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The Analysis of Optimal Portfolio Formation: The Evidence from BSE Index During the Covid19

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ABSTRACT:

The primary goal of this research is to create an optimal portfolio using the Sharpe single index model with reference to the BSE Sensex. Portfolio creation is an essential procedure for capital market participants and portfolio managers. In this study, we attempted to apply the Sharpe single index model to the BSE Sensex 8 stocks. To build the BSE Sensex portfolio, 8 equities with 9 months of data, from April 1st, 2020 to December 31st, 2020, were evaluated. The suggested strategy develops a sharp ratio and optimal weights.

In order to enhance the understanding of different optimal portfolio formation the study incorporates various asset classes which includes equities alternate investments as well as bonds. With respect to performance of specific sectors a special attention is given and all those industries which exhibited the resilience of vulnerability during the pandemic induced economic turmoil.

The research also investigates the different roles of macroeconomic indicators govt interventions as well as global economic trends in order to shape the different optimal portfolio construction. By employing different advanced statistical models the study aims to identify the patterns and correlations that can guide investors in making informed decisions and heightened uncertainty.

KEYWORDS: Optimal portfolio BSE Sensex Standard deviation Sharpe ratio

Introduction:

Choosing proper stocks for portfolio creation is a challenging process. A prudent investor constantly attempts to maximize rewards while minimizing risk. Putting all of the funds into a single stock is extremely hazardous and exposes you to greater losses. The best portfolio is always built to minimize investment risk (Naveen 2014) [12]. This is accomplished by constructing an optimal portfolio of assets from the capital markets. The relevance of the current study stems from the fact that the application of fundamental models produces an offer to investors for making decisions in the selection of optimal portfolios in the BSE Sensex 8 firms.

Many economists presented numerous theories to design portfolios, the most prominent of which being the Markowitz and Sharpe models. The study's rationale is to apply a theoretical framework of portfolio management to a practical setting and construct a well-diversified optimal portfolio using BSE Sensex 08 companies. The Markowitz model is used by rational investors to generate an optimal portfolio utilizing an efficient frontier (Markowitz 1952). According to the (Sharpe 1964) single index model, all stocks are impacted by capital market movements, and securities that provide an excess return to beta values are qualified to create a portfolio with a reduced degree of risk.

Finally, determine which stocks have a unique cut-off rate and should be included in the ideal portfolio. In this study, we attempted to build an optimal portfolio using the Sharpe single index model with BSE Sensex 08 stocks. An empirical study on conception portfolios concerning the BSE provides an opportunity to understand the performance, risk, and diversification benefits associated with investing in this sector. It offers investors valuable insights into constructing and managing portfolios to optimize returns while managing risk effectively in the ever-evolving construction industry landscape.

Review of Literature:

- Gullickson M., and S. Mazur (2020) [7] investigated portfolio formation using a single covariance matrix. The study of convergence qualities yields a solution that is superior to solutions based on limited least norm Moore-Penrose, Lasso, and naïve equal-weighted techniques. It demonstrates that the optimal portfolio weights produced by the DFPM and Moore-Penrose inverse techniques can be simulated using a white noise process.

- From 2011 to 2016, Basha, S. M., and Rajaratnam, M. S. (2017) [3] examined nifty midcap 150 stocks for optimal portfolio development. Sharpe single index model was used to calculate the cut-off point and excess return to beta. According to the study, just 25 of the 150 midcap companies are covered in the final portfolio. It has been discovered that pharmaceutical stocks would have a higher weightage than other sectors' equities.
- P. Basanna and N. P. Konnur (2019) [2] A study was conducted to create an ideal portfolio by combining the Sharpe single index with the Nifty 50 index. For the construction portfolio, daily closing prices were collected from 2014 to 2019. It was discovered that the stocks chosen for the ideal portfolio include consumer non-durables (3 stocks), consumer durables (1 stock), finance (3 stocks), and agreement-based sectors (1 stock).
- T. Angelidis and N. Tessaromatis (2017) [1] investigated a global factor allocation approach based on capital market indexes and portfolio creation methodologies to fulfill the robust estimation of error. It has been discovered that exchange-traded funds or index futures, a portfolio based on national indexes with favorable factor exposures, greatly outperform the world market capitalization portfolio, both economically and statistically. After accounting for transaction costs, alternative portfolio formation approaches, and tracking error errors, the outperformance remains considerable.

