International Journal of Engineering Research and Science & Technology

ISSN 2319-5991 www.ijerst.com

Peer Reviewed, Referred & Indexed Journal

Research Paper

A STUDY ON FINANCIAL RISK MODELING

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ABSTRACT

Financial Risk Modeling is a systematic approach used to identify, measure, analyze, and manage the financial risks faced by organizations and investors. It applies statistical methods, mathematical models, and computational techniques to estimate potential losses arising from market risk, credit risk, liquidity risk, and operational risk. The study aims to evaluate the effectiveness of financial risk models in supporting informed decision-making, improving portfolio performance, and enhancing organizational resilience under uncertain economic conditions. By utilizing historical financial data, risk metrics, and predictive analytical tools, financial risk modeling enables institutions to assess risk exposure, optimize asset allocation, and comply with regulatory requirements. The findings highlight that robust financial risk models significantly improve risk assessment accuracy, strengthen financial planning, and contribute to sustainable business growth by minimizing potential losses and maximizing long-term financial stability.

INTRODUCTION

Financial risk modelling as a shared or brought together action must achieve the accompanying assignments: personality concerns; distinguish risks and risk proprietors - assess the risks as to probability and results; survey the choices for obliging the risks; organize the Financial risk modelling endeavours; create financial risk modelling plans; approve the usage of the Financial risk modelling plans; track the financial risk modelling endeavours and oversee as needs are. It is conceivable outcomes that are being obliged. Management must do the arranging that will oblige the potential outcomes. The client is the last adjudicator, yet inner objectives ought to be to a more elevated level than client desires.

The catchphrases in financial risk modelling are: proactive; management; suit; acceptably; proficient; probability. The requirement for new risk evaluation and management systems is required to consistently find potential and basic risks, and to create techniques for taking care of these risks, for instance: during item advancement. Clearly, without a solid financial risk modelling plan as a feature of the procedure, an organization will sit around idly, cash, and assets, and will neglect to deal with their activities accurately.

Financial risk modelling is the entirety of all proactive management coordinated exercises inside a program that are expected to acceptably oblige the chance of disappointments in the components of a program. From an association's point of view, a disappointment is anything achieved in under an expert way as well as with a not exactly sufficient outcome.

inancial risk modelling Options

Financial risk modelling choices are normally referred to as risk-taking care of choices subdivided as evasion, control, presumption, risk move, and information and research. For the most part, the evaluation of management choices is hipshot since the essential choices must happen right off the bat in a program when things are as yet fluffy. Be that as it may, whenever experienced staff is given the realities, one can

expect generally excellent choices since there is only here and there any genuine riddle about the reasonableness of alternatives accessible. (The common sense of any alternative is typically only an issue of the calendar and subsidizing.)

Evasion: Use another methodology that doesn't have the risk. This mode isn't constantly an alternative. Some programs intentionally include high risks in the desire for high gains. Notwithstanding, this is the best Financial risk modelling system on the off chance that it very well may be applied.

Control: Controlling risks includes the improvement of a risk decrease plan and afterward following the arrangement. The key perspective is arranging by experienced people. The arrangement itself may include equal improvement programs, and so
forth.

Supposition: Simply tolerating the risk and continuing. Be that as it may, there can be an inclination inside associations to bit by bit let the presumption of risk assume the air of controlled risk.

NEED FOR THE STUDY

Risk in investment is defined as the deviation between expected and real returns. The study on financial risk modelling helps the investors in analysing and optimizing the risk factors that contribute to the creation of value for shareholders. Financial risk modelling helps organizations in minimizing the risk and maximizing profits for the shareholders.

The study highlights all the factors that add to the risk of investments and thereby help them in making the right to investment choices.

SCOPE OF THE STUDY

This study of derivatives is of utmost importance in recent days. The scope of the study is limited to options with special reference to the Indian context and the bonanza has been taken as a representative sample for the study. The study cannot be said as a perfect and alteration may come the study has only made a humble attempt evaluating derivatives markets only in the Indian context. The study is not based on the international perspective of the derivatives markets. Ones being varied categories, different types of derivatives suitable for various trade and firm.

OBJECTIVES OF THE STUDY

- To study about financial risk modelling with the help of options.
- To find the profit/loss position of the option writer and buyer to option holder.
- To analyze the operation of options.
- To analyze the derivatives markets in India.
- To study the payoffs of options.

RESEARCH METHODOLOGY

- The data used in this project is purely secondary data where it is collected from different websites, journals, and newspapers.

