CONSTRUCTION OFOPTIMUM PORTFOLIO DURING PANDEMIC-WITH REFERENCE TO MUSCAT STOCK EXCHANGE

Dr. A. Ananth*; Mrs. Indu Unni krishnan**; Ms. Mary Pauline Santos***

*Lecturer,
Department of Accounting and Finance,
University of Technology and Applied Sciences,
Ibra, OMAN
Email Id: ananth@ict.edu.om

**Lecturer,
Department of Accounting and Finance,
University of Technology and Applied Sciences,
Ibra, OMAN
Email Id: indu@ict.edu.in

***Lecturer,
Department of Accounting and Finance,
University of Technology and Applied Sciences,
Ibra, OMAN
Email Id: mpsantos@ict.edu.om

ABSTRACT

This research attempts to study "An application of portfolio construction model on stocks in Muscat Security Market during pandemic period" by using Sharpe's single index model which will enable them to construct an optimum portfolio empirically using this model. For the purpose of the research 16 companies were selected from 3 sectors namely; Industrial, Financial and Service sectors. The data was collected for conducting an analytical study for the period, March 2020 to February 2021, to apply Sharpe single index for constructing optimum portfolio. It is done basically by ranking the picked assets based on excess return to beta ratio and then finding out the cut-off point (Ci), thereby the optimal combination of the assets. It is observed that there were three stocks identified from two sectors namely; Industrial and financial sectors.

KEYWORDS: *Sharpe's Index, Portfolio Construction, Stock Market, Beta, Risk, Cut-Off Point.*

1. INTRODUCTION

Portfolio is a group of financial investments used to carry papers or samples of businesses such as stocks, commodities, bonds, cash, as well as containing a group of assets such as real estate and private investments. The objective of the portfolio is to assist the investor in the best type of investment according to the individual's income. Portfolio Construction is the process of understanding how different asset classes such as bonds, stocks, weights and funds affect each other and affect the decisions and goals of the investor. The main objective of portfolio construction is to create a group of investments from a group of asset classes, which are in perfect harmony between protection from market fluctuations and monetary needs, as well as consistency of returns with the long-term growth goals of the investor.

Single index model is used to measure the risk and return of investment. It is a simple asset pricing model. It is commonly used in the finance industry. This model was developed in 1963 by William

Sharpè. It is important to construct an optimal portfolio with their respective weights calculated on the basis of some variables under consideration.

The world is experiencing uncertainty due to the unprecedented COVID-19 pandemic. This global recessionary trend calls for taking prudent financial decisions, both preventive and corrective, to ensure the overall financial well-being of an individual and the economy. The global economic recessionary trend has led to liquidity crunch coupled with high inflationary pressures. In this context investment decisions during this period should be made factoring in the financial goals of an individual. The modern portfolio theory, developed by Harry Markowitz in 1950s, made a simple foundation that almost all investors diversify their investment in multiple securities rather than in a single security. Though Markowitz's model is viewed as a classic model to develop a comprehensive technique to incorporate the concept of diversification of investments in a portfolio as a risk-reduction mechanism, it has many limitations. One of the most significant limitations of Markowitz's model is the increased complexity of computation. To this direction, the Single Index Model (SIM) developed by William F. Sharpe had a simplified portfolio analysis taking indication from Markowitz's concept of index for generating covariance terms. This study has aimed at analyzing the stocks of three important sectors, namely; Industrial, Financial and Service sectors that playa crucial role in the economy, though they may have faced a huge volatility due to the pandemic, but nevertheless they remain to be crucial sectors for the growth and development of a country. Investors always tend to look into them from bird's eye view, especially when the global market is seeing a huge shift in the economy, driving them to invest continually in these above-mentioned sectors. This research enables the investors to construct an optimum portfolio based on Sharpe's index model.

