"Analysing the importance of construction of an optimal portfolio for Investors".

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Abstract:

Securities market is a place where securities are bought and sold, the facilities and people engaged in such transactions. Investment opportunities include different types of products and services like offline/online Trading System, Stocks Trading, Portfolio Management Services, Mutual Fund, Systematic Investment Plan, Initial Public Offering etc. Portfolio construction is a critically important aspect when it comes to managing investments. Identifying the potential stocks is the first step in creating an optimal portfolio as we observe the investors who invests in stocks does not have efficient knowledge of investment strategies, also investors are risk-averse, so for providing them better one to invest and managing money effectively it is necessary to construct an optimal portfolio by managing a portfolio. This study focuses on, how to Avoid Future Uncertainties and increase Return on investment.

Keywords: Optimal portfolio, Risk Uncertainties, Investment Return.

INTRODUCTION

Securities market a place where securities are bought and sold, the facilities and people engaged in such transactions, the demand for and availability of securities to be traded, and the willingness of buyers and sellers to reach agreement on sales. Securities market include over-the counter-markets, the New York Stock Exchange, the Bombay Stock Exchange, the Chicago Board of Trade, and the American Stock Exchange.

There are different type of product and services like offline/online Trading System, Stocks Trading, Portfolio Management Services, Mutual Fund, Systematic Investment Plan, Initial Public Offering etc.

The field of investment is traditionally divided into securities analysis and portfolio management. The heart of security analysis is valuation of financial assets. Value in turn is the function of risk and return. These two concepts are in the study of investment.

Portfolio construction is a critically important aspect when it comes to managing investments. Identifying the potential stocks is the first step in creating an optimal portfolio, after which the important factors like expected risk and return come into the picture.

Investing in Equity among different sectors should be according to risk-return and past data analysis and ratios which ensure the return on investment. Moreover, if an investor is investing in different sectors, then it is also necessary to create a portfolio as per the interest of investing in the share market.

A diversification of securities gives the assurance of obtaining the anticipated return on portfolio. In a diversified portfolio, some securities may not perform as expected, but others may exceed the expectation and making the actual return of the reasonably close to the anticipated return.

RISK:

Risk can be defined as the likelihood that the expectation or potential benefit, earn earnings or return may failure materialize, that the real result of the investment may be less than the expected outcome is value. Since then, the variance of the complete social. Likewise covariance measures.

TYPES OF RISK

1 SYSTEMATIC RISK:

Systematic risk/ Non-Diversifiable Risk is related to stock market and economic, sociology, political etc. The result of these factors place pressure on all the securities in such how that the costs can move within same direction.

Types of systematic Risk:

Market Risk:

Due to changes in attitude and expectations of investors, market risk is referred to as inventory variable.

Interest Risk:

Interest rate risk is the risk arising from floating interest rates for bond holders. How much interest rate risk a bond has depends on how susceptible it is to market modifications in interest rates.

2 UNSYSTEMATIC RISKS:

Unsystematic risk / Diversified risk is risk associated with individual asset/stock of sector or organisation.

Types of unsystematic Risk:

Business Risk

Business risk the chance that a business will experience a loss rather than a profit that is smaller than expected. Business risk is influenced by various variables, including the quantity of sales per unit cost, input expenses, competition and general financial climate and governmental conditions.

Financial Risk

Financial risk is an umbrella term for various types of financial risk, including economic operations involving default risk corporate loans.

A rational investor should not take on any diversifiable risk, as only non-diversifiable risks are rewarded within the scope of this model. Therefore, the required return on an asset, that is the return that compensates for risk taken, must be linked to its riskiness in a portfolio.

A rational investor always attempts to minimize risk and maximize return on is investment. Investing in more than one security is a strategy to attain this often-conflicting goal. In 1952 Harry M Markowitz developed a model that could be used to systematically operationalise the old age adage- don't put all in eggs in one basket. Markowitz's portfolio model is concerned with selecting optimal portfolio by risk adverse investors. According to the model risk adverse investors should select efficient portfolios, the portfolio that maximizes return at a given level of risk or minimize risk at a given level of return, which can be formed by combining securities having less than perfect positive correlations in their returns. Markowitz model was theoretically elegant and conceptually sound. However, its serious limitations were the volume of work well beyond the capacity of all except a few analysts.

