstrates the extra returns earned. To understand the excess return per unit of risk taken, the Sharpe Ratio was calculated.

The underlying risk-adjusted and risk-unadjusted returns are compared to the risk-adjusted and risk-unadjusted returns of the futures instrument. An overview of the associated trends and a quick remark on backwardation and contango are included.

ACKNOWLEDGEMENT

We are extremely grateful to Dr. Thota Nagaraju for giving us the opportunity to work on this project. This project was a huge learning curve for us as it gave us a wonderful way to apply what we had learnt in our course. The project wouldn't be possible without the help and insights provided by Sir. We would like to thank Sir for being patient with us and giving us his precious time to help us figure out the project and guiding us through each and every step. We would also like to thank the Economics Department of BPHC for providing us with such a wonderful opportunity to gain hands-on experience in applying what we have learnt. The project has helped us develop skills in report making and researching for data furthermore improving our skills so as for us to excel in the field. The project was challenging and every difficulty we encountered encouraged us to do more research and learn more about the topic.

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SECTION 1:

INTRODUCTION:

i) Nature of the business

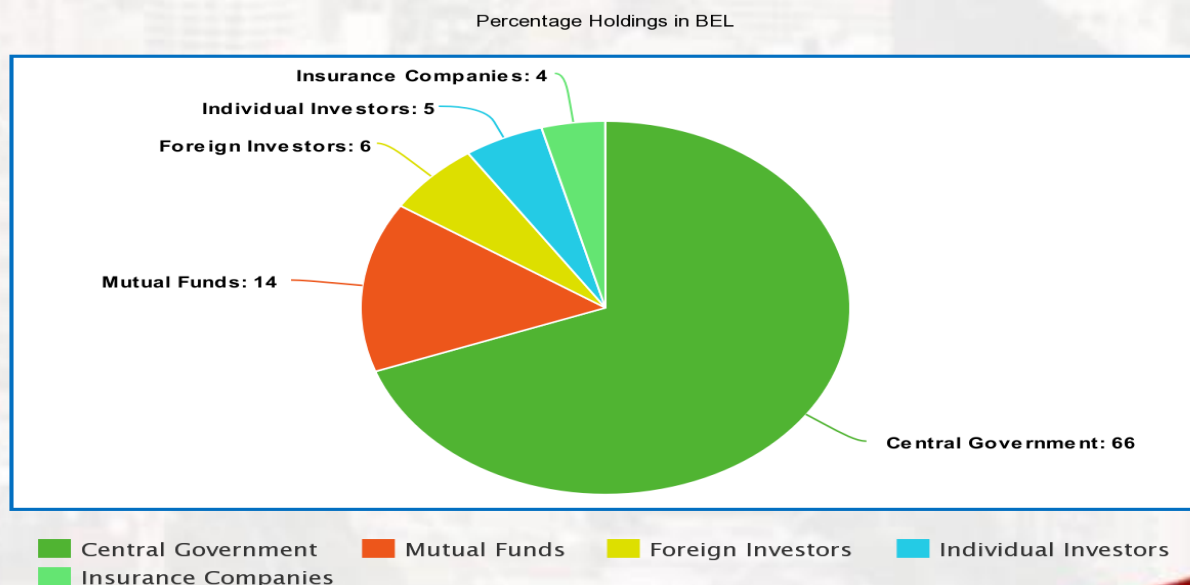
BEL: BEL is an aerospace and defence electronics manufacturing company. It is owned by the Indian Government. It is a PSU with a Navaratna status granted by the Indian Government. It produces electronic products which find application in space and ground operations of the Indian Armed Forces.

Siemens: Siemens is a multinational industrial manufacturing European company headquartered in Munich. The major segments into which the corporation focuses are Industry, Healthcare, Energy, Infrastructure and Cities. Its one of the major manufacturers of medical equipment. Its medical healthcare and industrial automation division generate the maximum revenue. Siemens is listed on the Euro Stoxx 500 stock market index.

ii) Public or private ownership

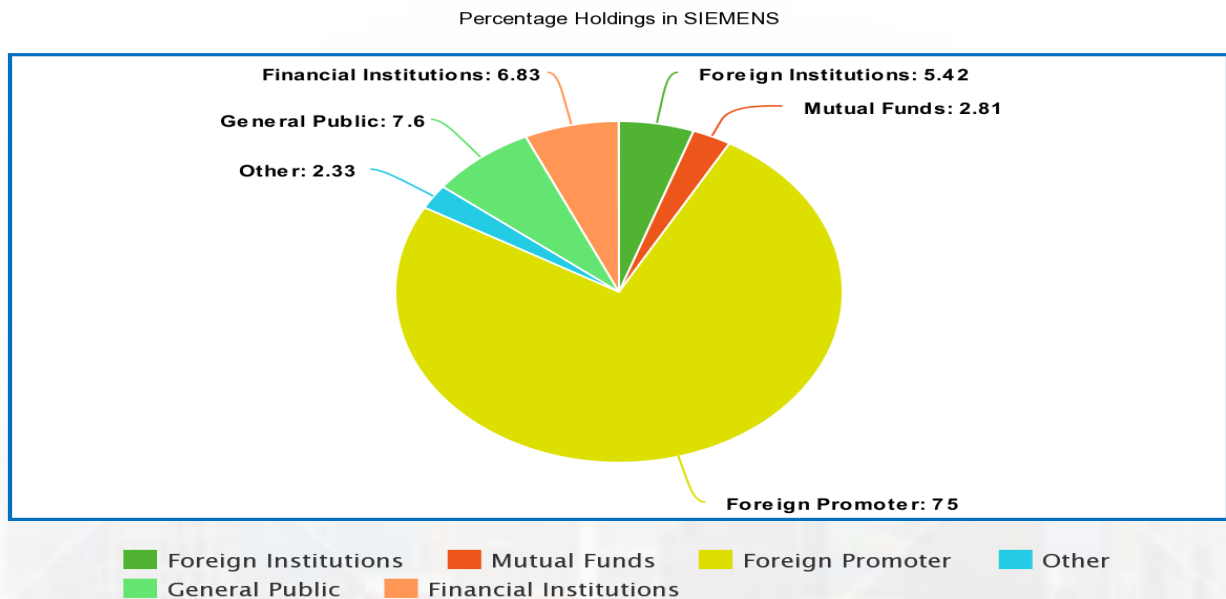
BEL: Public Ownership

Bharat Electronics is owned by the Central Government (66%), Mutual Funds and UTI (14%), Foreign institutional investors (6%), individual investors (5%) and insurance companies (4%).



Siemens: Public Ownership

There are more than 188,000 Siemens employees which are also shareholders of the company across the globe.



meta-chart.com

iii) When did these companies started & under what circumstances

BEL: BEL was setup in 1954 at Bangalore by the Government of India under the Ministry of Defense. It was setup to develop solutions to the needs of electronic equipment of the Indian Armed Forces. Today, BEL manufactures various products using a large variety of technologies and serves customers across the globe.

Siemens: Siemens was founded by Werner von Siemens and Johann Georg Halske in Berlin, Germany. The duo aimed to build telegraph installations and other electrical equipment in Berlin.

iv) Which Industry they belongs? And their importance in the industry?

BEL: India is considered as a major manufacturing hub. India's domestic electronics production grew from 29 Billion USD in 2014-15 to 67 Billion USD in 2020-21 and its contribution is roughly 3.4% of India's GDP. BEL serves Indian Defense Services, Civil Aviation, Meteorological Department, Space Department, Telecommunication Department, Power Sector, Oil Industry, Railways, All India

Radio, Door darshan, Police, State Governments, Public Sector Undertakings and many more. The company has made India increasingly ready for attacks by developing advanced machines and has brought the Indian industry to global standards.

Siemens: The Indian Electronics Market has grown from 69.6 Billion USD in 2012 to 400 Billion USD in 2020 by a compounded growth rate of 25%. Siemens group has been a pioneer of technological solutions in its business segments in which its represented by various companies. Siemens uses cutting edge technology to create end to end solutions for various problems. Siemens is able to combine its products, systems and services to create megaprojects like hospitals, airports and industrial units.

v) Overall greatness of the companies

BEL: BEL is one of the elite PSUs with the Navaratna status granted by the Government of India. BEL has been able to maintain its mark in the electronics industry amidst the industry's growth and diversification. In 2010-11, its turnover was Rs 5561.03 Crores. It has received the Dun & Bradstreet's Rolta Corporate Award under the Electronic and Electrical equipment category in 2010 and the SCOPE (Standing Conference for Public Enterprises) Meritorious Award for Corporate Governance for year 2009-10.

Siemens: Siemens runs 17 companies in India and provides employment to more than 18000 people. It owns 21 manufacturing plants, a wide network of sales and service offices across the country and more than 500 channel partners. Siemens has been a value-adder in its customers' lives through its product offerings and has always ensured green standards and energy efficiency in its factories, supply chains, buildings, energy grids and transportation.

SAMPLE RETURNS OF BEL

Risk-unadjusted Returns of BEL

Returns	Daily	Weekly	Monthly
Mean(%)	0.2155	1.078	4.9516
Max(%)	6.5477	11.1642	17.5565
Min(%)	-6.3548	-8.8687	-1.5929

Standard Deviation	2.0853	4.7947	6.765
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The unadjusted returns for BEL are as above. Their graphs shown below indicate daily, weekly and monthly frequencies. MS Excel has been used to perform frequency sampling calculations. The results have been displayed here for the reader's convenience. Data has been expressed in percentages to maintain regularity throughout the report.

Readers can observe from the above table that all the mean frequencies are positive meaning that the company has successfully preserved shareholder's invested capital. Shareholders have also benefited by significant returns on their short-term investments.

Risk-adjusted Returns of BEL

Returns	Daily	Weekly	Monthly
Mean(%)	0.1697	1.0317	4.905
Max(%)	6.5103	11.124	17.501
Min(%)	-6.3902	-8.9297	-1.6421
Standard Deviation	2.0849	4.794	6.761

The adjusted returns for BEL are as above. Their graphs shown below indicate daily, weekly and monthly frequencies. MS Excel has been used to perform frequency sampling calculations. The results have been displayed here for the reader's convenience. Data has been expressed in percentages to maintain regularity throughout the report.

The mean risk-adjusted returns for the previous year are all positive. This signals that the stock has performed better than risk-free return investments and preserved the share owners' invested capital.

Economic Interpretation of BEL

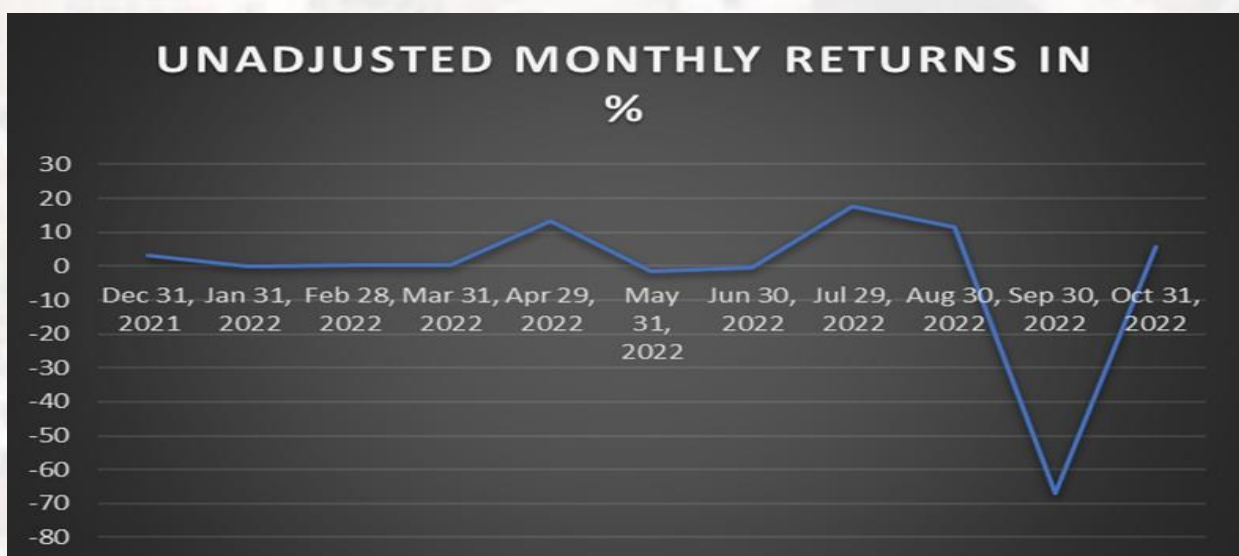
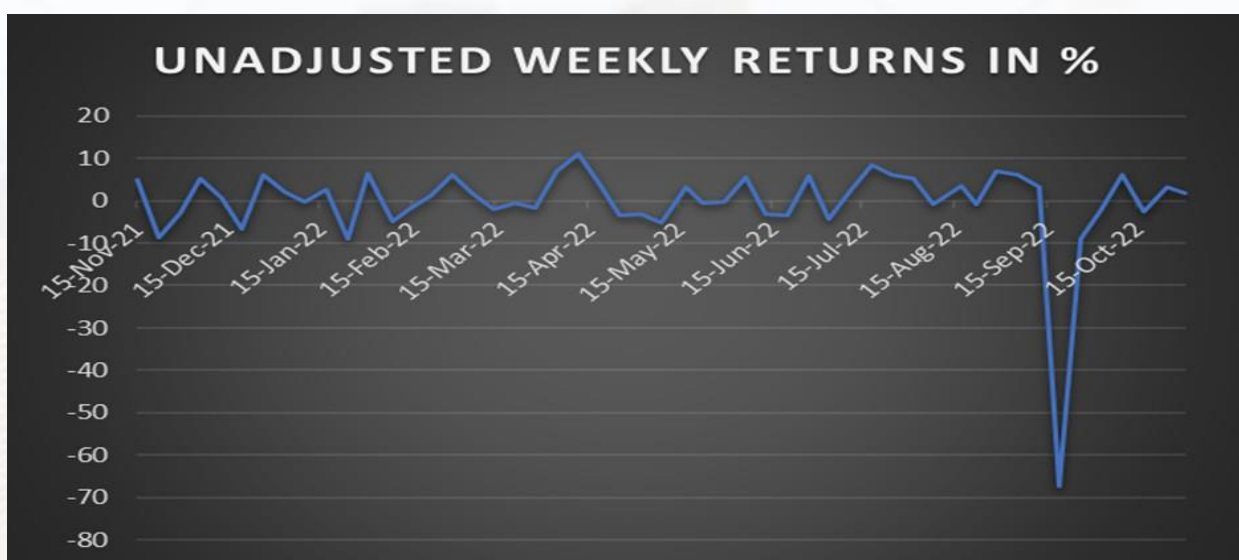
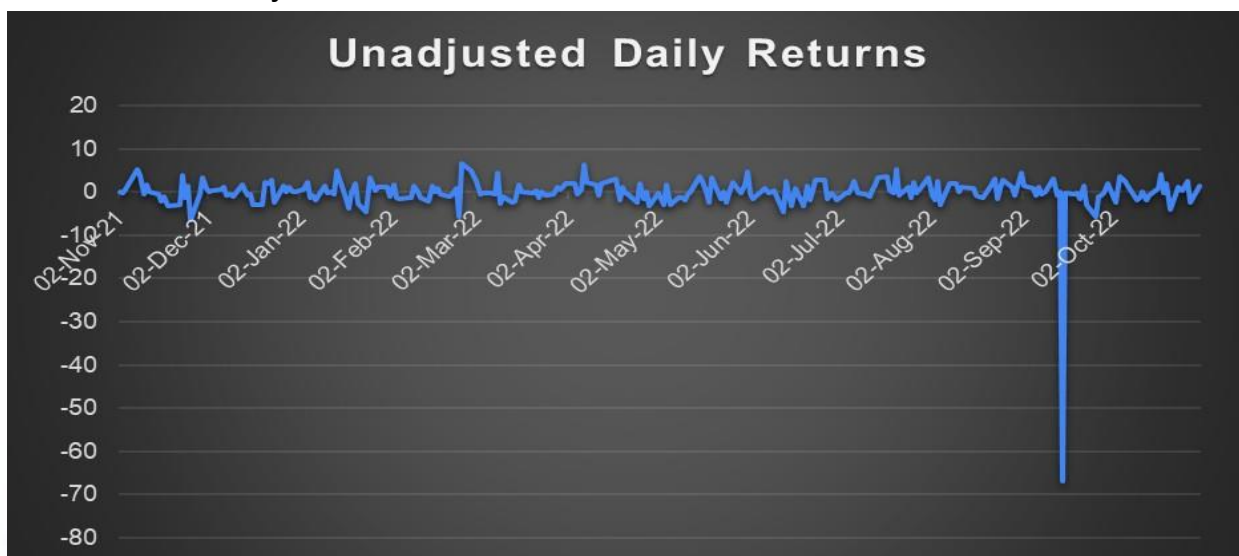
To decide whether to take advantage of the low risk-free rate in exchange for safety or to take a risk with the invested capital in order to earn a high rate of return, risk unadjusted returns do not provide enough information. However, by analysing risk adjusted returns' positive or negative nature, we can make the same decision. The difference between the return on investment of a high-risk, high-return investment and an investment with a risk-free rate is what constitutes positive risk adjusted returns. To obtain a favourable reward to risk ratio, it is necessary to analyse risk free rates. BEL recommends that we take advantage of high-risk, high-return investments.

