PORTFOLIO CONSTRUCTION AND INVESTMENT DECISION USING MARKOWITZ MODEL

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ABSTRACT:

Portfolio refers to a combination of securities such as stocks, bonds and money market instruments. Diversifying one's investments helps to spread the risk over many assets. Portfolio construction is the process of combining the broad asset classes to yield optimum return with minimum risk. Constructing an investment portfolio depends to a significant degree on the nature of the investor. Understanding market instruments and market movements can help one to understand the market. The significance of this study is of understanding the application of Markowitz model in analyzing the risk and returns of the stocks and also how to use the analysis in the construction of an optimal portfolio for the investments. The study aims at guiding the investors with an investment opportunity that reaps them the maximum returns with minimum volatility. In this study, portfolios are being compared based on their risk and return profiles. The outcomes derived using this function will provide standard recommendations on the suitable approach to choose stocks in building the portfolio.

Keywords: Portfolio Construction, Diversification, Markowitz Model, Risk & Return

1. INTRODUCTION:

The concept of optimal portfolio belongs to Modern Portfolio Theory (MPT). This theory assumes that investors obsessively attempt to minimize the risk with maximum returns. The theory states that investor's act logically, and tries to make decisions directed at maximizing their returns for the given tolerable level of risk.

The concept of optimal portfolio was first used in the year 1952 by Harry Markowitz, and from that it is evident that it is possible for diverse portfolios to have different levels of risk and return.

Before going for portfolio construction, investor should have a clear mind-set about how much risk they can candle and start allocating accordingly

Constructing an investment portfolio depends to a significant degree on the nature of the investor. Understanding market instruments and market movements can help one to understand the market. Portfolio refers to a combination of securities such as stocks, bonds and money market instruments. Portfolio construction is the process of combining the broad asset classes to yield optimum return with minimum risk. Diversifying one's investments helps to spread the risk over many assets. Diversification of securities in a portfolio assures the anticipated return. In a diversified portfolio, at certain cases selected securities in the portfolio may not perform as anticipated. Keeping a portfolio with a single security may lead to a greater likelihood of the actual return being quite different from that of the expected return. Hence, it is a common practice to have a diverse portfolio of securities.

The investor must select the industries appropriate to his investment objectives. Each industry should meet the goals of the investor. If regular income is the main criterion for investors, then industries that resist the trade cycle should be selected. Likewise, the investor should select one or two companies from each industry. The selection of the company depends upon its growth, yield, expected earnings, past earnings, expected price- earning ration, dividend and the amount spent on research and development.

Selecting the best company is widely followed by all the investors but it depends upon their knowledge and perceptions towards the company. The final step in this process is to decide number of shares of each company stock to be bought. This involves determining the number of different stocks that are required to provide adequate diversification. Funds are allocated to each stock depending upon the size of the portfolio. The investor must buy round lots to avoid transaction costs.

The two common approaches to the construction of a portfolio of securities are the traditional approach and the Markowitz efficient frontier approach. The traditional approach evaluates investor needs in terms of capital appreciation and income and selects appropriate securities to meet the wants of the investor. Usually, in the traditional approach, the complete fiscal plan of the individual is elevated. In the modern approach, the main intension in constructing portfolios are maximizing returns at the given level of risk.

Portfolio construction is both an art and science. The science of investing has evolved over time, just like the science of investing, portfolio construction has also seen its share of major breakthroughs overtime producing different asset allocation methods. The development of portfolio construction began with Harry Markowitz's paper on the mean-variance optimization. The mean-variance portfolio selection is one of the cornerstones of modern portfolio theory.

2. LITERATURE REVIEW:

Saravanan, A. Natarajan.P, made a review on Advances in Management; the study suggests that optimal portfolio can be constructed by using Sharpe's Single Index Model using NSE; NIFTY 50 stocks have been used as market index for constructing the portfolio. This study uses data on daily bases for a certain period of time which involves a unique way off formulating known as cut off point and later the percentage of each stock is selected along with their respective weights and other variance and covariance. The optimal portfolio considers four best stocks selected from the nifty fifty short listed stocks or scripts obtaining the return of 0.116%.

S.Kushalappa &Akhila has made a review on the study construction of optimal portfolio with reference to BSE 30 in India. The study is based on modern portfolio theory and the impact of the risk on overall portfolio. It suggests that rather than increasing profits or returns it is mainly focused on reducing the risk for the investors. The study deals with Sharpe's model of capital asset pricing helping or guiding the investor to make investment after distinguishing them and to select the best securities which has minimum risk involved.