To Resolve the problem William F Sharpe developed a simplified variant of the Markowitz model that reduces substantially its data and computational requirements (Sharpe 1963). As per Sharpe's Model, the construction of an optimal portfolio is simplified if a single number of measures the desirability of including a stock in the optimal portfolio. If we accept his model, such a number exists. In this case, the desirability of any stock is directly related to its excess return-to-beta ratio. If the stocks are ranked from highest to lowest order by excess return to beta that

represents, the desirability of any stock's inclusion in a portfolio. The number of stocks elected depends on a unique cut off rate such that all stocks with higher ratios will be included and all stocks with lower ratios excluded.

Sharpe's Optimal Portfolio:

Sharpe had provided a model for the selection of appropriate securities in a portfolio. The selection of any stock is directly related to its excess return beta ration Ri-Rf.

The excess return is the difference between the expected return on the stock and the risk less rate of interest such as offered on government securities or Treasury bill. The excess return to beta ratio measures the additional return on securities (excess of the risk less asset return) per unit of systematic risk or non-diversifiable risk. This ratio provides a relationship between potential risk and return. Ranking of the stocks are done based on their excess return on beta portfolio managers would like to include stock with higher ratios.

Sharpe had provided a model for the selection of appropriate securities in portfolio. The selection of any stock is directly related to its excess return-beta ratio.

Where,

Ri = The expected return on stock i

Rf = The return on a riskless asset

Bi = The expected change in the rate of return on stock I associated with one unit change in Market return

NEED OF THE STUDY

As we observe the investors who invests in stocks does not have efficient knowledge of investment strategies, also investors are risk-averse, so for providing them better one to invest and managing money effectively it is necessary to construct an optimal portfolio.

1 To Avoid Future Uncertainties.

2 To increase Return on investment.

3 For proper management of portfolio.

2.1 Review of Literature

(Rossi, 2006) Purchasing volatility to add a S&P stock portfolio substantially reduces risk without having much effect on return. This article examines the risk and return properties of the VIX, S&P 500 stock portfolio, and a Markowitz combination of these assests, showing the risk-return benefits of including volatility as an asset. Since the daily correlation between the S&P and VIX assets ranges from -.45 to -.82, there are significant benefits to

adding volatility to a portfolio of stocks. Purchasing volatility is now possible via exchange traded futures contracts or over-the-counter instruments.

(Raffaele Zenti, 2006) Alpha generation and portfolio construction are key parts of the investment process, together with portfolio implementation. The purpose of portfolio construction is to create and maintain, through a logical sequence of steps, optimal combinations of investment vehicles to achieve stated goals, starting from a set of forecasted asset returns. In other words, it is the process by which individual assets are combined to create a portfolio which meets given objectives in terms of return and risk.

(Karen Benson, 2008) The foundation if popular approaches to portfolio construction and performance measurement lies in the mean-variance framework of Markowitz (1952-1959). However, the suitability of such approaches in practice is questionable considering considerable evidence of non-normalities in returns. This paper explores the potential usefulness of a non-parametric approach to portfolio construction and performance measurement recently proposed by stuzter.

(Panagiotis Xidonas, 2009) A multi-objective mixed integer programming model for equity portfolio construction and selection is developed in this study, to generate the Pareto optimal portfolios, using a novel version of the well-known E-Constraint method. Subsequently, an interactive filtering process is also proposed to assist the decision maker in making His/ Her final choice among the pareto solutions. The proposed methodology is tested through an application in the Athens Stock Exchange.

(Gruber, 2009) Many financial institutions employ outside portfolio managers to manage part or all their investable assets. It is well recognized that outside portfolio managers are unwilling to share security information with each other or with the centralized decision maker and this in general will lead to sub-optimal portfolios. In this paper, we drive an implementable set of rules under which a central decision maker to reveal estimates of security returns. Furthermore, we derive conditions under which these rules hold and then they do not hold.

(Pankaj Sinha, 2014) The objective of this paper is to develop an algorithm to create an optimum portfolio from a large pool of stocks listed in a single index SPX 500 Index. USA using Genetic Algorithm. The algorithm selects stocks based on a priority index function designed on company fundamentals, and then genetically assigns optimum weights to the selected stocks by finding a genetically suitable combination of return and risk based on historical data. The effect of genetic evolution on portfolio optimization has been demonstrated by developing a MATLAB cod to implement the genetic application of reproduction, crossover ad mutation operators. The effectiveness of the obtained portfolio has been successfully tested by running its performance over a six-month holding period.

(Dr. S Poornima, 2015) A portfolio is a set of securities such as stocks, bonds, and money market instruments. The process of blending together these assets classes, to obtain return with minimum risk is called portfolio construction. It is a very difficult task to find out good investments among various types of investments.