A well-known metric called the Sharpe ratio shows the return on investment for a given amount of risk. An investor can opt to invest in the first situation but should refrain from doing so in the second because positive and negative sharp ratios signal positive and negative adjusted returns, respectively. To put it another way, a higher Sharpe ratio denotes a higher rate of return on investment.

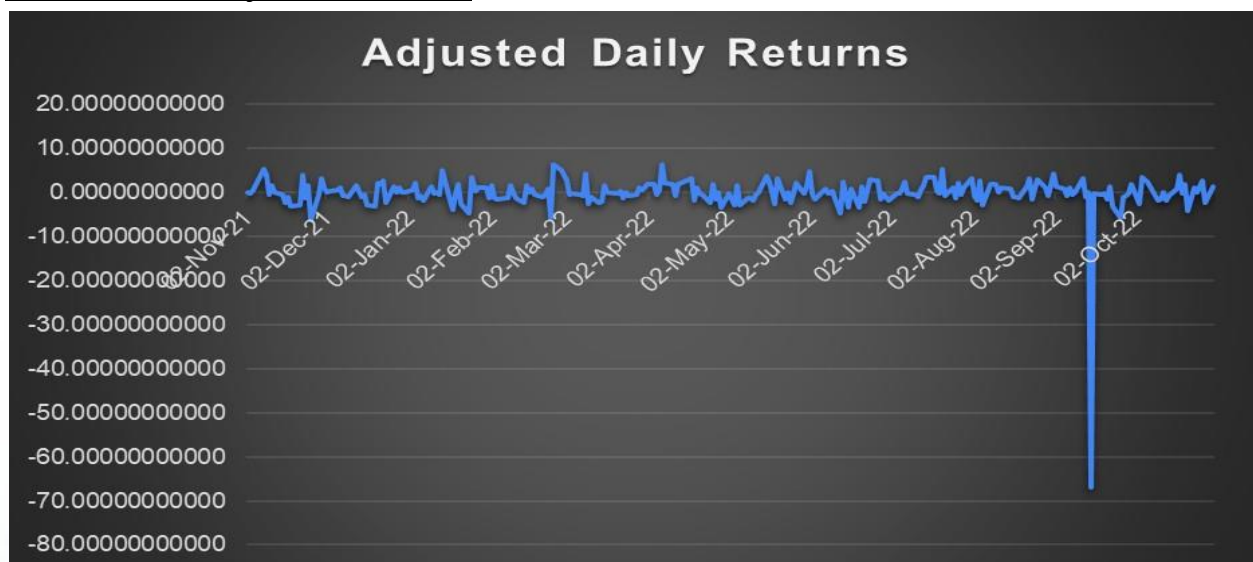
It is clear that the daily, weekly, and monthly estimates all show a rise in the mean rate of return and volatility in the same order. Risk-adjusted and risk-unadjusted returns have nearly identical standard deviations. This happens since risk-adjusted returns are quite close to risk-unadjusted returns. The stock has had significant price swings, making it an aggressive and hazardous stock to trade.

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price.

Plots of Risk Unadjusted Returns



Plots Of Risk Adjusted Returns



Sharpe Ratio

$$S(x) = (R_x - R_f) / \text{Std. Dev}(x)$$

Here: x = investment

R_x = average rate of return on x

R_f = best available rate of return on risk-free securities (T-bills)

Std. Dev (x) is the standard deviation of R_x

Frequency	Sharp Ratio
Daily	0.0814
Weekly	0.2152
Monthly	0.7255

As its clear from the above table, the sharp ratio is the highest for monthly, followed by weekly and daily. From this, we can infer that monthly trading on the BEL stock will yield a higher return for the same amount of risk as compared to weekly and daily trading.

Sharp Ratio VS Frequency Graph



SAMPLE RETURNS OF SIEMENS

Risk-unadjusted Returns

Returns	Daily	Weekly	Monthly
Mean(%)	0.1254	0.6022	2.9707
Max(%)	7.6487	14.9778	12.2372
Min(%)	-5.3395	-7.4666	-4.0896
Standard Deviation	1.8241	4.1644	5.6323

The unadjusted returns for Siemens are as above. Their graphs shown below indicate daily, weekly and monthly frequencies. MS Excel has been used to perform frequency sampling calculations. The results have been displayed here for the reader's convenience. Data has been expressed in percentages to maintain regularity throughout the report.

Readers can observe from the above table that all the mean frequencies are positive meaning that the company has successfully preserved shareholder's invested capital. Shareholders have also benefited by significant returns on their short-term investments.

Risk-adjusted Returns

Returns	Daily	Weekly	Monthly
Mean(%)	0.0796	0.5556	2.9227
Max(%)	7.6137	14.9422	12.1812
Min(%)	-5.375	-7.5067	-4.1299
Standard Deviation	1.8238	4.1638	5.6303

The adjusted returns for Siemens are as above. Their graphs shown below indicate daily, weekly and monthly frequencies. MS Excel has been used to perform frequency sampling calculations. The results have been displayed here for the reader's convenience. Data has been expressed in percentages to maintain regularity throughout the report.

The mean risk-adjusted returns for the previous year are all positive. This signals that the stock has performed better than risk-free return investments and preserved the share owners' invested capital.

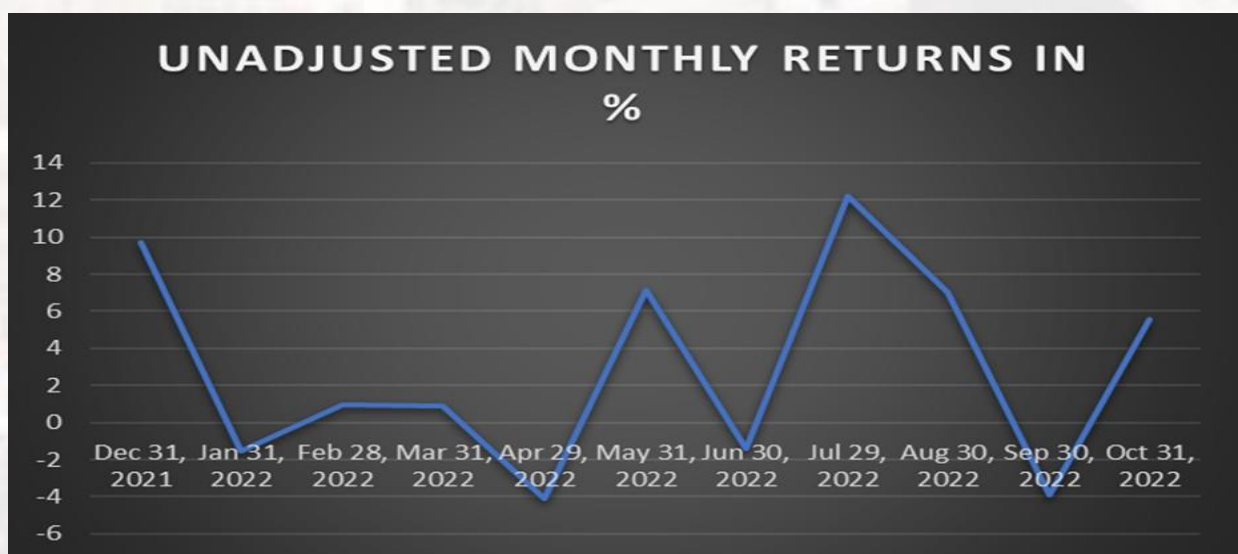
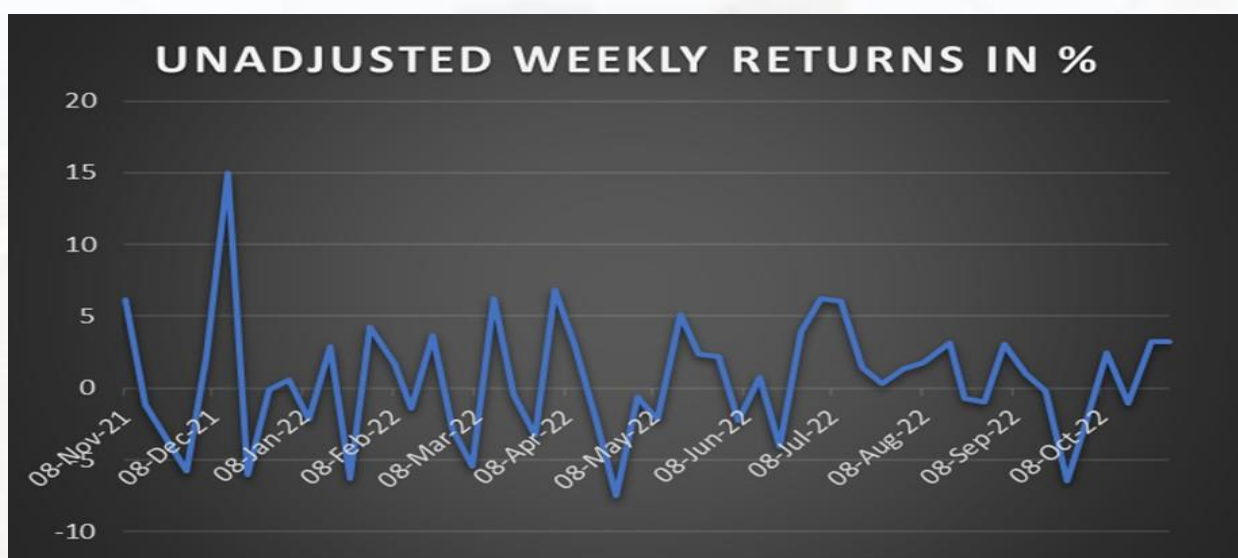
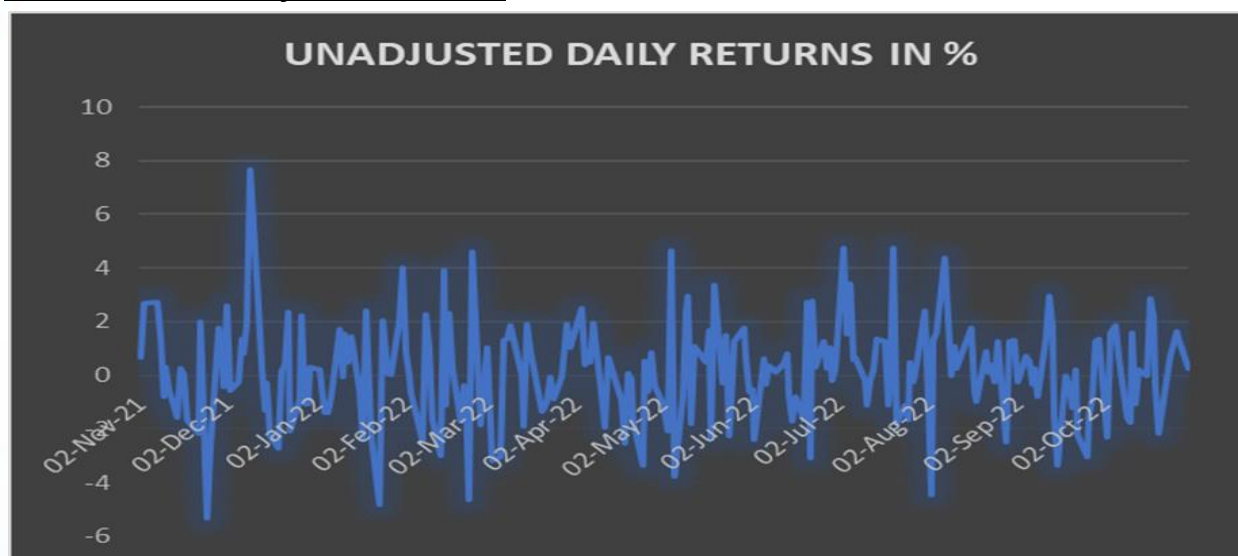
Economic Interpretation

Risk unadjusted returns do not offer enough information to decide whether to avail the low risk-free rate in return of safety or to risk the invested capital for a high rate of return. But risk adjusted returns enable us to decide the same by their positive or negative nature. Positive risk adjusted returns are essentially the differences between return on investment of a high-risk and a high return investment and an investment with a risk-free rate. Risk free rates need to be analysed to get a good reward to risk ratio. In the case of Siemens, they suggest us to avail the high-risk, high-rate of return investments.

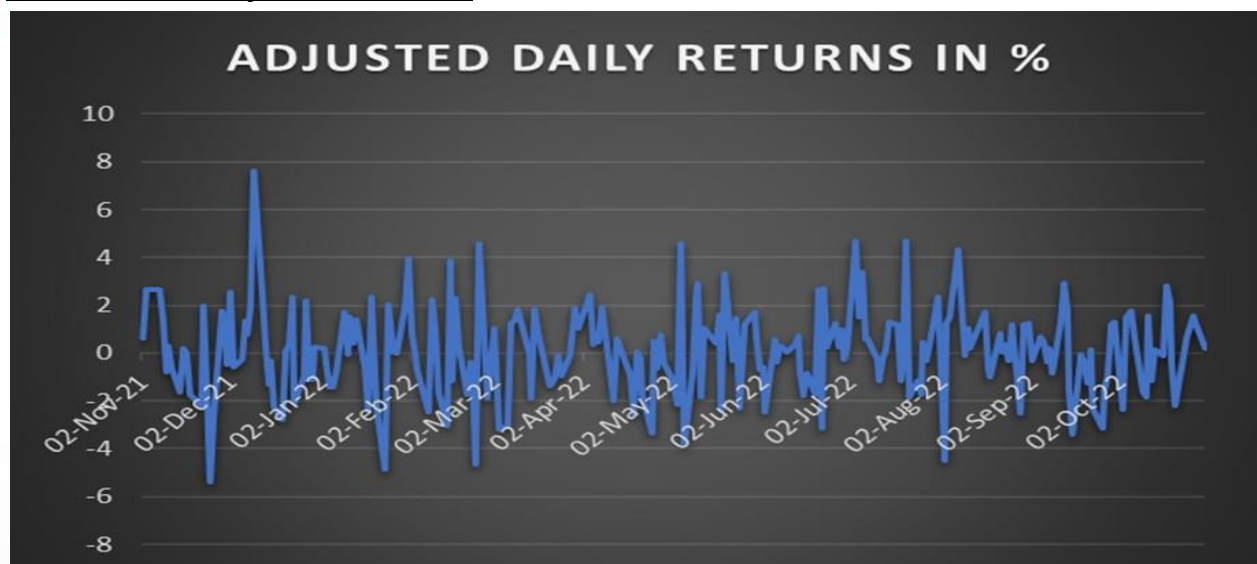
The Sharpe ratio, a renown metric, is an indicator of return on investment for its corresponding level of risk. A positive and a negative sharp ratio indicate positive and negative adjusted returns and an investor can choose to invest in the former case but should avoid doing so in the latter. In other words a larger Sharpe ratio indicates a better return on investment.

It is evident that the mean rate of return and volatility in the daily, weekly and monthly calculations increase in the same sequence. The standard deviations for risk-adjusted and risk-unadjusted returns are almost the same. This occurs because risk-adjusted returns are just some differences away from risk-unadjusted returns. The stock has undergone large price changes and can be considered as an aggressive and a risky stock for trading.

Plots of Risk Unadjusted Returns



Plots Of Risk Adjusted Returns



Sharpe Ratio

$$S(x) = (R_x - R_f) / \text{Std. Dev}(x)$$

Here: x = Investment

R_x = Average rate of return on x

R_f = Best available rate of return on risk-free securities (T-bills)

Std. Dev (x) is the standard deviation of R_x

Frequency	Sharp Ratio
Daily	0.0436
Weekly	0.1334
Monthly	0.5191

As its clear from the above table, the sharp ratio is the highest for monthly, followed by weekly and daily. From this, we can infer that monthly trading on the Siemens stock will yield a higher return for the same amount of risk as compared to weekly and daily trading.

Sharp Ratio VS Frequency Graph



SECTION 2:

WHEN IT STARTED

The NSE started trading in derivatives with the launch of index futures on 12th June 2000. BEL was listed on the NSE on 1st January 2003 and SIEMENS was listed on 1st January 2002. Since then the trading volume has increased day by day.

Lot size and contract details of BEL

Symbol	BEL
Instrument	FUTSTK
Lot size	5700 shares
Expiry Date	Last Thursday of the expiry month. If last Thursday is a trading holiday, then the expiry day is the previous trading day
Trading Cycle	3-month trading cycle – the near month (one), the next month (two), and the far month (three).
Trading Hours	As in the equity derivative segment.
Price Stops	Rs. 0.05
Price Band	Operating range of 10% of the base price.

Lot size and contract details of SIEMENS

Symbol	SIEMENS
Instrument	FUTSTK
Lot size	275 shares
Expiry Date	Last Thursday of the expiry month. If last Thursday is a trading holiday, then the expiry day is the previous trading day
Trading Cycle	3-month trading cycle – the near month (one), the next month (two), and the far month (three).
Trading Hours	As in the equity derivative segment.
Price Stops	Rs. 0.05
Price Band	Operating range of 10% of the base price.

