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OPTIMAL PORTFOLIO CONSTRUCTION USING SHARPE INDEX MODEL ON NIFTY50 10 YEARS-CONSISTENT SECURITIES

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Abstract: Portfolio is a combination of all the assets and investments tools that are held by an individual, referred to as the investor. The main focus of this paper is to help such investors in constructing an optimal portfolio with the help of Sharpe Index Model. In this research, the scrips that have managed to constantly be a part of the NIFTY50 Index for the period of April 2011 to March 2021 have been taken into consideration. The proposed method herein leverages the excess returns to beta ratio tool to formulate the cut-off point. Those securities with greater excess returns to beta than the cut-off point ultimately form the portfolio. The proportion of investment to be made in each selected security is done basis their beta, excess returns to beta, unsystematic risk and the cut-off point. This analysis will help investors to yield more returns with reduced risk.

Index Terms **- Investment, risk, return, Sharpe's Index Model, optimal portfolio.**

I. INTRODUCTION

The act of saving has accomplished a lot in past years. With the advent of the increased propensity to save, a significant deliberation on using the idle funds for wealth creation and augmentation was put into action, to the result of which investment instruments such as fixed deposits and recurring deposits received much attention. But, the performance of the market index in recent years has compelled people in countries like India to grab a different lens to increase their income. With the availability of comprehensive knowledge about investment on various avenues via different platforms, people - especially the millennials - tend to seek better investment opportunities. The NIFTY50 Index, for example, gave an average return of a whopping 75.76% in 2009, an exemplary 31.29% in the year 2014, 28.65% in 2017 and so on. But what stocks should be risked with funds still remains a question with most of the people. Lack of exhaustive knowledge and ability to comprehend the financial jargons becomes quite challenging for an amateur. This paper, thus, aims to provide some ground knowledge to such investors about portfolio construction and then present before them a suggestive portfolio.

II. RESEARCH METHODOLOGY

3.1 Problem Statement

"To construct an optimal portfolio from the NIFTY 50 companies that are a part of the Index for continuous 10 years."

3.2 Objectives

1. To study the relative market performance for the companies constituent to NIFTY 50 Index for the last 10 years.
2. Construction of an optimal portfolio empirically using the Sharpe's Single Index Model.
3. Determine the proportion of investment to be made in each of the selected stocks.
4. Identify the risk and return of the portfolio hence built.

3.3 Population and Sample

NIFTY 50 is an index that consists of 50 companies on the basis of market capitalization. It is representative of the different sectors in the country. Out of the 50 securities we have here considered those companies only that have been a part of this index for the complete ten years period.

3.4 Data and Sources of Data

For the purpose of this research secondary data has been used, obtained from yahoo finance and moneycontrol.com for the period April 1, 2011 to March 31, 2021. The selection of 29 securities from 50 companies of the NIFTY50 Index is done based on the press release reports released every month for the last ten years (obtained from the official website of NSE).

3.5 Literature Review

Investment encapsulates the very idea of sacrificing something now for gains in the future. It is, thus, the sacrifice of current money in anticipation of future benefits. The two important key aspects of investment are – Risk and Return. The act of sacrifice happens in the present and is certain for the uncertain future returns/gains. Thus an investor is always keen to optimize his portfolio for the purpose of maximizing the returns and minimizing the risk. Therefore, there is a need for a systematic and rational investment decision-making process. One such method was devised by Sharpe popularly known as Single Index Model (SIM).

Prior to the development of portfolio theories, the concepts of risk and return were dealt with somewhat loosely by the investors. The Father of Portfolio Theory, Henry Markowitz, was the first person to quantify the risk of a portfolio. However, his model was highly information-sensitive which required n expected returns, n variance terms and n(n-1)/2 covariance terms for modeling n number of securities to an optimal portfolio. He had also suggested that for the purpose of obtaining the covariance terms, the index to which the securities are related can be used. This proved a cue for William Sharpe who then developed the Single Index Model wherein the expected return, standard deviation and co-variance represent the joint movement of the securities. Movements in security prices could be understood with the help of index movement. This model needed 3n + 2 bits of information compared to the [n(n+3)/2] bits of information needed in the Markowitz analysis. Basing this theory there have been several pieces of work that have pulled up the deliberation of investors - young in their experience of investing – to rev up their investment action.