DATA ANALYSIS

- Return = (second value of spot price –first value of spot price) /first price of spot value*100
- Average return =sum of the returns values

- Difference(D) =Returns-Average return
- Variance=$\sum D^2/(n-1)$
- Risk(σ_s)=$\sqrt{}$variance
- Covariance=$\sum$DS*DF/n-1
  - Hedging Ratio = covariance/$\sigma s*\sigma f$

LIMITATIONS OF THE STUDY

- The study is conducted to understand the use of the option contract in the Indian stock market.
- The study includes various calculations and it is restricted to only a few companies.
- The study includes are different types of call options and put options, it is so lengthy process to analyze the project and interpreted the results thereof.
  - Based on the availability of data suggestions and conclusions are provided.

CHAPTER-II REVIEW OF LITERATURE

The emergence of the market for derivatives products, most notably forwards, futures and options, can be tracked to the willingness of risk-averse economic agents to guard themselves against uncertainties arising out of fluctuations in asset prices. By their very nature, the financial markets are marked by a very high degree of volatility. Through the use of derivative products, it is possible to partially or fully transfer price risks by locking-in asset prices. As instruments of financial risk modelling, these generally do not locking-in asset prices, derivative product minimizes the impact of fluctuations in asset prices on the profitability and cash flow situation of risk-averse investors.

Derivatives are financial risk modelling instruments, which derive their value from an underlying asset. The underlying asset can be bullion, index, share, bonds, currency, interest etc., Banks, securities firms, companies and investors to hedge risks, to gain access to cheaper money and to make profit, use derivatives are likely to grow even at a faster rate in future.

DEFINATION

- Derivative is a product whose value is derived from the value of an underlying asset in contractual manner. The underlying asset can be equity, forex, commodity or any other asset.
- Securities contracts (regulation) act, 1956 (SCR act) defines “derivative” to secured or unsecured, risk instrument or contract for differences or any other form of security.

HISTORY OF DERIVATIVES

With the opening of the economy to multinationals and the adoption of the liberalized economic policies, the economy is driven more towards the free market economy. The complex nature of financial structuring itself involves the utilization of multi-currency transactions. It exposes the clients, particularly corporate clients to various risks such as exchange rate risk, interest rate risk, economic risk and political risk.

With the integration of the financial markets and free mobility of capital, risks also multiplied. For instance, when countries adopt floating exchange rates, they have to face risks due to fluctuations in the exchange rates. Deregulation of interest rate cause interest risks. Again, securitization has brought with it the risk of default or counter party risk. Apart from it, every asset whether commodity or metal or share or currency is subject to depreciation in its value. It may be due to certain inherent factors and external factors like the market condition, Government‟s policy, economic and political condition prevailing in the country and so on.

In the present state of the economy, there is an imperative need of the corporate clients to protect their operating profits by shifting some of the uncontrollable financial risks to those who are able to bear and manage them. Thus, Financial risk modeling becomes a must for survival since there is a high volatility in the present financial markets.

KINDS OF FINANCIAL DERIVATIVES

The important financial derivatives are the following:

- ✓ Forwards
- ✓ Futures
- ✓ Options
- ✓ Swaps

FORWARDS

Forwards are the oldest of all the derivatives. A forward contract refers to an agreement between two parties to exchange an agreed quantity of an asset for cash at certain date in future at a predetermined price specified in that agreement. The promised asset may be currency, commodity, instrument etc.

Example: on June 1, x enters into an agreement to buy 50 bales of cotton on December 1at Rs. 1,000/- per bale from y, a cotton dealer. It is a case of a forward contract where x has to pay Rs. 50,000 on December 1 to y and y has to supply 50 bales of cotton.

In a forward contract, a user (holder) who promises to buy the specified asset at an agreed price at a fixed future date is said to be in the „long position". On the other hand, the user who promises to sell at an agreed price at a future date is said to be in „short position". Thus, „long position & „short position" take the form of „buy & sell" in a forward contract.

CHAPTER-III INDUSTRY PROFILE AND COMPANY PROFILE

INDUSTRY PROFILE

The securities market achieves one of the most important functions of channelling idle resources to productive resources or from less productive resources to more productive resources. Hence in the broader context the people who save and investors who invest focus more towards the economy"s abilities to invest and save respectively. This enhances savings and investments in the economy, the two pillars for economic growth. The Indian Capital Market has come a long way in this process and with a strong regulator it has been able to usher an era of a modern capital market regime. The past decade in many ways has been remarkable for securities market in India. It has grown exponentially as measured in terms of amount raised from the market, the number of listed stocks, market capitalization, trading volumes and turnover on stock exchanges, and investor population. The market has witnessed fundamental institutional changes resulting in drastic reduction in transaction costs and significant improvements in efficiency, transparency and safety.