OVERALL GREATNESS OF FUTURE DERIVATIVES

BEL near month

Fundamentals		Historical Data	
	Print	Order Book	Intra-day
Traded Volume (contracts)	3,467		Future v/s Index
Traded Value * (lacs)	20,921.92		
VWAP	105.87		
Underlying value	105.30		
Market Lot	5700		
Open Interest	9,52,98,300		
Change in Open Interest	45,71,400		
% Change in Open Interest	5.04		
Implied Volatility	-		

Buy Qty.	Buy Price	Sell Price	Sell Qty.
39,900	106.00	106.15	5,700
11,400	105.95	106.20	34,200
39,900	105.90	106.25	62,700
51,300	105.85	106.30	68,400
39,900	105.80	106.35	1,02,600
19,20,900	Total Quantity		42,92,100

☐ Cost of Carry

BEL next month

Fundamentals		Historical Data	
	Print	Order Book	Intra-day
Traded Volume (contracts)	224		Future v/s Index
Traded Value * (lacs)	1,359.54		
VWAP	106.48		
Underlying value	105.30		
Market Lot	5700		
Open Interest	23,19,900		
Change in Open Interest	3,02,100		
% Change in Open Interest	14.97		
Implied Volatility	-		

Buy Qty.	Buy Price	Sell Price	Sell Qty.
5,700	106.70	106.95	17,100
11,400	106.65	107.10	11,400
22,800	106.60	107.15	11,400
5,700	106.45	107.20	17,100
11,400	106.40	107.30	11,400
3,99,000	Total Quantity		3,13,500

☐ Cost of Carry

BEL far month

Fundamentals	Historical Data	Order Book	Intra-day	Future v/s Index
	Print			
Traded Volume (contracts)	17			
Traded Value * (lacs)	103.25			
VWAP	106.55			
Underlying value	105.30			
Market Lot	5700			
Open Interest	1,25,400			
Change in Open Interest	62,700			
% Change in Open Interest	100.00			
Implied Volatility	-			

Buy Qty.	Buy Price	Sell Price	Sell Qty.
5,700	106.55	107.15	11,400
5,700	106.10	107.30	5,700
5,700	106.05	107.55	17,100
5,700	105.30	108.20	17,100
5,700	105.00	108.30	5,700
74,100	Total Quantity		85,500

Cost of Carry

SIEMENS near month

Fundamentals	Historical Data	Order Book	Intra-day	Future v/s Index
	Print			
Traded Volume (contracts)	1,253			
Traded Value * (lacs)	9,563.78			
VWAP	2,775.53			
Underlying value	2,775.00			
Market Lot	275			
Open Interest	20,09,700			
Change in Open Interest	30,525			
% Change in Open Interest	1.54			
Implied Volatility	-			

Buy Qty.	Buy Price	Sell Price	Sell Qty.
275	2,782.55	2,786.25	275
275	2,782.50	2,786.90	275
275	2,782.05	2,787.70	275
275	2,782.00	2,788.00	1,375
275	2,781.15	2,788.10	550
50,050	Total Quantity		72,875

SIEMENS next month

Fundamentals		Historical Data	
	Print	Order Book	Intra-day
Traded Volume (contracts)	34	Future v/s Index	
Traded Value * (lacs)	260.93	Buy Qty.	Buy Price
VWAP	2,790.68	275	2,794.35
Underlying value	2,775.00	275	2,793.40
Market Lot	275	275	2,793.00
Open Interest	21,175	275	2,791.00
Change in Open Interest	2,750	275	2,790.75
% Change in Open Interest	14.93	24,200	Total Quantity
Implied Volatility	-		22,275

SIEMENS far month

Fundamentals		Historical Data	
	Print	Order Book	Intra-day
Traded Volume (contracts)	3	Future v/s Index	
Traded Value * (lacs)	23.13	Buy Qty.	Buy Price
VWAP	2,803.20	275	2,803.00
Underlying value	2,775.00	825	2,787.95
Market Lot	275	275	2,755.00
Open Interest	2,475	550	2,753.45
Change in Open Interest	550	275	2,750.00
% Change in Open Interest	28.57	2,200	Total Quantity
Implied Volatility	-		2,200

UNADJUSTED RETURNS

The sample returns are calculated in excel and are also listed here for your reference. (These are all in percentages to maintain uniformity throughout the report). In the graphs x-axis has dates and Y-axis has returns in percent. Unadjusted Returns are calculated by :

$$\text{Unadjusted Returns} = (P(i) - P(i-1)) / P(i-1) ; \text{ where } P(i) \text{ is the closing price on that day}$$

Current Month BEL

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.2195	1.0762	5.5344
Max	6.6004	10.7159	19.7615
Min	-6.0950	-9.3146	-5.8931
Standard Deviation	2.0854	4.7764	8.0173

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price.

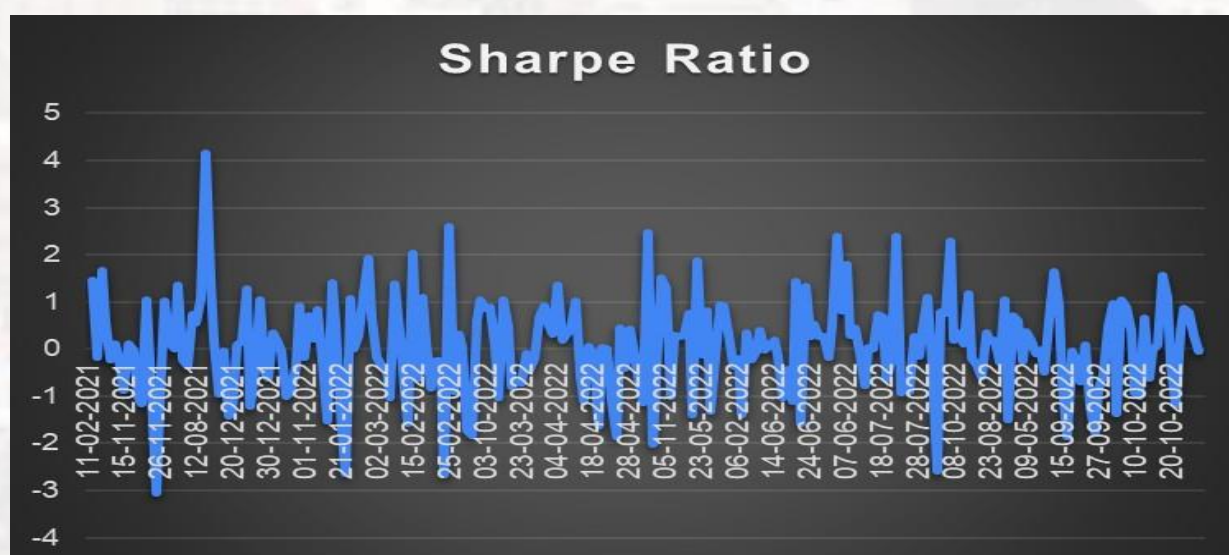
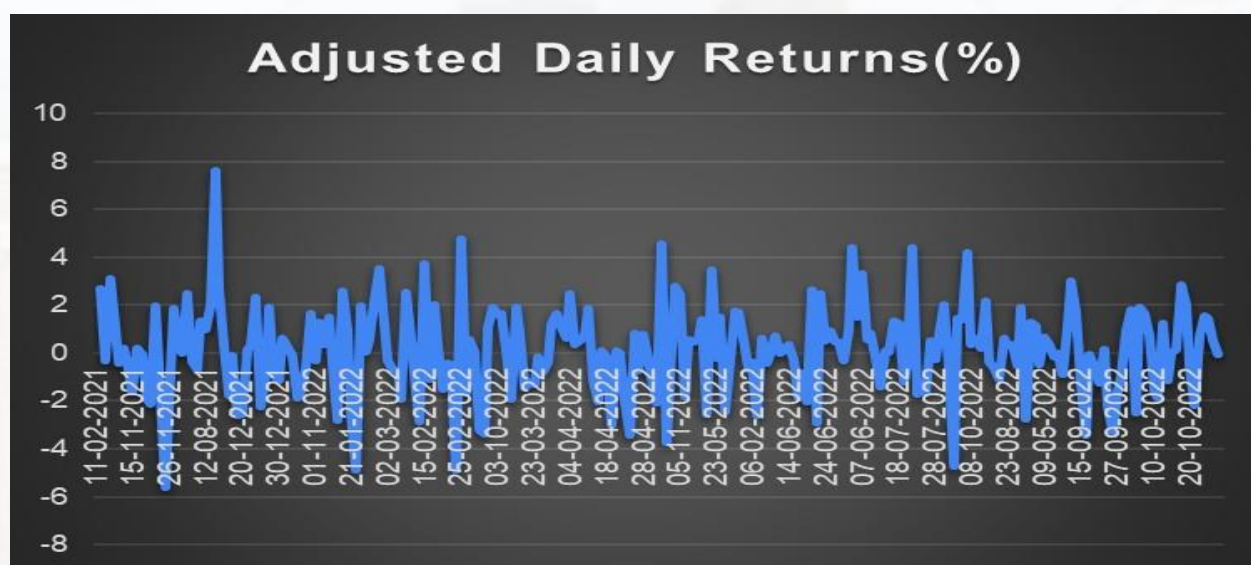
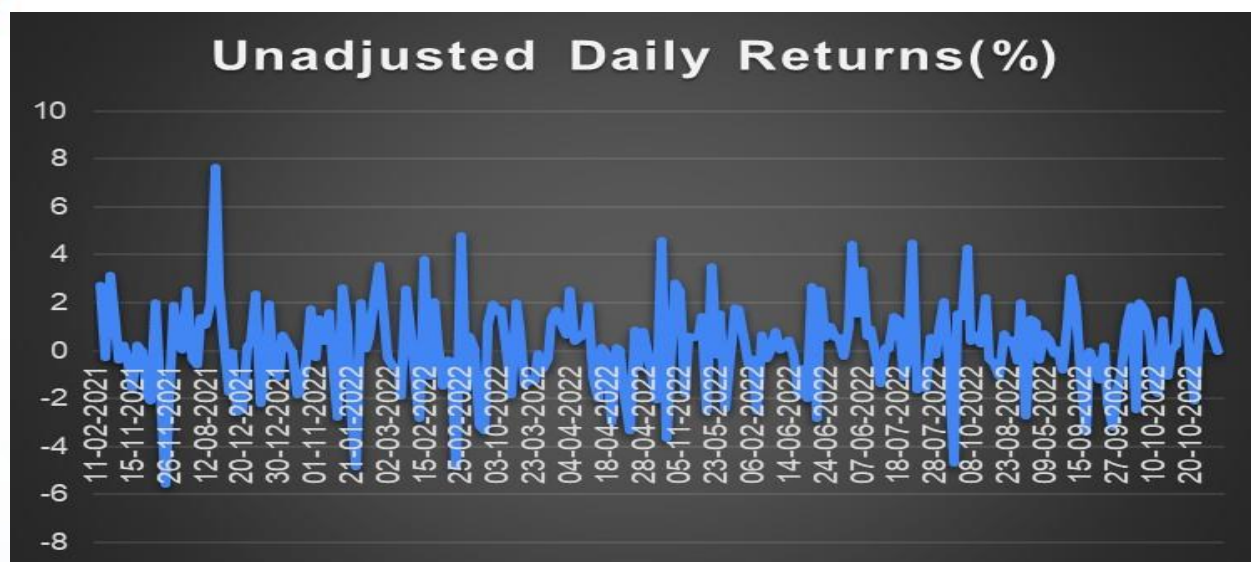
Current Month BEL Graphs



Current Month SIEMENS:

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.1261	0.6089	3.1324
Max	7.5630	15.2565	14.9150
Min	-5.1647	-8.0275	-3.4645
Standard Deviation	1.8430	4.3401	6.1543

CURRENT MONTH SIEMENS GRAPHS

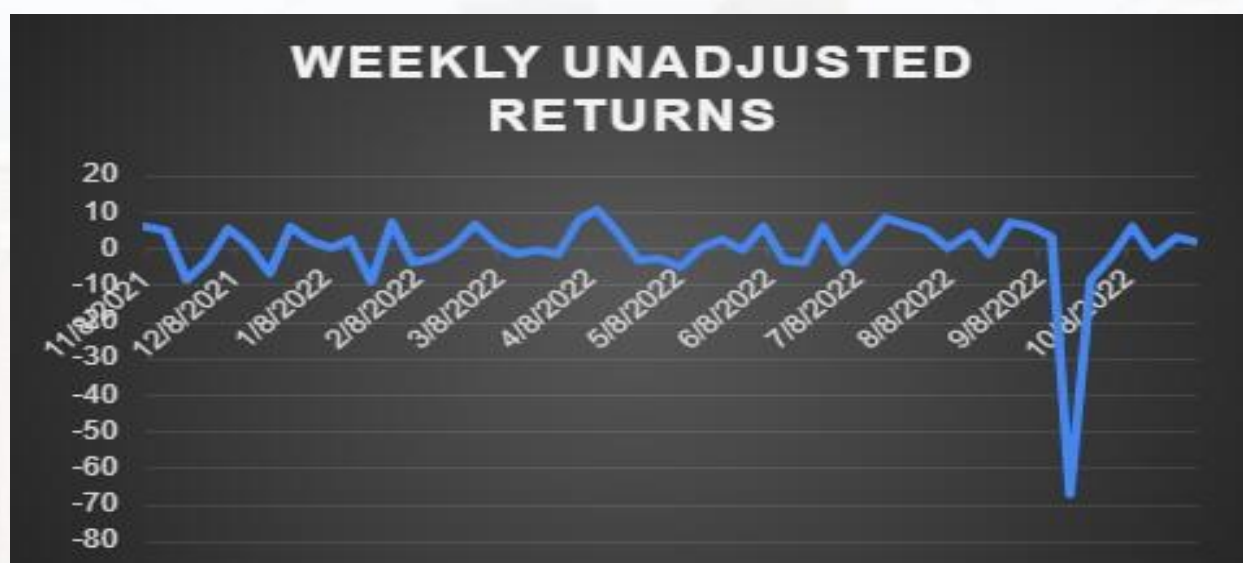


Next Month BEL

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.2197	1.0755	5.0469
Max	6.5781	10.7675	17.6747
Min	-6.1734	-9.3050	-1.8375
Standard Deviation	2.0814	4.7852	6.8833

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price.

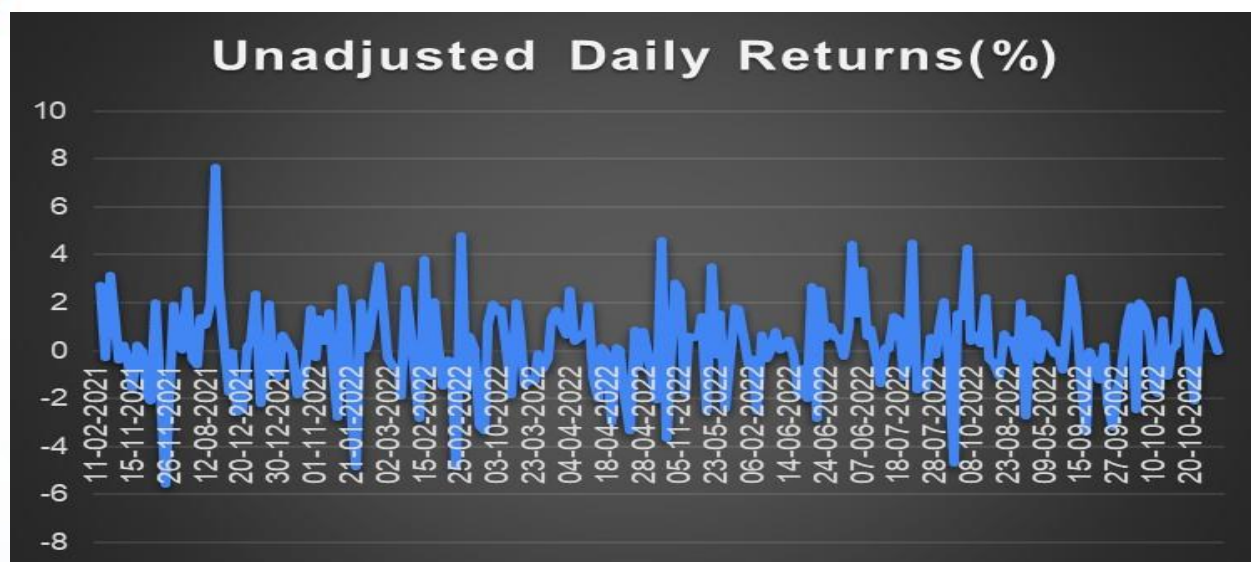
Next Month BEL Graphs



Next Month SIEMENS:

Returns/Frequency	Daily	Weekly	Monthly
Mean	0.1252	0.6076	3.1084
Max	7.6671	15.5290	14.9385
Min	-5.5714	-7.9948	-3.5218
Standard Deviation	1.8403	4.3417	6.0641

NEXT MONTH SIEMENS GRAPHS



Far Month BEL

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.2202	1.0738	5.0322
Max	7.3229	10.9858	18.0808
Min	-6.7199	-9.1349	-3.0693
Standard Deviation	2.1459	4.8879	7.0742

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price.