P.Varadharajan and Ganesh (2012) employed the concept of SIM on large cap companies of selected sectors (Power, Shipping and Textiles sectors) in India. The companies having the highest market capitalization from their respective sectors were considered for this research. At the end of their analysis, out of the sample of eighteen selected companies, five companies constituted the portfolio. They also concluded that the final decision of investment should be made only after considering all the factors that affect the securities. These could include the general economic factors or other macro-economic factors governing the action and movement of securities in the market.

Tripathy, Sasikanta (2011) employed the single index model on a sample of fifteen securities of BANKEX for data collected for one year.

Mandal, Niranjan (2013) considered the daily prices of twenty-one securities for a ten year period and applied the SIM and created a 10 securities portfolio. The BSE SENSEX was used as the market performance index.

Gopalakrishna, Muthu (2014) conducted a research to identify if the single index model would serve as a good measure to explain the returns on IT stocks. The study concluded to identify four aggressive stocks (with beta more than one) out of thirteen actively trading scrips. It suggested that all the stocks except for one were undervalued and that these stocks could be used by investors for their portfolio revision.

Debasish, Satya Swaroop and Khan, Jakki Samir (2012) took a sample of fourteen stocks from the manufacturing sector. They collected the daily data for all the stocks and used the SIM to construct an optimal portfolio consisting of three stocks.

Chintan A. Shah, Assistant Professor, Bhagwan Mahavir College of Business Administration in his article constructed an optimal portfolio out of top 15 BSE securities using the Sharpe Index Model and CAPM Model. His study suggests the Sharpe Index Model gives exact number of securities along with weightage for investment, while this is not possible in CAPM model. CAPM model only suggests the securities that an investor can consider investing in while the Sharpe Index Model helps to successfully determine the proportion of each security in order to maximize the return and minimize the risk.

A study by Kwok Wai Yu, Xiao Qi Yang, and Heung Wong (2007) suggested portfolio improvement using the Sharpe Index Model. Their study proposed that a portion of the portfolio value should be invested in some other assets for portfolio management. Using the Sharpe rule, it can be determined that new stocks are worthy to the old portfolio if they satisfy a condition, in which the average return rate of these stocks is greater than the return rate of the old portfolio multiplied by the sum of the elasticity of the Value at Risk.

3.6 Statistical tools and the model used

3.6.1 Statistical tools

Statistical tools used in this paper are

Mean daily return: The average of the daily returns yielded by individual stocks.

Standard Deviation: It is the measure of the spread of data from the mean of the data values. It helps determine the volatility of the stocks prices.

Variance: It measures how distant are the daily returns from the mean return of a particular stock.

Correlation and Covariance: Co-movements between the returns of securities are measured by covariance and coefficient of correlation. Covariance reflects the degree to which the returns of the two securities vary or change together. A positive covariance means the returns from the two securities move in the same direction while a negative covariance refers to their returns moving in opposite direction. Correlation coefficient is simply the covariance divided by the product of standard deviations, which indicates the strength of the linear relationship between the returns of the two securities.

Beta: Beta refers to the measurement of volatility of returns with respect to the market index. For a given certain change in R_m, beta measures the expected change in the dependent variable R_i.

3.6.2 Symbols used

R_i = return on security *i*
R_f = risk-free rate of return
R_m = market return
σ_i = standard deviation of daily returns on security *i*
β_i = beta coefficient, i.e., the slope of the straight line R_i on R_m
σ^2_m= variance of return on the market index
σ^2_i = variance of return on security *i*
σ^2_{ei} = unsystematic risk for the stock
W_i = Proportion of investment in stock *i*

3.6.3 Sharpe Index Model

The steps towards the construction of optimal portfolio using Sharpe's Index Model are as enlisted under. All the calculations pertaining to the same have been done in MS-Excel.