2. NEED FOR THE STUDY

In a highly volatile market, with the impact of the pandemic Covid-19, it is of high importance to diversify the investment thoughtfully leading to minimizing the risk exposure and optimizing the return. This study aimed at helping investors to build upon the optimal portfolio from the sixteen companies chosen from three different industries. This research becomes significant as it is required so as the investors can diversify their funds in the best proportion possible, thereby diversifying the risk, and maximizing the return from the preferred list of companies amidst the impact of the pandemic.

3. OBJECTIVES OF THE STUDY

- To find out the risk and return of selected stocks

- To rank the selected stock based on risk premium to beta ratio

- To construct optimum portfolio and suggest to the investor

4. LITERATURE REVIEW

Imroz Mammud (2020) [1] studied the Optimal portfolio construction using sharpe's single-INDEX model: evidence from Chittagong stock exchange. The study aimed to apply Sharpe's single-index model of portfolio construction and evaluate the model's performance on the securities traded on Chittagong Stock Exchange (CSE). The data used in this study are secondary and were taken from CSE library and Bangladesh Bank. The findings of the study revealed that the constructed portfolio out-performed every sample security in offering the best risk-return combinations by a large margin. The portfolio constructed using Sharpe's SIM indeed diversified risk and yielded the best possible return.

M. Nagendra, Dr. P. V. Raveendra, Dr. U .Brahmam (2012) [2] studied the Construction of Optimal Portfolio using Sharpe Index Model. This paper made an attempt to construct optimal

portfolio using Sharpe Optimization Model from NSE NIFTY Stocks. Constructing the Optimal is a challenge to the investor to maximize the return at given risk. Thus, the research is on how to construct optimal portfolio from the stocks NSE nifty to reduce the risk and to maximize the return using Sharpe Index Model. Data used is secondary data used and collected from text books and internet. Tools used for this paper are Arithmetic return, Variance, Beta, Alpha and Sharpe Index Model. The period of study is year 2010 only. According to this paper, Sharpe Index Model is good for construction of an optimal portfolio, for the investor who will think stock volatility is near to equal to market volatility. It is concluded that Sharpe Index Model is the best model to construct an optimal portfolio.

Niranjan Mandal, B.N. Dutta Smriti Mahavidyalaya and Burdwan (2013) [3] studied that Sharpe's single index model and its application to construct optimal portfolio: an empirical study. The main objective of the study is to get an insight into the idea embedded in Sharpe's Single Index Model, to construct an optimal portfolio empirically and to determine return and risk. The data have been collected from secondary sources of information. It is observed that as compared to the Markowitz's Mean-Variance Model, the Sharpe's Single Index model gives an easy mechanism of constructing an optimal portfolio of stocks for a rational investor by analyzing the reason behind the inclusion of securities in the portfolio with their respective weights.

Mohite. S, Pavithra. S, Bharadwaj R and A. Ananth (2017) [4] studied the application of single Sharpe index on the optimum portfolio construction in Indian capital market. This research used analytical research method and the study period covered was on1st January 2011 to 31st December 2015. This study used secondary data and applied analytical analysis. It was found out that the investors must make changes in their portfolio to get an optimal return on investment.

M Sathyapriya (2016) [5] studied the Optimum Portfolio Construction Using Sharpe Index Model with Reference to Infrastructure sector and Pharmaceutical sector. The researcher collected data from NSE, RBI, etc. websites, and databases like ProQuest. This research used descriptive and quantitative research methods. The study period covered was from September 2008 to September 2012. In this study, statistical tools used for analyzing the data were beta coefficient, return, correlation, risk free rate of return and excess return to beta ratio. It was found out that Pharmaceutical sector performs 80% better than that of Infrastructure sector.

Imroz Mahmud (2019) [6] studied the Optimal Portfolio Construction: Application of Sharpe's Single-Index Model on Dhaka Stock Exchange. The researcher collected data from month-ended closing price data of 178 companies listed on the DSE, the prime bourse of Bangladesh and the month-ended index value of DSEX and DSE Library. This research used purposive sampling technique and study period covered was between January 2013 to February 2018. He used a number of statistical tools to analyze the risk-return characteristics which are standard deviation, variance and covariance. The findings of the study revealed a huge possibility of risk reduction through diversification while achieving a substantial return for Bangladeshi investors.