(Mahammadrafique, 2015) Portfolio construction is the process of investment of funds in different securities in which the total risk of portfolio is minimum while the return is maximum. It primarily involves reducing risk rather than increasing return. Constructing an optimal portfolio is a challenging task for the individual as well as the institutional investors. This study is aimed at creating awareness in the minds of investors regarding the utility of Sharpe's Single Index Model in portfolio construction.

(Dr. Simranjeet Kaur Sandhar, 2018) Portfolio construction is a widely used theory on how investors can construct investment portfolio to maximize expected returns and minimize risk. The practice of portfolio construction includes implementing an asset allocation strategy, which involves balancing investment risk and return by adjusting the percentage of a portfolio allocated to each asset class. Asset allocation is based on investor's risk tolerance, investment goals and investment timeframe.

(Dr. M. Raja, 2018) Portfolio is a process of blending together the broad asset classes to obtain optimum return with minimum risk is called portfolio construction. The risk, investor need to diversify, spread their portfolio across a broad mix of assets.

(Patel, 2018) The focus of this research is to construct an optimal portfolio in Indian market with the help of a Sharpe single index model. The construction of a portfolio has become increasing challenging in recent years, as investors expect to maximize return and minimize risk from their respective investment therefore a good combination of portfolio will give maximum return for a particular level of risk.

(Andrew Ang, 2019)We examine the efficiency of using individual stocks or portfolios as base assets to test asset pricing models using cross-sectional data. The literature has argued that creating portfolios reduces idiosyncratic volatility and allows more precise estimates of factor loadings and consequently risk premia. We show analytically and empirically that smaller standard errors of portfolio beta estimates do not lead to smaller standard errors of cross-sectional coefficient estimates. Factor risk premia standard errors are determined by the cross-sectional distributions of factor loadings and residual risk.

(Anuwoje Ida Logubayom, 2019)An investment portfolio is a collection of financial assets consisting of investment tools such as stocks, bonds, and bank deposits, among others which are held by a person or a group of persons. Constructing a portfolio with standardized optimization remains a myth in Ghana and hence this study displayed how the Markowitz model can be applied on the Ghana Stock Exchange and unravelled the most efficient portfolio among selected stocks to the relief of the investor.

(Pejman Peykani, 2020) Portfolio construction is one of the most critical problems in financial markets. In this paper, a new two robust portfolio selection and optimization approach is proposed to deal with the uncertainty of the data, increasing the robustness of investment process against uncertainty, decreasing computational complexity and comprehensive assessments of stocks from different financial aspects and criteria are provided.

In the first phase of this approach all the candidate stocks efficiency is measured using a robust data envelopment analysis method. Then in the second phase, by applying robust mean-semi variance-liquidity and robust mean-absolute deviation-liquidity models, the amount of investment in each qualified stock is determined. Finally, the proposed approach is implemented in a real case study of the Tehran stock exchange.

(Zeynep Cipiloglu Yildiz, 2020) A novel framework that injects future return predictions into portfolio construction strategies is proposed in this study. First, a long-short-term-memory model is trained to learn the monthly closing prices of the stock. Then these predictions are used in the calculation of portfolio weights. Five different portfolio construction strategies are introduced including modifications to smart-beta-strategies. The suggested methods are compared to several baseline methods, using the stocks of BIST30 Turkey Index.

(Sherwood, 2021) This paper introduces a portfolio construction framework for risk-averse investors that aim to meet or exceed a client's capital accumulation needs for a future event, such as retirement. Risk Capacity Portfolio Construction presents a risk-optimized alternative to Target Date Funds. Risk Capacity Construction is an economic sciences innovation that is validated by Skew-Risk Modelling, which was first presented in Targeted Return Portfolio Construction Sherwood and is detailed within this paper in its application to retirement-focused on investors.

(Dr. Aashka Thakkar, 2022) Portfolio construction is a widely used theory that describes how investor can build investment portfolios to maximize expected returns while minimizing risk. Implementing an asset allocation strategy, which balancing investment risk and return by adjusting the percentage of a portfolio allocated to each asset class, is part of portfolio construction practice.

(DingmingWu, 2022) How to construct a promising portfolio to reduce the risk of investment and to improve returns has markedly attracted scholar's attention. Firstly, it is hard to choose prospective det of assets for the portfolio. When the number of candidate stock pools is relatively large, it is challenging to screen out qualified stocks to construct the portfolio and to calculate the corresponding weights. Traditional portfolio theories, such as risk parity and Markowitz's portfolio theories, are only used to calculate the corresponding weights in the given stock portfolio and cannot be used to automatically select good stocks in a large stock pool.