1. Determination of Daily Returns **R_i** of the stock using the formula: ln(today's price/yesterday's price)
2. Finding the beta **β_i** of the security – the measure of the security's volatility. It is a slope and can take any real value
3. Determining the **Excess Return to Beta ($(R_i-R_f)/\beta_i$)** ratio for each of the stock under consideration.
4. Rank the securities in descending "excess return to beta" values, i.e., highest to lowest.
5. Calculation of the Ci values for each of the ranked securities employing the formula:

$$C_i = \frac{\sigma_m^2 * \sum_{i=1}^{n}[((R_i - R_f) * \beta_I)/\sigma_{ei}^2]}{1 + \sigma_m^2 * \sum_{i=1}^{n}(\beta_i^2/\sigma_{ei}^2)} \qquad (1)$$

6. Finding the cut-off point **C*** by scanning the **C_i** values to reach the maximum value. The maximum value until which the Ci increases is the cut-off value. The values below this keep on decreasing.
7. The securities having the **$((R_i-R_f)/\beta_i) > C^*$** will be the securities included in the optimal portfolio.
8. Determining the weightage of the selected securities in the optimal portfolio. This is done using the formula **$W_i = Z_i/\Sigma Z_i$**, where

$$Z_i = (\beta_i{}^2/\sigma_{ei}^2) * \left[\left(\frac{\{R_i - R_f\}}{\beta_i}\right) - C_i\right] \qquad (2)$$

III. Results and Discussion

3.1 Results of Descriptive Statics of Study Variables

Table 3.1: Required Data for Optimal Portfolio Construction Using Sharpe's Index Model. The Market Standard Deviation (σ_m) is 1.1127402%.

