



ANALYSIS OF OPTIMAL ASSET PORTFOLIO DURING COVID 19 PANDEMIC (CASE STUDY ON LQ 45 INDEX AND CORPORATE BOND)

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Abstract

The purpose of this study is to determine the optimal asset portfolio during the covid 19 pandemic. LQ 45 indexed stocks and corporate bonds are samples in this study with certain criteria. In this study, two portfolios were formed using a single index method, they are stock and bond portfolio and stock portfolio. Based on the results of performance measurements using the Sharpe index, Treynor index and Jensen's alpha, the stock portfolio is the optimal portfolio during the Covid 19 pandemic. The portfolio consists of ANTM 78.4%, MNCN 12.70%, ERAA 5.88% and INCO 3.02%.

Keywords : *Optimal Portfolio, Single Index, LQ 45 Index, Corporate Bond, Sharpe Index, Treynor Index, Alpha Jensen, Covid 19*

INTRODUCTION

Investment is a commitment of funds or other resources made at this time, to obtain the benefits in the future (Tandelilin, 2010). The fundamental thing in investment decisions is understanding the relationship between expected return and risk of an investment. The relationship between the expected return and the risk of an investment is a linear relation. It means that the greater the expected return, the greater the risk of an investment. To reduce the level of investment risk, investors need to diversify. Diversification means that investors need to form a portfolio through the selection of assets in such a way that risk can be minimized without reducing the expected return.

Unexpected investment risks can occur at any time, one of the very big investment risks is the Covid 19 pandemic that has hit the whole world. In Indonesia, the Covid 19 pandemic began on March 2, 2020, when two people were confirmed to have contracted it from a Japanese citizen. As of June 3, 2020, Indonesia has reported 28 233 positive cases of Covid 19. The impact of COVID 19 that has hit the world, especially Indonesia, is certainly very influential on the economic system, including stock investment.

At the beginning of the Covid 19 pandemic in March 2020, the IHSG experienced a significant decrease, which was a 61.9% decrease from the closing price in 2019. The significant decline in the IHSG certainly made investors panic. The company's shares listed on the LQ 45 Index, which is an index consisting of 45 stocks on the IDX with high liquidity and large market capitalization, and passed the selection according to several selection criteria also experienced a significant decline. The decline in the LQ 45 Index in March 2020 reached 61% from the closing price in 2019.

In contrast to investment in the stock sector, bond investment did not experience a large decline due to the COVID-19 pandemic. It can be said that investing in bond instruments during the COVID-19 pandemic is not risky.

The decline in stock prices during the Covid-19 pandemic shows that stock investment is very risky at certain times. To minimize investment risk, especially in unexpected times such as the Covid-19 pandemic, an analysis of the formation of an optimal asset portfolio is needed. The portfolio formed does not only consist of stocks but also bonds to reduce the risk of a decline in investment.

Based on this background, the authors want to analyze the optimal portfolio formation on company stocks listed on the LQ45 index and low-risk assets such as bonds. In this study, an asset portfolio consisting only of stocks from the LQ 45 index will be compared with an asset portfolio consisting of stocks from the LQ 45 index and corporate bonds listed on the Indonesia Stock Exchange. Comparisons will be made by assessing the performance of each portfolio using the Sharpe index, Treynor index, and Alpha Jensen. From this research, investors are expected to be able to make the right decisions in investing their funds during the COVID-19 pandemic or if unexpected risks occur in the future.