Research Gaps

2.2 Scope of the study

- This study focusses on 3 major sectors.
- This study analyzes the stocks listed in BSE.
- This study emphasizes wealth and profit maximization.

2.3 Objectives of the study

- To understand the importance of construction of an optimal portfolio for equity investors.

- To study the fluctuations in the share price of selected Stocks.

- To find out the risk and return of the different sectors of selected stocks.

- To construct an optimal portfolio.

2.4 Hypothesis

Ho: The return on portfolio will not be affected by portfolio construction.

H1: The return on portfolio will be affected by portfolio construction.

2.5 Research Methodology

Research methodology is the specific procedures or techniques used to identify, select　process, and analyze information about a topic. In a research paper, the methodology section allows the reader to critically evaluate a study's overall validity and reliability.

2.6 Data Collection

Primary Data: The company's primary data will be collected.

Secondary Data: Data will be collected from books, website, and company's journals.

2.7 Limitations of the Study

- This study did not take into consideration the companies that are not listed in BSE.

- This study considers only stocks for constructing a portfolio.

- This study is limited by taken consideration of only 3 sectors.

- Only 1 year data has been considered for the construction of optimal portfolio.
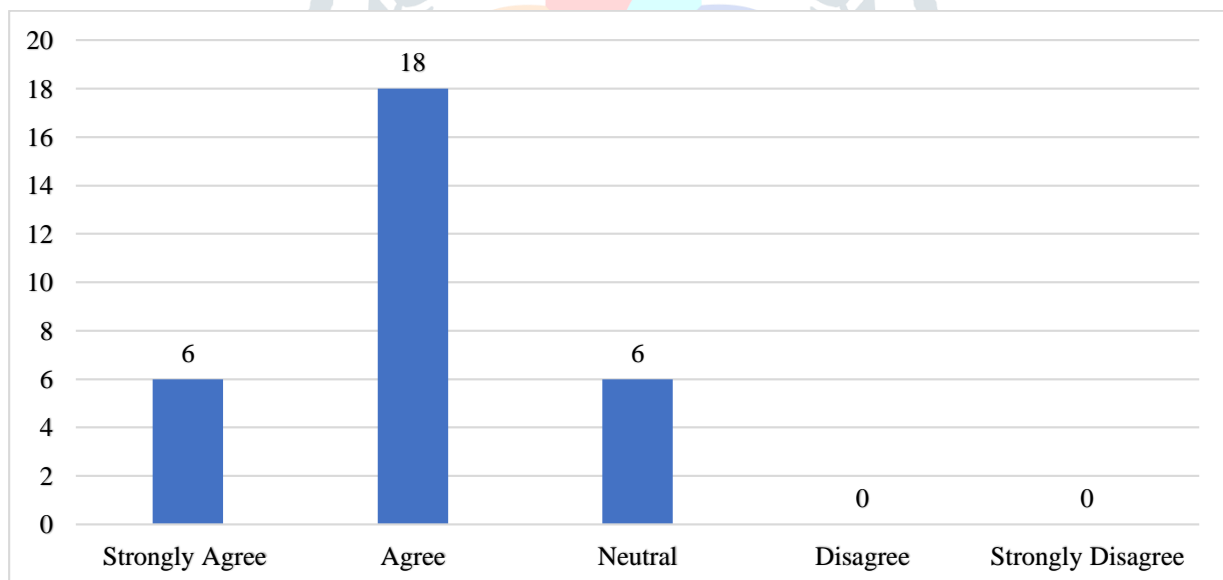
DATA ANALYSIS AND INTERPRETATION

