

# Jakarta Islamic Index Performance Analysis, Before, During and After the 2008 Global Crisis Using Sharpe, Treynor, and Jensen Index

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**Abstract**—The stages of the investment decision process include five stages of decision, which is the determination of investment objectives; investment policy determination; selection of portfolio strategy; asset selection; measurement and evaluation of portfolio performance. This study aims is to find out (1) which optimal portfolio is best performing after being measured by Sharpe, Treynor, and Jensen Indexes (2) Comparison of the performance rankings of the Sharpe, Treynor, and Jensen models of the optimal portfolios of the Jakarta Islamic Index which were formed before, medium, and after the crisis whether the results obtained are the same or there are differences between the three models. The results of this study indicate that there is no significant difference in the measurement of optimal portfolio performance in the period before, during, and after the 2008 global crisis using the Sharpe, Treynor, and Jensen methods.

**Keywords:** Sharpe, Treynor, Jensen, Jakarta Islamic Index

## I. INTRODUCTION

Investment is a commitment to a number of funds or other resources made at this time, with the aim of obtaining a number of benefits in the future [1]. The basis of investment decisions is the expected rate of return, the level of risk, and the relationship between return and risk. Return expectancy is the rate of return that investors anticipate in the future. While the return that occurs or the actual return is the level of return that has been obtained by the investor or the return he actually received. The difference between expected return and actual return is a risk [1]. Investment analysis often faces a problem that is about estimating returns to be received by investors with the risk that must be borne. Financial theory explains that if the investment risk increases, the level of profit required by the investor will be even greater. To reduce investment losses / risks, investors can invest in various types of shares by forming a portfolio [2].

A portfolio is basically a combination of a number of assets or assets to minimize risk. A portfolio can be interpreted as an investment in a variety of financial instruments that can be traded on the Stock Exchange and Money Market with the aim of spreading the source of the acquisition of returns and possible risks [3]. The financial instruments include stocks, bonds, foreign exchange, deposits, stock price indexes, other

derivative products. While the understanding of other portfolios is a combination of a number of assets in such a way that risk can be minimized without reducing expectation returns [1].

The stages of the investment decision process include five decision stages, namely the determination of investment objectives; determination of investment policies; portfolio strategy selection; asset selection; portfolio performance measurement and evaluation. The five stages of the decision go on and on until the best investment decision is reached. The portfolio performance measurement and evaluation stage is the final stage of the investment decision process. Measuring and evaluating portfolio performance includes measuring portfolio performance and comparing the results of these measurements with other portfolio performance through the process benchmarking. This process benchmarking is usually carried out on the market portfolio index, to find out how well the performance of the portfolio that has been determined compared to the performance of other portfolios (market portfolios) [1].

The decline in the value of the JCI is inevitable as a result of the global crisis that began in the United States. As illustrated in graph 1.2, the highest JCI was recorded in the period before the crisis occurred on January 9, 2008 which reached the level of 2,830,263. In 2008, the Jakarta Composite Index closed down 51.17% with an average Composite Index reaching 1,340,892 compared to the 2007 closing level of 2,745,826 (www.info-saham.com). The sharp JCI correction occurred in January to near the 2200 level, but the strengthening of the JCI again occurred until March and then weakened in the coming months. Therefore, it can be said that the global crisis began to affect the Indonesian capital market sector since March 2008.

In the following months the JCI fell sharply due to the impact of the crisis. In the graph 1.3 below, shows that the JCI reached its lowest point during the crisis that occurred in October 2008 to near the 1100 level.



Fig. 1. The Capital Market Situation in Indonesia During and After the Global Crises (Source: IDX Statistics 2009).

Based on the description above that has been disclosed by the author, the Jakarta Islamic Index has a pretty good performance when compared to the index that is commonly used as a proxy by investors, namely the Jakarta Composite Index and the LQ45 index. In addition, JII becomes a reference for potential investors who do not understand about the haram activities in the capital market and are concerned about them so that activities in trading on the capital market increase because investors feel calm and comfortable in investing their funds. Therefore, the authors chose JII shares as research objects. On the other hand, investors must be careful in investing their funds by looking at various aspects that affect the capital market situation. One of the factors influencing capital market activity is external factors such as the 2008 Global Crisis which affected a sharp correction in capital markets throughout the world including Indonesia. The author tries to analyze the performance of sharia-based optimal stock portfolios formed by looking at aspects of the global crisis phenomenon that affects the capital market, especially on the Indonesia Stock Exchange. Analysis or measurement of this performance using the Sharpe, Treynor, and Jensen methods.