Need For the Study

Every investor feels confused when it comes to selecting the proper stocks in the stock market. Portfolio investors have no idea about where to invest, how much to invest, and the amount of investment. A lack of financial knowledge and understanding is a barrier to participating in capital markets. To satisfy investor demand, the Sharpe single index model is an effective technique for meeting these goals.

Objectives of the study

- To calculate the risk and return on individual securities in the BSE Sensex.
- To calculate the best portfolio using a single index model.
- determining the proportion of investment in the ideal portfolio.

Research Methodology:

The portfolio creation research is empirical, including secondary data gathered from the BSE website. From April 2020 to December 2020, data will be gathered. The sample size is limited to 08 BSE equities, with the risk-free rate taken into account.

Theoretical Framework:

Sharpe developed a methodology for selecting relevant assets in an optimal portfolio. Rather than co-relate each security to an index of all securities included in the study, co-relate each security to the efficient market value-weighted portfolio of all risky assets in the universe.

The following involved in the portfolio creation process are as follows:

Date	***SBI***	***HDFC***	***HCL***	***Infosys***	***Reddy's Lab***	***Cipla***	***India MART***	***Tata steel***
1-Apr-20	178.53	36.12	398.23	577.2	3,023.23	399.12	1,000.12	22.58
3-Apr-20	167.96	36.09	398.82	588.47	3,032.79	410.22	1,004.13	25.8
7-Apr-20	178.39	37.87	391	570.3	3,453.38	445.49	991.19	24.58
8-Apr-20	175.14	39.74	436.24	624.52	3,549.56	487.99	1,075.89	26.74
9-Apr-20	179.68	38.66	446.71	615.36	3,490.34	508.87	1,093.82	26.6
13-Apr-20	175.61	39.97	452.75	621.11	3,610.86	574.84	1,113.66	27.58
15-Apr-20	174.51	37.62	442.51	620.62	3,669.65	587.93	1,110.76	27.36
16-Apr-20	180.4	36.76	462.16	622.62	3,720.77	587.78	1,055.04	27.61
17-Apr-20	184.95	38.97	443.82	608.05	3,787.18	595.72	1,085.30	27.95
20-Apr-20	184.23	40.35	439.66	613.02	3,705.45	593.29	1,115.15	28.4
21-Apr-20	176.81	38	454	636.01	3,870.88	580.04	1,096.26	27.73
22-Apr-20	180.59	39.76	440.1	616.67	3,909.82	586.05	1,091.46	25.76
23-Apr-20	178.68	39.86	446.66	625.44	3,881.19	582.38	1,123.92	26.01
24-Apr-20	172.03	38.95	462.02	660.9	3,857.77	581.93	1,111.33	26.18
27-Apr-20	173.13	39.57	452.31	641.27	3,836.09	594.77	1,085.58	25.93
28-Apr-20	176.38	39.82	466.94	647.07	3,806.65	603.8	1,108.03	26.31
29-Apr-20	181.93	43.79	455.84	643.95	3,740.10	593.63	1,108.65	26.49