Conceptual Model

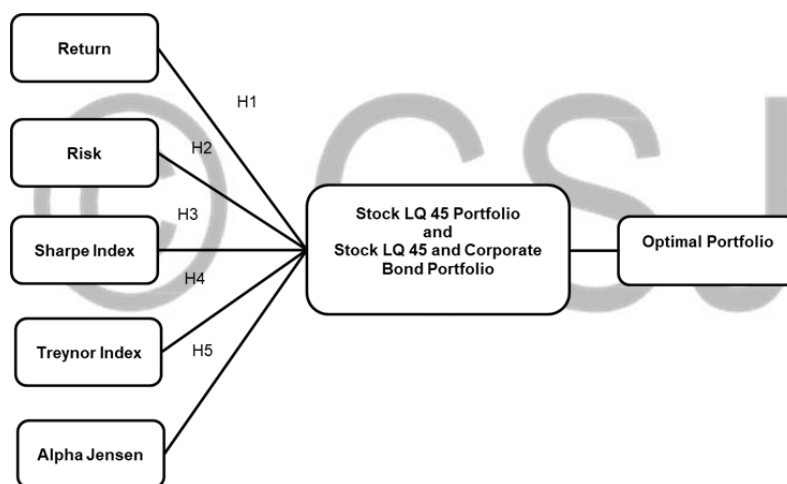


Figure 1: The Conceptual Model

- H1 : There is a significant difference between the return on stock portfolio and stock and bond portfolio during Covid 19 pandemic
- H2 : There is a significant difference between the risk on stock portfolio and stock and bond portfolio during Covid 19 pandemic
- H3 : There is a difference between performance on stock portfolio and stock and bond portfolio during Covid 19 pandemic measured by Sharpe index.
- H4 : There is a difference between performance on stock portfolio and stock and bond portfolio during Covid 19 pandemic measured by Treynor index.
- H5 : There is a difference between performance on stock portfolio and stock and bond portfolio during Covid 19 pandemic measured by Alpha Jensen.

RESEARCH METHOD

Location and Research Design

This research is a quantitative research. This research was conducted using a single index model to form an optimal portfolio of financial asset investments during the Covid 19 pandemic. The sites of this research are Indonesia Stock Exchange website (<http://www.idx.co.id>) and

Indonesia Bond Pricing Agency (IBPA). The time of this research is May - July 2021

Population or Samples

The population in this study are stocks listed on the Indonesia Stock Exchange (IDX) with the index LQ 45 and bonds listed on the IDX with 5 years period. The sample for the stock in this study is the stock of companies that are consistently indexed LQ 45 from January 2019 – March 2021

No	Code	Company
1	ADRO	Adaro Energy Tbk.
2	AKRA	AKR Corporindo Tbk.
3	ANTM	Aneka Tambang Tbk.
4	ASII	Astra International Tbk.
5	BBCA	Bank Central Asia Tbk.
6	BBNI	Bank Negara Indonesia (Persero) Tbk.
7	BBRI	Bank Rakyat Indonesia (Persero) Tbk.
8	BBTN	Bank Tabungan Negara (Persero) Tbk.
9	BMRI	Bank Mandiri (Persero) Tbk.
10	BSDE	Bumi Serpong Damai Tbk.
11	CPIN	Charoen Pokphand Indonesia Tbk.
12	ERAA	Erajaya Swasembada Tbk.
13	EXCL	XL Axiata Tbk.
14	GGRM	Gudang Garam Tbk.
15	HMSP	H.M. Sampoerna Tbk.
16	ICBP	Indofood CBP Sukses Makmur Tbk.
17	INCO	Vale Indonesia Tbk.
18	INDF	Indofood Sukses Makmur Tbk.
19	INKP	Indah Kiat Pulp & Paper Tbk.
20	INTP	Indocement Tunggul Prakarsa Tbk.
21	ITMG	Indo Tambangraya Megah Tbk.
22	JSMR	Jasa Marga (Persero) Tbk.
23	KLBF	Kalbe Farma Tbk.
24	MNCN	Media Nusantara Citra Tbk.
25	PGAS	Perusahaan Gas Negara Tbk.
26	PTBA	Bukit Asam Tbk.
27	PTPP	PP (Persero) Tbk.
28	PWON	Pakuwon Jati Tbk.
29	SMGR	Semen Indonesia (Persero) Tbk.
30	TKIM	Pabrik Kertas Tjiwi Kimia Tbk.
31	TLKM	Telkom Indonesia (Persero) Tbk.
32	UNTR	United Tractors Tbk.
33	UNVR	Unilever Indonesia Tbk.
34	WIKA	Wijaya Karya (Persero) Tbk.

The sample for bonds in this study is determined by purposive sampling method, it is the method of selecting samples with certain criteria. The sample criteria are:

1. Corporate bonds traded during the years 2019-2021;
2. Bonds are still outstanding or have not matured so that data on the prevailing bond prices can be obtained;
3. Paying coupons in a fixed rate, to ensure that there is no floating rate effect on bond yields;

4. Coupon rate is above 8%.
5. Company bonds are listed in the bond rating issued by Pefindo;
6. The term of the bonds is 5 years;
7. Companies that issue bonds have complete financial statements during the observation period.