Security Number	Security Name	Mean Daily Return (R_i)	Variance(σ^2_i)	Standard Deviation(σ_i)	Covariance with Market	Correlation with the Market	Beta (β_i)	R^2	$\beta_i * \sigma_m$	$\beta_i^2 * \sigma_m^2$ (Systematic Risk)^2	σ^2_{ei}(Unsystematic Risk)
1	ASIANPAINTS	0.093719476	2.717477115	1.648477211	0.00008840	0.482947601	0.7174	0.2345	0.798279788	0.63725062	2.080226495
2	AXISBANK	0.036814968	5.55921659	2.357799099	0.000184865	0.704620202	1.493	0.4965	1.661321053	2.759987642	2.799228947
3	BAJAJ-AUTO	0.037444731	2.721313209	1.649640327	0.00009743	0.530777284	0.7872	0.2819	0.875949051	0.76728674	1.954026469
4	BHARTIARTL	0.018710395	4.268095561	2.065936969	0.000102675	0.446636231	0.8293	0.1994	0.922795412	0.851551372	3.416544189
5	BPCL	0.057574539	5.195812204	2.27943243	0.000123076	0.484456088	0.9909	0.2356	1.102614221	1.21575812	3.980054084
6	CIPLA	0.037965041	2.796151577	1.672169721	0.00006923	0.37207557	0.5591	0.1384	0.622133021	0.387049496	2.409102081
7	DRREDDY	0.041659806	2.921032731	1.709102903	0.00005890	0.309692003	0.4757	0.0959	0.529330492	0.28019077	2.640841961
8	HCLTECH	0.086440625	3.361145218	1.833342635	0.00008480	0.415686302	0.6849	0.1728	0.762115733	0.580820391	2.780324828
9	HDFC	0.051159059	3.364543157	1.834269107	0.000142829	0.699779172	1.1535	0.4897	1.28354577	1.647489744	1.717053412
10	HDFCBANK	0.075338128	2.227357473	1.492433407	0.000124113	0.74735647	1.0024	0.5585	1.115410733	1.244141103	0.983216371
11	HEROMOTOCO.NS	0.024256029	3.325314719	1.823544548	0.000101176	0.498616973	0.8171	0.2486	0.909219982	0.826680975	2.498633743
12	HINDALCO	0.017141145	6.791473673	2.606045601	0.000180891	0.623794394	1.4609	0.3891	1.625602094	2.642582169	4.148891504
13	HINDUNILVR	0.087153629	2.320058564	1.523173846	6.75349E-05	0.398460195	0.5454	0.1588	0.606888481	0.368313629	1.951744935
14	ICICIBANK	0.043250486	4.786185018	2.187735134	0.000184147	0.756444529	1.4872	0.5722	1.65486716	2.738585319	2.047599699
15	INFY	0.04967619	3.371259801	1.836099072	0.00009150	0.447848623	0.7374	0.1996	0.820534591	0.673277015	2.697982786
16	ITC	0.023762215	2.697014125	1.642258848	0.00008898	0.486905557	0.7186	0.2371	0.799615076	0.63938427	2.057629854
17	KOTAKBANK	0.083229047	3.270326985	1.808404541	0.000132228	0.657106396	1.0679	0.4318	1.188295213	1.412045513	1.858281472
18	LT	0.026859836	3.585147189	1.893448491	0.000148286	0.70380748	1.1976	0.4953	1.332617611	1.775869698	1.809277491
19	M&M	0.032672929	3.671540462	1.916126421	0.000124502	0.583925178	1.0055	0.341	1.118860227	1.251848208	2.419692254
20	MARUTI	0.068413482	3.519382223	1.876001658	0.000123132	0.589853404	0.9945	0.3479	1.106620085	1.224608013	2.294774209
21	NTPC	-0.01582862	2.869647521	1.6940034	0.00009153	0.485593996	0.7393	0.2358	0.822648798	0.676751044	2.192896476
22	ONGC	-0.02631639	4.51342681	2.124482716	0.000124087	0.524901537	1.0022	0.2755	1.115188185	1.243644687	3.269782123
23	POWERGRID	0.029266476	2.293851505	1.514546634	0.00007652	0.454046644	0.618	0.2062	0.687673417	0.472894728	1.820956777
24	RELIANCE	0.055256669	3.351835913	1.830801986	0.000136484	0.669956955	1.1023	0.4488	1.226573474	1.504482488	1.847353425
25	SBIN	0.011864493	4.98986264	2.233800045	0.000166148	0.668433355	1.3419	0.4468	1.493186016	2.229604478	2.760258163
26	SUNPHARMA	0.04008341	3.755061452	1.937798094	0.00007949	0.368648736	0.642	0.1359	0.71437918	0.510337613	3.244723838
27	TATAMOTORS	0.008342292	7.2358657	2.68995645	0.000176613	0.590044486	1.4264	0.3482	1.587212559	2.519243707	4.716621993
28	TATASTEEL	0.01247662	5.618873551	2.370416324	0.000164747	0.624596194	1.3305	0.3901	1.480500778	2.191882553	3.426990998
29	TCS	0.068332407	2.65834636	1.630443608	0.00007915	0.436287003	0.6393	0.1903	0.711374782	0.50605408	2.152292279

To begin with the data preparation for further calculations Table 3.1 is created with mean daily returns calculated on the Closing Price of each day for a particular security. Covariance of each security with the market is positive, meaning that all of them are positively related with the market. The correlation coefficient of securities ranges from 0.3097 to 0.7564. It is clearly seen that ICICI Bank is most positively related with NIFTY50 Index with a correlation co-efficient of 0.7564. There are a total of 13 companies with beta greater than 1 giving a daily mean return of 0.00834% to 0.0832% (except ONGC with -0.02631639% mean daily return). For those with beta less than 1, the range of daily mean return is 0.0187% to 0.0937% with an exception of NTPC offering a daily mean return of -0.0158%. This suggests that stocks of these 13 companies are more volatile than the market, while the remaining 16 companies with beta less than one are less volatile/less risky than the market. Furthermore, the systematic risk (unique risk) for the data set ranges from 0.2801% to 2.7599% and the unsystematic risk (market risk) ranges from 0.9832% to 4.7166%. Thus, the total risk of all the securities ranges between 2.2273% and 7.2358%.