Stock market:

When investors think of the stock market, they Nov imagine a specific place - such as a stock exchange. In fact, the stock market is the abstract idea of stock trading and stock exchange. All selling of stocks - at stock exchanges and in other ways - affects the market overall. Following stock market information in the news can help you make the right decisions about stock market investing.

Need of stock market:

The stock market is simply a term for the overall market or industry that is concerned with buying and selling company stock, both private and publicly traded securities.

The stock market does many things. It helps to set prices of stocks. The more a stock is traded on the market and the more in demand the stock, the higher is its value. Having a stock market that is interconnected with stock markets around the world helps traders and investors to see how Specific stocks are doing.

Of course, the stock market is mainly present to create money. Through the market, investors - both companies and individuals - can buy stocks, which effectively make them own a small part of a company. If the company prospers, investors are rewarded with dividends and profits. Companies, by becoming public and offering stocks to the public, can raise money and improve their profile through business expansions which can help them make great profit.

How to invest in stock market:

Most Financial experts recommend that investors must consult a full-service Financial advisor initially. This type of advisor can provide advice and can help ensure that an investor's money gets a good return. More experienced investors Nov be interested in one of the online investing options. These allow almost anyone with a fast internet connection and a subscription to an investment site to buy and sell stocks when they wish.

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COMPANY PROFILE

Bajaj Finance Limited (BFL), the lending arm of Bajaj Finserv, has fundamentally rewritten the rules of retail lending in India. Headquartered in Pune, Maharashtra, it has transformed from a captive auto-financier (primarily funding Bajaj two-wheelers) into India's largest, most profitable, and most technologically advanced Non-Banking Financial Company (NBFC).

1. Key Strengths & Market Dominance

Bajaj Finance did not just capture market share; it created an entirely new market segment in India by making consumer credit accessible, instant, and frictionless.

- **The "No Cost EMI" Revolution:** Bajaj Finance single-handedly pioneered the Zero-Percent (No Cost) EMI model in India. By partnering directly with manufacturers (like Apple, Samsung, and Sony) and large retail chains, they shifted the interest burden away from the consumer. This innovation drove a massive boom in the Indian consumer durables and electronics market.
- **The Massive EMI Network:** The company operates an unparalleled Offline-to-Online (O2O) ecosystem. It boasts a merchant network of over **1.5 Lakh** (150,000+) partner stores across India. Whether a customer is in a massive metropolitan mall or a Tier-3 town electronics shop, the "Bajaj EMI Card" ecosystem is omnipresent.
- **Unrivaled Customer Franchise:** Through aggressive retail penetration, Bajaj Finance has built a captive customer base exceeding **8.5 Crore** (85 million) individuals. This massive data pool allows the company to cross-sell personal loans, insurance, and wealth products with near-zero acquisition costs.
- **Algorithmic Underwriting & Data Analytics:** BFL operates more like a fintech data science company than a traditional lender. It utilizes deep analytics and proprietary algorithms to approve loans in a matter of seconds—often under 3 minutes—directly at the point of sale (POS).

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CHAPTER-IV DATA ANALYSIS AND INTERPRETATION

STATEMENT SHOWING THAT STOCK OPTIONS (CALL) OF ACC LTD WHERE STRIKE PRICE IS 1500 AND EXPIRY DATE IS 27 FEB 2024

Date	Spot price	Returns	Average Returns	Difference	D*D
2-Dec-23	1600.75				
3-Dec-23	1587.05	-0.8558	1.3850	-2.2408	5.0224
4-Dec-23	1584.65	-0.1512	1.3850	-1.5362	2.3600
5-Dec-23	1574.35	-0.6500	1.3850	-2.0350	4.1412
6-Dec-23	1566.85	-0.4764	1.3850	-1.8614	3.4647
9-Dec-23	1559.35	-0.4787	1.3850	-1.8637	3.4732
10-Dec-23	1548.05	-0.7247	1.3850	-2.1097	4.4507
11-Dec-23	1540.3	-0.5006	1.3850	-1.8856	3.5556
12-Dec-23	1544.3	0.2597	1.3850	-1.1253	1.2663
13-Dec-23	1562.05	1.1494	1.3850	-0.2356	0.0555
16-Dec-23	1549.95	-0.7746	1.3850	-2.1596	4.6640
17-Dec-23	1560.7	0.6936	1.3850	-0.6914	0.4781
18-Dec-23	1553.2	-0.4806	1.3850	-1.8656	3.4803
22-Dec-23	1551.35	-0.1201	1.3850	-1.5041	2.2623
23-Dec-23	1546.45	-0.3159	1.3850	-1.7009	2.8929
23-Dec-23	1554.7	0.5335	1.3850	-0.8515	0.7251
24-Dec-23	1549.4	-0.3409	1.3850	-1.7259	2.9787
26-Dec-23	1542.95	-0.4163	1.3850	-1.8013	3.2446
27-Dec-23	1540.55	-0.1555	1.3850	-1.5405	2.3733
30-Dec-23	1538.05	-0.1623	1.3850	-1.5473	2.3941