The research question are:

- How is the optimal portfolio performance in the pre-crisis period formed from JII stocks using the Sharpe, Treynor, and Jensen Index.
- How is the optimal portfolio performance formed in crisis periods formed from JII stocks using the Sharpe, Treynor, and Jensen Index.
- How is the optimal portfolio performance formed in the post-crisis period formed from JII stocks using the Sharpe, Treynor, and Jensen Index.
- Which optimal portfolio performs best after being measured by the Sharpe, Treynor, and Jensen index.

## II. LITERATURE STUDY

Comparison of performance rankings of the Sharpe, Treynor, and Jensen models of the optimal portfolios of JII stocks formed before, during, and after the crisis whether the results obtained are the same or there are differences between the three models.

The Jakarta Islamic Index (JII) consists of 30 shares selected from shares that are compliant with Islamic sharia and are liquid stocks. JII is intended as a benchmark to measure the performance of investments in shares on sharia basis and is expected to increase investor confidence in investing in sharia [1].

JII was made by IDX in collaboration with PT Danareksa Investment Management. JII uses a basis on January 1995 with a base value of 100. JII is updated every 6 months.

Namely in early January and July. The following are the stock valuation procedures that enter JII [4].

- The selected shares must have been listed for at least the last 3 months, except for shares included in 10 large capitalization.
- Have a debt to asset ratio of no more than 90% in the annual or midyear financial statements.
- Shares that enter the two criteria above, were selected 60 stocks in order of the largest average market capitalization during the past year.
- 30 stocks were selected in the order of average liquidity levels of regular trading values during the past year.

In addition to the stock price indices above, there are other stock indices on the Indonesia Stock Exchange. The stock price indexes are Kompas 100 Index, Sectoral Index, Main Board Index and Development Board Index.

In this study, the authors focus on the Jakarta Islamic Index (JII) as the object under study.

### A. Optimal Portfolios Based on the Single Index Model The Single Index

Model is the result of the development of Sharpe [5] from the portfolio formation model of the complex Markowitz model. This model links the calculation of each asset to the market index return. Mathematically, Tandelilin [1] states the single index model is as follows:

$$R_i = \alpha_i + \beta R_M + e_i \tag{1}$$

Notation:

$R_i$  = return securities  $i$

$R_M$  = return market index

$\alpha_i$  = Part returns of securities  $i$  are not affected market performance

$\beta_i$  = Size of the sensitivity of returns of securities  $i$  to changing market return

$e_i$  = Error residual

Model single index divides return of a security into two components, namely as follows [4]:

- The unique return component is represented by  $\alpha_i$  that is independent of market return. Unique returns only relate to micro events that affect certain companies, but do not affect all companies in general.
- Components returns associated with market return as represented by  $\beta$  RM.

One important concept in a single index model is the terminology Beta ( $\beta$ ) [1]. Beta is a measure of the sensitivity of security returns to market returns. The greater the beta of a security, the greater the sensitivity of the security to changes in market returns.

The assumption used in the single index model is that securities will correlate only if they have the same response to market returns. Therefore, residual errors between two securities, for example shares A and B that are not correlated (0) will result in covariance between residual errors of shares A and shares B equal to 0.

### B. Hypothesis

Based on the research objectives and frame of mind, the hypotheses in this study are as follows:

H0: There is no difference in the assessment of optimal Portfolio performance in the period before, during and after the 2008 global crisis measured using the Sharpe, Treynor, and Jensen methods.

H1: There are differences in the assessment of optimal Portfolio performance in the periods before, during and after the 2008 global crisis measured using the Sharpe, Treynor, and Jensen methods.

## III. METHOD

Based on the period that has been divided and shares that have been valued as feasible by DSN MUI and BEI included in JII, the authors divide the sample into portfolios into three, namely:

Portfolio 1: shares taken in the period before the crisis (January 2006 - June 2008). The shares included in the period consisted of 51 shares. With a purposive sampling technique, the criteria used by the author for the needs of this study are:

- Selecting shares or those that enter JII at least 4 observation periods out of 5 observation periods (January 2006 - June 2008).
- Not doing stock split, during the observation period because it will cause a bias in calculating returns stock.