Table 3.2: Ranking of Securities on the Basis of Excess Return to Beta Ratio. Here, r_f = 5.6% p.a. = 0.015355 per day.

Security Number	Company Security with postive mean returns and positive beta	Mean Daily Return (R_i)	Excess of Mean Daily Return over Risk-free Rate(daily) (Ri-Rf)	Beta (β_i)	Excess Return to Beta Ratio $\left(\frac{R_i-R_f}{\beta_i}\right)$	Rank according to Highest to Lowest $\left(\frac{R_i-R_f}{\beta_i}\right)$
1	ASIANPAINTS	9.3719%	0.078364788	0.7174	0.109234441	2
2	AXISBANK	3.6815%	0.021460281	1.493	0.014373932	19
3	BAJAJ-AUTO	3.7445%	0.022090043	0.7872	0.028061539	15
4	BHARTIARTL	1.8710%	0.003355707	0.8293	0.004046433	23
5	BPCL	5.7575%	0.042219852	0.9909	0.042607581	10
6	CIPLA	3.7965%	0.022610354	0.5591	0.040440626	11
7	DRREDDY	4.1660%	0.026305118	0.4757	0.055297705	7
8	HCLTECH	8.6441%	0.071085937	0.6849	0.103790243	3
9	HDFC	5.1159%	0.035804371	1.1535	0.031039767	14
10	HDFCBANK	7.5338%	0.059983441	1.0024	0.059839825	6
11	HEROMOTOCO.I	2.4256%	0.008901342	0.8171	0.010893821	21
12	HINDALCO	1.7141%	0.001786457	1.4609	0.001222847	24
13	HINDUNILVR	8.7154%	0.071798941	0.5454	0.131644557	1
14	ICICIBANK	4.3250%	0.027895799	1.4824	0.018817997	17
15	INFY	4.9676%	0.034321502	0.7374	0.046543941	9
16	ITC	2.3762%	0.008407527	0.7186	0.011699871	20
17	KOTAKBANK	8.3229%	0.06787436	1.0679	0.063558722	5
18	LT	2.6860%	0.011505148	1.1976	0.009606837	22
19	M&M	3.2673%	0.017318242	1.0055	0.017223512	18
20	MARUTI	6.8413%	0.053058794	0.9945	0.053352232	8
21	POWERGRID	2.9266%	0.013911788	0.618	0.022510984	16
22	RELIANCE	5.5257%	0.039901982	1.1023	0.03619884	13
23	SBIN	1.1864%	-0.003490195	1.3419	-0.002600935	26
24	SUNPHARMA	4.0083%	0.024728722	0.642	0.038518259	12
25	TATAMOTORS	0.8342%	-0.007012396	1.4264	-0.00491615	27
26	TATASTEEL	1.2477%	-0.002878068	1.3305	-0.002163148	25
27	TCS	6.8332%	0.052977719	0.6393	0.082868324	4

For further development towards the optimal portfolio, we ignore the securities that have negative return and rank the remaining according to their Excess Returns to Beta ratio (highest to lowest). HINDUNILVR secures the first spot in ranking while TATAMOTORS holds the last.

The risk-free rate of return is calculated after deducting the possibility of default (1.95% p.a.) for the country from the mean returns of 10-year bond yield (calculated to be 7.55% p.a.). Thus the value 5.6% for r_f.