30-Apr-20	182.31	42.27	474.57	660.17	3,793.68	591.85	1,124.09	27.36
4-May-20	171.16	41.05	524.1	697.67	3,796.29	584.76	1,114.36	28.9
5-May-20	163.08	39.68	496.63	656.32	3,694.99	607.07	1,124.69	26.5
6-May-20	163.75	39.74	502.33	656.81	3,712.92	592.25	1,172.34	26.41
7-May-20	163.41	39.72	501.7	648.97	3,698.61	587.29	1,162.43	26.89
8-May-20	159.49	39.3	494.17	647.85	3,839.66	584.66	1,167.27	26.71
11-May-20	158.34	39.57	500.44	657.2	3,722.08	587.09	1,173.51	26.42
12-May-20	159.73	37.56	509.57	665.09	3,636.69	581.38	1,117.78	26.75
13-May-20	166.62	39.37	507.83	669.96	3,642.66	565.41	1,088.73	26.52
14-May-20	160.73	37.03	510.15	675.95	3,596.79	565.61	1,092.43	26.81
15-May-20	159.25	36.65	498.95	641.08	3,599.77	565.02	1,098.84	26.01
18-May-20	148.63	35.53	493.64	635.43	3,545.85	565.61	1,140.63	26.48
19-May-20	146.23	35.62	493.44	646.43	3,565.56	595.77	1,134.35	25.8
20-May-20	146.81	34.97	500.78	651.64	3,768.53	590.01	1,171.15	26.34
21-May-20	145.42	36.83	508.65	652.86	3,708.10	615.36	1,186.24	27.43
22-May-20	144.37	36.27	516.33	654.62	3,751.81	611.49	1,244.10	27.46
26-May-20	144.89	35.8	511.93	674.34	3,724.29	633.86	1,260.61	26.58
27-May-20	151.78	36.66	505.95	662.56	3,742.31	622.8	1,235.78	27.16
28-May-20	151.4	39.8	512.95	687.05	3,746.89	627.81	1,200.92	27.88
29-May-20	154.37	40.07	525.5	688.95	3,923.74	623.24	1,171.15	28.58
1-Jun-20	162.74	40.78	531.44	673.47	3,810.31	642.39	1,230.97	28.59
2-Jun-20	162.93	41.45	540.08	681.4	3,754.17	636.88	1,269.83	30.51
3-Jun-20	167.38	43.48	541.19	689.73	3,818.84	632.32	1,226.30	30.92
4-Jun-20	166.57	44.94	543.8	683.21	3,854.02	636.29	1,158.11	30.72
5-Jun-20	179.73	44.24	558.96	689.49	3,879.07	655.58	1,159.65	31
8-Jun-20	178.77	46.42	556.06	685.54	3,823.85	645.86	1,159.38	32.86
9-Jun-20	176.52	44.68	558.33	701.91	3,974.39	630.14	1,144.60	32.31
10-Jun-20	179.63	42.77	553.21	699.18	3,963.50	634.75	1,170.50	32.18
11-Jun-20	169.54	42.54	558.81	697.33	3,910.59	637.33	1,181.92	31.4
12-Jun-20	171.45	39.71	558.14	685.4	3,862.74	629.84	1,133.18	30.34
15-Jun-20	166.24	41.27	552.01	674.2	3,866.93	638.47	1,131.64	30.75
16-Jun-20	165.47	40.73	558.76	669.47	3,860.33	638.17	1,098.32	29.64
17-Jun-20	165.52	41.65	560.89	682.82	3,840.81	632.72	1,083.57	29.91
18-Jun-20	171.93	41.65	555.63	685.4	3,861.82	635.35	1,108.32	29.85
19-Jun-20	176.57	42.66	559.39	695.38	3,860.47	636.39	1,119.80	30.8
22-Jun-20	179.63	43.57	566.24	685.4	3,886.74	642.68	1,145.62	31.06
23-Jun-20	184.18	43.6	549.93	685.45	3,959.98	650.52	1,169.31	31.56
24-Jun-20	176.67	44.29	560.94	701.81	3,896.18	654.39	1,174.85	32.14
25-Jun-20	177.29	43.01	540.08	695.72	3,861.44	626.57	1,171.67	31.57
26-Jun-20	176.67	44.51	530.86	681.5	3,853.73	629.99	1,185.75	31.29
29-Jun-20	171.55	43.96	543.36	728.8	3,829.87	629.59	1,190.99	31.37
30-Jun-20	170.78	44.48	534.72	712.53	3,802.02	639.86	1,174.67	31.11
1-Jul-20	176.86	44.32	537.14	716.86	3,769.73	634.9	1,150.91	31.63
2-Jul-20	177.48	46.73	532.5	713.55	3,778.50	622.05	1,098.14	31.36
3-Jul-20	176.76	46.57	550.22	736.74	3,779.37	640.6	1,052.35	32.44
6-Jul-20	179.97	47.6	532.5	742.96	3,750.99	638.24	1,041.97	31.95
7-Jul-20	180.5	46.72	558.67	743.99	3,684.97	629.49	1,040.58	32.8
8-Jul-20	183.65	47.41	571.51	773.85	3,745.88	631.28	1,086.12	31.97
9-Jul-20	190.54	47.34	554.85	754.56	3,755.42	629.34	1,097.75	32.36
10-Jul-20	187.19	47.18	567.99	761.33	3,763.95	633.66	1,122.58	33.35
13-Jul-20	184.42	45.84	562.29	761.58	3,775.58	633.51	1,106.26	32.79
14-Jul-20	178.06	45.14	581.84	776.09	3,782.48	633.01	1,092.56	33.12