No	BondID	Issuer Code	Due Date	Period (Year)	Coupon
1	ADMF04ECN3	ADMF	16 Aug 2023	5	9.25
2	APAI01A	APAI	22 Nov 2021	5	8.10
3	APIA01BCN1	APIA	12 Dec 2023	5	8.95
4	BBIA01CCN1	BBIA	25 Nov 2021	5	8.25
5	BBRI01CCN3	BBRI	25 May 2021	5	8.70
6	BEXI04CCN3	BEXI	08 Nov 2023	5	9.25
7	BMRI01CN3	BMRI	21 Sep 2023	5	8.50
8	BNGA02CCN4	BNGA	20 Sep 2023	5	8.80
9	BNII02CCN3	BNII	26 Oct 2023	5	8.80
10	EXCL01CCN1	EXCL	16 Oct 2023	5	9.60
11	IIFF01B	IIFF	19 Jul 2021	5	8.70
12	ISAT02CCN1	ISAT	31 May 2022	5	8.55
13	PPLN03ACN2	PPLN	10 Oct 2023	5	8.65
14	PRTL01BCN1	PRTL	23 Nov 2021	5	8.25
15	SMFP03CN6	SMFP	27 Sep 2021	5	8.60
16	SMII01BCN1	SMII	18 Nov 2021	5	8.20

Research Variable

1. Return Realized

This calculation is to calculate the return of each asset

$$R_i = \frac{P_{t(i)} - P_{t-1(i)}}{P_{t-1(i)}} + \text{yield}$$

Description:

R_i = Return realized for each asset

$P_{t(i)}$ = Closing Price on period t

$P_{t-1(i)}$ = Closing Price on period t-1

2. Expected Return

Calculating the expected return on securities is to find the weighted average of the total security returns divided by the total period.

$$E(R_i) = \frac{\sum R_i}{n}$$

Description:

$E(R_i)$ = Expected Return

R_i = Return Realized

n = Number of periods

3. Standard Deviation

This variable is used to calculate asset investment risk.

$$\sigma = \sqrt{\frac{\sum_{i=1}^n [R_i - E(R_i)]^2}{n}}$$

Description:

- σ = Standard deviation
- $E(R_i)$ = Expected Return
- R_i = Return Realized
- n = Number of periods

4. Beta

Beta calculates the sensitivity of a security's return to a market's return.

$$\beta_i = \frac{\sigma_{iM}}{\sigma_M^2}$$

Description:

- β_i = Beta security
- σ_{iM} = security's standard deviation
- σ_M = market's standard deviation

5. Alpha

Alpha is part of the return of securities I which is not affected by market performance.

$$\alpha_i = R_i - \beta_i \cdot R_M$$

Description:

- α_i = alpha security
- β_i = beta security
- R_i = Security return
- R_M = Market return

6. Unsystematic risk

Unsystematic risk is risk that is not related to changes in the overall market and can be eliminated by diversification.

$$\sigma_{ei}^2 = \sigma_i^2 - \beta_i^2 \sigma_M^2$$

Description:

- σ_{ei} = unsystematic risk
- σ_i = security risk
- β_i = beta security

7. Excess Return to Beta

Excess Return to Beta (ERB) is used to measure excess returns relative to a diversified unit of risk measured by beta.

$$ERB = \frac{E(R_i) - R_f}{\beta_i}$$

Description:

- ERB = Excess Return to Beta
- $E(R_i)$ = Expected return
- R_f = Risk free rate
- β_i = beta security

8. Cut of rate

Cut of rate is the quotient value for market variance and return premium on stock error variance with market variance and individual stock sensitivity to stock error variance.

$$C = \frac{\sigma_{ei}^2 \sum \frac{(R_i - R_f)\beta}{\sigma_{ei}^2}}{1 + \sigma_{ei}^2 \sum \frac{\beta^2}{\sigma_{ei}^2}}$$

Description:

- Ci = Cut-Off Rate
- Ri = security's return
- Rf = Risk free rate
- σ_{ei}^2 = unsystematic risk
- β_i = beta security

9. Sharpe Index

A comparison between excess return portfolio to the total portfolio risk.

$$Sp = \frac{Rp - Rf}{\sigma p}$$

Description:

- Sp = Sharpe Index
- Rp = portfolio return
- Rf = risk free rate
- σp = portfolio risk