31-Dec-23	1533.3	-0.3088	1.3850	-1.6938	2.8691
1-Jan-24	1529.4	-0.2544	1.3850	-1.6394	2.6875
2-Jan-24	1565.35	2.3506	1.3850	0.9656	0.9324
3-Jan-24	1555.4	-0.6356	1.3850	-2.0236	4.0830
p6-Jan-24	1540.6	-0.9515	1.3850	-2.3365	5.4593
7-Jan-24	1548.2	0.4933	1.3850	-0.8917	0.7951
8-Jan-24	1548.75	0.0355	1.3850	-1.3495	1.8201
9-Jan-24	1559.8	0.7135	1.3850	-0.6715	0.4509
10-Jan-24	1573.3	0.8655	1.3850	-0.5225	0.2699
13-Jan-24	1578.95	0.3591	1.3850	-1.0259	1.0524
14-Jan-24	1569.6	-0.5923	1.3850	-1.9772	3.9092
15-Jan-24	1568.2	-0.0892	1.3850	-1.4742	2.1732
16-Jan-24	1560	-0.5239	1.3850	-1.9079	3.6400
17-Jan-24	1562.25	0.1442	1.3850	-1.2408	1.5395
23-Jan-24	1551.05	-0.7169	1.3850	-2.1022	4.4180
22-Jan-24	1548.15	-0.1870	1.3850	-1.5723	2.4711
23-Jan-24	1571.55	1.5115	1.3850	0.1265	0.0160
23-Jan-24	1581.15	0.6109	1.3850	-0.7741	0.5993
24-Jan-24	1596.45	0.9677	1.3850	-0.4173	0.1742
27-Jan-24	1577.55	-1.1839	1.3850	-2.5689	6.5991
28-Jan-24	1585.05	0.4754	1.3850	-0.9096	0.8273
29-Jan-24	1576.25	-0.5552	1.3850	-1.9402	3.7643
30-Jan-24	1561.6	-0.9294	1.3850	-2.3144	5.3565
31-Jan-24	1557.5	-0.2626	1.3850	-1.6475	2.7144
1-Feb-24	1527.65	-1.9165	1.3850	-3.3015	10.9001
3-Feb-24	1530.8	0.2362	1.3850	-1.1788	1.3896
4-Feb-24	1538.3	0.4899	1.3850	-0.8951	0.8011
5-Feb-24	1535.3	-0.2250	1.3850	-1.5800	2.4965
6-Feb-24	1545	0.6318	1.3850	-0.7532	0.5673
7-Feb-24	1552.55	0.4887	1.3850	-0.8963	0.8034

10-Feb-24	1518.25	-2.2393	1.3850	-3.5943	12.9187
11-Feb-24	1514.35	-0.2569	1.3850	-1.6422	2.6957
12-Feb-24	1513.75	-0.0396	1.3850	-1.4246	2.0295
13-Feb-24	1511.15	-0.1718	1.3850	-1.5568	2.4235
14-Feb-24	1509.6	-0.1026	1.3850	-1.4876	2.2029
17-Feb-24	1505.7	-0.2583	1.3850	-1.6433	2.7006
18-Feb-24	1504.55	-0.0764	1.3850	-1.4614	2.1356
22-Feb-24	1505.3	0.0498	1.3850	-1.3351	1.7826
23-Feb-24	1503.5	-0.1226	1.3850	-1.5046	2.2637
24-Feb-24	1501.75	-0.1164	1.3850	-1.5014	2.2542
25-Feb-24	1500.95	-0.0533	1.3850	-1.4383	2.0686
26-Feb-24	1500.2	-0.0500	1.3850	-1.4350	2.0591
27-Feb-24	2883.35	92.2277	1.3850	90.8127	8246.9483
		1.3850			8413.3559