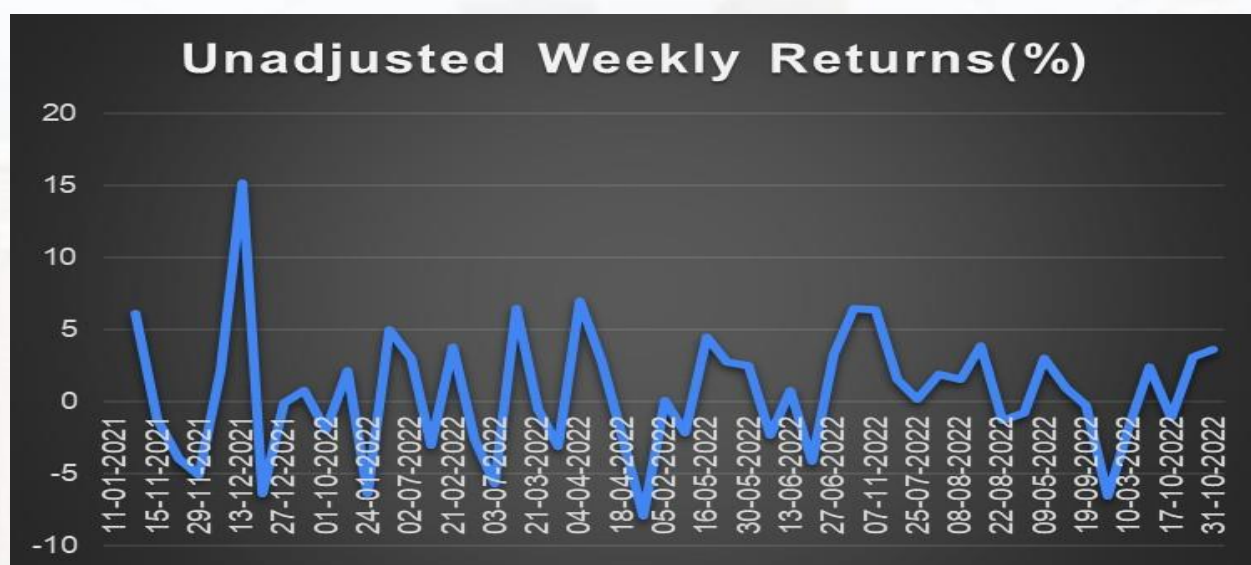
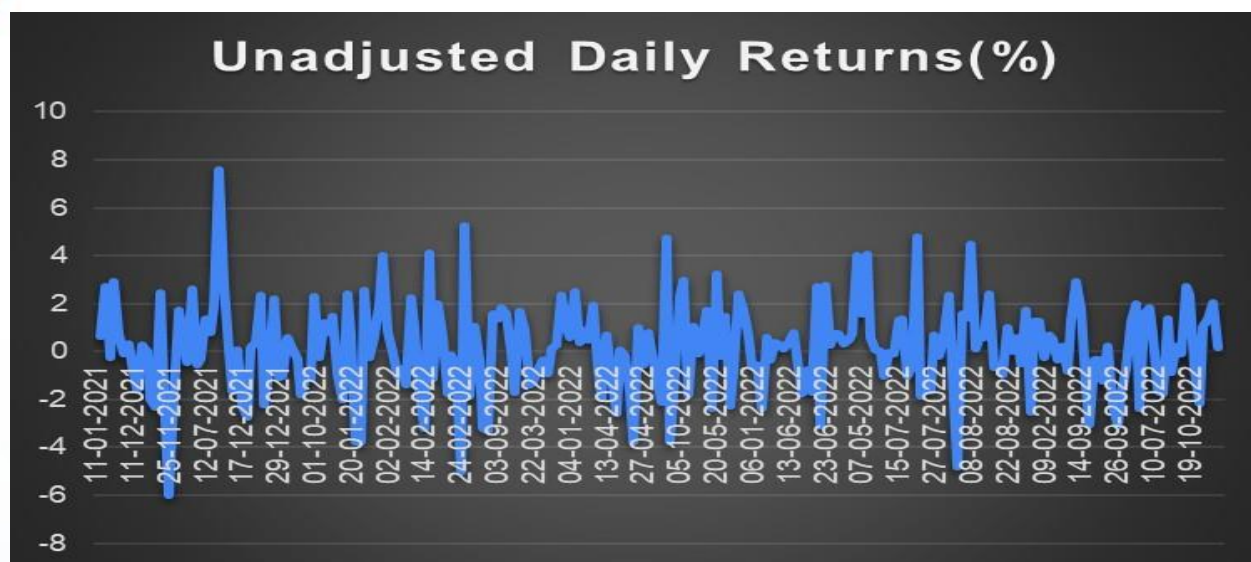
Far Month BEL Graphs



Far Month SIEMENS

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.1293	0.6186	3.1321
Max	7.6043	15.2411	15.1214
Min	-5.9833	-7.9569	-3.2959
Standard Deviation	1.8691	4.2731	6.1702

FAR MONTH SIEMENS GRAPHS



ADJUSTED RETURNS

The sample returns are calculated in excel and are also listed here for your reference. (These are all in percentages to maintain uniformity throughout the report). The adjusted returns are calculated by subtracting the the returns of the risk free asset which in our case is the T-bills. Thus,

$$\text{Adjusted Returns} = \text{Unadjusted Returns} - \text{T-bill Returns}$$

Near Month BEL

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.1738	1.0298	5.4877
Max	6.5617	10.6760	19.7212
Min	-6.1304	-9.3522	-5.9422
Standard Deviation	2.0850	4.7757	8.0146

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price

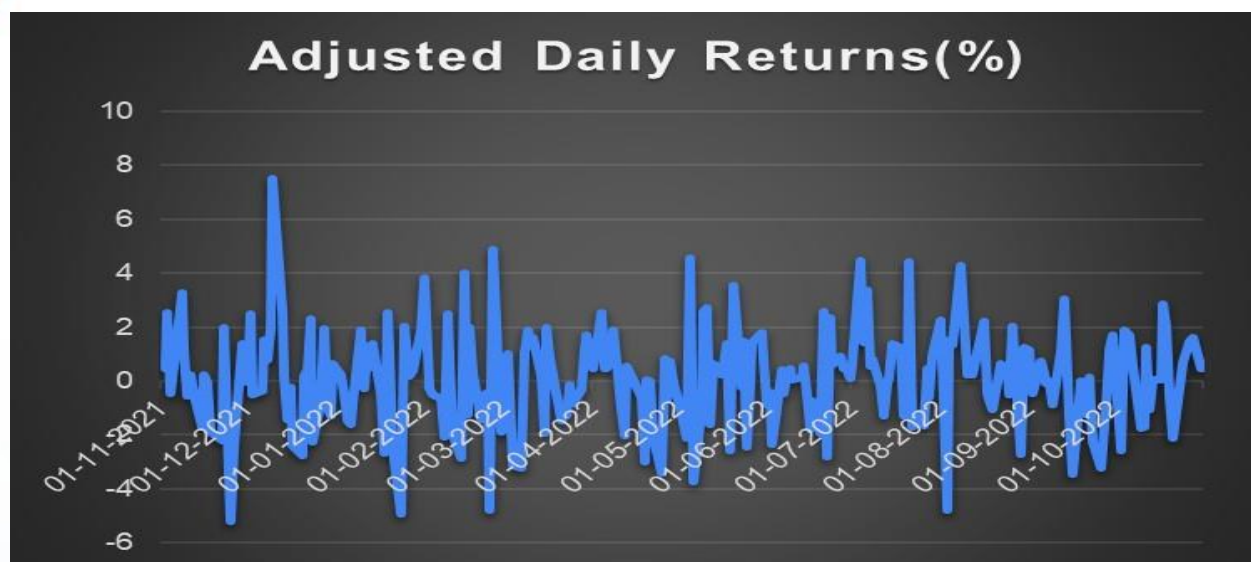
NEAR MONTH BEL GRAPHS



Near Month SIEMENS

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.0804	0.5623	3.0845
Max	7.5280	15.2209	14.8590
Min	-5.2002	-8.0676	-3.5028
Standard Deviation	1.8426	4.3395	6.1521

NEAR MONTH SIEMENS GRAPHS



Next Month BEL

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.1740	1.0291	5.0003
Max	6.5394	10.7276	17.6187
Min	-6.2088	-9.3426	-1.8866
Standard Deviation	2.0810	4.7845	6.8792

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price

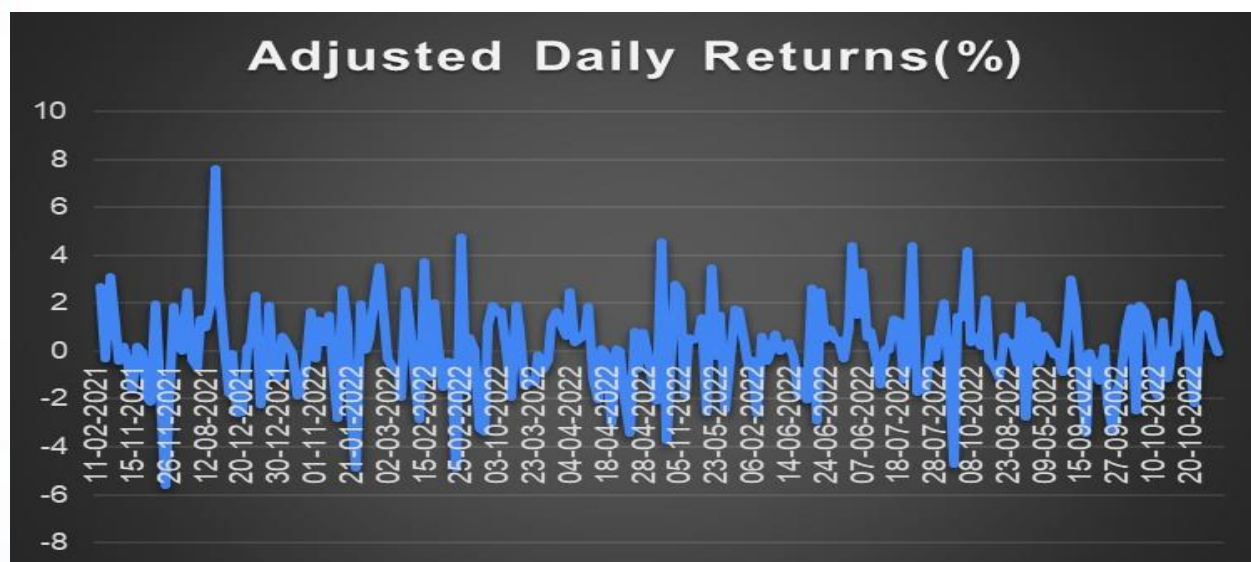
NEXT MONTH BEL GRAPHS



Next Month SIEMENS

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.0795	0.5610	3.0604
Max	7.6319	15.4934	14.8825
Min	-5.6069	-8.0349	-3.5601
Standard Deviation	1.8399	4.3411	6.0617

NEXT MONTH SIEMENS GRAPHS

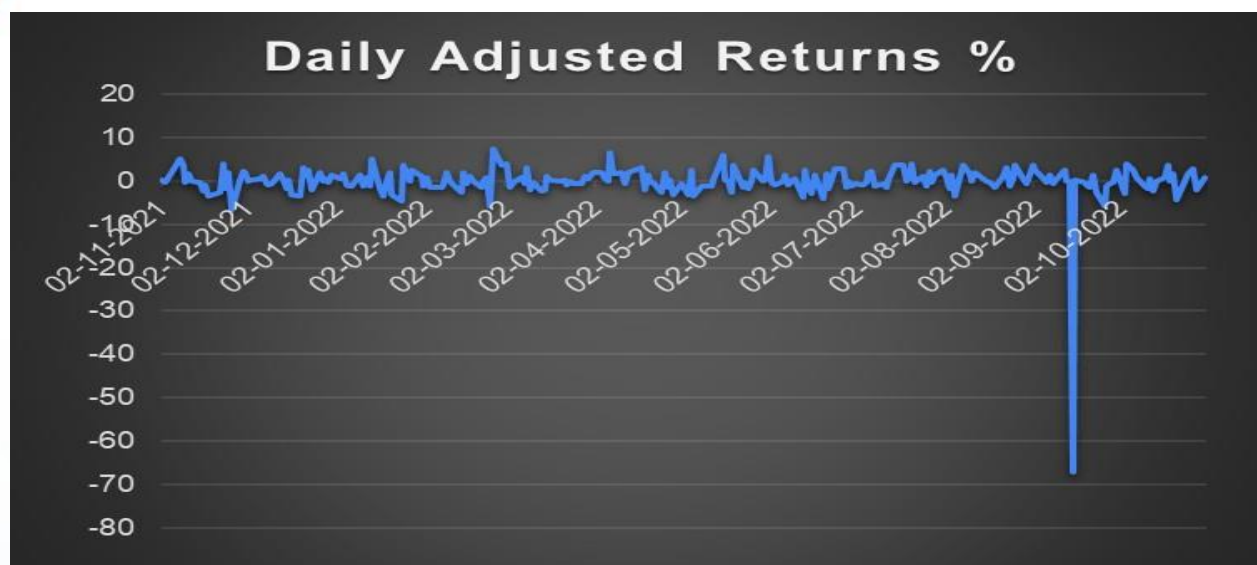


Far Month BEL

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.1745	1.0274	4.9856
Max	7.2855	10.9459	18.0248
Min	-6.7553	-9.1725	-3.1184
Standard Deviation	2.1456	4.8873	7.0705

*As you will notice there is a sudden dip in the graph of BEL it is because there was a 3-for-1 stock split thus that drop should be neglected as the calculation are done on closing price.

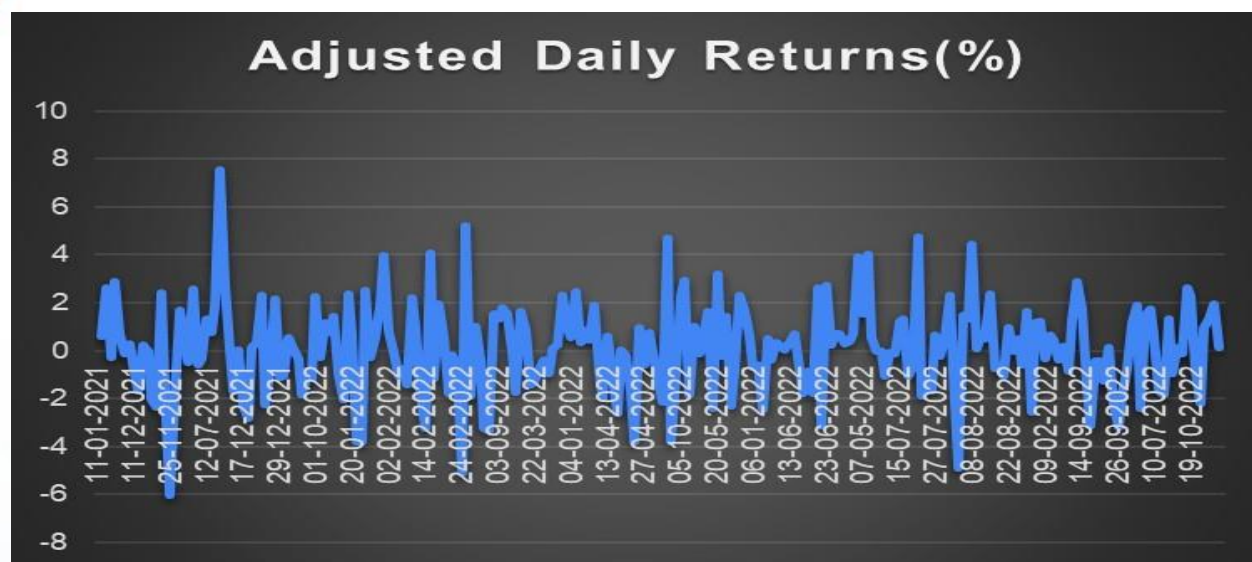
FAR MONTH BEL GRAPHS



Far Month SIEMENS

Frequency Returns(%)	Daily	Weekly	Monthly
Mean	0.0835	0.5720	3.0842
Max	7.5693	15.2055	15.0654
Min	-6.0188	-7.9970	-3.3342
Standard Deviation	1.8688	4.2724	6.1678

FAR MONTH SIEMENS GRAPHS



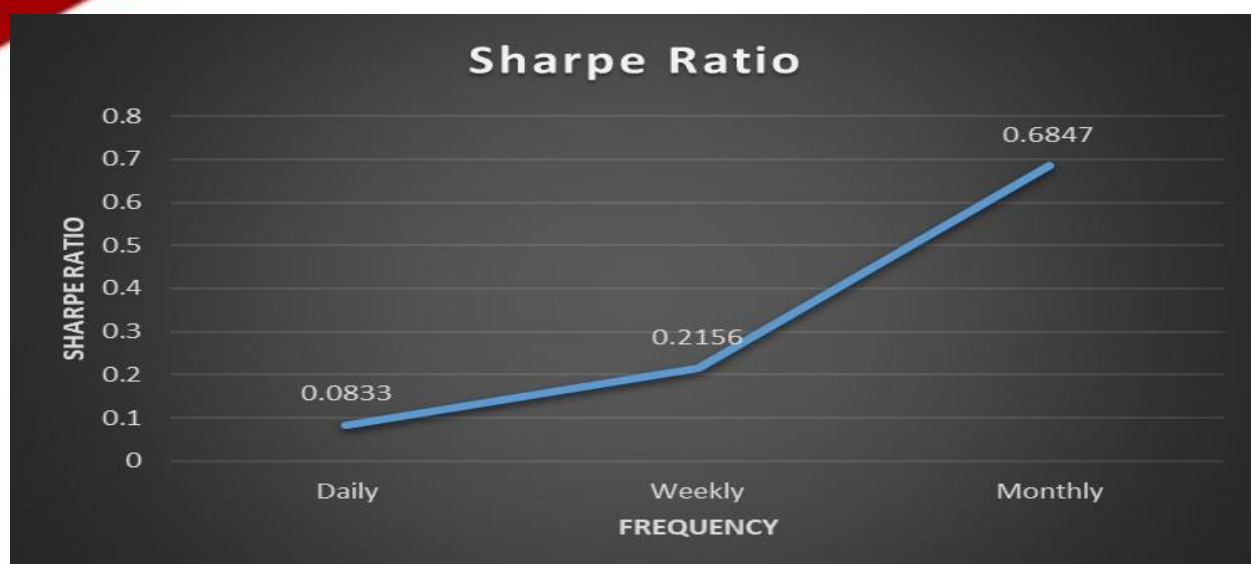
SHARPE RATIO

Sharpe Ratio takes into consideration the overall risk i.e., the systematic risk as well as the unsystematic risk of the stock. 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.

NEAR MONTH BEL

Frequency Sharpe Ratio(%)	Daily	Weekly	Monthly
Mean	0.0833	0.2156	0.6847
Max	3.1471	2.2355	2.4607
Min	-2.9402	-1.9583	-0.7414
Standard Deviation	1.0000	1.0000	1.0000

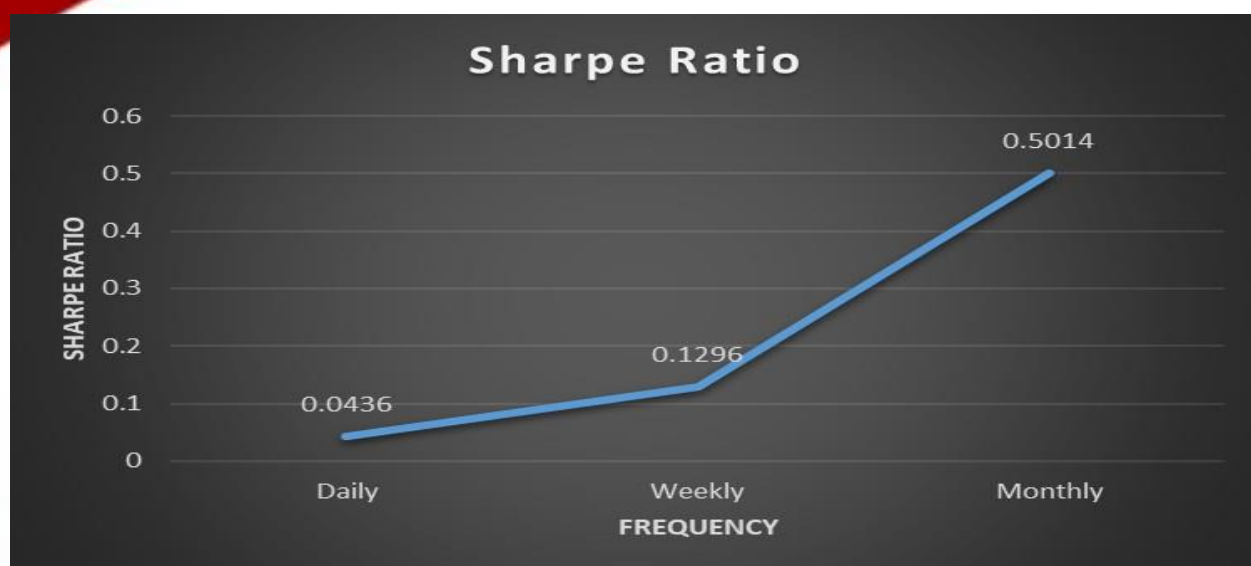
NEAR MONTH BEL Graphs



NEAR MONTH SIEMENS

Frequency	Daily	Weekly	Monthly
Sharpe Ratio(%)			
Mean	0.0436	0.1296	0.5014
Max	4.0855	3.5075	2.4153
Min	-2.8222	-1.8591	-0.5694
Standard Deviation	1.0000	1.0000	1.0000

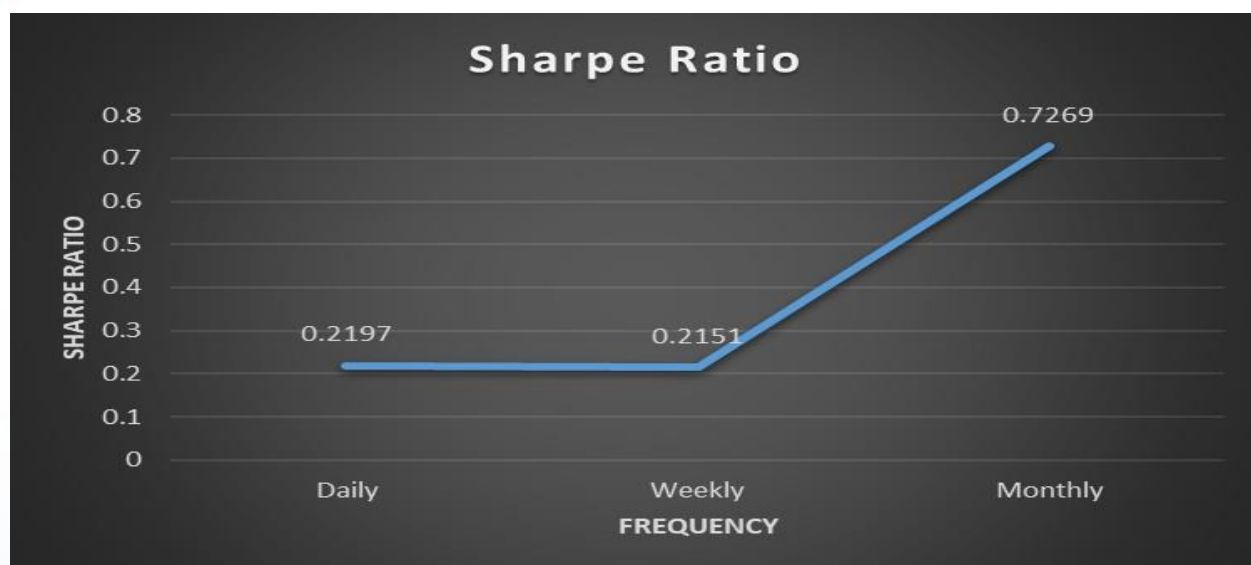
NEAR MONTH SIEMENS Graph



NEXT MONTH BEL

Frequency	Daily	Weekly	Monthly
Sharpe Ratio(%)			
Mean	0.2197	0.2151	0.7269
Max	6.5781	2.2421	2.5612
Min	-6.1734	-1.9527	-0.2743
Standard Deviation	2.0814	1.0000	1.0000

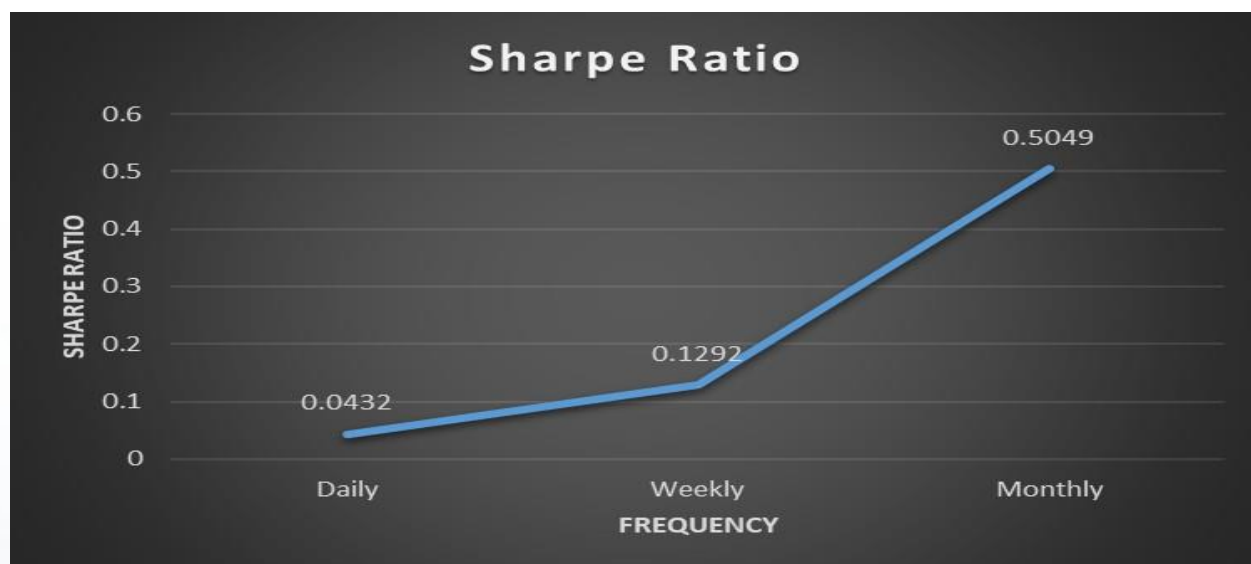
NEXT MONTH BEL Graphs



NEXT MONTH SIEMENS

Frequency	Daily	Weekly	Monthly
Sharpe Ratio(%)			
Mean	0.0432	0.1292	0.5049
Max	4.1479	3.5690	2.4552
Min	-3.0474	-1.8509	-0.5873
Standard Deviation	1.0000	1.0000	1.0000

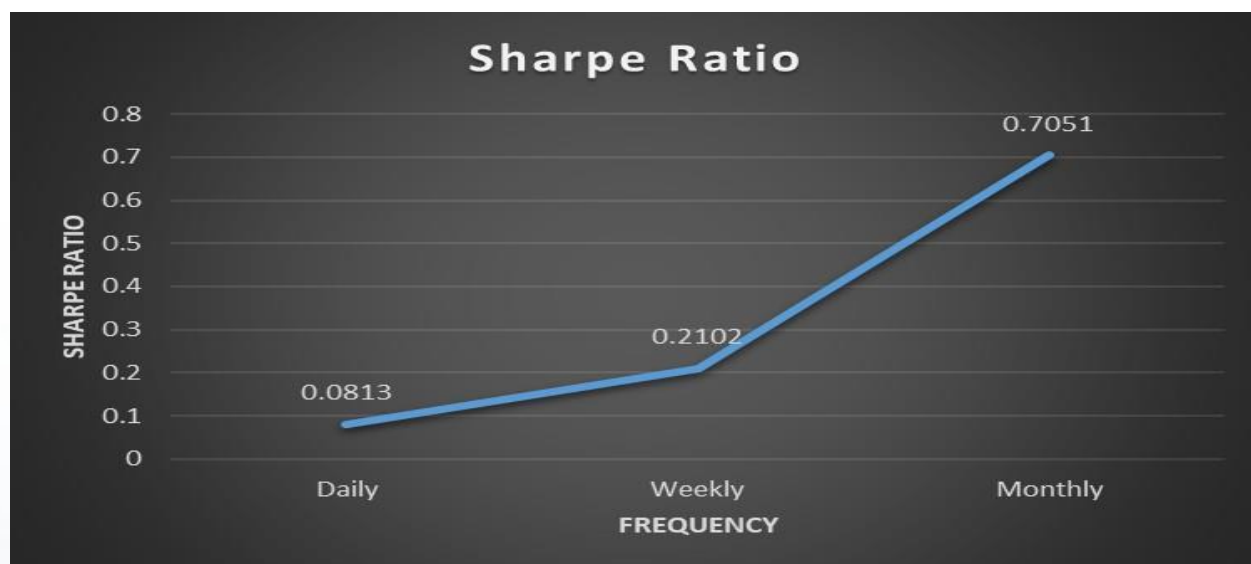
NEXT MONTH SIEMENS



FAR MONTH BEL

Frequency	Daily	Weekly	Monthly
Sharpe Ratio(%)			
Mean	0.0813	0.2102	0.7051
Max	3.3956	2.2397	2.5493
Min	-3.1485	-1.8768	-0.4410
Standard Deviation	1.0000	1.0000	1.0000

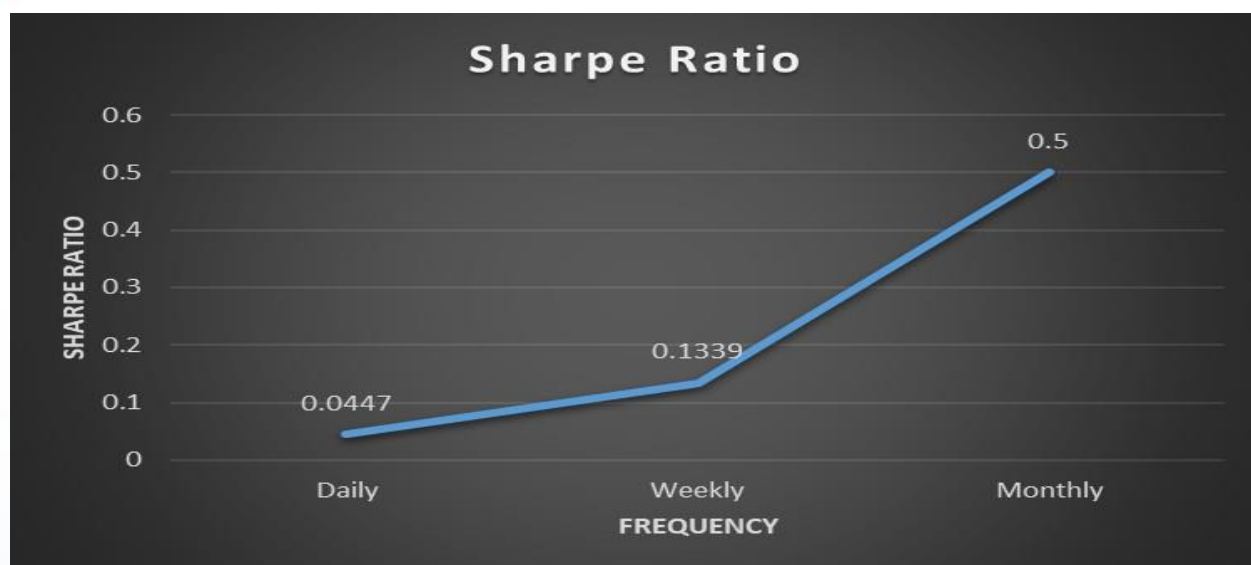
FAR MONTH BEL Graphs



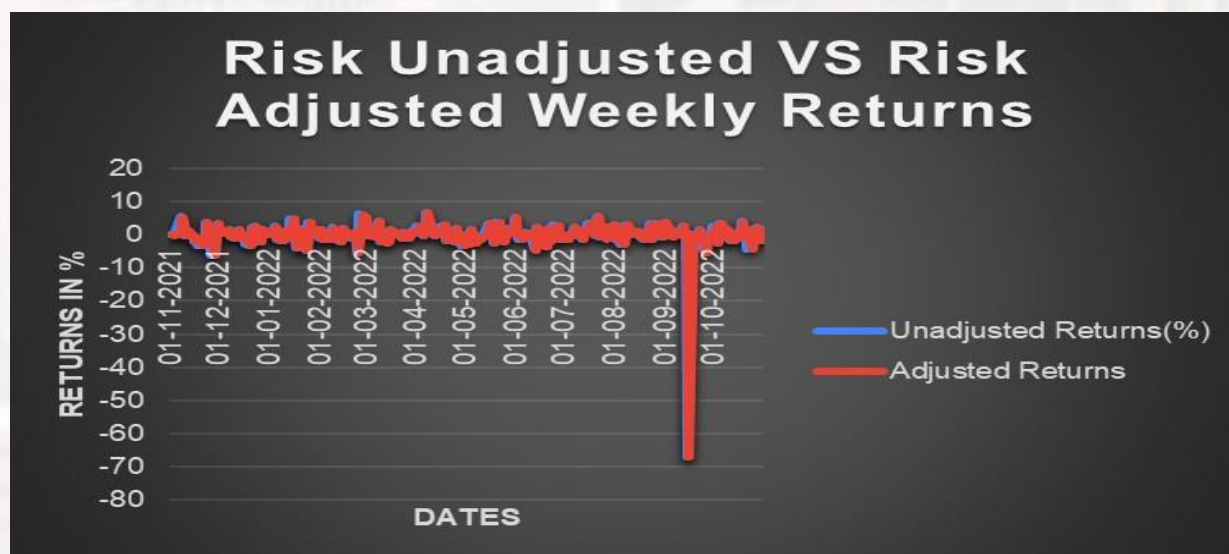
FAR MONTH SIEMENS

Frequency	Daily	Weekly	Monthly
Sharpe Ratio(%)			
Mean	0.0447	0.1339	0.5000
Max	4.0505	3.5590	2.4426
Min	-3.2208	-1.8718	-0.5406
Standard Deviation	1.0000	1.0000	1.0000