Chintan A. Shah (2015) [7] studied the Construction of Optimal Portfolio using Sharpe Index Model & Camp for BSE Top 15 Securities. The researcher used secondary data from BSE Top 15 securities. This research used descriptive research method. He used statistical tools such as Standard deviation, Expected return, Residual variance, Sharpe Model, Capital Asset Pricing Model (CAPM). It was found out that the Sharpe model gives the exact number of securities side by side that it is possible to invest but a CAPM model only suggests different securities that an investor can invest in and also does not give a specific portfolio or a certain weight for the investment.

Niranjan Mandal (2013) [8] studied the Sharpe's Single Index Model And Its Application To Construct Optimal Portfolio: An Empirical Study. The researcher collected data from secondary

sources. This research used analytical research method and the study period covered was between April 2001 to March 2011. He used statistical, financial tools and techniques. Charts and diagrams have been used for the purpose of analysis and interpretation of data. It was found out that the construction of optimal portfolio investment by using Sharpe's Single Index Model is easier and more comfortable than Markowitz's Mean-Variance Model

Kapil Sen and CA Disha Fattawat (2014) **[9]** studied the Sharpe's Single Index Model and its Application Portfolio Construction. The researchers collected data from fifty companies CNX NSE Nifty index for the period, 2010-2012. Data used were collected from secondary sources of (www.Bseindia.com). This research used analytical method and the study period they covered between January 2010 to December 2013. They used statistical tools to analyze the data such as Sharpe's Single Index Model, variance, beta, and standard deviation. From the analysis, it was found out that the construction of optimal portfolio investment by using Sharpe's Single Index Model is more comfortable and easier than by using Markowitz's Mean-Variance Model.

Dr. J. Murthy **[10]** studied the Construction of Optimal Portfolio Using Sharpe's Single Index Model - An Empirical Study on Nifty Metal Index. The researcher collected secondary data from the official website of (NSE) National Stock Exchange. This research used analytical research method and the study period covered was between January 2012 to December 2016. They used statistical tools to analyze the data such as Market variance, beta ratio, Market risk premium, cut-off rate and values of return. It was found out that maximum proposed investment is 86% in Vedanta and 14% in Tata Steel.

5. METHODOLOGY

The research is analyticalin nature and was conducted to study the performance of security market during this COVID19 pandemic and to identify the optimum portfolio by using single Sharpe portfolio construction model.Secondarydata was collected from the MSX website for the period, March 2020 to February 2021to analyse the impact of the pandemic COVID-19.MSX 30 Indexwas taken as the bench mark index. The sample size taken for the study includes 16 companies from 3different sectors, namely; Industrial, Financial and Service sectors listed in MSX.