Average returns = 1.3849

Variance = $\frac{\sum D^2}{n-1} = 135.6993$

Risk (σ)=$\sqrt{variance} = 11.6490$

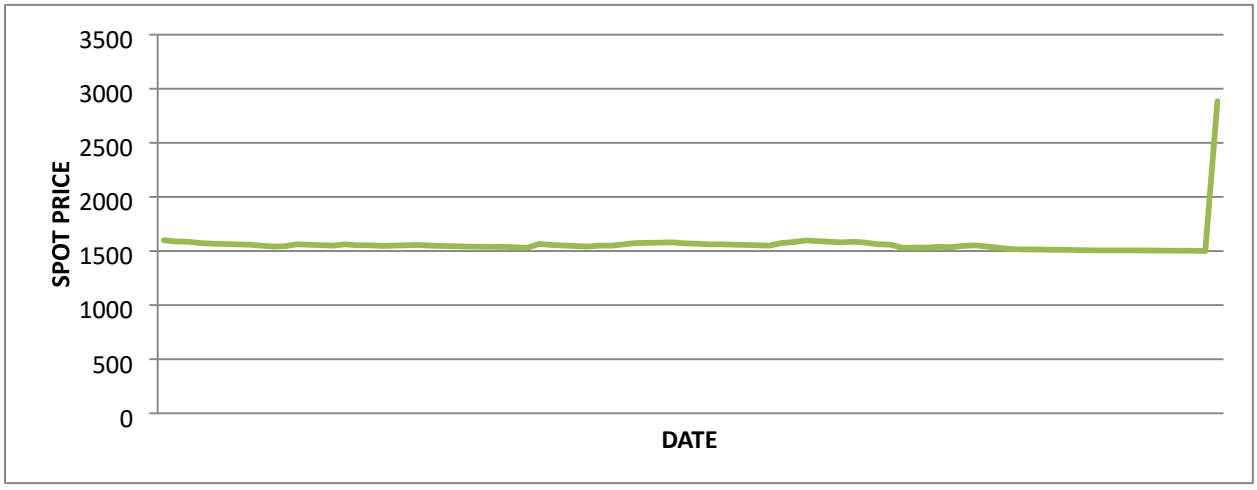
Co efficient of variation = Risk/returns

= 8.4109

Minimum value = 1500.2

Maximum value = 2883.35

GRAPHICAL REPRESENTATION OF ACC LTD



INTERPRETATION

- From the above table, it represents the risk and returns of stock options of ACC Ltd Whereas expiry is 27 Feb 2023.
- The company has an average return of 1.3849, Variance is 135.6993, Risk is 11.6490, Co-efficient of variance is 8.4109, Maximum value is 2883.3500 and Minimum value is 1500.2000.
- The investor has to buy the shares at 1500.2 and execute the contract at 2883.35 so that investor will get the profits.

CHAPTER-V FINDINGS SUGGESTIONS & CONCLUSIONS FINDINGS

- **ACC LTD**

a) CALL OPTION : The options stock price of the company has average returns of 1.3850 and risk is 11.6490
The underlying value of the company has average returns of -0.1530 and risk is 1.4622
The hedging ratio for the company is -8.9835

b) PUT OPTION : The options stock price of the company has average returns of 0.7042 and risk is 4.7136
The underlying value of the company has average returns of -0.1530 and risk is 1.4622
The hedging ratio for the company is 3.8022

- **BHARTIARTL LTD**

a) CALL OPTION: The options stock price of the company has average returns of 1.2512 and risk is 8.2849
The underlying value of the company has average returns of 0.2551 and risk is 1.8166
The hedging ratio for the company is -4.3892

b) PUT OPTION : The options stock price of the company has average returns of 1.4864 and risk is 13.4236
The underlying value of the company has average returns of 0.2551 and risk is 1.8166
The hedging ratio for the company is -14.4105.

SUGGESTIONS

ACC LTD

CALL OPTION

- The covariance of the company is -71.5725
- The hedging ratio of the company is -8.9835

PUT OPTION

- The covariance of the company is 3.8022
- The hedging ratio of the company is 1.1793 **BHARTI AIRTEL Ltd**

CALL OPTION

- The covariance of the company is -23.0172
- The hedging ratio of the company is -4.3892

PUT OPTION

CONCLUSION

Financial risk modelling options are usually cited as risk handling options subdivided as avoidance, control, assumption, risk transfer, knowledge, and research.

Hedging is buying or selling options contracts as protection against the risk of loss due to changing prices in the derivatives market. If you are feeding hogs to market, you want to protect against falling prices in the derivatives market. If you need to buy feed grain, you want to protect against rising prices in the derivatives market.

Financial risk modelling is the on-going process and is a combination of proactive management directed activities within a program that are intended to accommodate the possibility of failures.

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