15-Jul-20	175.9	45.56	570.45	762.94	3,863.57	627.11	1,074.16	32.62
16-Jul-20	178.25	45.3	594.01	809.94	3,915.27	633.01	1,083.14	32.84
17-Jul-20	180.11	46.1	606.03	887.34	4,027.49	669.07	1,046.24	33.09
20-Jul-20	182.55	50.22	601.97	880.61	3,995.10	683.46	1,021.39	33.98
21-Jul-20	186.05	50.75	626.11	909.4	3,969.25	668.87	1,037.93	34.13
22-Jul-20	183.75	48.87	629.49	912.47	3,912.46	656.08	1,069.54	34.78
23-Jul-20	189.73	48.9	628.19	895.62	3,939.66	656.47	1,121.41	33.9
24-Jul-20	183.7	48.99	630.17	885.34	4,006.01	666.15	1,216.74	34.09
27-Jul-20	179.11	47.34	657.2	898.73	3,943.88	660.14	1,220.16	33.51
28-Jul-20	181.31	47.29	677.04	923.43	3,895.14	647.4	1,213.24	34.17
29-Jul-20	182.98	47.49	688.34	937.84	3,929.72	657.37	1,194.51	34.7
30-Jul-20	178.53	46.34	670.04	929.17	4,173.04	675.77	1,232.46	36.21
31-Jul-20	183.22	45.58	671.15	936.97	4,381.00	680.43	1,291.60	35.51
3-Aug-20	183.99	44.62	681.15	941.25	4,385.32	714.5	1,405.23	35.48
4-Aug-20	183.37	45.15	681.73	932.58	4,391.53	704.83	1,435.13	36.15
5-Aug-20	183.22	45.25	668.35	925.52	4,495.70	708.11	1,442.06	36.05
6-Aug-20	182.74	45.15	664.4	920.16	4,462.82	716.74	1,513.60	38.33
7-Aug-20	182.46	45.37	680.91	944.13	4,445.46	725.81	1,541.63	38.79
10-Aug-20	185.47	44.99	665.8	926.15	4,436.19	722.74	1,531.30	39.12
11-Aug-20	186.67	45.86	668.45	926.5	4,550.07	789.25	1,518.44	39.72
12-Aug-20	194.56	45.97	660	923.67	4,457.92	772.43	1,470.54	40.33
13-Aug-20	193.22	45.97	692.11	930.64	4,382.51	756.07	1,448.81	40.16
14-Aug-20	188.06	45.5	700.46	926.64	4,367.08	754.28	1,473.07	40.02
17-Aug-20	184.8	44.72	684.62	928.83	4,383.72	765.59	1,450.03	40.52
18-Aug-20	186.72	46.38	694.23	932.73	4,383.48	765.24	1,459.69	41.15
19-Aug-20	188.58	46.01	689.84	942.13	4,384.69	758.5	1,467.39	42.1
20-Aug-20	186.38	46.53	685.54	934.48	4,354.47	752.35	1,482.48	41.82
21-Aug-20	189.87	47.19	685.54	930.34	4,341.62	756.51	1,515.98	41.87
24-Aug-20	192.79	48.47	682.02	924.3	4,354.96	755.02	1,606.86	41.53
25-Aug-20	199.01	48.84	681.53	922.7	4,338.28	745.9	1,747.88	41.59
26-Aug-20	200.83	48.48	678.59	914.08	4,294.77	741.48	1,842.64	41.06
27-Aug-20	206.38	48.17	688.1	926.2	4,301.61	741.93	1,808.64	41.15
28-Aug-20	215.19	49.81	685.59	921.92	4,303.79	749.97	1,826.60	41.34
31-Aug-20	202.89	48.36	681.49	910.67	4,242.97	742.77	1,756.07	41.07
1-Sep-20	208.73	49.99	669.42	904.48	4,136.67	706.37	1,827.49	40.01
2-Sep-20	206.96	50.47	666.66	890.65	4,221.30	731.32	1,902.08	41.54
3-Sep-20	203.99	49.62	677.82	900.15	4,222.07	731.96	2,272.10	42.5
4-Sep-20	197.72	48.85	684.43	911.2	4,300.06	732.66	2,113.52	42.4
7-Sep-20	198.97	48.23	676.85	895.47	4,192.73	718.87	2,036.15	40.8
8-Sep-20	195.28	48.6	684.62	900.73	4,287.16	710.88	2,258.54	40.9
9-Sep-20	186.48	48.04	700.07	915.73	4,218.24	702.65	2,362.33	39.22
10-Sep-20	189.64	48.1	697.61	904.29	4,296.47	721.94	2,247.02	40.41
11-Sep-20	193.99	47.6	696.84	915.63	4,248.65	721.5	2,354.86	39.5
14-Sep-20	189.97	48.25	696.21	920.94	4,269.46	719.66	2,368.02	39.45
15-Sep-20	191.55	49.2	767.52	952.65	4,233.08	715.94	2,494.63	39.14
16-Sep-20	189.68	48.97	765.1	956.5	4,308.98	736.33	2,549.21	39.24
17-Sep-20	187.05	47.76	762.16	975.15	4,488.96	746.64	2,551.65	39.18