Tanja Mago (2009) has overcome the techniques used to solve the problem of optimal portfolio selection which have drawbacks; along with their fellowmen they have proposed a better approach both theoretically and experimentally. The risk and return averse is based on estimated Sharpe's ratio using large-sample distribution on how the portfolio can be ideal. This distribution later represents the spectrum of possible optimal risk-return trade-offs that can be constructed from the data obtained.

Dr M Muthu & Amal Vijay (2017), observed from their study that as the return is high the expected risk from the asset will also be high, Investors should come to know the risk before investing in equity markets. The authors have analyzed the pharmaceutical industry which helps investors to make informed and rational investment decisions. They have used Excel for analyzing the data and their outcome of the study was Sun Pharmaceuticals provided high returns with high market risk, they said Divi's Laboratories Ltd is more favorable to potential investors because it was given high return with minimal risk.

Zavera (2017) in his paper titled, "Application of Markowitz Model on Romanian Stock Market", tested application of Markowitz model in Romanian market by creating a portfolio comprised of three securities. The study achieved its target of the practical application of Markowitz model to set up an optimal portfolio and the author concluded that by investing in efficient portfolios - the ones located on the efficient frontier, investors afford to get maximum return on investment given a certain level of risk.

Joel Allen & Dr. Suresha, (2018) investigated the performance of equity shares of 5 sectors consisting of 25 companies. The selected sectors are Banking, Automobile, Oil & Gas, Information Technology, and Pharmaceuticals. And ascertained the risk and return of each

company and of market as a whole. And he concluded that his study on MPT and its usage proved effective and created a portfolio to the investors which aided the investors in their investment decision.

Vishweswarsastry & Dr. Binoy (2019) focused on studying multiple industries and analyzing the risk and return of the selected companies along with evaluating the portfolio risk and returns and assesses its relationship in taking Investment decision of those multiple industries. The study was performed in assessing the right stocks for inclusion in the optimal basket, and also to check the volatility which causes losses for the investment made by the investors. It was concluded that the correlation sector-wise performed during the research was for checking the directional movement of the stocks which is used by most of the analysts for the selection of the stocks and for the portfolio.

3. RESEARCH METHODOLOGY:

Background of the Study:

The objective of the portfolio construction is nothing but the selection of securities from diversified fields that maximizes the expected returns at a given level of risk. This talks about assets must not be picked up individually, but rather as a portfolio, in order to reduce risk and maximize expected return.

Developing a venture portfolio relies on upon the way of the speculator. Understanding business sector instruments and market developments can offer one some assistance with understanding the business sector. Singular securities have hazard return qualities of their own. The arrival anticipated from a security is variable, and this variability of profits is termed as 'danger'. Financial specialists don't put their whole riches in a solitary security. On the off chance that the cost of that security falls, the speculator might need to acquire substantial misfortunes. Financial specialists shift contingent on their danger bearing capacity, and can be classified as high hazard bearing, moderate danger bearing, and generally safe bearing speculators. The portfolios are made relying on the danger bearing capability of the speculators. The procedure of making a portfolio is called enhancement.

While making a portfolio, speculators don't put resources into securities fitting in with one and only industry. Notwithstanding, they put resources into various sorts of commercial ventures to spread their danger. This is an outcome in enhancement of danger. In the event that one of the business' offer costs fall, and the profits from those securities are influenced, it might be repaid through the profits from the securities having a place with different segments. Another imperative inquiry relates to what number of portfolios might be developed. From a given arrangement of securities, any number of portfolios can be developed, and the financial specialist needs to choose about the portfolio that should be chosen. Normal financial specialists scan for the most proficient of these portfolios. This prompts the development of ideal portfolios. The real goal of ideal

portfolio development is to plan a portfolio that gives the most elevated give back the least hazard. Such a portfolio is known as an 'ideal portfolio'.

The reasonable structure for deciding the ideal portfolio is taught, and the same has been given by Harry Markowitz in his spearheading take a shot at portfolio investigation (Markowitz, 1952, 1959). His strategy for portfolio determination came to be known as the Markowitz model. Markowitz's works stamp the start of today's cutting edge portfolio hypothesis. Markowitz demonstrated that for a given level of expected return and for a given security universe, finding a particular portfolio that overwhelms the others requires information of the co-fluctuation or connection lattice between all conceivable security blends.

Statement of the Problem:

While there is an extensive literature on MPT, accurately projecting an optimal portfolio forward strikes as nearly impossible. The problem is the estimates. What goes into forecasting an optimal asset allocation has a big impact on what comes out. This often results in suggesting best distribution that are quite inaccurate and that leads to portfolio decisions that are counter-productive. Most MPT analysis relies on historical returns, risk, covariance and correlation at least as a starting point. We know that past data can be period-sensitive, so these estimates are often adjusted based on subjective input factors.