10. Treynor Index

A comparison between excess return compared to the risk of the portfolio. The risk being compared is systematic risk (market risk) which is beta value.

$$Tp = \frac{Rp - Rf}{\beta p}$$

Description:

- Tp = Treynor index
- Rp = Portfolio return
- Rf = Risk free rate
- βp = beta portfolio

11. Alpha Jensen

The difference between average return and minimum rate return

$$ap = Rp - [Rf + bp(Rm - Rf)]$$

Description:

- ap = Alpha Jensen
- Rp = Portfolio return
- Rf = Risk free rate
- Rm = Market Risk

Data Analysis Method

The data analysis technique used is a single index model to form an optimal portfolio. There are two portfolios formed, it is the stock portfolio and the stock and bond portfolio. Testing of Hypothesis 1 and Hypothesis 2 was conducted to determine the significant difference in return and risk between the stock portfolio and stock and bond portfolio with statistical methods. By using the independent sample test, it will be seen that there is a significant difference between the risk and return of portfolio 1 and portfolio 2 obtained from the output of

the SPSS version 25.0 for windows program by comparing the average values obtained. The significance level value used in this study is 5% according to the secondary data source used. Testing Hypothesis 3, Hypothesis 4 and Hypothesis 5 is to measure Stock Portfolio Performance with the Sharpe Index, Treynor Index and Alpha Jensen.

EMPIRICAL RESULTS

Calculation of Expected Return, Standard Deviation, Variance, Alpha, Beta and Unsystematic Risk

Asset Code	E(R _i)	SD	Var	α	β	Unsystematic Risk
ADRO	0.0051	0.1145	0.0131	0.0059	0.9175	0.0096
AKRA	-0.0023	0.1276	0.0163	-0.0010	1.5025	0.0068
ANTM	0.0606	0.2129	0.0453	0.0625	2.1881	0.0251
ASII	-0.0104	0.1072	0.0115	-0.0094	1.1648	0.0058
BBCA	0.0085	0.0599	0.0036	0.0091	0.7535	0.0012
BBNI	-0.0062	0.1272	0.0162	-0.0047	1.6944	0.0041
BBRI	0.0115	0.0935	0.0087	0.0126	1.2417	0.0022
BBTN	0.0063	0.2019	0.0408	0.0082	2.1670	0.0210
BMRI	-0.0010	0.1000	0.0100	0.0001	1.2826	0.0031
BSDE	0.0027	0.1147	0.0131	0.0040	1.4044	0.0048
CPIN	0.0042	0.1047	0.0110	0.0048	0.6186	0.0094
ERAA	0.0284	0.2204	0.0486	0.0300	1.8400	0.0343
EXCL	0.0083	0.1121	0.0126	0.0093	1.0991	0.0075
GGRM	-0.0270	0.0809	0.0066	-0.0263	0.7732	0.0040
HMSF	-0.0317	0.0932	0.0087	-0.0310	0.8301	0.0058
ICBP	-0.0024	0.0683	0.0047	-0.0023	0.0629	0.0046
INCO	0.0210	0.1394	0.0194	0.0223	1.4346	0.0108
INDF	-0.0013	0.0795	0.0063	-0.0010	0.3194	0.0059
INKP	0.0109	0.1728	0.0299	0.0122	1.4698	0.0208
INTP	-0.0113	0.0876	0.0077	-0.0105	0.9281	0.0040
ITMG	-0.0081	0.1687	0.0285	-0.0067	1.5373	0.0185
JSMR	0.0084	0.1346	0.0181	0.0097	1.4811	0.0089
KLBF	0.0037	0.0709	0.0050	0.0040	0.3562	0.0045
MNCN	0.0255	0.1645	0.0271	0.0269	1.5780	0.0166
PGAS	-0.0026	0.1675	0.0280	-0.0006	2.3004	0.0057
PTBA	-0.0137	0.0943	0.0089	-0.0131	0.6390	0.0072
PTPP	0.0135	0.2085	0.0435	0.0160	2.8634	0.0089
PWON	0.0038	0.1254	0.0157	0.0052	1.5532	0.0056
SMGR	0.0031	0.1146	0.0131	0.0042	1.2819	0.0062
TKIM	0.0189	0.2049	0.0420	0.0208	2.1482	0.0225
TLKM	-0.0008	0.0735	0.0054	-0.0002	0.7176	0.0032
UNTR	-0.0034	0.0963	0.0093	-0.0029	0.5410	0.0080
UNVR	-0.0100	0.0622	0.0039	-0.0099	0.1293	0.0038
WIKA	0.0138	0.1637	0.0268	0.0157	2.1838	0.0067
ADMF04ECN3	0.0100	0.0115	0.0001	-0.0010	1.1516	0.0000
APAI01A	0.0084	0.0062	0.0000	0.0043	0.4240	0.0000
APIA01BCN1	0.0093	0.0112	0.0001	0.0007	0.8980	0.0001
BBIA01CCN1	0.0081	0.0057	0.0000	0.0031	0.5264	0.0000

BBRI01CCN3	0.0072	0.0042	0.0000	0.0048	0.2535	0.0000
BEXI04CCN3	0.0102	0.0121	0.0001	-0.0018	1.2600	0.0000
BMRI01CN3	0.0101	0.0120	0.0001	0.0003	1.0350	0.0000
BNGA02CCN4	0.0102	0.0127	0.0002	-0.0016	1.2465	0.0000
BNII02CCN3	0.0103	0.0121	0.0001	-0.0015	1.2334	0.0000
EXCL01CCN1	0.0103	0.0105	0.0001	0.0004	1.0408	0.0000
IIF01B	0.0079	0.0056	0.0000	0.0037	0.4427	0.0000
ISAT02CCN1	0.0086	0.0074	0.0001	0.0020	0.6987	0.0000
PPLN03ACN2	0.0095	0.0123	0.0002	-0.0021	1.2226	0.0000
PRTL01BCN1	0.0084	0.0064	0.0000	0.0027	0.6001	0.0000
SMFP03CN6	0.0078	0.0063	0.0000	0.0046	0.3358	0.0000
SMII01BCN1	0.0084	0.0057	0.0000	0.0033	0.5324	0.0000

Calculation ERB, Ci, Cut off Point and Decision for Optimal Assets

Asset Code	ERB	Ci	C*	Decision
ANTM	0.0259	0.0115	0.0115	Optimal
MNCN	0.0136	0.0053	0.0115	Optimal
ERAA	0.0133	0.0039	0.0115	Optimal
BBRI01CCN3	0.0128	0.0042	0.0115	Optimal
INCO	0.0119	0.0053	0.0115	Optimal
SMFP03CN6	0.0114	0.0029	0.0115	Non Optimal
APAI01A	0.0103	0.0044	0.0115	Non Optimal
IIF01B	0.0089	0.0050	0.0115	Non Optimal
SMII01BCN1	0.0082	0.0065	0.0115	Non Optimal
BBIA01CCN1	0.0077	0.0058	0.0115	Non Optimal
PRTL01BCN1	0.0073	0.0058	0.0115	Non Optimal
TKIM	0.0069	0.0032	0.0115	Non Optimal
ISAT02CCN1	0.0066	0.0052	0.0115	Non Optimal
EXCL01CCN1	0.0060	0.0053	0.0115	Non Optimal
BBRI	0.0060	0.0045	0.0115	Non Optimal
BMRI01CN3	0.0059	0.0040	0.0115	Non Optimal
BBCA	0.0059	0.0040	0.0115	Non Optimal
APIA01BCN1	0.0059	0.0034	0.0115	Non Optimal
ADMF04ECN3	0.0052	0.0047	0.0115	Non Optimal
BNII02CCN3	0.0051	0.0047	0.0115	Non Optimal
BNGA02CCN4	0.0050	0.0043	0.0115	Non Optimal
BEXI04CCN3	0.0049	0.0048	0.0115	Non Optimal
INKP	0.0047	0.0014	0.0115	Non Optimal
PPLN03ACN2	0.0045	0.0040	0.0115	Non Optimal
WIKA	0.0045	0.0034	0.0115	Non Optimal
EXCL	0.0040	0.0016	0.0115	Non Optimal
PTPP	0.0033	0.0026	0.0115	Non Optimal
JSMR	0.0030	0.0015	0.0115	Non Optimal
ADRO	0.0012	0.0003	0.0115	Non Optimal
BBTN	0.0010	0.0005	0.0115	Non Optimal
CPIN	0.0004	0.0001	0.0115	Non Optimal
PWON	-0.0001	-0.0001	0.0115	Non Optimal
SMGR	-0.0007	-0.0004	0.0115	Non Optimal

BSDE	-0.0009	-0.0006	0.0115	Non Optimal
KLBF	-0.0009	-0.0001	0.0115	Non Optimal
PGAS	-0.0029	-0.0023	0.0115	Non Optimal
BMRI	-0.0039	-0.0027	0.0115	Non Optimal
AKRA	-0.0042	-0.0024	0.0115	Non Optimal
BBNI	-0.0060	-0.0045	0.0115	Non Optimal
TLKM	-0.0067	-0.0027	0.0115	Non Optimal
ITMG	-0.0079	-0.0027	0.0115	Non Optimal
ASII	-0.0123	-0.0061	0.0115	Non Optimal
UNTR	-0.0136	-0.0018	0.0115	Non Optimal
INTP	-0.0165	-0.0078	0.0115	Non Optimal
INDF	-0.0166	-0.0011	0.0115	Non Optimal
PTBA	-0.0276	-0.0054	0.0115	Non Optimal
GGRM	-0.0401	-0.0154	0.0115	Non Optimal
HMSP	-0.0430	-0.0144	0.0115	Non Optimal
ICBP	-0.1009	-0.0004	0.0115	Non Optimal
UNVR	-0.1080	-0.0020	0.0115	Non Optimal

Determining The Proportion of Optimal Portfolio from Optimal Assets

The proportion for Stock and bond Portfolio

Asset	Zi	Wi
ANTM	0.1473	0.53%
MNCN	0.2020	0.73%
ERAA	0.0937	0.34%
BBRI01CCN3	27.2333	98.23%
INCO	0.0480	0.17%

Source : Data Processed

The proportion for stock Portfolio

Stock	Zi	Wi
ANTM	1.2477	78.40%
MNCN	0.2020	12.70%
ERAA	0.0937	5.88%
INCO	0.0480	3.02%

Source : Data Processed

Correlation

In the calculation of correlation and covariance, the value of covariance between stocks is mostly close to 1, which means stocks during the COVID-19 pandemic have a tendency to move together and in the same direction. In contrast to bonds, the covariance value for bonds included in the portfolio and stocks is close to 0 which means that the movement of bond returns moves independently and is not affected by the movement of stock returns.

	ANTM	MNCN	ERAA	BBRI01CCN3	INCO
ANTM	1	0.4302	0.5258	-0.1469	0.7262
MNCN	0.4302	1	0.2160	0.1027	0.3567
ERAA	0.5258	0.2160	1	0.1014	0.5744
BBRI01CCN3	-0.1469	0.1027	0.1014	1	-0.0036
INCO	0.7262	0.3567	0.5744	-0.0036	1

Source : Data Processed

Calculation of Alpha Portfolio, Beta Portfolio, Expected Return Portfolio, and Risk of Portfolio

Asset	α	β	σ
ANTM	0.0028	0.0985	0.0011
MNCN	0.0002	0.0115	0.0001
ERAA	0.0001	0.0062	0.0001
BBRI01CCN3	0.0047	0.2490	0.0000
INCO	0.0000	0.0025	0.0000
Stock and Bond Portfolio	0.0079	0.3676	0.0014

Source : Data Processed

Return of Market	-0.09%
Return of Portfolio	0.52%
Variance of Market	0.0042
Variance of Portfolio	0.0017
Risk of Portfolio	0.0416

Source : Data Processed

Asset	α	β	σ
ANTM	0.0504	1.7647	0.0203
MNCN	0.0035	0.2061	0.0022
ERAA	0.0018	0.1114	0.0021
INCO	0.0001	0.0034	0.0003
Stock Portfolio	0.0558	2.0856	0.0249

Source : Data Processed

Return of Market	-0.09%
Return of Portfolio	5.30%
Variance of Market	0.0042
Variance of Portfolio	0.0422
Risk of Portfolio	0.2054

Source : Data Processed

Prerequisite Evaluations

Test Normality

In the results of the normality test, the return significance value is 0.086, it is more than 5%, which means that the data for return is normally distributed, while the significant risk value is 0.003 less than 5%, which means the data is not normally distributed.

Tests of Normality							
Group		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Return	Stock and Bond Portfolio	0,327	5	0,086	0,761	5	0,038
	Stock Portfolio	0,426	4		0,671	4	0,005
Risk	Stock and Bond Portfolio	0,432	5	0,003	0,633	5	0,002
	Stock Portfolio	0,410	4		0,710	4	0,015

Source : Data Processed

Independent test

Based on the results of the independent test, there is no significant difference in returns between stock and bond portfolios and stock portfolios. The test result shows a significant value of $0.303 > 0.05$. Thus, Hypothesis 1 (H1) is not accepted, assuming there is no significant difference in returns between stock and bond portfolios and stock portfolios during the covid 19 pandemic.

Independent Samples Test										
		Levene's Test		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error	95% Confidence	
Return	Equal variances assumed	8,590	0,022	-1,112	7	0,303	-0,0114	0,0103	-0,0357	0,0128
	Equal variances not assumed			-0,981	3,078	0,397	-0,0114	0,0116	-0,0479	0,0251

Source : Data Processed

Mann Whitney Test

Based on the results of non-parametric statistical tests using the Mann-Whitney Test, it is stated that there is a significant difference in risk between stock and bond portfolios and stock portfolios. The results indicated by a significant value of $0.027 < 0.05$. Thus, Hypothesis 2 (H2) is accepted, assuming there is a significant difference in risk between stock and bond portfolios and stock portfolios during the covid 19 pandemic.

Test Statistics ^a	
	Var
Mann-Whitney U	1,000
Wilcoxon W	16,000
Z	-2,205
Asymp. Sig. (2-tailed)	0,027
Exact Sig. [2*(1-tailed Sig.)]	.032 ^b

Source : Data Processed

Calculate Index Sharpe, Index Treynor, and Alpha Jensen

Based on the calculation results of the Sharpe Index, Treynor Index and Alfa Jensen, it can be seen that there are differences in portfolio performance between stock and bond portfolios and stock portfolios during the covid 19 pandemic, thus hypothesis 3 (H3), hypothesis 4 (H4) and hypothesis 5 (H5) accepted.

Portfolio Performance	Sharpe Index	Treynor Index	Alpha Jensen
Stock and Bond Portfolio	0,0279	0,0041	0,0025
Stock Portfolio	0,2387	0,0237	0,0591

Source : Data Processed

DISCUSSION

The results of the analysis carried out with a sample of 34 indexed stocks and 16 corporate bonds during January 2019 - March 2021. The portfolio formation was carried out using the single index method. Determination of the optimal asset is an asset that has $ERB > C^*$. In this study, two portfolios were formed, they are stock and bond portfolio and stock portfolio. The cut off point of the two portfolios is $C^* = 0.0015$. The stock and bonds portfolio consists of ANTM 4.33%, MNCN 0.70%, ERAA 0.32%, INCO 0.17% and bonds BBRI01CCN3 94.48%. The stock portfolio consists of ANTM 78.4%, MNCN 12.70%, ERAA 5.88% and INCO 3.02%.

The results of the calculation for the expected return of the stock and bond portfolio is 0.73% and the risk is 0.0433. The result of the calculation of the expected return of the stock portfolio is 5.30% and the risk is 0.2054.

The result of the independent sample test for the hypothesis 1 shows that there is no significant difference in returns between the two portfolios so that hypothesis 1 is rejected. This result is evidenced by a significance value of $0.303 > 0.05$. The result of the Mann Whitney Test for hypothesis 2 shows that there is a significant risk difference between the two portfolios so that hypothesis 2 is accepted. This result is evidenced by a significance value of $0.027 < 0.05$.

Based on the calculation results of the Sharpe Index, Treynor Index and Alfa Jensen, it can be seen that there are differences in portfolio performance between stock and bond portfolios and stock portfolios during the covid 19 pandemic, thus hypothesis 3 (H3), hypothesis 4 (H4) and hypothesis 5 (H5) accepted. Based on the calculation results of the Sharpe Index, Treynor Index and Jensen alpha index, the performance of the stock portfolio is better than the performance of the stock and bond portfolio during the covid 19 pandemic. Therefore the optimal portfolio is stock portfolio during Covid 19 pandemic.

CONCLUSION

Based on the results of the research, between stock and bond portfolio and stock portfolio, there is no significant difference in return but has a significant difference in risk. Nevertheless, the stock portfolio has a better performance as measured by the Sharpe index, Treynor index and Jensen's alpha. Thus the stock portfolio indexed by LQ 45 is the optimal portfolio during the Covid 19 pandemic.

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