18-Sep-20	184.32	46.89	780.16	984.51	4,682.33	746	2,459.87	38.61
21-Sep-20	177.82	47.06	783.16	976.61	5,173.23	800.36	2,486.07	38.28
22-Sep-20	178.2	46.88	774.66	983.19	4,987.63	761.52	2,365.46	36.15
23-Sep-20	175.9	46.45	793.49	981.14	5,012.80	771.94	2,409.98	36.24
24-Sep-20	168.77	47.41	786.3	993.27	4,954.41	760.73	2,432.88	34.98
25-Sep-20	174.37	47.33	760.9	950.12	4,876.47	726.9	2,391.41	33.3
28-Sep-20	179.2	47.74	798.99	984.9	4,958.72	764	2,611.27	34.08
29-Sep-20	177.1	48.71	806.09	983.39	4,975.84	768.42	2,647.94	34.95
30-Sep-20	177.43	50.48	784.41	984.12	4,931.56	756.12	2,530.71	35.83
1-Oct-20	182.12	50.47	783.64	981.92	5,032.05	768.52	2,479.19	34.84
5-Oct-20	180.64	51.21	784.75	991.37	4,958.58	766.88	2,480.11	35.34
6-Oct-20	183.37	51.96	794.55	1,021.08	5,004.60	772.83	2,470.15	37.01
7-Oct-20	182.51	52.6	800.15	1,028.44	4,982.29	773.92	2,493.00	36.54
8-Oct-20	183.27	53.48	799.23	1,038.96	4,951.69	767.42	2,486.61	35.91
9-Oct-20	189.78	54.81	820.28	1,065.70	5,038.45	804.87	2,456.59	36.17
12-Oct-20	190.16	54.36	826.51	1,078.90	4,998.30	796.84	2,483.39	35.81
13-Oct-20	187.29	54.32	836.5	1,103.01	5,063.77	808.14	2,484.48	35.93
14-Oct-20	191.45	55	869.43	1,128.04	5,013.57	781.91	2,481.03	35.59
15-Oct-20	184.56	54.01	859.44	1,106.71	4,969.20	775.11	2,482.32	36.37
16-Oct-20	187.53	54.6	829.84	1,079.34	4,904.45	762.27	2,478.37	36.19
19-Oct-20	195.23	55.96	798.61	1,098.43	4,928.02	775.81	2,492.00	38.14
20-Oct-20	194.32	57.43	815.55	1,096.43	4,906.30	757.7	2,406.41	38.28
21-Oct-20	194.99	58.28	849.73	1,107.64	4,918.90	757.9	2,427.27	37.96
22-Oct-20	194.56	58.52	840.7	1,118.59	4,895.24	761.37	2,456.64	39.11
23-Oct-20	194.09	58.85	837.23	1,100.91	4,871.23	751.26	2,423.47	39.7
26-Oct-20	188.25	57.96	822.89	1,092.97	4,867.59	750.76	2,481.13	41
27-Oct-20	186.29	58.4	818.93	1,083.33	4,828.65	739.05	2,481.23	39.52
28-Oct-20	182.27	57.1	818.26	1,063.90	4,946.31	764.25	2,481.95	39.8
29-Oct-20	180.59	56.16	801.02	1,048.75	4,802.36	758.99	2,441.89	38.96
30-Oct-20	181.12	56	810.92	1,047.00	4,793.58	755.77	2,465.88	38.86
2-Nov-20	187.63	57.56	814.15	1,033.16	4,741.88	748.03	2,407.77	39.74
3-Nov-20	195.95	58.65	793.88	1,044.27	4,712.78	744.91	2,341.97	39.01
4-Nov-20	198.1	59.9	785.81	1,034.48	4,730.92	753.54	2,346.59	39.39
5-Nov-20	209.25	60.77	787.07	1,065.70	4,787.42	774.96	2,407.53	39.11
6-Nov-20	209.78	61.86	814.3	1,075.34	4,809.64	787.46	2,429.08	41.2
9-Nov-20	210.07	65.09	821.3	1,084.60	4,755.75	783.54	2,464.46	41.28
10-Nov-20	221.74	65.64	826.17	1,106.81	4,733.15	756.46	2,491.95	42.38
11-Nov-20	224.14	64.83	781.9	1,062.73	4,556.96	711.92	2,465.71	42.79
12-Nov-20	217.05	64.93	797.59	1,093.56	4,735.58	736.13	2,473.20	45.95
13-Nov-20	219.59	66.22	795.95	1,088.83	4,681.94	733.95	2,464.96	45.82
14-Nov-20	219.78	67	799.52	1,094.83	4,711.09	738.51	2,477.08	47.11
17-Nov-20	229.88	66.96	802.13	1,104.13	4,725.78	740.24	2,470.60	47.65
18-Nov-20	241.17	65.48	787.17	1,094.78	4,640.52	736.52	2,412.42	50.63
19-Nov-20	229.45	64.95	786.05	1,081.87	4,562.58	737.37	2,376.14	50.07
20-Nov-20	232.32	64.84	776.54	1,068.09	4,566.37	735.93	2,390.74	50.69
23-Nov-20	228.44	64.94	790.88	1,074.52	4,530.72	733.95	2,481.70	51.57