Need and Importance of the Study:

Investing money in the assets where the risk is less has always been difficult to decide. As money investment needs to be done carefully, the need to be aware of risk involved in it, is very important. This in turn becomes a huge task to decide if the risk is less or high.

Investors will find the study beneficial as it gives a wide spectrum based on the risk and return analysis. The investors can use the study and the analysis to make the right choice of investment. It gives them a wide range of choices and a variety of options to make the safe decision. The risk and return analysis would provide the investors all the details that require in analyzing the assets in terms of the risk involved and also the returns. The investor should not just look into the returns but also should be able to think in terms of volatility of a stock.

The research conducted is basically an analytical study to determine the optimum portfolio level and it generally gives an idea to the investor where to invest and which securities are better to gain good return at the best.

Investor’s decisions merely depend upon return as they can’t depend on random investment in order to avoid risk i.e. Investors can achieve less risk affiliated securities or a portfolio.

This study has a paradigm model which is helpful to invest or diversify them there to.

Objectives of the Study:

1. To develop an ideal Modern Portfolio Theory utilizing Markowitz model and break down the danger and return antagonistically through business sector lists.
2. To aid the financial specialist's in picking a best security that gives better return in relation with risk for irrational investors and rational investors.
3. To observe the securities to be held in the view of the portfolio made.
4. To calculate the return and risk of BSE 30 companies.
5. To suggest the proportion of investment in each selected securities.
6. To understand the effect of diversification of investment.

Type of Research:

The research conducted is basically an analytical study

Sources of Data:

Data collection for this research paper is through secondary sources.

The data for the study has been collected from:

1. BSE Website
2. Yahoo finance website
3. Money control website
4. Various published and unpublished articles and research papers
5. Scholarly books and guides
6. Newspapers

Sampling Technique & Sample Size:

Convenience Sampling Technique. For this study, the target population taken into consideration is all the companies listed in the BSE and sample population is the companies that are listed in BSE 30 for the period of June 2015 to June 2020. The monthly returns of the selected 30 stocks and the BSE 30 index prices were extracted from the BSE official site.

Tools Used for the Analysis:

Analysis of the study consists of various tools such as:

- Risk & Return
- Correlation
- Covariance
- Beta
- Sharpe Ratio
- Portfolio Risk & Return

Limitations of the Study:

- Only four years' information has been utilized or determined for the development of ideal portfolio.
- Study is confined especially to 30 organizations from BSE are chosen
- The study is not suitable for transient venture.
- The study is principally centred on Markowitz model.

4. DATA ANALYSIS & INTERPRETATION:

i. RISK AND RETURN OF SECURITIES

Table 1: Risk & Return of Securities

S.No	Industry	Stock	Annual Expected Return	Risk
1	LIFESTYLE	TITAN	2.07	9.55
2	FMCG	NESTLE	1.85	6.02
3	FINANCIAL SERVICES	BAJAJ	1.66	16.78
4	FMCG	HINDUSTAN LVR	1.52	5.03
5	CHEMICALS	ASIAN PAINTS	1.52	5.91
6	MNC CONGLOMERATE	RELIANCE	1.41	11.11
7	AUTOMOTIVE	MARUTHI	1.1	9.76
8	TELECOMMUNICATION	AIRTEL	0.82	8.41
9	FINANCIAL SERVICES	HDFC	0.76	7.33
10	CEMENT	ULTRATECH	0.72	7.90
11	BANKING & FINANCIAL SERVICES	ICICI	0.62	9.42
12	STEEL & IRON	TATA STEEL	0.56	9.98
13	IT SERVICES & CONSULTING	TECH MAHENDRA	0.53	8.03
14	AUTOMOTIVE	BAJAJ AUTO	0.45	7.89
15	ELECTRIC UTILITY	POWERGRID	0.38	5.62
16	BANKING & FINANCIAL SERVICES	KOTAK	0.35	9.21
17	BANKING	HDFC BANK	0.32	8.58
18	AUTOMOTIVE	HERO	0.22	8.57
19	IT SERVICES & CONSULTING	TCS	0.18	9.49
20	BANKING & FINANCIAL SERVICES	AXIS	-0.05	9.52
21	IT SERVICES &	INFYOSIS	-0.07	8.96

	CONSULTING			
22	BANKING & FINANCIAL SERVICES	INDUSIND	-0.07	12.90
23	BANKING & FINANCIAL SERVICES	SBI	-0.17	10.29
24	IT SERVICES & CONSULTING	HCL TECH	-0.31	9.15
25	ELECTRIC UTILITY	NTPC	-0.36	6.36
26	MNC CONGLOMERATE	ITC	-0.47	7.26
27	PHARMACEUTICALS	SUNPHARMA	-0.63	9.23
28	MNC CONGLOMERATE	LT	-0.65	9.02
29	AUTOMOTIVE	MM	-0.92	11.51
30	OIL GAS AND POWER	ONGC	-1.65	9.73

Based on the above table's data, it is observed that the top 5 stocks that can provide *Maximum Returns* are:

1. Titan- Lifestyle – 2.07%
2. Nestle- FMCG – 1.85%
3. Bajaj- Financial services – 1.66%
4. Hindustan Unilever- FMCG – 1.52%
5. Asian Paints- Chemicals – 1.52%

However, when we consider the stocks with the *Minimum Risk*, the following are on the leading:

1. Hindustan Unilever- FMCG – 5.03%
2. Powergrid- Electric Utility – 5.62%
3. Asian Paints- Chemicals – 5.91%
4. Nestle- FMCG – 6.02%
5. NTPC- Electric Utility – 6.36%

It is also noted that the FMCG, Information Technology and telecom industry is nearly performing better than the Banking or any other industry.

ii. SELECTION OF STOCKS FOR PORTFOLIO

As we interpret the above data we also consider the prevailing economic situation - Pandemic (COVID19), company performance based on its Q3 results and industry performance and prospects influencing the stock risk and expected return capacity. Based on which we were able to arrive at a list of

industries which is expected to perform better in the next quarter (July, August & September 2020):

i. FMCG
ii. Information Technology
iii. Telecommunication
iv. Chemicals & Paints
v. Financial Services
vi. Pharmaceuticals

Basis which we have arrived at two portfolios of 10 stocks each, where one portfolio is from the perspective of a *Risk-Averse Investor* and the other is from the perspective of a *Risk-Taking Investor.*

Table 2: Portfolio 1: (Risk-Taker)

S.No	Industry	Stock	Return	Risk
1	LIFESTYLE	TITAN	2.07	9.55
2	AUTOMOTIVE	BAJAJ AUTO	0.45	7.89
3	CHEMICALS	ASIAN PAINTS	1.52	5.91
4	IT SERVICES & CONSULTING	TCS	0.18	9.49
5	IT SERVICES & CONSULTING	INFYOSIS	-0.07	8.96
6	BANKING	HDFC BANK	0.32	8.58
7	IT SERVICES & CONSULTING	HCL TECH	-0.31	9.15
8	MNC CONGLOMERATE	ITC	-0.47	7.26
9	FINANCIAL SERVICES	HDFC	0.76	7.33
10	CEMENT	ULTRATECH	0.72	7.90

The portfolio return for the above set of stocks is 0.72 and the Portfolio risk is 4.31.

Table 3: Portfolio 2: (Risk-Averse Investor)

S.No	Industry	Stock	Return	Risk
1	FMCG	Hindustan lvr	1.52	5.03
2	electric utility	Powergrid	0.38	5.62
3	Chemicals	Asian Paints	1.52	5.91
4	IT Services & Consulting	Tech Mahendra	0.53	8.03
5	Pharmaceuticals	Sunpharma	-0.63	9.23
6	Lifestyle	Titan	2.07	9.55
7	FMCG	Nestle	1.85	6.02
8	Financial Services	HDFC	0.76	7.33
9	MNC Conglomerate	Reliance	1.41	11.11
10	Telecommunication	Airtel	0.82	8.41

The portfolio return for the above set of stocks is 0.83 and the Portfolio risk is 3.23.

iii. COVARIANCE OF SECURITIES

An analysis of different degrees of correlation coefficients helps to understand the relationship between securities better. Given below is the Covariance matrix for both the portfolios.

Table 4: Covariance Matrix for Portfolio 1 (Risk-Taker)

Covariance	Titan	Bajaj auto	Asian paints	HDFC	Ultratech	TCS	Infy	hdfc bank	HCL Tech	ITC
Titan	0.91	0.26	0.09	0.24	0.23	0.21	0.11	0.17	0.08	0.15
Bajaj	0.26	0.62	0.11	0.35	0.37	0.24	0.10	0.28	0.28	0.19
Reliance	0.09	0.11	0.35	0.18	0.19	0.02	0.14	0.11	0.03	0.08
HDFC	0.24	0.35	0.18	0.54	0.26	0.21	0.20	0.43	0.18	0.11
Ultratech	0.23	0.37	0.19	0.26	0.62	0.23	0.15	0.21	0.20	0.23
TCS	0.21	0.24	0.02	0.21	0.23	0.90	0.18	0.14	0.32	0.19
Infy	0.11	0.10	0.14	0.20	0.15	0.18	0.80	0.17	0.12	0.21
SBI	0.17	0.28	0.11	0.43	0.21	0.14	0.17	0.74	0.17	0.08
HCL Tech	0.08	0.28	0.03	0.18	0.20	0.32	0.12	0.17	0.84	0.17
ITC	0.15	0.19	0.08	0.11	0.23	0.19	0.21	0.08	0.17	0.53

Table 5: Covariance Matrix for Portfolio 2 (Risk-Averse Investor)

Covariance	Hindustan lvr	Power grid	Asian Paints	Nestle	HDFC	Tech M	Airtel	Sun pharma	Titan	Reliance
Hindustan lvr	0.25	0.04	0.10	0.14	0.06	0.01	0.11	-0.08	0.12	0.08
Powergrid	0.04	0.32	0.09	0.07	0.14	0.06	0.09	0.00	0.08	0.08
Asian Paints	0.10	0.09	0.35	0.12	0.18	0.03	0.12	0.00	0.09	0.24
Nestle	0.14	0.07	0.12	0.36	0.14	0.09	0.11	0.09	0.20	0.14
HDFC	0.06	0.14	0.18	0.14	0.54	0.15	0.18	0.15	0.24	0.35
Tech Mahendra	0.01	0.06	0.03	0.09	0.15	0.65	0.01	0.05	0.15	0.10
Airtel	0.11	0.09	0.12	0.11	0.18	0.01	0.71	0.15	0.17	0.43
Sun pharma	-0.08	0.00	0.00	0.09	0.15	0.05	0.15	0.85	-0.03	0.30
Titan	0.12	0.08	0.09	0.20	0.24	0.15	0.17	-0.03	0.91	0.32
Reliance	0.08	0.08	0.24	0.14	0.35	0.10	0.43	0.30	0.32	1.23

iv. CALCULATION OF WEIGHTS, EXPECTED RETURN AND RISK OF A PORTFOLIO:

Appling Markowitz Model Minimum weight for each security in both the portfolios was

obtained and risk and return of each portfolio were calculated using the 'Solver' option in excel. Also an attainable set of portfolios were developed to construct an Efficient Frontier Line and below are the results obtained.

Table 6: Efficient Frontier for Portfolio 1 (Risk-Taker)

Stocks	Weights									
Titan	1.00	0.81	0.67	0.50	0.25	0.08	0.00	0.00	0.00	0.00
Bajaj AUTO	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01
ASIAN PAINTS	0.00	0.19	0.33	0.50	0.64	0.41	0.38	0.31	0.19	0.13
HDFC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Ultratech	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
TCS	0.00	0.00	0.00	0.00	0.06	0.08	0.09	0.10	0.12	0.13
Infy	0.00	0.00	0.00	0.00	0.00	0.05	0.07	0.08	0.11	0.12
hdfc bank	0.00	0.00	0.00	0.00	0.03	0.10	0.12	0.12	0.14	0.14
HCL Tech	0.00	0.00	0.00	0.00	0.02	0.10	0.13	0.14	0.17	0.18
ITC	0.00	0.00	0.00	0.00	0.00	0.17	0.20	0.21	0.25	0.26
	P1 (A)	P1 (B)	P1 (C)	P1 (D)	P1 (E)	P1 (F)	P1 (G)	P1 (H)	P1 (I)	P1 (J)
Portfolio Return	2.07	1.97	1.89	1.8	1.5	**0.72**	0.5	0.4	0.2	0.1
Portfolio Risk	9.55	8	7	6	5	**4.31**	4.39	4.45	4.68	4.85
	Max Ret					Min Var				
					Optimal Portfolio					

Chart 1: Efficient Frontier for Portfolio 1 (Risk-Taker)

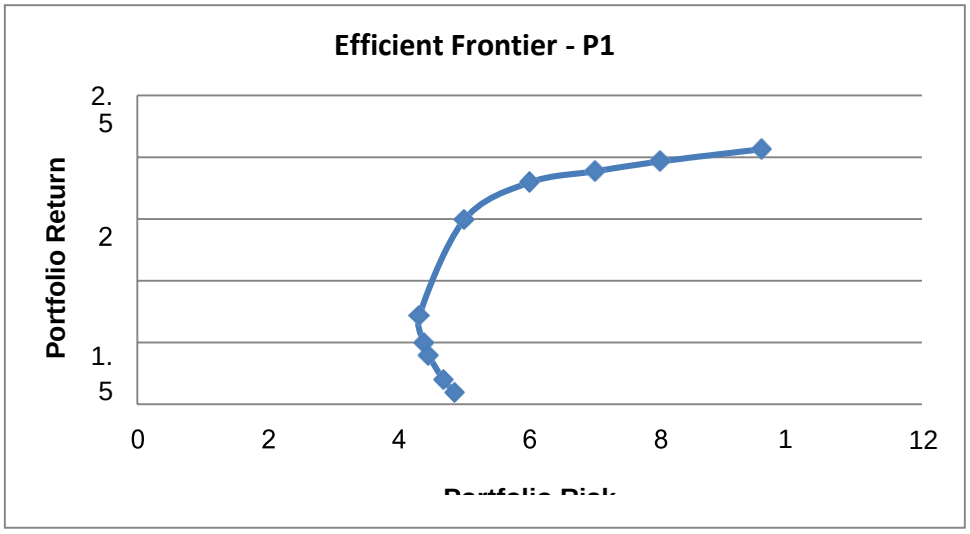
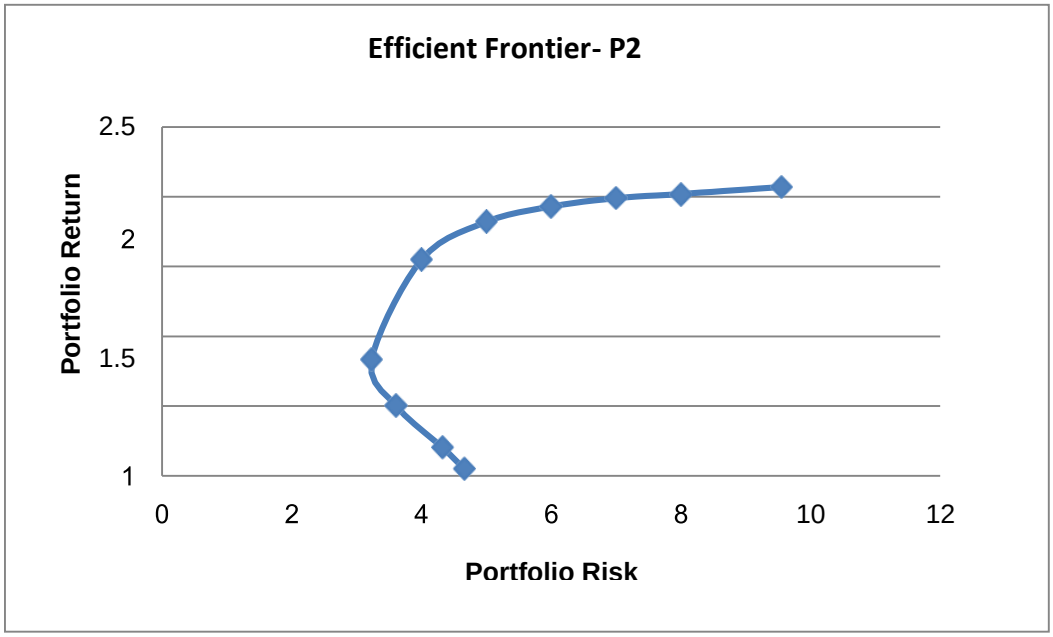


Table 7: Efficient Frontier for Portfolio 2 (Risk-Averse Investor)

Stocks	Weights									
Hindustan lvr	0.00	0.00	0.00	0.00	0.12	0.36	0.37	0.15	0.00	0.00
Powergrid	0.00	0.00	0.00	0.00	0.00	0.03	0.22	0.27	0.34	0.40
Asian Paints	0.00	0.00	0.00	0.00	0.14	0.24	0.12	0.12	0.08	0.02
Nestle	0.00	0.22	0.39	0.64	0.50	0.22	0.00	0.00	0.00	0.00
HDFC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.02
Tech Mahendra	0.00	0.00	0.00	0.00	0.00	0.06	0.12	0.16	0.18	0.17
Airtel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.01
Sunpharma	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.24	0.33	0.38
Titan	1.00	0.78	0.61	0.36	0.24	0.09	0.02	0.00	0.00	0.00
Reliance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	P2 (A)	P2 (B)	P2 (C)	P2 (D)	P2 (E)	P2 (F)	P2 (G)	P2 (H)	P2 (I)	P2 (J)
Portfolio Return	2.07	2.02	1.99	1.93	1.82	1.55	0.83	0.5	0.2	0.05
Portfolio Risk	9.55	8	7	6	5	4	3.23	3.61	4.33	4.66
	Max Return						Min Var			
							Optimal Portfolio			

Chart 2: Efficient Frontier for Portfolio 2 (Risk-Averse Investor)



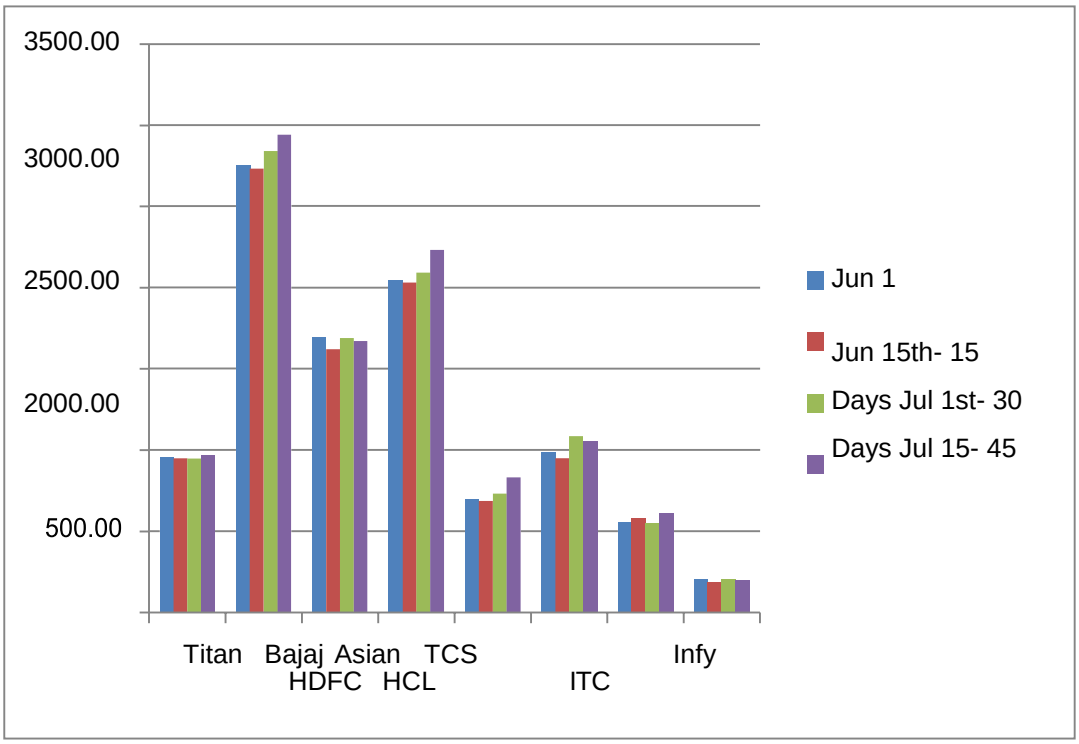
In order to test the conclusion, the BSE Sensex was studied for the next 45 days to understand the price movements. It was observed in case of Portfolio-1(Risk-Seeking Investor) there has been an increase in the prices of 6/8 stocks at the end of 45 days.

Table 8: Stock Prices of Portfolio-1(Risk-Taker)

Stock Price	Titan	Bajaj Auto		Asian paints	TCS	Infy	HDFC Bank	HCL Tech	ITC
Jun 1	958.35	2757.05		1693.50	2044.65	699.50	986.90	559.35	200.60

Jun 15th- 15 Days	947.95	2730.10		1618.05	2030.05	687.25	950.80	578.70	187.20
Jul 1st- 30 Days	948.60	2842.40		1688.10	2092.55	732.50	1085.65	551.50	202.70
Jul 15- 45 Days	967.95	2940.80		1671.30	2233.55	831.45	1052.70	615.20	198.50

Chart 3: Stock price Movements-Portfolio-1 (Risk-Taker)



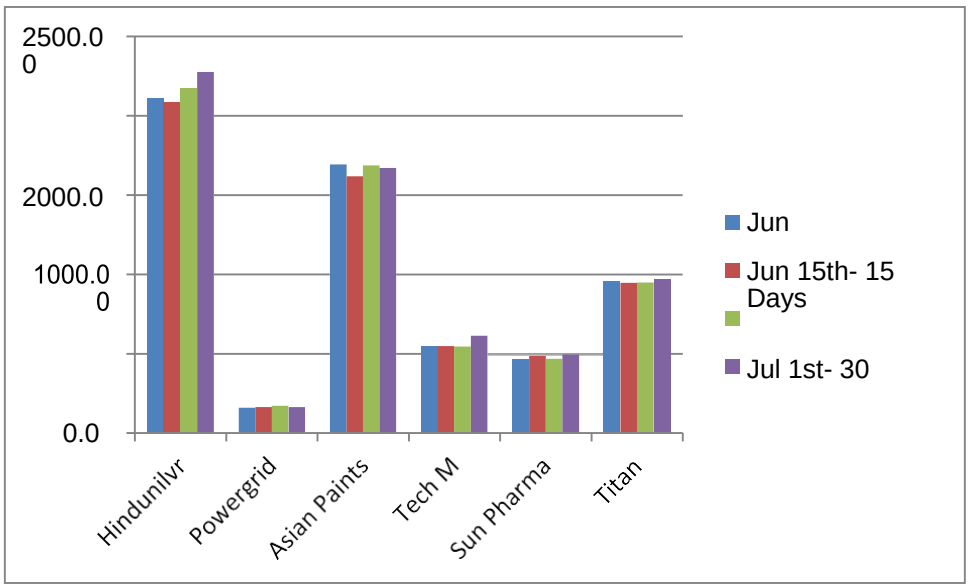
And in case of Portfolio-2 (Risk-Averse Investor) there has been an increase in the prices of 5/6 stocks at the end of 45 days.

Table 9: Stock Prices of Portfolio-2 (Risk-Averse Investor)

Stock	**Hindunilvr**	**Powergrid**	**Asian Paints**	**Tech M**	**Sun Pharma**	**Titan**

Jun 1	2106.70	158.90	1693.50	543.00	465.15	958.35
Jun 15th- 15 Days	2082.8	163.35	1618.05	548.1	485.45	947.95
Jul 1st- 30 Days	2170.70	173.30	1688.10	545.95	468.20	948.60
Jul 15th- 45 Days	2275.65	163.50	1671.30	614.90	494.80	967.95

Chart 4: Stock price Movements-Portfolio-2 (Risk-Averse Investor



SUGGESTIONS

- It is highly recommended to invest in Lifestyle industry in the coming months as the expected annual return is around 2%. If you take the example of Titan AER is 2.07% whereas risk is 9.55%. Titan is the industrial leader. Diversified fields such as watches, diamond jewellery and customized stylish garments going to give very good return to an investor.
- Next it is recommended to invest in HDFC in the financial sector from many companies chosen in this study. Reason being reasonable AER of 0.76% with risk

factor of 7.33%. In the financial sector though Bajaj's return is 1.66%, the risk factor is 16.78%. So we are not recommending Bajaj.

- Of all the stocks taken for study, Reliance is going to be a star stock as the return is good at 1.41%. Reason is billion amount of investment by MNCs like Google and Facebook. Retail and Telecom sector going to fetch more profits for Reliance. Risk percentage is reasonable at 11.11%.
- Performance of FMCG sector is also expected to be above average in next two years. Investor can go for the companies like Nestle and Hindustan Lever. In the case of Nestle return is 1.85% and risk is 6.02% which is one notch above Hindustan Lever whose return is 1.52 %and risk is 5.91%.
- Chemicals sector is also going to find robust growth in the medium term. This study shows that Asian Paints has an AER of 1.52% like Hindustan Lever. And risk is also not much, which is just 5.91%.
- Of the low priced stocks we recommend Power sector's company called Powergrid Corporation. This company's AER is though low at 0.38% but risk is also low at 5.62%. This stock would bounce back in short term with the increase of stock price by 25%.
- Another valuable stock under Banking and Financial sector is ICICI Bank whose value has eroded by 40% in last quarter. This Banking stock is also going to get the attention of all investors as the AER is 0.62 and the risk is at 9.42%.
- Automotive sector is also showing promising trend in long term. Bajaj Auto and Hero are promising companies in this automotive field. Bajaj Auto has a return of 0.45% and the risk is just 7.89%.
- Hero shows an AER of 0.22%, no doubt, not a good return. But the risk is 8.57% only. The company is coming out with good many variances in Electric Vehicles which is going to be future.
- Steel and Iron industry has been lagging behind for many years. But he Tata Steel is expected to bring good value to its investors. With the banning of Chinese ventures and increased dependence of home companies, Tata Steel going to get good many orders. Expected AER is 0.56% and the risk is just 9.98%.

- For small time investors with less than an investment amount of Rs.100000 we recommend stocks like Titan, Power grid, Infosys and also ITC. Though AER is negative at 0.07% in the case of Infosys, the risk is low at 8.96%. AER of ITC is negative at 0.47% but the risk is at 7.26%.

CONCLUSION

To conclude, this article focused on the Modern Portfolio theory and its cornerstones, the mean-variance model and the efficient frontier. The main purpose of this study was to create a portfolio to two different type of investors, one a risk-seeking investor and two a risk averse investor, which would aid them in investment decision making, with the help of Markowitz Portfolio Theory. It is also evident from the study that Markowitz model helps in building an efficient portfolio with maximum returns for a given level of risk and also in diversifying the investments.

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