6. TOOLS USED

- Beta coefficient

- Return

- Risk Free rate of return

- Excess Return to Beta Ratio

- Cut-off point

7. ANALYSIS AND INTERPRETATION
TABLE: 1 EXCESS RETURN TO BETA RATIO

Securities	R_i	β	σ^2_{ei} (Unsystematic)	Ri-Rf /β	Rank
AL MAHA CERAMICS	0.404499994	0.124642189	0.1769703	3.18133207	1
JAZEERA STEEL PROD	0.976140586	0.329617307	0.2436848	2.93725106	2
OMAN UNITED COMPANY	0.203919315	0.594685433	0.1100636	0.32949775	3
OMAN TELECO COMPANY	0.17917403	1.079361859	-0.017087	0.1586143	4
BANK MUSCAT	-0.072388435	1.148667452	-0.033777	-0.0699595	5
AL ANWAR COMPANY	-0.084964836	1.014683225	-0.004646	-0.0915918	6
OMINVEST	0.03762212	-0.316158961	0.2924314	-0.0937829	7
OOREDOO	-0.170618598	1.004757967	-0.00114	-0.1777447	8
GELFAR COMPANY	-0.166726357	0.769559268	0.1023575	-0.2270107	9
RAYSUT CEMENT	-0.344519806	1.098645067	-0.036035	-0.3208421	10
RENAISSANCE SER.	-0.256857234	0.818863673	0.0589404	-0.3234104	11
OMAN CEMENT	0.050507811	-0.131042711	0.2956351	-0.3245965	12
OMAN INVST& FIN	-0.238750131	0.747924597	0.0725315	-0.3298754	13
NATIONAL GAS	-0.424075576	0.465207346	0.1164296	-0.92872	14
MUSCAT FINANCE	-0.393887343	0.353909741	0.2059345	-1.1354848	15
AHLI BANK	-0.31210544	0.269095611	0.1424459	-1.1894554	16

Rf	0.797%	T.Bill Rate	
Б²m	0.11073805	Market Variance	

Interpretation: The above table shows that the stocks are ranked based on risk premium to beta ratio. The risk premium is an excess return gained from market than on risk free return. The stocks are represented in top order from Industrial and Financial sector.

TABLE: 2 PORTFOLIO CONSTRUCTION MODEL

Securities	$(R_i-R_f)\beta/\sigma^2_{ei}$	$\Sigma(R_i-R_f)\beta/\sigma^2_{ei}$	$\sigma^2_m*\Sigma(R_i-R_f)\beta/\sigma^2_{ei}$
AL MAHA CERAMICS	0.279279316	0.279279316	0.030926847
JAZEERA STEEL PROD	1.309581771	1.588861088	0.175947379
OMAN UNITED COMPANY	1.058725329	2.647586417	0.293188558
OMAN TELECO COMPANY	-10.81454425	-8.16695783	-0.904392987
BANK MUSCAT	2.732809585	-5.434148245	-0.601766982
AL ANWAR COMPANY	20.29596114	14.86181289	1.645768184
OMINVEST	-0.032056118	14.82975677	1.642218352
OOREDOO	157.3983952	172.228152	19.07220976
GELFAR COMPANY	-1.313441242	170.9147107	18.92676184
RAYSUT CEMENT	10.74694789	181.6616586	20.11685789
RENAISSANCE SER.	-3.679290878	177.9823677	19.70942039
OMAN CEMENT	-0.018854436	177.9635133	19.70733249
OMAN INVST& FIN	-2.544128818	175.4193845	19.42560063
NATIONAL GAS	-1.726293797	173.6930907	19.23443422
MUSCAT FINANCE	-0.690617057	173.0024736	19.15795663
AHLI BANK	-0.604660212	172.3978134	19.09099774

Rf	0.797%
σ^2m	0.11073805

TABLE: 3 CUT-OFF POINT

Securities	β^2/σ^2_{ei}	$\Sigma\beta^2/\sigma^2_{ei}$	$1+\sigma^2_m*\Sigma\beta^2/\sigma^2_{ei}$	Ci
AL MAHA CERAMICS	0.087786911	0.087786911	1.009721351	0.030629091
JAZEERA STEEL PROD	0.445852854	0.533639766	1.059094227	0.166130052
OMAN UNITED COMPANY	3.213148847	3.746788613	1.414912066	0.207213271
OMAN TELECO COMPANY	-68.1813935	-64.4346048	-6.135362513	0.14740661
BANK MUSCAT	-39.0627208	-103.497326	-10.46109206	0.057524298
AL ANWAR COMPANY	-221.591529	-325.088854	-34.9997059	-0.04702234
OMINVEST	0.341811796	-324.747042	-34.96185433	-0.04697172
OOREDOO	-885.530761	-1210.2778	-133.0238043	-0.14337441
GELFAR COMPANY	5.785813058	-1204.49199	-132.3830947	-0.14296963
RAYSUT CEMENT	-33.4960637	-1237.98805	-136.0923835	-0.14781766
RENAISSANCE SER.	11.37653826	-1226.61152	-134.8325678	-0.146177
OMAN CEMENT	0.058085759	-1226.55343	-134.8261355	-0.14616849
OMAN INVST& FIN	7.712393118	-1218.84104	-133.9720801	-0.14499738
NATIONAL GAS	1.858788182	-1216.98225	-133.7662415	-0.14379139
MUSCAT FINANCE	0.60821337	-1216.37404	-133.6988892	-0.14329182
AHLI BANK	0.508350449	-1215.86569	-133.6425954	-0.14285114