Table 3.3: Calculations for Determination of Cut-off rates Ci for securities and Cut-off Point C*

Ranks basis the excess returns to beta	Company Security *i* according to the Rank	$\frac{(R_i-R_f)*\beta_i}{\sigma_{ei}^2}$	$\frac{\beta_i^2}{\sigma_{ei}^2}$	$\sum\frac{(R_i-R_f)*\beta_i}{\sigma_{ei}^2}$	$\sum\frac{\beta_i^2}{\sigma_{ei}^2}$	C_i
1	HINDUNILVR	**0.020063658**	**0.152408**	**0.020063658**	**0.152407804**	**0.020898819**
2	ASIANPAINTS	**0.027025374**	**0.247407**	**0.047089032**	**0.399814883**	**0.038998906**
3	HCLTECH	**0.017511176**	**0.168717**	**0.064600208**	**0.568531863**	**0.046942302**
4	TCS	**0.015736086**	**0.189893**	**0.080336294**	**0.758424516**	**0.051298528**
5	KOTAKBANK	**0.039005409**	**0.613691**	**0.119341703**	**1.372115406**	**0.054750293**
6	HDFCBANK	**0.061153783**	**1.021958**	**0.180495486**	**2.394073329**	**0.056374831**
7	DRREDDY	0.004738392	0.085689	0.185233879	2.479762095	0.056346754
8	MARUTI	0.022994406	0.430992	0.208228285	2.910754498	0.055999664
9	INFY	0.009380592	0.201543	0.217608877	3.112297207	0.055513499
10	BPCL	0.010511327	0.246701	0.228120204	3.358998079	0.054749355
11	CIPLA	0.00524737	0.129755	0.233367574	3.488752983	0.054317218
12	SUNPHARMA	0.004892817	0.127026	0.238260391	3.615778893	0.053863523
13	RELIANCE	0.023809172	0.657733	0.262069562	4.273511882	0.051576902
14	HDFC	0.024053033	0.77491	0.286122595	5.04842211	0.048859297
15	BAJAJ-AUTO	0.008899205	0.317132	0.2950218	5.365553863	0.047790865
16	POWERGRID	0.004721411	0.209738	0.299743211	5.575291955	0.046960187
17	ICICIBANK	0.020195711	1.073213	0.319938922	6.648504537	0.042909488
18	M&M	0.007196573	0.417834	0.327135495	7.066338767	0.041546455
19	AXISBANK	0.01144608	0.796308	0.338581575	7.86264698	0.039050837
20	ITC	0.002936218	0.250962	0.341517792	8.113608521	0.038281432
21	HEROMOTOC	0.002910905	0.267207	0.344428698	8.380815514	0.03748498
22	LT	0.007615507	0.792717	0.352044205	9.173532921	0.03527086
23	BHARTIARTL	0.000814533	0.201297	0.352858738	9.374829451	0.034653586
24	HINDALCO	0.000629044	0.514409	0.353487782	9.889238856	0.033045911
25	TATASTEEL	-0.001117385	0.516555	0.352370396	10.40579412	0.031423978
26	SBIN	-0.001696759	0.652365	0.350673638	11.05815905	0.029553335
27	TATAMOTOR	-0.002120688	0.431372	0.34855295	11.48953069	0.028344181

C_i value for all the stocks arranged in their ranked order is calculated using Eq. 1. The cut-off point, **C***, hence obtained is **0.05637**.
The securities from Rank 1 until the cut-off point, C*, make up for inclusion into the optimal portfolio.

Table 3.4: Calculation of Z_i and W_i for the Selected Securities in the Optimal Portfolio

Selected Securities in the Optmial Portfolio	$\left(\frac{R_i-R_f}{\beta_i}\right)$	$\frac{\beta_i^2}{\sigma_{ei}^2}$	Z_i	W_i	Approximate value of W_i(%)
HINDUNILVR	0.131644557	0.152407804	0.0108167	22.317041	22
ASIANPAINTS	0.109234441	0.247407079	0.0122955	25.368164	25
HCLTECH	0.103790243	0.168716981	0.0075692	15.616816	16
TCS	0.082868324	0.189892653	0.0046641	9.6228796	10
KOTAKBANK	0.063558722	0.61369089	0.005066	10.452208	10
HDFCBANK	0.059839825	1.021957923	0.0080568	16.622892	17
Total			**0.048468**	**100**	**100**