24-Nov-20	233.37	67.85	810.29	1,110.75	4,683.78	740.1	2,462.75	52.55
25-Nov-20	232.56	66.5	811.16	1,109.68	4,767.93	742.53	2,391.98	53.08
26-Nov-20	234.9	66.12	796.1	1,087.32	4,662.01	725.46	2,364.52	52.39
27-Nov-20	233.75	67.27	813.33	1,084.84	4,754.20	732.11	2,333.68	55.09
1-Dec-20	237.39	68.47	793.88	1,072.08	4,683.98	738.66	2,518.07	55.96
2-Dec-20	236.34	67.99	805.32	1,107.83	4,685.38	749.47	2,539.28	56.7
3-Dec-20	245.29	66.33	814.68	1,111.53	4,704.64	752.05	2,512.91	58.52
4-Dec-20	252.18	65.81	832.01	1,097.41	4,775.25	755.87	2,489.99	60.13
7-Dec-20	258.01	65.65	829.21	1,105.30	4,761.19	760.43	2,541.32	60.29
8-Dec-20	260.22	65.69	825.74	1,114.45	4,878.12	766.23	2,541.99	59.5
9-Dec-20	258.73	65.76	834.48	1,124.00	4,864.63	759.74	2,600.19	59.47
10-Dec-20	257.97	65.78	840.51	1,144.75	4,905.08	756.12	2,631.98	59
11-Dec-20	260.74	65.09	836.94	1,137.30	4,901.40	756.76	2,630.46	59.09
14-Dec-20	262.42	64.93	831.82	1,132.96	4,866.33	749.82	2,660.18	60.21
15-Dec-20	259.02	67.07	843.41	1,134.42	4,872.01	782.9	2,673.45	60.69
16-Dec-20	257.82	67.42	855.57	1,124.54	4,880.30	775.41	2,674.41	61.51
17-Dec-20	256.2	68.59	854.66	1,135.59	4,887.67	780.32	2,730.06	62.3
18-Dec-20	259.79	68.68	849.15	1,129.11	4,920.55	776.9	2,848.06	61.53
21-Dec-20	243.76	66.64	860.35	1,158.97	5,071.77	787.51	3,026.97	61.14
22-Dec-20	246.39	66.71	839.59	1,145.87	4,916.38	771.79	2,828.17	57.63
23-Dec-20	251.7	67.34	882.37	1,189.17	5,006.83	788.95	2,979.91	58.22
24-Dec-20	255.38	67.81	890.72	1,220.54	5,067.26	817.62	2,992.88	60.19
28-Dec-20	263.37	68.83	888.07	1,204.37	5,045.63	826.74	3,094.09	60.26
29-Dec-20	265.96	68.95	890.04	1,208.02	5,045.63	823.37	3,112.59	61.28
30-Dec-20	265	70.2	903.76	1,217.81	5,010.52	820.99	3,090.51	61.19