**Graph No 1: Awareness about various investment options.**
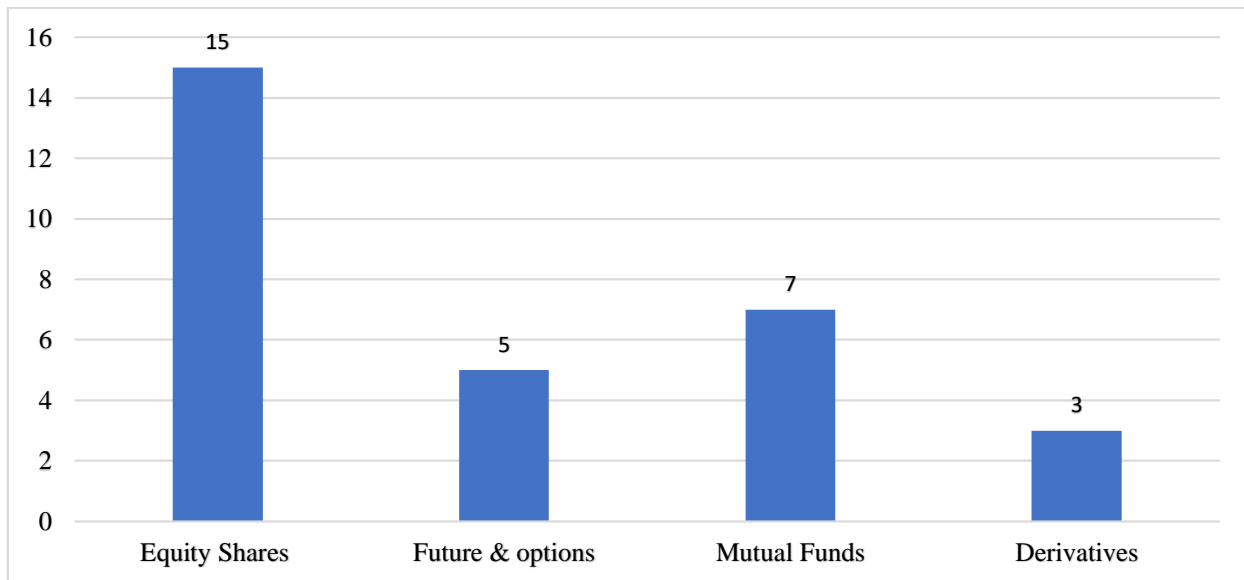
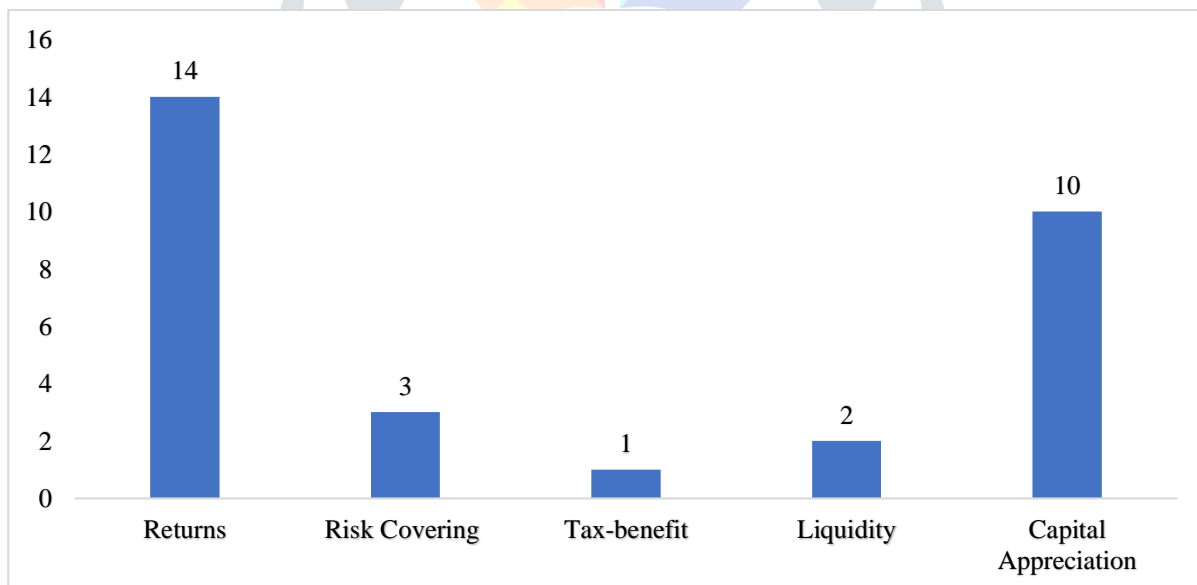**Interpretation:** We can conclude that most respondents are aware about equity shares.

Graph No 2: Investing in Equity can yield more return compared to other Investments.

**Interpretation:** The above chart shows that a greater number of respondents are agree that investing in equity can yield more return.

Graph No 3: Category of investments
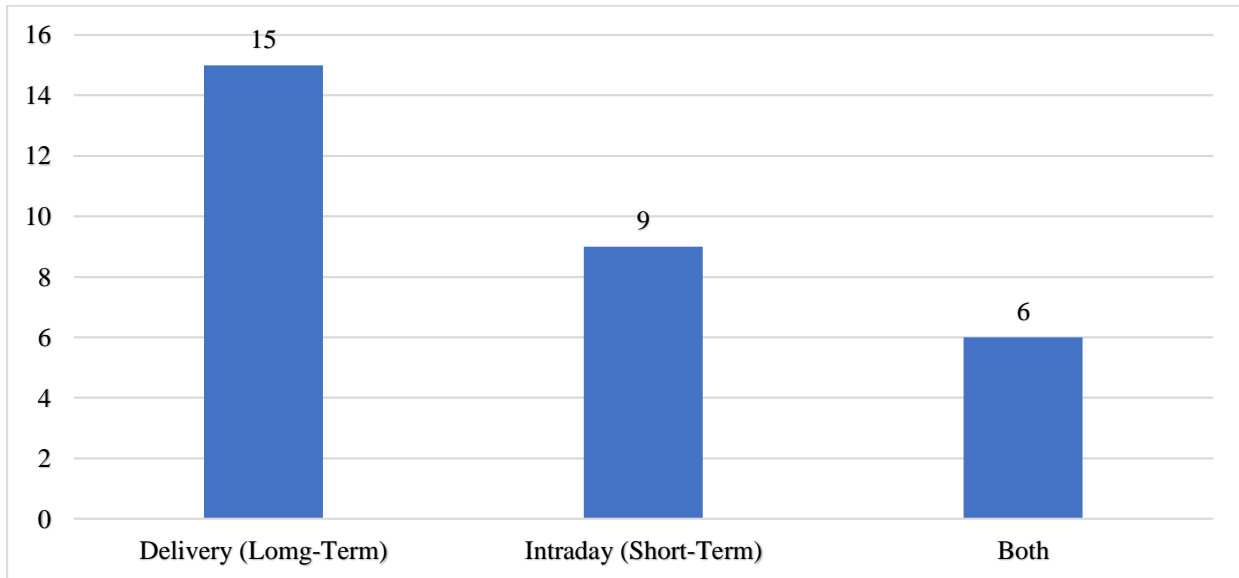
Interpretation: We can conclude that majority of investors prefer to invest in Long-term.

Graph No 4: Purpose of investment

Interpretation: We can conclude that a greater number of investors prefer returns as their purpose.

Graph No 5 : Experience in the Stock-market
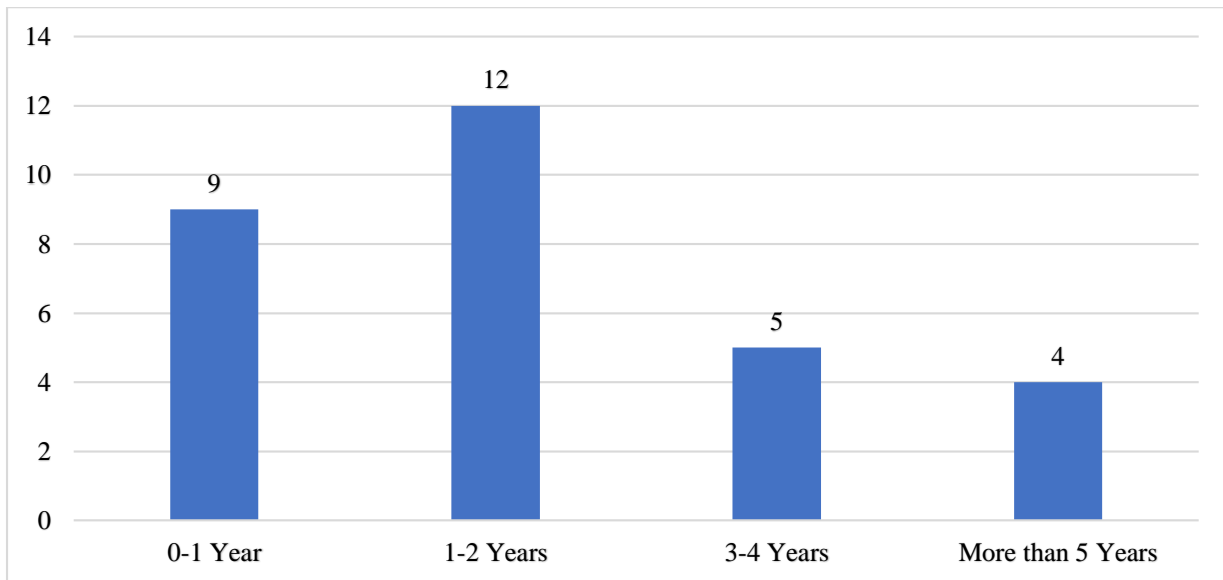
Interpretation: We can conclude that the majority of investor have 1–2-year experience in stock-market.

Graph No 6: Rank the IT Sector companies in terms of investment.
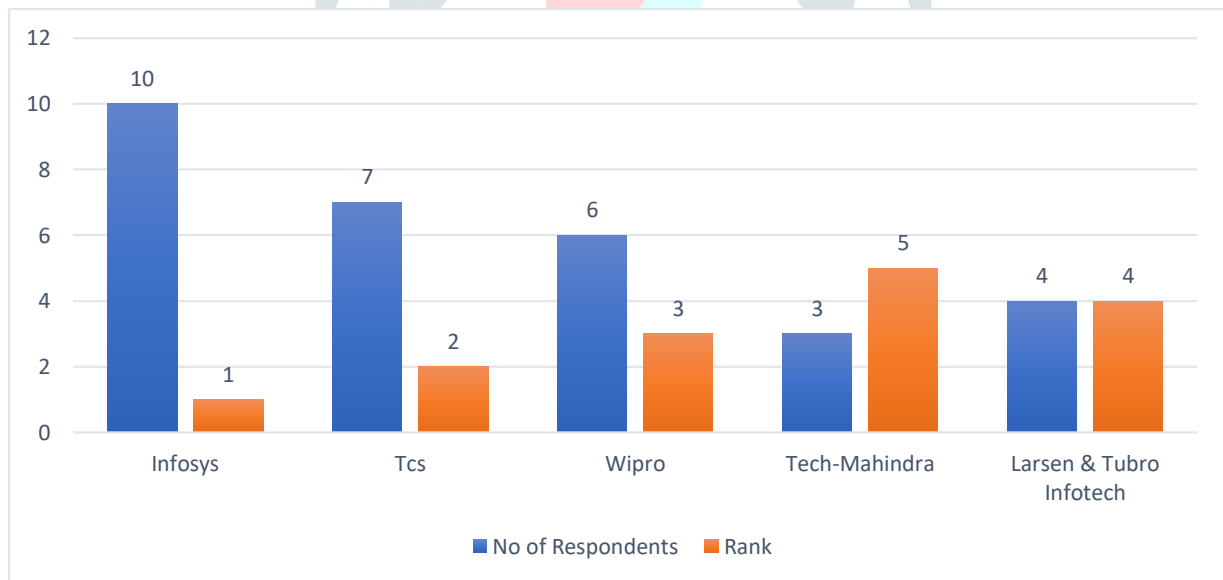
Interpretation: We can depict that investors prefer 1st Infosys company to invest.

Graph No 7: Rank the Pharmaceutical Sector companies in terms of investment.
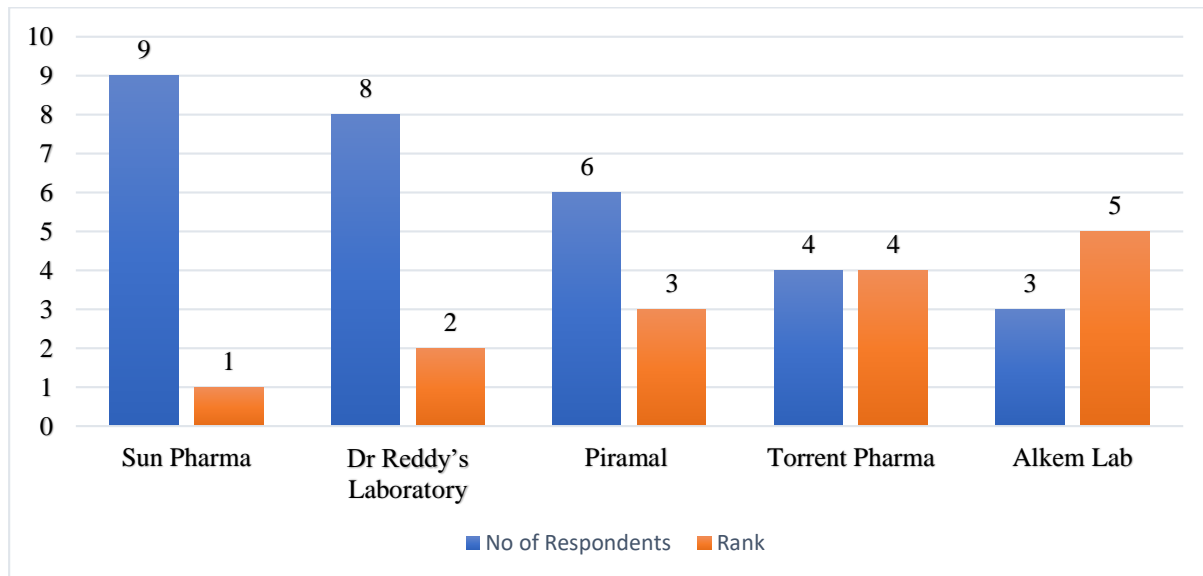

Interpretation: We can conclude that investors chose Sun pharma as their 1st rank in terms of investment.

Graph No 8: Rank the Energy Sector companies in terms of investment.

Interpretation: We can analyze that investors prefer to invest in Adani Green Energy as their 1st choice to invest.

Formula used to calculate.

Return:

$$Return = \frac{(Closing\ price - opening\ price)}{Opening\ Price} \times 100$$

Example: Infosys   1907-1385/1385*100 = 0.73432

Risk (Systematic Risk)

Risk/Beta

$$\text{Beta} = \frac{\text{Covariance}}{\text{Variance}}$$

Covariance = covar(sum of index return : sum of stock return)

Variance = varp (stock return)

Example: Infosys   0.74155/1.00984 = .73432

Company	Risk	Return
Infosys	0.73432	37.6742
Tcs	0.66595	18.096
Wipro	0.87294	42.2393
Tech-Mahindra	0.98109	51.1772
L & T Infotech	0.83202	49.7161
Sun Pharma	0.60582	49.7585
Dr Reddy	0.37831	-6.1565
Piramal >1	1.43164	23.1302
Torrent Pharma	0.49162	9.68678
Adani G E	0.8457	65.0194
Tata Power >1	1.33823	127.368
Adani Transmission	0.72557	137.432
JSW Energy	0.76323	229.73
NTPC	0.73639	25.2436
Alkem Lab	0.34221	30.3083

IT Sector

Company	Risk	Return	Rank
Infosys	0.73432	37.6742	4
Tcs	0.66595	18.096	5
Wipro	0.87294	42.2393	3
Tech-Mahindra	0.98109	51.1772	1
L & T Infotech	0.83202	49.7161	2

Pharma Sector

Company	Risk	Return	Rank
Sun Pharma	0.60582	49.7585	1
Dr Reddy	0.37831	-6.1565	5
Piramal >1	1.431648776	23.1302	3
Torrent Pharma	0.49162	9.68678	4
Alkem Lab	0.34221	30.3083	2

Energy Sector

Company	Risk	Return	Rank
Adani G E	0.8457	65.0194	4
Tata Power >1	1.33823	127.368	3
Adani Transmission	0.72557	137.432	2
JSW Energy	0.76323	229.73	1
NTPC	0.73639	25.2436	5

Table: Showing Sharpe's Portfolio Construction

Company	Return (R_i)	Risk Free Rate (R_f)	(R_i-R_f)	Beta	$(R_i-R_f)_{/B}$	Rank
Infosys	37.6742	6	31.6742	0.73432	43.134	9
Tcs	18.0959	6	12.0959	0.66595	18.1635	12
Wipro	42.2393	6	36.2393	0.87294	45.5141	10
Tech-Mahindra	51.1772	6	45.1772	0.98109	46.048	8
Larsen & Toubro Infotech	49.7161	6	43.7161	0.83202	52.5421	7
Sun Pharma	49.7585	6	43.7585	0.60582	72.2303	4
Dr Reddy Laboratory	-6.1565	6	-12.1565	0.37831	-32.1336	15
Piramal Enterprise limited	23.1302	6	17.1302	1.431648776	11.9654	13
Torrent Pharma	9.6867	6	3.6867	0.49162	7.49925	14
Alkem Lab	30.3083	6	24.3038	0.34221	71.0333	5

Adani Green Energy	65.0194	6	59.0194	0.8457	69.7876	6
Tata Power	127.368	6	121.368	1.33823	90.6929	3
Adani Transmission	137.432	6	131.432	0.72557	181.143	2
JSW Energy	229.73	6	223.73	0.76323	293.135	1
NTPC	25.2436	6	19.2436	0.73639	26.1324	11

CONCLUSION:

Portfolio helps in diversifying the risk and maximizes the returns. It is not as easy task to construct a portfolio which is optimal. It requires analysis of return and risk. Apart from it, the investors must compute the excess return earned for per unit risk, market return, cutoff rate, and proportion of funds to be invested in individual securities. We can conclude that majority of investors are aware about equity shares with more than 2 years of experience in stock market and agree that investing in equity can yield more return and they prefer investing in Long-term and chose Infosys, Sun pharma and Tata power companies to invest depending on the yields. Investment in individual security is always riskier and therefore investors tend to invest in a group of securities termed as portfolio Thus, this paper attempts to discuss the methodology and computations involved in selecting the stocks for building the portfolio and the proportion of funds to be invested. The study employed Sharpe's Single Index Model for selecting the stocks from NSE Nifty 50.

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