TABLE I. PORTFOLIO 1 ( BEFORE THE CRISIS )

No	Share Name	Code
1	Bumi Resource Tbk	BUMI
2	Indocement tunggal Prakasa Tbk	INTP
3	Kalbe Farma Tbk	KLBF
4	Bukit Asam Coal Mine	PTBA
5	Telekomunikasi Indonesia Tbk	TLKM
6	United Tractors Tbk	UNTR
7	Uniliver Indonesia Tbk	UNVR
8	Bakrie & Brother Tbk	BNBR
9	Astra Agro Lestari Tbk	AALI
10	Astra International Tbk	ASII
11	Ciputra Development Tbk	CTRA
12	PP London Sumatra Tbk	LSIP
13	Berlian Speed Tanker Tbk	BLTA
14	Bakrie Telecom Tbk	BTEL
15	Indofood Sukses Makmur Tbk	INDF
16	Indah Kiat Pulp & Paper Tbk	INKP
17	Indosat Tbk	ISAT
18	Medeo Energi International Tbk	MEDC
19	Perusahaan Gas Negara Tbk	PGAS
20	Holcim Indonesia Tbk	SMCB

Portfolio 2: IDX advances the valuation period for shares entered into JII to June-November, which will be effective on June 5, 2008. Thus, shares taken during the crisis period are from June 2008 to November 2009. Shares that enter the period consist of 43 shares. With a purposive sampling technique, the criteria used by the author for the needs of this study are:

- Choosing stocks that are included in JII for 3 observation periods or the entire observation period (July 2008 - December 2009).
- Not doing stock split, during the observation period because it will cause a bias in calculating returns stock.

TABLE II. PORTFOLIO 2 (JII CRISIS PERIOD)

No	Share Name	Code
1	Astra Agro Lestari Tbk	AALI
2	Aneka Tambang (Persero) Tbk	ANTM
3	Bumi Resource Tbk	BUMI
4	International Nickelind. Tbk	INCO
5	Indocement Tunggal Prakasa Tbk	INTP
6	Kalbe Farma Tbk	KLBF
7	Pp London Sumatra Tbk	LSIP
8	Bukit Asam Coal Mine Tbk	PTBA
9	Telekomunikasi Indonesia Tbk	TLKM
10	Bakrie Sumtra Plantations Tbk	UNSP
11	Uniliver Indonesia Tbk	UNVR
12	Semen Grsik (Persero) Tbk	SMGR
13	Bisi International Tbk	BISI
14	Global Mediacom Tbk	BMTR
15	Elnusa Tbk	ELSA
16	Indo Tambangraya Megah Tbk	ITMG
17	Sampoerna Agro Tbk	SGRO
18	Wijaya Karya (Persero) Tbk	WIKA

Source: [www.idx.aco.id](http://www.idx.aco.id),processed

Portfolio 3: shares taken in the post-crisis period (June 2008 - November 2009). The shares included in the period consisted of 37 shares. With a purposive sampling technique, the criteria used by the author for the needs of this study are:

- Selecting stocks that enter JII for 2 observation periods or the entire observation period (January 2010 - December 2010).
- Not doing stock split, during the observation period because it will cause a bias in calculating returns stock

TABLE III. PORTFOLIO 3 ( JII SHARES AFTER THE CRISIS)

No	Share Name	Code
1	Astra Agro Lestari Tbk	AALI
2	Aneka Tambang (persero) Tbk	ANTM
3	Astra International Tbk	ASH
4	International Nickelind. Tbk	INCO
5	Indocement Tunggak Prakasa Tbk	INTP
6	Kalbe Farma Tbk	KLBF
7	PP London Sumatra Tbk	LSIP
8	Bukit Asam Coal Mine Tbk	PTBA
9	Telekomunikasi Indonesia Tbk	TLKM
10	Bakrie Sumtra Plantations Tbk	UNSP
11	United Tractors Tbk	UNTR
12	Uniliver Indonesia Tbk	UNVR
13	Lippo Karawaci Tbk	LPKR
14	Semen Gresik (Persero) Tbk	SMGR
15	Timah Tbk	TINS
16	Global Mediacom Tbk	BMTR
17	Barito Putra Pacific	BRPT
18	Darma Henwa	DEWA
19	Bumi Damai Serpong Tbk	BSDE
20	Elnusa Tbk	ELSA
21	Indo Tambangraya Megah Tbk	ITMG
22	Sampoerna Agro Tbk	SGRO

Source : www.idx.aco.id,processed

#### IV. RESULTS AND DISCUSSION

Analysis or Measurement of Optimal Portfolio Performance.