|	
Rf	0.797%
$\sigma^2 m$	0.11073805

Interpretation:

The above table shows the cut-off point calculated based on Sharpe index, it shows 0.207. At this point, there are only three stocks identified as potential stock for the investment. The following stocks are identified for the optimum portfolio investment,Al-Maha ceramics, Jazeera steel products and Oman United Company.

TABLE: 4 PROPORTION TO BE INVESTED:

Securities	X_i	$Z_i/\sum Z_i$		
	Z_i	$\beta/\sigma^2_{ei}(R_i-R_f/\beta)-(C_i))$		
Securities	Z_i	Securities	Investment Proportion	Percentage
AL MAHA CERAMICS	2.033435087	AL MAHA CERAMICS	0.275818854	27.58188537
JAZEERA STEEL PROD	3.765823773	JAZEERA STEEL PROD	0.510803223	51.08032229
OMAN UNITED COMPANY	1.573098251	OMAN UNITED COMPANY	0.213377923	21.33779234
Total	7.372357111			100

Chart 1:
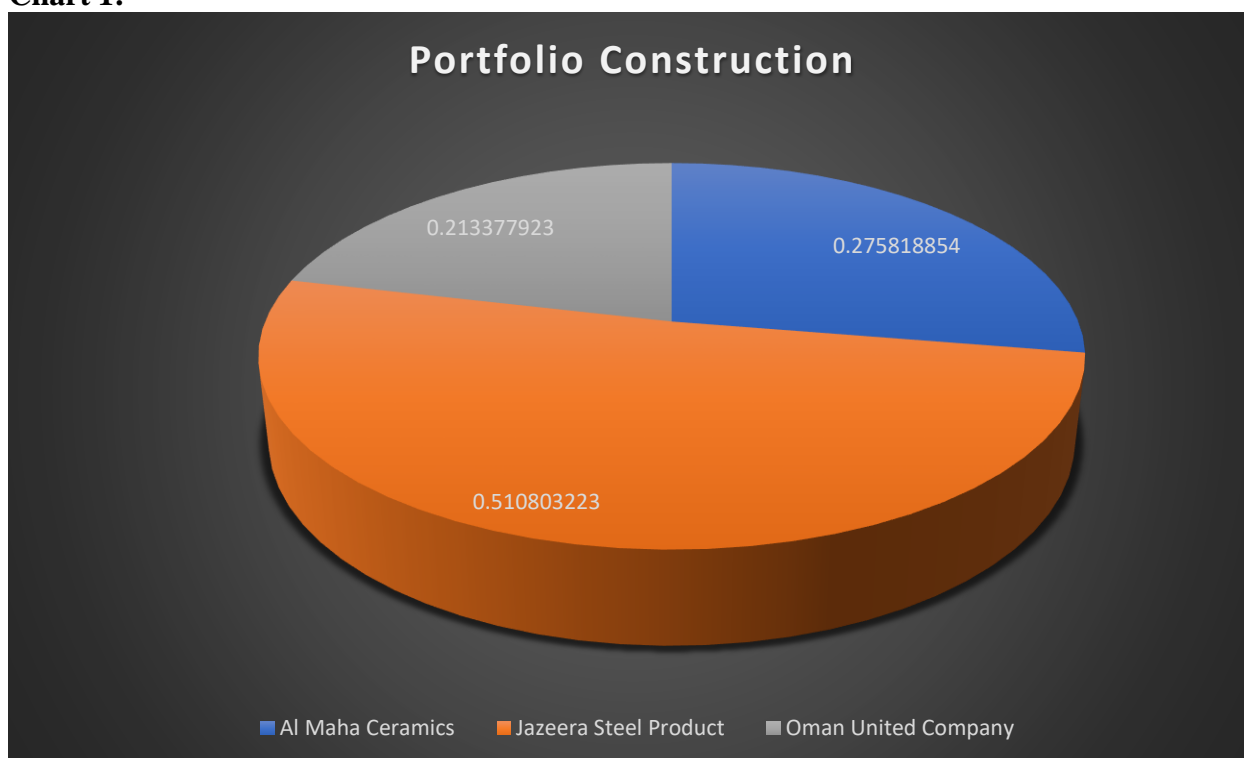
Interpretation:

The above table shows the investment proportion on the selected potential stocks. As per the Sharpe index, Al-Maha Ceramics (27.5%), Jazeera Steel Product (51.0%) and Oman United Company (21.3%) are identified and the investment proportion rates are given.

8. CONCLUSION

From the discussion and analysis, it is evident that COVID-19 has significantly affected the capital market as there are only three stocks shortlisted from sixteen stocks due to high volatility during this pandemic. There was no representation from service sector even though it is the emerging sector at this point, but based on historical price movement only industrial sector and financial sector are preferred by the investor than the service sector. It can be inferred that focus of the investors have turned towards the industrial sector and financial sector as the industry foresees a

potential growth in the coming years. This study will be beneficial to the potential investors to understand the cause and effect of COVID-19 and its impact on portfolio construction, leading to rationale investment decisions. A follow-up study on Pre and post COVID 19 Impact on Muscat Securities Market may be done as a follow-up study by the researchers.

REFERENCES:

1. Mammud I. Optimal portfolio construction using sharpe's single-INDEX model: evidence from Chittagong stock exchange" International journal of commerce and finance, 2020;6(1):127-142

2. Nagendra M, Raveendra PV, Brahmam U. Construction of Optimal Portfolio using Sharpe Index Model. Published in conference paper. 2012. Available at: https://www.coursehero.com/file/57612799/ConstructionofOptimalPortfoliousingSharpeIndexModelpdf/

3. Mandal N. Sharpe's single index model and its application to construct optimal portfolio: an empirical study. Great Lakes Herald. 2013;7(1):1-60.

4. Mohite S, Pavithra S, Bharadwaj R, Ananth A. The application of single Sharpe index on the optimum portfolio construction in Indian capital market. International journal of physical and social science, 2017;7(7):60-72.

5. Sathyapriya M. Optimum Portfolio Construction Using Sharpe Index Model with Reference to Infrastructure sector and Pharmaceutical Sector. International Journal of Scientific and Research Publications, 2016;6(8):490-496.

6. Mahmud I. The Optimal Portfolio Construction: Application of Sharpe's Single-Index Model on Dhaka Stock Exchange. JEMA Jurnal Ilmiah Bidang Akuntansi dan Manajemen 2019;16(1):60.

7. Shah CA. The Construction of Optimal Portfolio Using Sharpe Index Model & Camp for BSE Top 15 Securities" International Journal of Research and Analytical Reviews, 2015;2(2):168-178.

8. Mandal N. Sharpe's single index model and its application to construct optimal portfolio: an empirical study. Great Lakes Herald, 2017;7(1):1-21.

9. Sen K, Disha Fattawat CA. Sharpe's Single Index Model and its Application Portfolio Construction. Global Journal of Finance and Management. 2014;6(6):511-516.

10. Murthy J. The Construction of Optimal Portfolio Using Sharpe's Single Index Model - An Empirical Study on Nifty Metal Index. SUMEDHA Journal of Management, 2018;7(1).