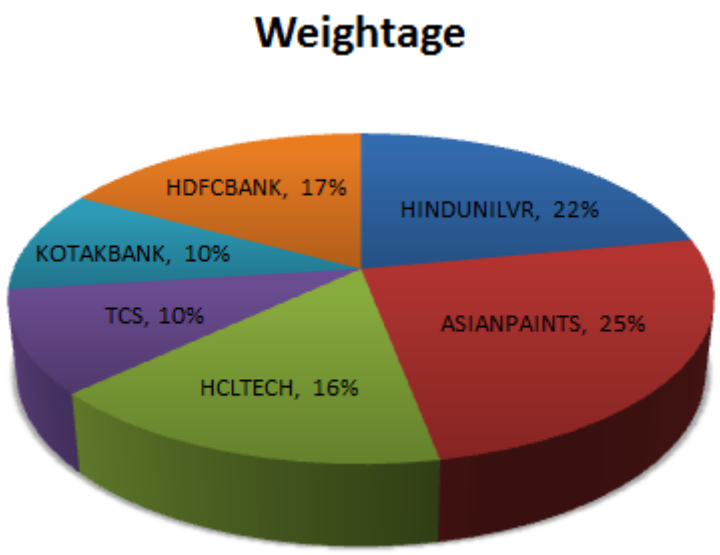
Table 3.4 above shows the weightage of each security in the optimal portfolio. With respect to the weightage and the associated risk and return against each security in the portfolio are calculated in Table 3.5 which helps in finding out the overall risk and return of the portfolio.

Table 3.5: Portfolio Risk and Return

Security	Mean Daily Return (R_i)	Standard Deviation of Returns σ_i	Beta (β_i)	σ_{ei}^2 (Unsystematic Risk)	Weightage	σ_{ei}	$W_i R_i$	$W_i \beta_i$	$W_i * \sigma_{ei}$
HINDUNILVR	0.087153629	1.523173846	0.5454	1.9517449	0.223170406	1.3970487	0.0194501	0.12171714	0.3117799
ASIANPAINTS	0.093719476	1.648477211	0.7174	2.0802265	0.253681642	1.442299	0.0237749	0.18199121	0.3658848
HCLTECH	0.086440625	1.833342635	0.6849	2.7803248	0.156168156	1.6674306	0.0134993	0.10695957	0.2603996
TCS	0.068332407	1.630443608	0.6393	2.1522923	0.096228796	1.4670693	0.0065755	0.06151907	0.1411743
KOTAKBANK	0.083229047	1.808404541	1.0679	1.8582815	0.10452208	1.363188	0.0086993	0.11161913	0.1424832
HDFCBANK	0.075338128	1.492433407	1.0024	0.9832164	0.166228919	0.9915727	0.0125234	0.16662787	0.1648281
				Total	1		0.0845225	0.75043399	1.3865499

IV. FINDINGS AND CONCLUSIONS

- The optimal portfolio consists of 6 companies, as per the Sharpe's Single Index Model.
- The weightage of each security can be represented as below



- The Sector-wise weightage of the optimal portfolio:
  - Consumer Goods – 47%
  - Banking – 27%
  - Information Technology – 16%
- Portfolio beta value ($W_i\beta_i$) is 0.750434 which is less than one and indicates the defensive nature of the portfolio.
- Portfolio Return is 30.85071% p.a. (W_iR_i * 365 = 0.084522 * 365) while the diversified portfolio risk is 2.619809% in terms of variance or 1.618582% in terms of standard deviation.

"The market is a pendulum that swings back and forth through the median line of rationality." So, an investor should tend towards this median to extract the most out of this universe of stocks. An investor must diversify his portfolio in order to cover up for the losses made by some securities and still make some gains. An optimal portfolio constructed using the Sharpe Index Model gives the perfect number of securities that an investor should build his portfolio from with minimized risk and maximized return.

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