##### A. Sharpe Method

Sharpe's method of calculation is to divide the risk premium ( $R_p - R_f$ ) by its standard deviation. If the value is Sharpe Index positive and the greater the better portfolio performance.

##### B. Treynor Method

Basically the Treynor method is almost the same as the Sharpe method, which is connecting the level of portfolio return with the magnitude of the risk of the portfolio. The difference is that the Treynor method or index uses Beta or systematic risk as a divider. If the value is Treynor index positive and the greater the better portfolio performance.

##### C. Jensen Method

Alpha is positive, it means that the performance of the stock portfolio produces better performance than the market index; whereas if it is negative, it means the manager of stock portfolio performance has lower performance than the market index. If alpha is zero, then portfolio performance is the same as market performance.

The results of the calculation of the three optimal portfolios are the optimal portfolio before the 2008 global crisis (1),

during the 2008 global crisis (2), and after the 2008 global crisis (3) can be seen in the table below.

TABLE IV. CALCULATION RESULT OPTIMAL PORTFOLIO PERFORMANCE BY USING

Performance	Optimal Portfolio 1	Optimal Portfolio 2	Optimal Portfolio 3
Sharpe	7.8370	0.5460	1.6443
Treynor	0.0726	0.0695	0.0912
Jensen	0.0787	0,0358	0.0503

Source: Secondary data processed by the author

##### D. Method Sharpe, Treynor, Jensen

From the calculation results in the table above, Optimal Portfolio 1 which was formed from JII shares in the period before the 2008 global crisis had a good performance based on Sharpe and Jensen's performance measurement methods, respectively, indexes of 7, 8270 and 0.0787. While the optimal portfolio 2 formed from JII stocks in the 2008 global crisis period) is the optimal portfolio which has the lowest performance because the measurement results based on the three methods of measuring performance Sharpe, Treynor, and Jensen show a lower value or index than the other portfolios. Consequently the optimal portfolio index 2 based on the Sharpe, Treynor, and Jensen methods is 0.5460; 0.0695; .358. Based on Treynor's performance measurement, Optimal Portfolio 3 formed from JII shares in the period after the 2008 global crisis has a performance that outperforms other optimal portfolio performance. This is indicated by the optimal portfolio Treynor index 3 which has a value of 0.0912; followed by optimal portfolio 1 with a value of 0.0726; and the last is optimal portfolio 2 with a Treynor Index value of 0.0695.

##### E. Hypothesis Testing

The population of this study consisted of three independent sample groups and not normally distributed so that the statistics used were non-parametric statistics. Therefore this study uses the hypothesis one way anova kruskal-wallis test (Kruskal-Wallis One Way Variant Test) or commonly referred to as the Kruskal-Wallis Test. With these statistical testing tools, the hypothesis can be tested for truth, namely whether there are differences in performance rankings between the Sharpe, Treynor, and Jensen methods that measure three groups of independent samples (optimal portfolio 1, optimal portfolio 2, optimal portfolio 3).

Each method of stock portfolio performance has a basis of relative numbers that cannot be compared directly with each other considering the measurement method is different. Therefore The default value will be calculated using the method Standardized Z-score transformation. transformation Z-score is how to convert data values into score a standardized that has value means (average) equal to zero and standard deviation it sequal to one [6]. Calculation Z-Score in this study using the SPSS Program calculation results Zscore can be seen in the table below:

TABLE V. VALUE Z-SCORE SHARPE INDEX, TREYNOR, AND JENSEN

Performance	Optimal Portofolio 1	Optimal Portofolio 2	Portofolio Optimal Portfolio
Zsharpe	1.1434	-0.7114	-0.4320
Ztreynor	-0.5742	-0.5805	1.1547
Zjensen	1.0891	-0.8768	-0.2123

Source: Secondary data processed by the author

After each value of all standardized methods, it is then changed to rank or ordinal measurement scale so that the three methods can be tested for differences. The test can be tested using (Formula 3.20). Testing the hypothesis of this study using the SPSS program. The results of non-parametric statistical tests using the Kruskal Wallish test can be seen from the table below:

TABLE VI. KRUSKAL-WALLIS TEST RESULT ON THE Z-SCORE OF THE SHARPE INDES, TREYNOR, AND JENSEN

	performance
Chi-Square	.089
df	2
Asymp. Sig.	.957

<sup>a</sup> Kruskal Wallis Test

<sup>b</sup> Variable Grouping: Method

Source: Data processed by the author

The results of testing with the Kruskal-Wallis test on the three methods obtained by the value of chi square ( $\chi^2$ ) count of 0.089 with a probability of 0.957.  $H_0$  if  $\chi^2$  count  $< \chi^2$  table with a significance level of 0.05 and a probability value  $\geq 0.05$ . It is known that  $\chi^2$  count = 0.089  $< \chi^2$  tables (5.991) and probability = 0.957  $> 0.05$ . These results indicate that there is no significant difference in the assessment of optimal portfolio performance before, during and after the 2008 global crisis using the Sharpe, Treynor, and Jensen Methods. Thus the null hypothesis ( $H_0$ ) in this study was accepted.

## V. CONCLUSION AND SUGGESTIONS

### A. Conclusion

Discussion on the preparation of optimal portfolios formed from stocks Jakarta Islamic Index (JII) in the periods before, during and after the 2008 global crisis using a single index model, measuring optimal portfolio performance that has been formed using the Sharpe, Treynor, and Jensen methods as well testing the differences from the measurements of the three models has been described above. The results of the discussion from the description above, can be drawn conclusions on the research of the optimal portfolio performance of shares incorporated in the Jakarta Islamic Index (JII) in the period from the beginning of the month of 2006 to the end of the year 2010. Some conclusions are as follows:

- There are two Twenty Islamic and economic criteria which are candidates to be included in the optimal portfolio in the period before the 2008 global crisis. Of the twenty stocks, four stocks were selected to be included in the optimal portfolio in the period before the crisis after going through the formation or selection of shares using the single index model (single index model). The four shares are Indah Kiat Pulp and Paper Tbk shares. (INKP) whose business fields are paper

making, Bumi Resource Tbk (BUMI) whose business fields are coal mining, Bukit Asam Coal Mining, (PTBA) whose business is coal mining, and finally Astra Agro Lestari (AALI) shares whose business fields are plantation and agriculture. The optimal portfolio of JII shares before the crisis had a portfolio return (Rp) of 0.1180 (11.8%) with a risk (variant) that investors had to carry at 0,0002 (0.02%). Measurement of optimal portfolio performance of JII shares using the Sharpe method has a value of 7.8370. Meanwhile, the optimal portfolio performance measurement results using the Treynor method amounted to 0.0726. Meanwhile, the results of the Jensen method measurement amounted to 0.0787.

- There are eighteen Islamic and economic criteria which are candidates for inclusion in optimal portfolios during the 2008 global crisis period. Of the eighteen shares selected 3 stocks included in optimal portfolios in the pre-crisis period after going through the formation or selection of shares using a single index model (single index model). These three shares are the shares of Unilever Indonesia Tbk. (UNVR) whose business sector is consumer goods, Semen Gresik Tbk. (SMGR) whose business sector is cement production, and Indocemen Tunggal Prakasa (INTP) whose business sector is cement production. The optimal portfolio at the time of the 2008 global crisis had a return on investment (Rp) of 0.0402 (4.02%) with the risk (variant) to be borne at 0.0042 (0.42%). Measurement of the optimal portfolio performance of JII stock crisis period 2008 using the Sharpe method has a value of 0.5460. Meanwhile, the optimal portfolio performance measurement using the Treynor method is 0.695. Meanwhile, the results of the Jensen method measurement amounted to 0.0358.
- There are 22 Islamic and economic criteria which are candidates for inclusion in the optimal portfolio in the period after the 2008 global crisis. Of the eighteen shares, six stocks were selected for optimal portfolio in the pre-crisis period after going through the formation or selection of shares using a single index model (single index model). The six shares are shares of Kalbe Farma Tbk. (KLBF) in the pharmaceutical business, Indo Tambangraya Megah Tbk. (ITMG) in the coal mining business, Global Mediacom Tbk. (BMTR) in the holding & investments business, Unilever Indonesia Tbk. (UNVR) in the business of producing daily consumer products, United Tractors Tbk. (UNTR) in the automotive business, PP London Sumatera Tbk. (LSIP) in the palm oil plantation business. The optimal portfolio formed in the 2008 global crisis period has a return on investment (Rp) of 0.0650 (6.5%) with a risk ( $\sigma^2$ ) that must be borne at 0.0013 (0.13%). Measurement of optimal portfolio performance of JII shares after the 2008 global crisis using the Sharpe method has a value of 1.6443. Meanwhile, the optimal portfolio performance measurement results using the Treynor method is 0.0912. