Security Analysis of Selected Stocks at BSE

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ABSTRACT

In today's volatile financial markets, effective risk management has become a crucial component of portfolio optimization and long-term wealth preservation. One of the most significant tools available to investors and financial institutions for this purpose is the use of derivative instruments. This research paper, titled *"The Role of Derivatives in Portfolio Hedging and Risk Management"*, aims to analyze how derivatives—such as futures, options, forwards, and swaps—are strategically used to mitigate various types of financial risks, including market risk, interest rate risk, currency risk, and commodity price risk.

The study explores the theoretical foundation of derivatives, along with their practical application in portfolio hedging, wherein investors use these instruments to reduce the impact of adverse price movements in underlying assets. It further investigates the concept of hedging effectiveness, delta hedging, and the implications of basis risk in imperfect hedging scenarios. Through case studies, market data, and simulations, the paper illustrates how both institutional and retail investors can incorporate derivatives into diversified portfolios to manage systematic and unsystematic risks.

The research also evaluates the regulatory framework governing derivative markets in India and globally, highlighting the importance of transparency, leverage control, and risk disclosure in derivative trading. While derivatives offer significant advantages in managing portfolio risk, the study also cautions against speculative misuse and the potential for amplified losses due to leverage and improper strategy execution.

The findings of this study reinforce that when used responsibly and with adequate risk assessment, derivatives serve as powerful financial instruments for portfolio insurance, yield enhancement, and strategic asset allocation. This paper thus contributes to a deeper understanding of derivatives as essential tools for modern investment management.

Keywords: Derivatives, Hedging, Portfolio Management, Risk Management, Futures, Options, Swaps, Forwards, Systematic Risk, Basis Risk, Delta Hedging, Leverage, Market Volatility, Derivative Markets, Financial Instruments.

1.   INTRODUCTION

Derivatives are financial instruments that have values derived from other assets like stocks, bonds, or foreign exchange. Derivatives are sometimes used to hedge a position (protecting against the risk of an adverse move in an asset) or to speculate on future moves in the underlying instrument. Hedging is a form of risk management that is common in the stock market, where investors use derivatives to protect shares or even entire portfolios.

KEY TAKEAWAYS

- Derivatives are financial instruments that have values tied to other assets like stocks, bonds, or futures.
- Hedging is a type of investment strategy intended to protect a position from losses.
- A put option is an example of a derivative that is often used to hedge or protect an investment.
- Buying or owning stock and buying a put option is a strategy called the protective put.
- Investors can protect gains of a stock that has increased in value by purchasing a put.

WHAT ARE DERIVATIVES

A derivative is a financial instrument with a price that depends on (or is derived from) another asset. It is typically a contractual agreement between two parties in which one party is obligated to buy or sell the underlying security and the other has the right to buy or sell the underlying security.

However, derivatives can take many forms and some—like OTC derivatives—are complex and mostly traded by professional rather than individual investors. On the other hand, many derivatives are listed on derivatives exchanges and are standardized in terms of the quantities traded (size), expiration dates, and exercise (strike) prices.

Equity options are examples of derivative contracts. A call option gives the owner the right (not the obligation) to buy 100 shares of stock per contract. A put option, on the other hand, is a contract that gives the holder the right to sell 100 shares of stock. Put options are often used to protect stock holdings or portfolios.

Example of Hedging

Hedging is the act of taking a position in a related and uncorrelated security, which helps to mitigate against opposite price movements. For example, assume an investor bought 1,000 shares of Tesla Motors (TSLA) for $65 a share. The investment is held for over two years and now the investor is worried that Tesla will miss earnings per share (EPS) and revenue expectations—sending shares lower and giving back some of the profits accumulated over those two years.

In April 2019, Tesla's stock price was $239—representing a value of $239,000 and an unrealized profit of $174,000 on 1,000 shares—and the investor wants to initiate a protective strategy. To hedge the position against the risk of any adverse price fluctuations, the investor buys 10 put option contracts on Tesla with a strike price of $230 and a September expiration date.

The put option contract gives the investor the right to sell his shares of Tesla for $230 a share through September. Since one stock option contract leverages 100 shares of the underlying stock, the investor could sell 1,000 (100 x 10) shares with 10 put options. This strategy—of buying shares and buying puts—is called the protective put.
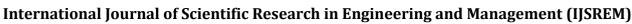
Exercising Options
If Tesla misses its earnings expectations and the stock price falls below the $230 strike price, the investor has locked in a selling price of $230, through September, with the put option. The investor can sell the put after any increase in value or exercise the put: selling 1,000 shares at $230, gaining a profit of $165 ($230 - $65) per share. Once the put option is exercised (and a seller of the put has been assigned at $230 per share), the contract ceases to exist.

2.   RESEARCH METHODOLOGY

The research methodology for evaluating the role of derivatives in portfolio hedging and risk management follows a structured approach that involves data collection, analysis, and interpretation. This study primarily relies on secondary data sourced from financial reports, market data, academic research papers, and regulatory guidelines. Additionally, empirical analysis is conducted using historical market data to assess the effectiveness of derivative instruments in mitigating risks.

A descriptive research design is adopted to provide an in-depth understanding of derivative instruments and their applications in risk management. The study includes a detailed review of various derivative products such

as futures, options, swaps, and forwards, along with their pricing mechanisms and strategies for risk mitigation. Financial models, including Value at Risk (VaR), Black-Scholes Option Pricing Model, and Monte Carlo simulations, may be employed to quantify the risk-reducing capabilities of derivatives.

Furthermore, the study incorporates comparative analysis by evaluating the performance of hedged and unhedged portfolios under different market conditions. Case studies of institutional investors and corporations utilizing derivatives for hedging purposes are analyzed to understand best practices and practical applications. Statistical tools such as correlation analysis, regression models, and trend analysis may be used to measure the effectiveness of derivative strategies in reducing volatility and enhancing portfolio stability.

The study also explores the regulatory landscape governing derivative markets, considering guidelines set by regulatory bodies such as the Securities and Exchange Commission (SEC), Commodity Futures Trading Commission (CFTC), and International Organization of Securities Commissions (IOSCO). By examining legal and compliance aspects, the research aims to provide insights into the challenges and risks associated with derivative trading.

Overall, this study employs a comprehensive and analytical approach to evaluate the role of derivatives in portfolio hedging, offering valuable insights for investors, financial professionals, and policymakers seeking to optimize risk management strategies.

3. DATA ANALYSIS

Automobile Industry: The Automobile industry includes all businesses and activities involved in the production of motor cars, including the majority of components such as engines and bodywork, but excludes tires, batteries.

Tata Motors: Tata Motors Limited is a worldwide automotive firm based in Mumbai. The company makes cars, trucks, vans, and buses.

Return Obtained Through Investing In The Cash Market :

Date	Open	Close	Volume	Return
04-Jul-24	984	998.2	1,21,39,832	-
03-Jul-24	984.95	975.65	73,46,258	-2.25907
02-Jul-24	1,004.05	981.3	1,22,84,132	0.579101
01-Jul-24	989.75	1,002.05	1,40,06,105	2.114542
28-Jun-24	975	989.75	2,30,25,267	-1.22748
27-Jun-24	952.5	972.1	1,93,85,412	-1.78328
26-Jun-24	956	951.85	69,08,988	-2.08312
25-Jun-24	960	955	73,04,128	0.330934
24-Jun-24	960.9	958.05	66,55,577	0.319372
21-Jun-24	979	961.8	1,43,03,735	0.39142
20-Jun-24	980	978.25	72,99,571	1.710335
19-Jun-24	990	977.35	76,05,719	-0.092
18-Jun-24	1,000.00	985.9	98,45,075	0.874815
14-Jun-24	990	993.4	1,15,91,421	0.760726

13-Jun-24	1,002.00	985.85	1,21,57,226	-0.76002
12-Jun-24	994.5	988.7	1,75,27,993	0.289091
11-Jun-24	973.8	987.1	1,48,28,702	-0.16183
10-Jun-24	977	975.15	92,58,931	-1.21062
07-Jun-24	940	970.5	1,55,77,866	-0.47685
06-Jun-24	940	938.25	1,17,92,640	-3.32303
05-Jun-24	924.95	929.95	1,37,52,553	-0.88463
				Total=-6.89158
				Mean-6.89158/20=-0.34458

Risk Obtained Through Investing In The Cash Market :

Return	$(X - \bar{X})$	$(X - \bar{X})^2$
-2.25907	-1.91449	3.665262
0.579101	0.579101	0.335358
2.114542	2.114542	4.471288
-1.22748	-1.22748	1.506716
-1.78328	-1.78328	3.180083
-2.08312	-2.08312	4.339385
0.330934	0.330934	0.109518
0.319372	0.319372	0.101998
0.39142	0.39142	0.15321
1.710335	1.710335	2.925245
-0.092	-0.092	0.008464
0.874815	0.874815	0.7653
0.760726	0.760726	0.578704
-0.76002	-0.76002	0.577624
0.289091	0.289091	0.083573
-0.16183	-0.16183	0.026189
-1.21062	-1.21062	1.465593
-0.47685	-0.47685	0.227386
-3.32303	-3.32303	11.04252
-0.88463	-0.88463	0.782563

Total=-6.89158		Total=36.34598
Mean= -6.89158/20 = -0.34458		Mean=36.34598/20 =1.817299
		SD=1.348072

Calculation of risk: SD = $\sqrt{\dfrac{\Sigma((X-\bar{X})2}{N}}$

$=\sqrt{\dfrac{36.34598}{20}}$

SD= 1.348072

Return Obtained Through Derivatives:

Date	Expiry Date	Option Type	Strike Price	Open Price	Close Price	Volume	Settle Price	Return
04-Jul-24	25-Jul-24	CE	1,000	17.55	28.35	3,24,03,250	28.35	-
03-Jul-24	25-Jul-24	CE	1,000	20.45	16.9	64,13,000	16.9	-40.388
02-Jul-24	25-Jul-24	CE	1,000	28	19.25	1,11,94,700	19.25	13.90533
01-Jul-24	25-Jul-24	CE	1,000	23.3	29.75	1,66,73,800	29.75	54.54545
28-Jun-24	25-Jul-24	CE	1,000	19	24.9	2,48,35,800	24.9	-16.3025
27-Jun-24	25-Jul-24	CE	1,000	13.7	18.35	74,10,700	18.35	-26.3052
26-Jun-24	25-Jul-24	CE	1,000	15.1	13.15	39,54,500	13.15	-28.3379
25-Jun-24	25-Jul-24	CE	1,000	18.2	14.25	27,58,250	14.25	8.365019
24-Jun-24	25-Jul-24	CE	1,000	19.95	17.25	19,09,600	17.25	21.05263
21-Jun-24	25-Jul-24	CE	1,000	28.75	20.1	31,21,250	20.1	16.52174
20-Jun-24	25-Jul-24	CE	1,000	28.9	28.75	18,04,550	28.75	43.03483
19-Jun-24	25-Jul-24	CE	1,000	33.9	27.55	14,79,500	27.55	-4.17391
18-Jun-24	25-Jul-24	CE	1,000	36	32	10,67,000	32	16.15245
14-Jun-24	25-Jul-24	CE	1,000	34.5	35.25	7,84,300	35.25	10.15625
13-Jun-24	25-Jul-24	CE	1,000	38.65	34.5	7,20,500	34.5	-2.12766
12-Jun-24	25-Jul-24	CE	1,000	40.7	37.2	10,92,300	37.2	7.826087
11-Jun-24	25-Jul-24	CE	1,000	27.55	36.5	8,04,650	36.5	-1.88172
10-Jun-24	25-Jul-24	CE	1,000	29.5	29.3	3,23,400	29.3	-19.726
07-Jun-24	25-Jul-24	CE	1,000	17.4	28.15	3,91,600	28.15	-3.92491
06-Jun-24	25-Jul-24	CE	1,000	21.05	20.25	75,900	20.25	-28.0639

05-Jun-24	25-Jul-24	CE	1,000	20.5	20	1,34,200	20	-1.23457
								Total=19.09341
								Mean=19.09341/20= 0.954671

Risk Obtained Through Derivatives:

Return	$(X-\overline{X})$	$(X-\overline{X})^2$
-40.388	-41.3929	1713.374
13.90533	13.90533	193.3581
54.54545	54.54545	2975.207
-16.3025	-16.3025	265.7722
-26.3052	-26.3052	691.9646
-28.3379	-28.3379	803.0351
8.365019	8.365019	69.97354
21.05263	21.05263	443.2133
16.52174	16.52174	272.9679
43.03483	43.03483	1851.996
-4.17391	-4.17391	17.42155
16.15245	16.15245	260.9016
10.15625	10.15625	103.1494
-2.12766	-2.12766	4.526935
7.826087	7.826087	61.24764
-1.88172	-1.88172	3.540872
-19.726	-19.726	389.1162
-3.92491	-3.92491	15.40496
-28.0639	-28.0639	787.5849
-1.23457	-1.23457	1.524158
Total=19.09341		Total=10925.28
Mean=19.09341/20 = 0.954671		Mean=10925.28/20 =546.264
		SD=23.37229

Calculation of risk: SD $= \sqrt{\dfrac{\Sigma((X-\bar{X})2}{N}}$

$= \sqrt{\dfrac{10925.28}{20}}$

SD = 23.37229

4. CONCLUSION

•   According to my research instead of funding in cash market it is better to invest in futures market to get more return.

•   Among all stocks which I have considered in future market nearly all the stocks got positive returns.

•   With this I conclude that for the short term investment it is better to invest in derivatives market for hedging and managing the risk.

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