Security	***SBI***	***HDFC***	***HCL***	***Infosys***	***Reddy's Lab***
Annual Return	70.77%	146.03%	203.54%	174.99%	98.27%
Standard Deviation	40.56%	40.11%	37.14%	33.25%	32.96%
Minimum Weight	10.00%	10.00%	10.00%	10.00%	10.00%
Maximum Weight	40.00%	40.00%	40.00%	40.00%	40.00%
Optimal Weight	10.00%	10.00%	10.00%	10.00%	10.00%

portfolio summary	
Expected return	216.64%
Standard Deviation	20.61%
Risk-Free Rate	5%
Total Weight	100.00%
Sharpe Ratio	10.267065

In this analysis first, we need to calculate the natural logarithms of the current return will be divided by the previous returns of all the securities.

- The annual returns will be calculated with the formula

Annual Return = e (Average Log Return × Number of Periods in a Year)−1

- The next process will be to calculate the standard deviation by using the formula below Standard Deviation = SQRT of Variance, where, Variance = 1/N ∑ (Log Return−μ)2
- Then we need to assume the minimum investment for each security and we take 10% as the minimum investment for every security and 40% as the maximum.
- Expected return is calculated by the sum of the product of annual returns and optimal weights.

- The standard deviation of the portfolio returns by using SQRT (MMULT (MMULT (optimal weights, covariance matrix), TRANSPOSE (optimal weights) *252))
- It is risk-free rate is assumed as 5%
- Sharp ratio, S = (Rp – Rf)/SD

Where S is a sharp ratio,

RP is the expected portfolio return, RF is a risk-free and

SD is a standard deviation.

Findings and results:

The annual returns of the Securities Like SBI, HDFC, HCL, Infosys, Reddy's laboratories, Cipla, India Mart, and Tata Steel are 70.77%, 146.03%, 203 .54%, 174.99%, 98.27%, 165.69%,

361.15% and 286.00% respectively. In all these securities the company that is getting the low returns is SBI Bank and the high returns go to Tata Steel.

The standard deviation of securities is 40.56%, 40.11%, 37.14%, 33.25%, 32.96%, 37.98%, 50.97%, and 42.42% of all the securities respectively

Here, optimal weights will be calculated with the help of a solver in Excel to find the optimal weights of each security. That is 10% is for SBI, HDFC, HCL, Infosys, Reddy's laboratories, and Sipla two 1.70% for India mart, and 18.30% for Tata Steel.

The expected return is 216.64% The standard deviation is 20.61%.

The sharp ratio is 10.267065. Here the sharp ratio is above 10. we can say an excellent investment.

CONCLUSION:

Risk and returns to parameters play a very important role in investment. this study aims to analyze opportunities that are available for investors as per returns and risks are concerned while investing in selected stocks listed in the BSE Sensex. All 8 securities are providing the best results so we can say that the four have equal optimum weights which is 10% and the two which is performing very highly have a high percentage of optimal weight. This study believes a fundamental analysis of each security included in the effort would be a great extent to improve the performance of well-diversified portfolios. Investors should take appropriate advice and suggestions from experts from the capital markets to evaluate the stock. We conclude that the above-all securities gained high returns to the investors.

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