FAR MONTH SIEMENS Graphs



DIFFERENCE BETWEEN RISK ADJUSTED AND RISK UNADJUSTED RETURNS

Near Month Bel Graphs

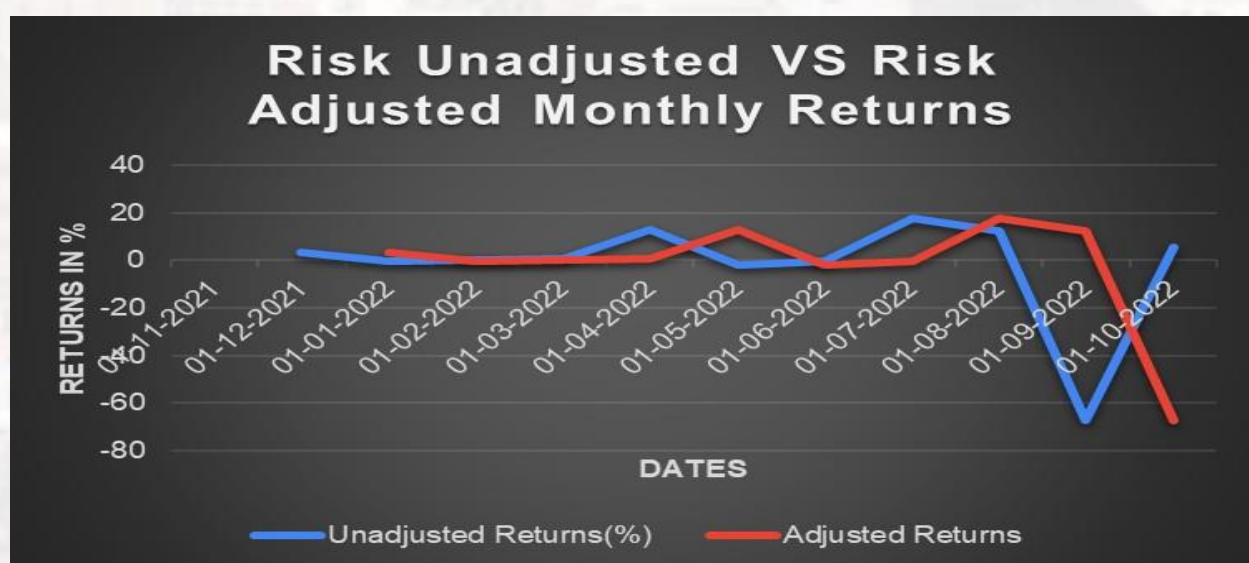
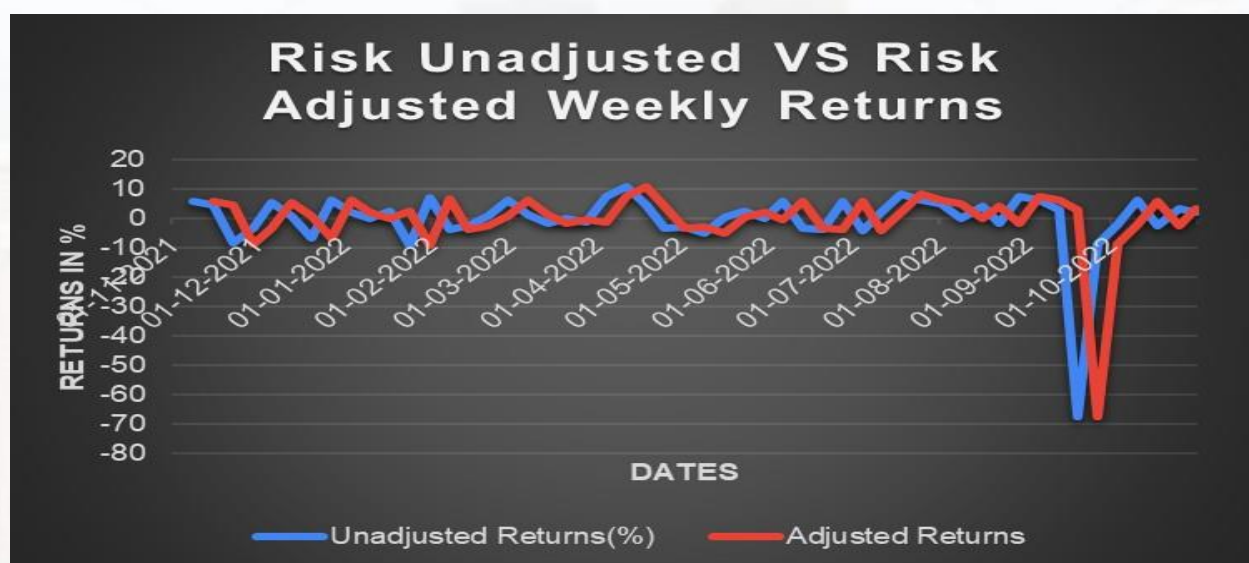
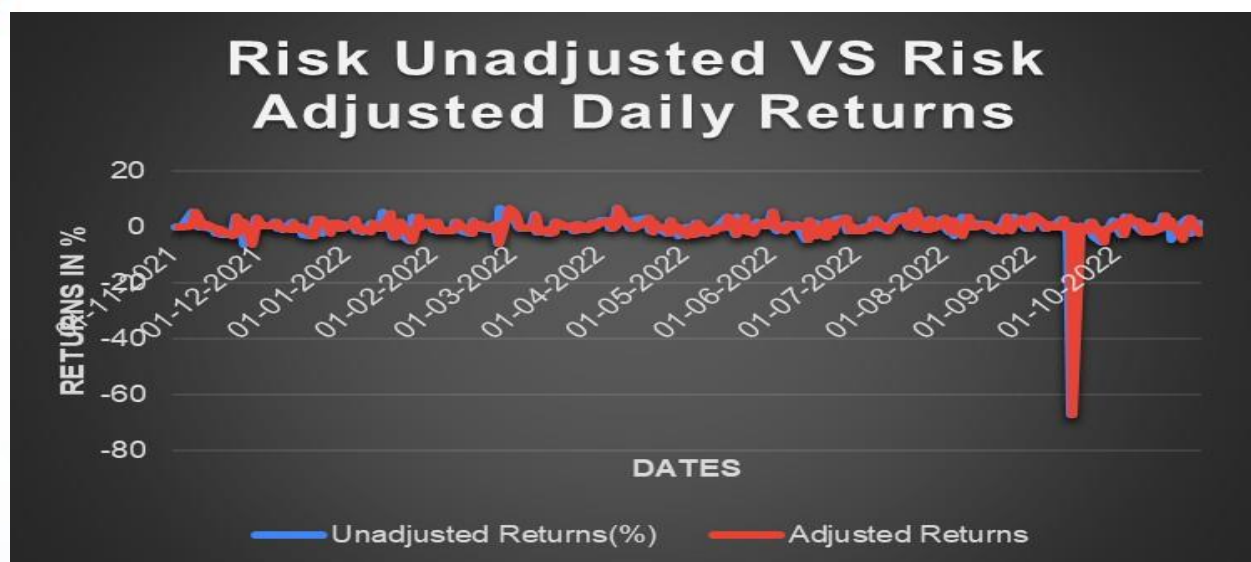
Risk Unadjusted VS Risk Adjusted Weekly Returns



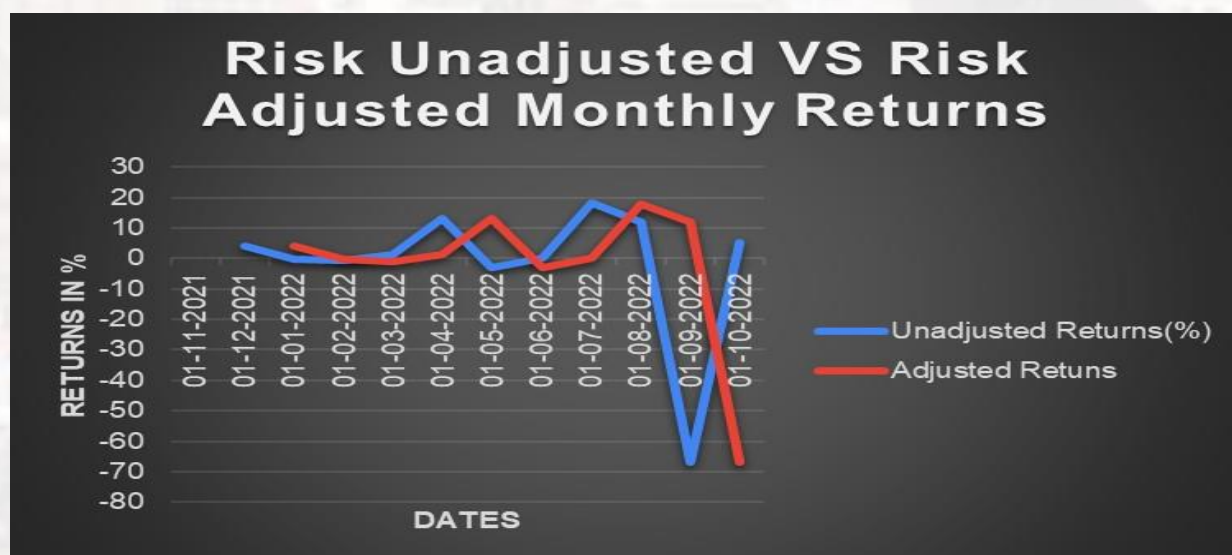
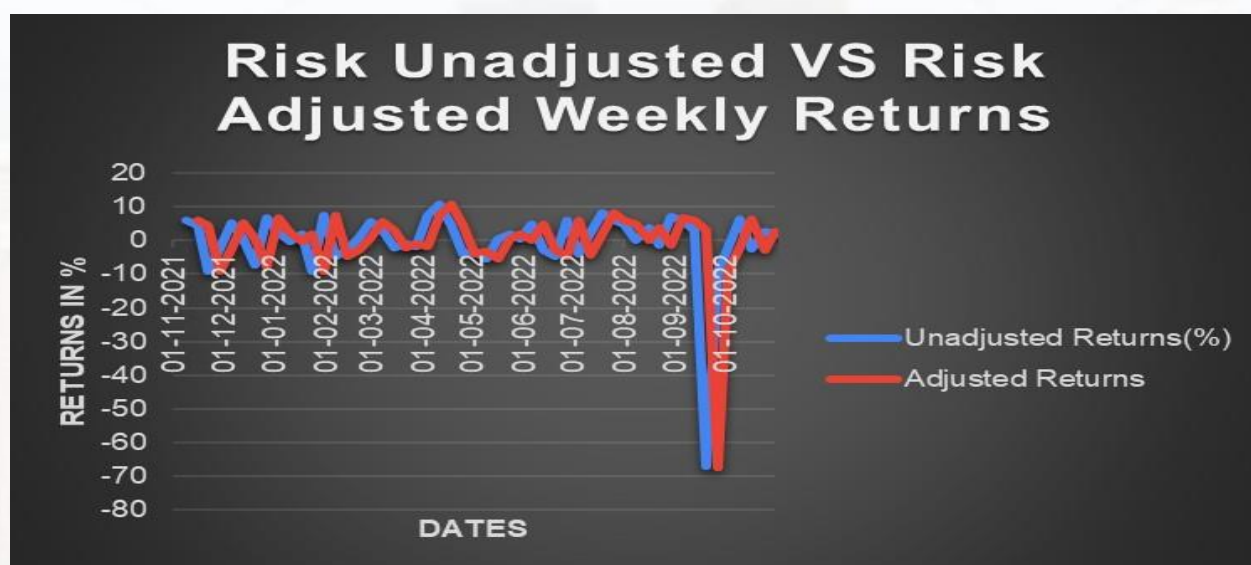
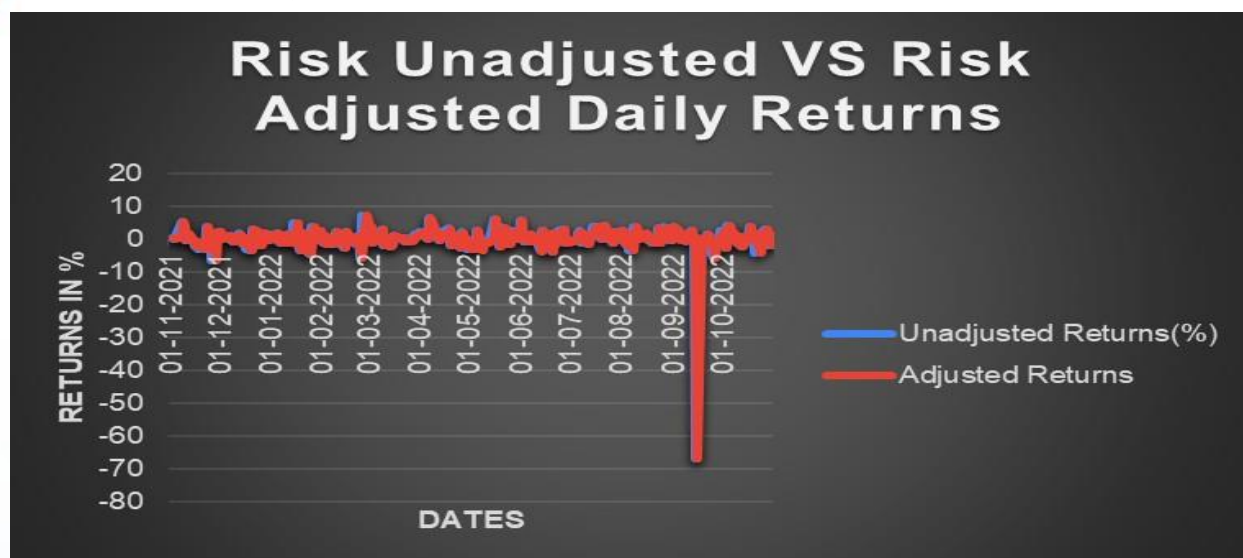
Risk Unadjusted VS Risk Adjusted Monthly Returns



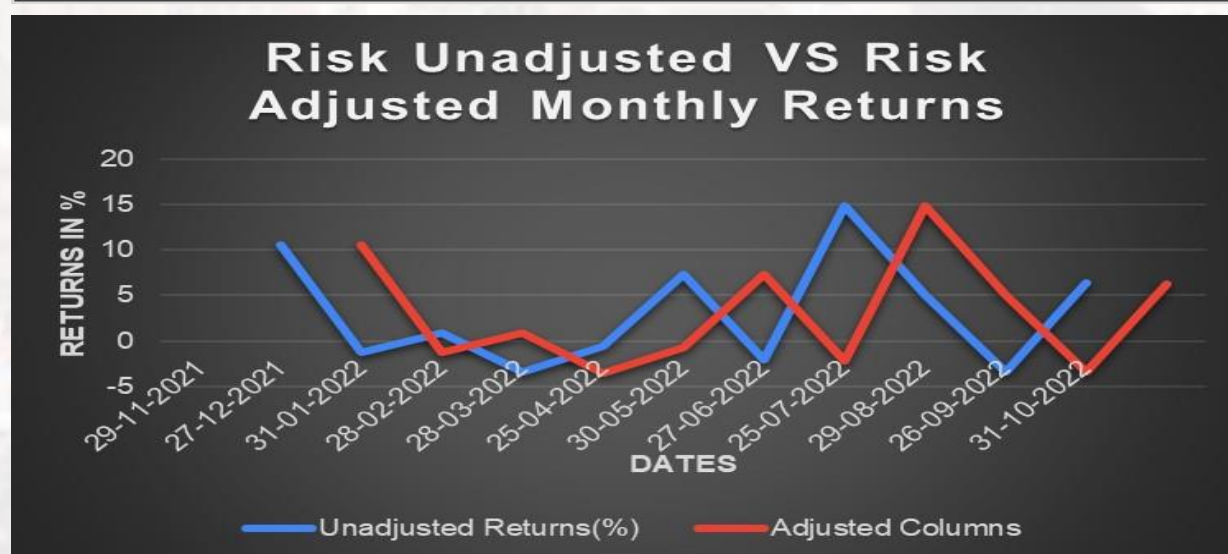
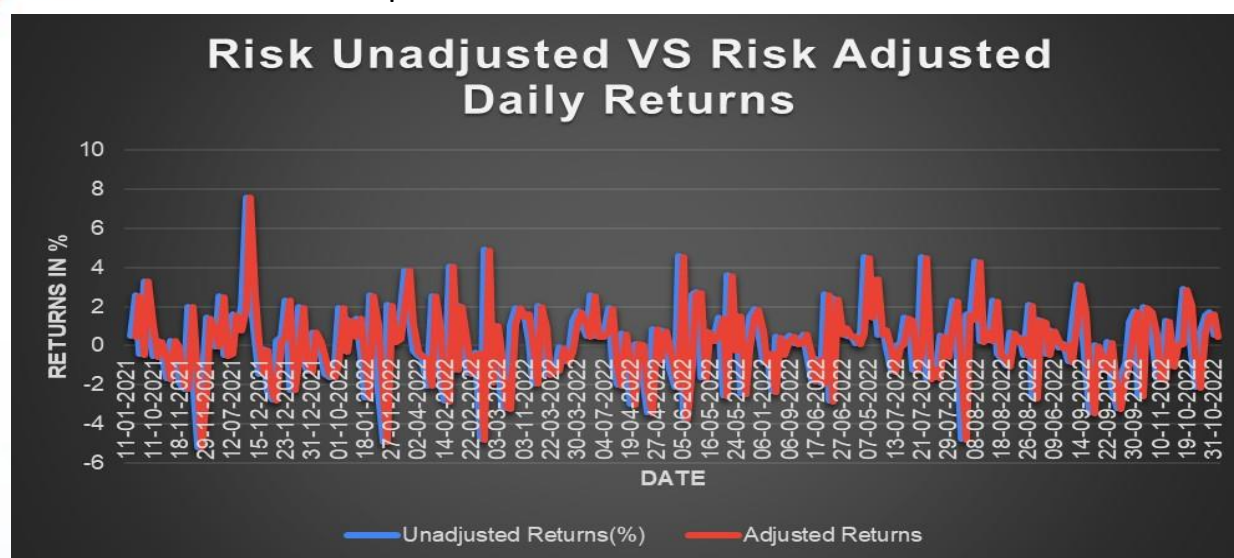
Next Month BEL Graphs



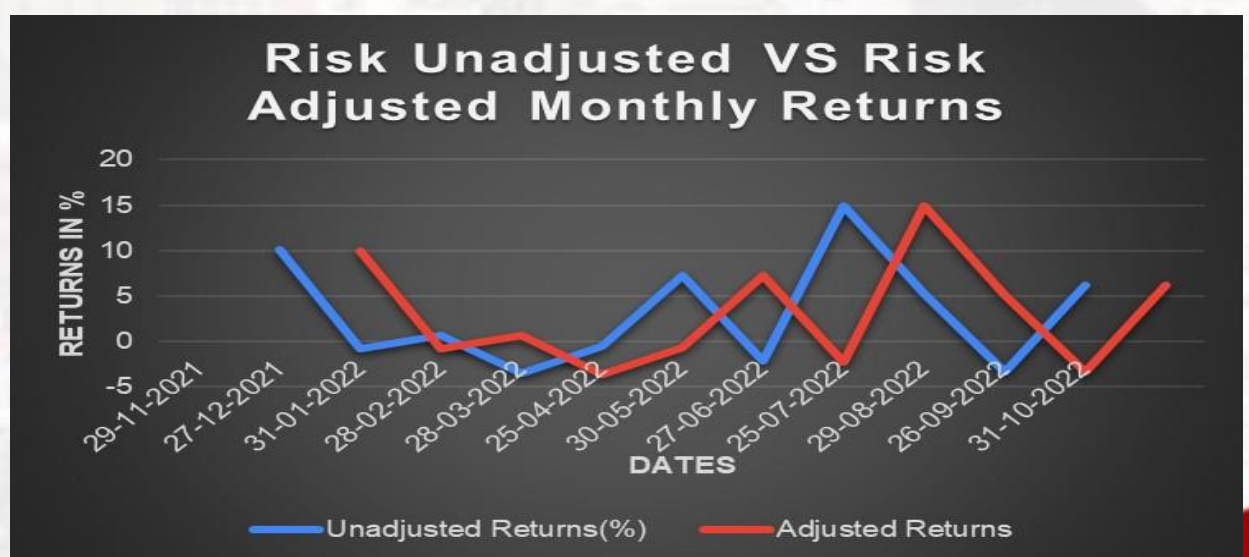
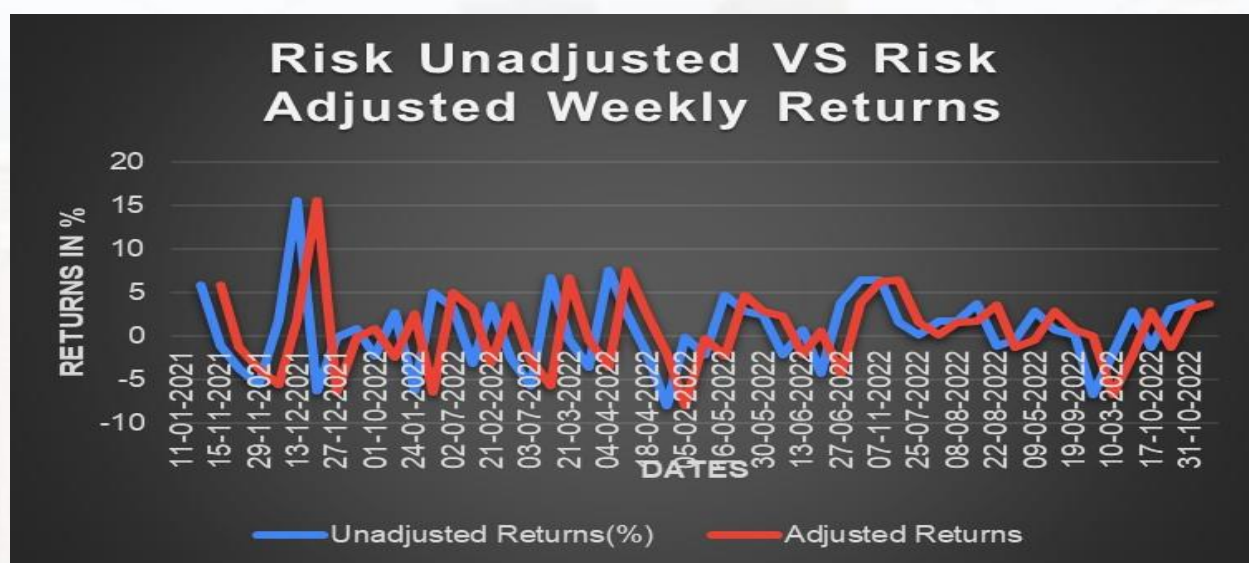
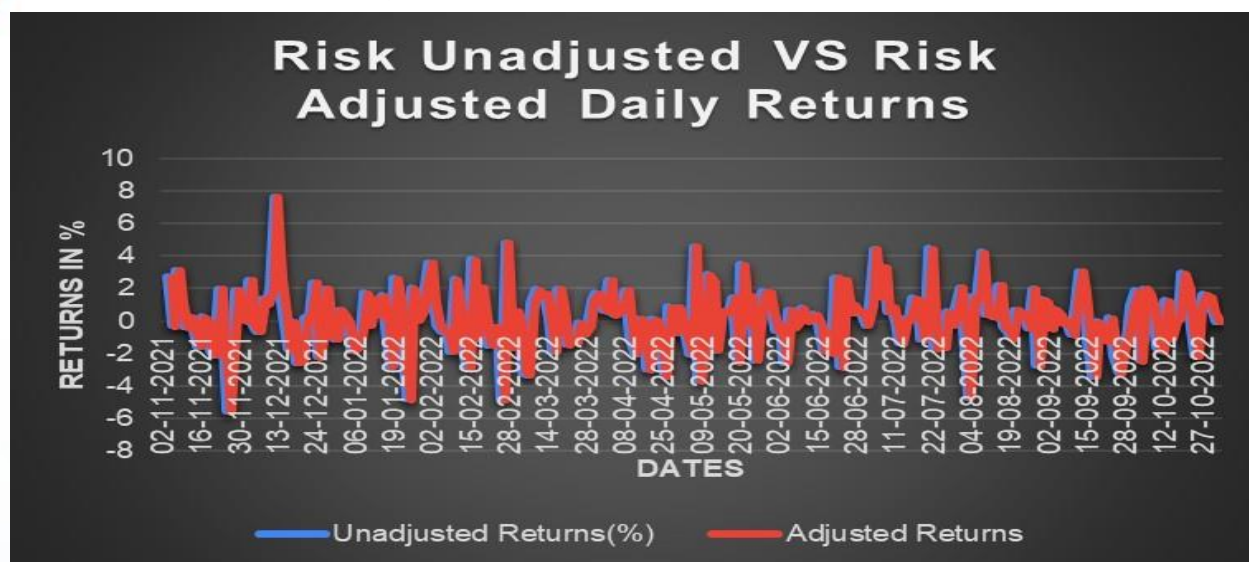
Far Month BEL Graphs



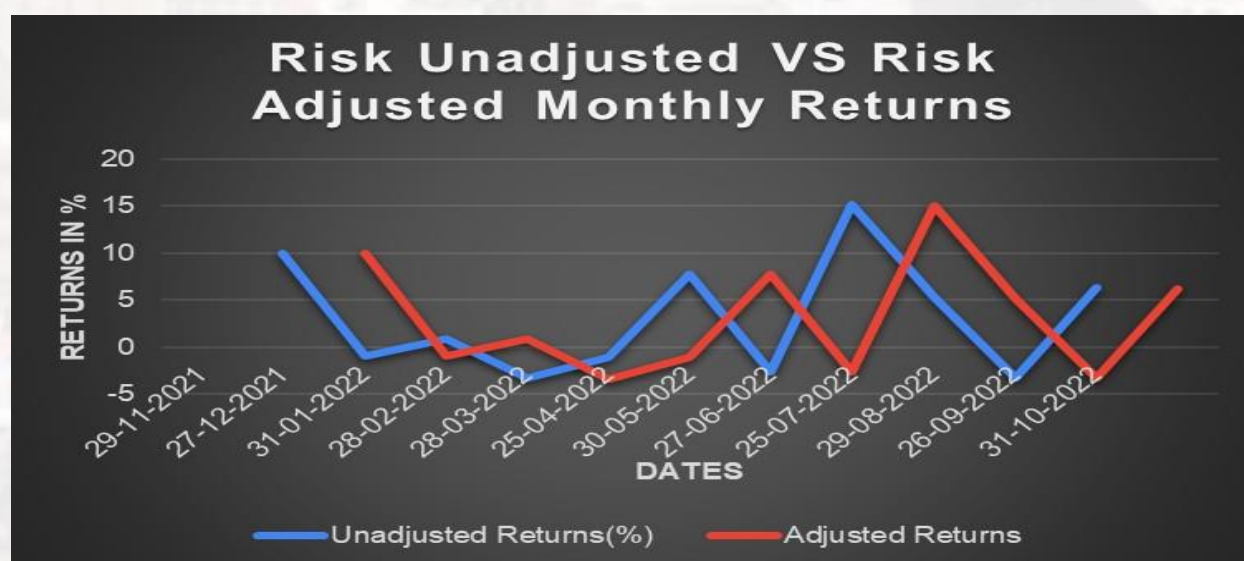
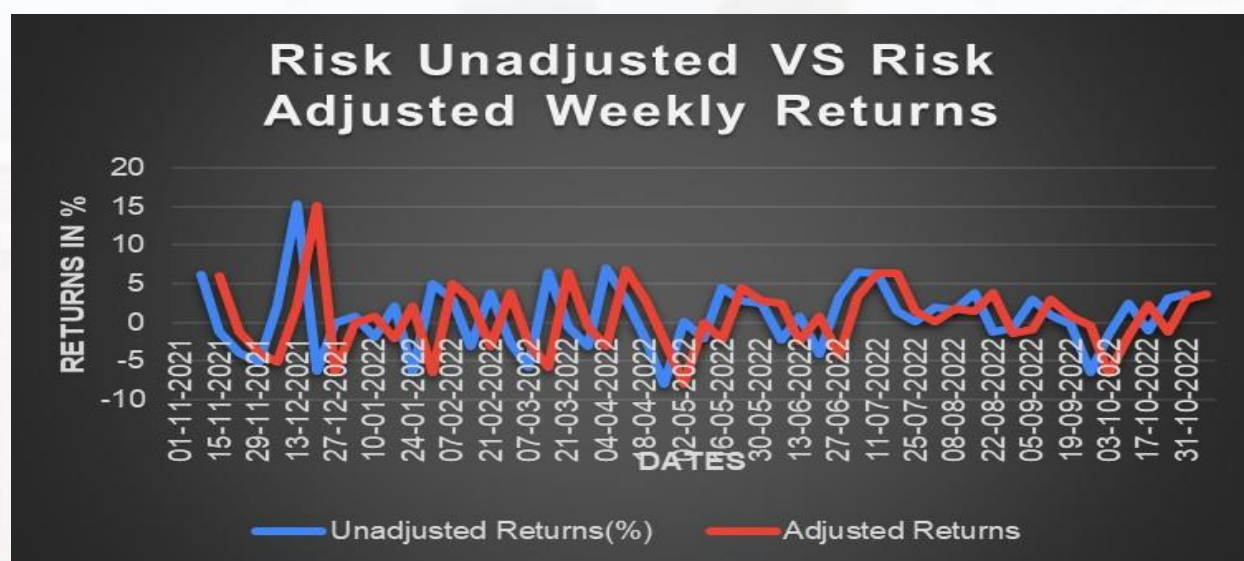
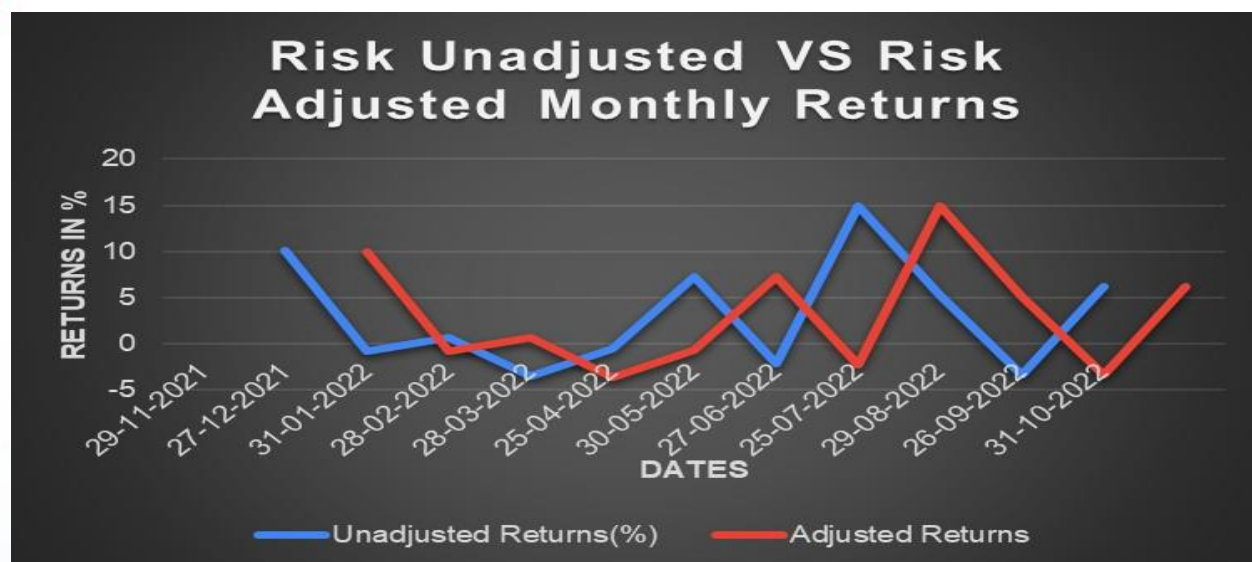
Near Month Siemens Graphs



Next Month Siemens Graphs



Far Month Siemens Graphs



CONCLUSION/OBSERVATIONS ON THE FUTURES of BEL:

- In daily frequency, the highest returns are given by Far month future contracts.
- In weekly frequency, the highest returns are given by Equity Shares.
- In monthly frequency, the highest returns are given by Near month future contracts.
- The standard deviation is the most for monthly returns followed by weekly and daily respectively.

CONCLUSION/OBSERVATIONS ON THE FUTURES of SIEMENS:

- In daily frequency, the highest returns are given by Far month future contracts.
- In weekly frequency also, the highest returns are given by Far month future contracts.
- In monthly frequency, the highest returns are given by Near month future contracts.
- The standard deviation is the most for monthly returns followed by weekly and daily respectively.

SECTION 3

COMPARISON OF ADJUSTED AND UNADJUSTED RETURNS OF EQUITY SHARES AND EQUITY FUTURES:

TABLE FOR RISK UNADJUSTED RETURNS OF BEL:

FREQUENCY	EQUITY SHARES	FUTURES		
		NEAR MONTH	NEXT MONTH	FAR MONTH
DAILY	0.2156	0.2195	0.2197	0.2202
WEEKLY	1.0781	1.0762	1.0755	1.0738
MONTHLY	4.9517	5.5344	5.0469	5.0322

TABLE FOR RISK ADJUSTED RETURNS OF BEL:

FREQUENCY	EQUITY SHARES	FUTURES		
		NEAR MONTH	NEXT MONTH	FAR MONTH
DAILY	0.1698	0.1738	0.1740	0.1754
WEEKLY	1.0317	1.0298	1.0291	1.0274
MONTHLY	4.9050	5.4877	5.0003	4.986

- Thus, we observe that both the risk unadjusted and risk adjusted returns obtained from trading futures are more than that obtained from investing in the equity of BEL in most of the cases.
- In daily frequency we observe that the returns of Far month futures are the most and equity shares is the least.

- However, if the frequency is weekly then we observe that equity gives better returns than futures.
- Also, in the monthly frequency, we observe that Near month futures have the highest returns.
- Thus, risk averse and risk loving investors must look out for the standard deviation and invest accordingly.

TABLE FOR RISK UNADJUSTED RETURNS OF SIEMENS:

FREQUENCY	EQUITY SHARES	FUTURES		
		NEAR MONTH	NEXT MONTH	FAR MONTH
DAILY	0.1255	0.1261	0.1252	0.1293
WEEKLY	0.6022	0.6089	0.6076	0.6186
MONTHLY	2.9707	3.1324	3.1084	3.1321

TABLE FOR RISK ADJUSTED RETURNS OF SIEMENS:

FREQUENCY	EQUITY SHARES	FUTURES		
		NEAR MONTH	NEXT MONTH	FAR MONTH
DAILY	0.0796	0.0804	0.0795	0.0835
WEEKLY	0.5556	0.5629	0.5616	0.5726
MONTHLY	2.9228	3.0849	3.0609	3.0846

- Thus, we observe that both the risk unadjusted and risk adjusted returns obtained from trading futures are more than that obtained from investing in the equity of SIEMENS in all of the cases.
- In daily, weekly and monthly we observe that the far month gives the highest returns.
- It can be also observed that near month has greater returns than next month.
- Thus, risk averse and risk loving investors must look out for the standard deviation and invest accordingly.

LIQUIDITY POSITION:

- Liquidity describes the availability of a particular asset or how easily it can be converted to its intrinsic value by buying or selling.
- For equity shares this is indicated by the Average Daily Volume traded and for the futures contracts it is indicated by the number of open interests and number of contracts for daily frequency.
- More number of volumes traded and more number of open interests and futures contracts increases the liquidity of the equity share and the future respectively.

MONTH	NEAR	NEXT	FAR
AVERAGE NO. OF CONTRACTS(BEL)	3091.5951	950.4979	21.1174
AVERAGE OPEN INTEREST(BEL)	29179992.31	6121569.231	23253.1

MONTH	NEAR	NEXT	FAR
AVERAGE NO. OF CONTRACTS (SIEMENS)	1933.51	607.7530	6.6802
AVERAGE OPEN INTEREST (SIEMENS)	1417665	258347.1903	5825.101

FOR EQUITY SHARES:

AVERAGE DAILY VOLUME TRADED(BEL): 9213766.6530

AVERAGE DAILY VOLUME TRADED(SIEMENS): 362751.7581

- Given the average number of contracts and average open interest in the market, it is clear from the daily trading data that people prefer near-month contracts over next- and far-month futures contracts because they offer a stronger liquidity position.
- This is due to the fact that forecasting prices three months out is more challenging than doing so one month out.
- The open interest is so heavily skewed toward near-month contracts even though the far month futures offer superior returns than the near and next month for daily frequency.

SECTION 4:

CONTANGO AND BACKWARDATION

Contango and Backwardation are terms which we use to explain the situation of the futures market based on the difference between the spot price and the futures price of a commodity/ 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 behavior. A speculator may lock in a profit by purchasing more future contracts since futures prices that are higher than spot prices may be speculative about prices that will be higher in the future.

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. 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.

In the graphs if the column is above zero then it is Contango in nature and if it is below zero then it is Backwardation.

Note: All the graphs in this section are given for weekly frequency for clear interpretation.

In the graphs below;

Y-axis denotes the difference between settlement price and future price

X-axis denotes the dates

BEL:

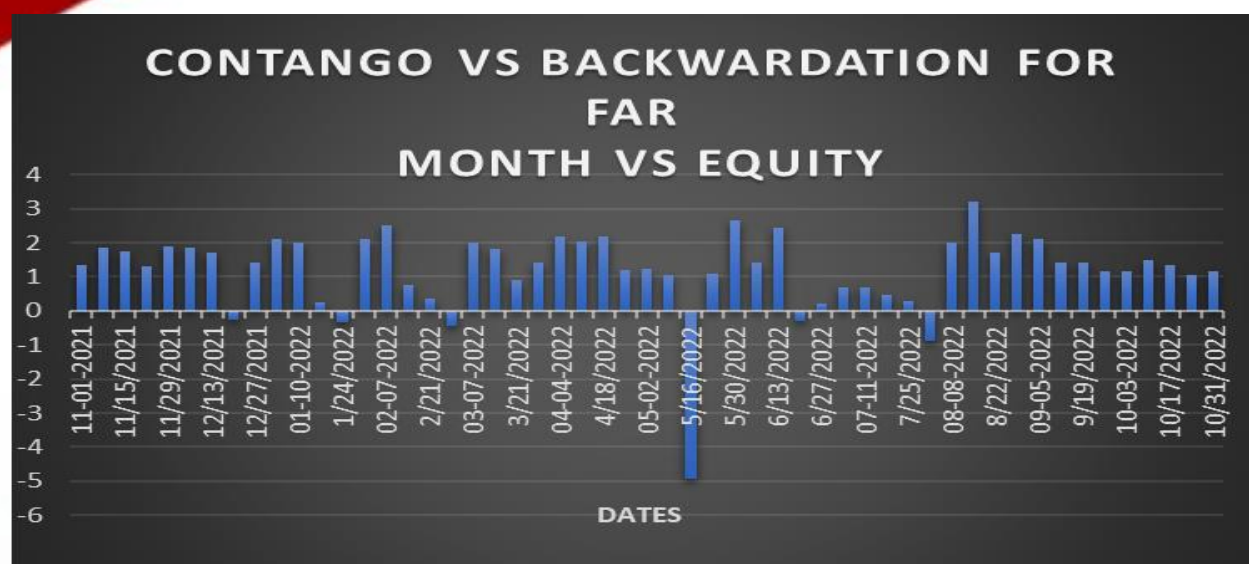
1. FOR NEAR MONTH FUTURES V/S UNDERLYING EQUITY



2. NEXT MONTH FUTURES V/S UNDERLYING EQUITY



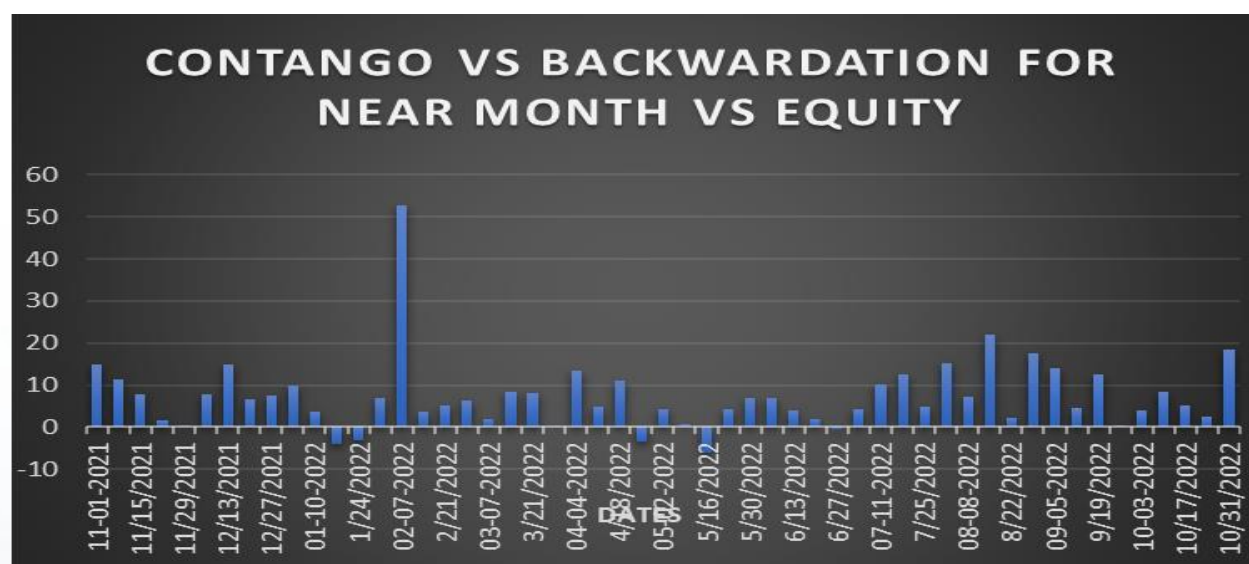
3. FAR MONTH FUTURES V/S UNDERLYING EQUITY



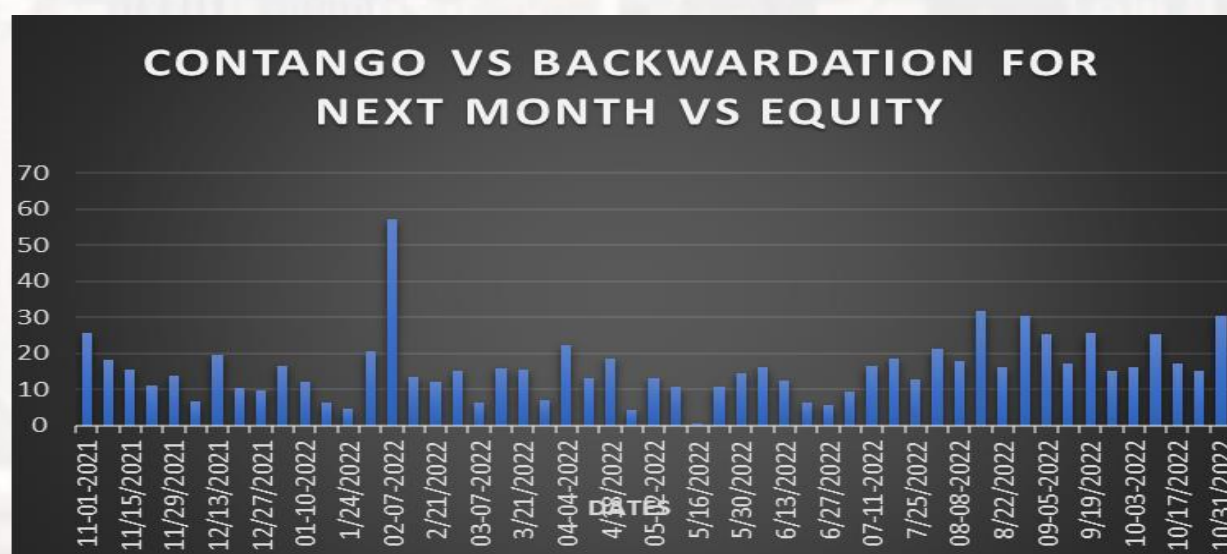
Thus from the above graphs it is evident that it is majorly contango in nature but it continuously fluctuates between contango and backwardation. BEL is expected to be very slightly bullish in nature. It can also be observed that the bullish nature increases each month i.e., it is the greatest in the far month then in the next month and the least in the current month.

SIEMENS:

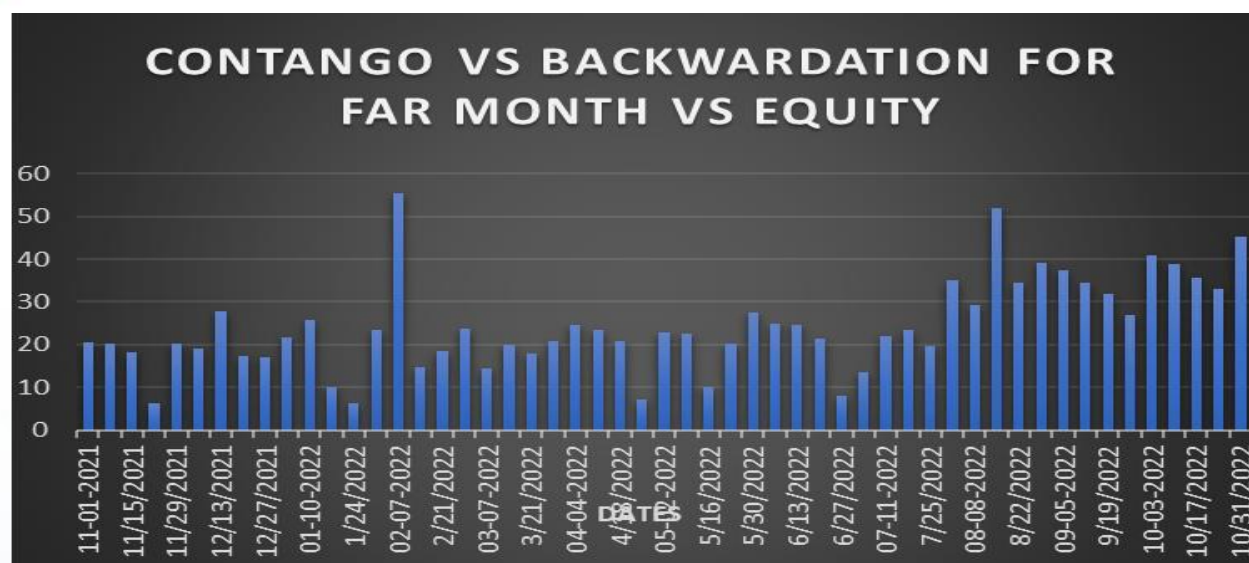
1. FOR NEAR MONTH FUTURES V/S UNDERLYING EQUITY



2. FOR NEXT MONTH FUTURES V/S UNDERLYING EQUITY



3. FOR FAR MONTH FUTURES V/S UNDERLYING EQUITY



Thus from the graphs it is clear that the SIEMENS is highly Contango in nature. However, in the near month there are some instances where it exhibits backwardation. The next month and far month exhibit complete contango.

SIGNIFICANCE OF FREQUENCY:

- Economic theories like the Random Walk Theory presume that a stock price or market's previous movements cannot be used to anticipate its future course.
- It takes into consideration technical analysis, which is an unreliable examination of stock price, volume, and return frequency.
- However, investors place a high priority on achieving maximum returns. The Sharpe ratio is used to calculate the standard deviation across that time period using the frequency of the duration.
- Frequency is very important as the returns vary a lot considering the investor wants to trade with daily, weekly or monthly frequency.
- It is very important as some asset may have very good monthly returns but bad daily returns.

From data of the underlying asset and equity futures of both BEL and SIEMENS, the following observations were made:

- Returns for both the underlying asset and the futures instrument was highest for monthly frequency but with considerable risk.
- The risk in monthly frequency is very high as it has the most standard deviation.

Considering the daily working days to be 252 and no. of weeks to be 52 we get

EQUITY:

DAILY ADJUSTED EARNING OF BEL= 42.7896

WEEKLY ADJUSTED EARNING OF BEL=53.6468

MONTHLY ADJUSTED EARNING OF BEL=58.8600

DAILY ADJUSTED EARNING OF SIEMENS=20.0592

WEEKLY ADJUSTED EARNING OF SIEMENS=28.8912

MONTHLY ADJUSTED EARNING OF SIEMENS=35.0736

NEAR MONTH:

DAILY ADJUSTED EARNING OF BEL=43.7976

WEEKLY ADJUSTED EARNING OF BEL=53.5496

MONTHLY ADJUSTED EARNING OF BEL=65.8524

DAILY ADJUSTED EARNING OF SIEMENS=20.2608

WEEKLY ADJUSTED EARNING OF SIEMENS=29.2708

MONTHLY ADJUSTED EARNING OF SIEMENS=37.0188

NEXT MONTH:

DAILY ADJUSTED EARNING OF BEL=43.8480

WEEKLY ADJUSTED EARNING OF BEL=53.5132

MONTHLY ADJUSTED EARNING OF BEL=60.0360

DAILY ADJUSTED EARNING OF SIEMENS=20.0340

WEEKLY ADJUSTED EARNING OF SIEMENS=29.2032

MONTHLY ADJUSTED EARNING OF SIEMENS=36.7308

FAR MONTH:

DAILY ADJUSTED EARNING OF BEL=44.2008

WEEKLY ADJUSTED EARNING OF BEL=53.4248

MONTHLY ADJUSTED EARNING OF BEL=59.832

DAILY ADJUSTED EARNING OF SIEMENS=21.0420

WEEKLY ADJUSTED EARNING OF SIEMENS=29.7752

MONTHLY ADJUSTED EARNING OF SIEMENS=37.0152

Thus, from above calculation we observe that;

- BEL has the highest returns for Near month monthly frequency
- SIEMENS also has the highest returns for Near month monthly frequency
- Hence, all the earning are calculated so the investor can manage his portfolio appropriately and invest according to the frequency he wants to invest.

SECTION 5:

CONCLUSIONS:

Conclusions from the above analysis of BEL:

- In daily frequency, the best returns are obtained for Far month contracts and Equity shares have the worst returns.
- On the other hand, in weekly frequency, the best returns are obtained for Equity shares and Far month futures contracts the worst returns.
- While in monthly frequency, Near month future contracts and Equity shares give the best and the worst returns respectively.
- In overall monthly frequencies have the highest standard deviation thus so investing in them is a little risky.

Conclusions from the above analysis of SIEMENS:

- In daily frequency, the best returns are obtained for Far month contracts and Next month futures contracts have the worst returns.
- In weekly frequency, the best returns are obtained for Far month future contracts and Equity shares have the worst returns.
- Monthly frequency follows the same trend like weekly frequency.
- In overall monthly frequencies have the highest standard deviation thus so investing in them is a little risky.

Overall conclusions:

- For underlying stock assets and equity futures products, the mean returns for all frequencies are positive, which is advantageous for an investor. financial items in a portfolio with a wide range of investments.
- The net profit margin of BEL is currently 15.74% which has declined as compared to the net profit margin of last quarter and it has a PE ratio of 28.64 which is considered to be the industry average.
- SIEMENS on the other hand has a net profit margin of 14.01% which has increased as compared to the previous quarter and it has a PE ratio of 81.44

which is pretty high. A high P/E ratio can be a good indicator of a company with good growth prospects.

- BEL also has a dividend yield of 1.41% while SIEMENS does not give any dividends.
- BEL has overall better returns than SIEMENS in every segment and it also has better liquidity.
- But SIEMENS has less volatility thus it proves to be a better investment for investors which are risk averse in nature.
- BEL exhibits some backwardation fluctuations while SIEMENS exhibits high contango.
- Overall, both assets have best returns for monthly frequency for the most amount of volatility.
- Thus, the final conclusion would be that BEL has better returns with more volatility and SIEMENS has a little less return for less volatility. So, investors should invest in these assets as the strategy which suits them.

SECTION 6:

REFERENCES:

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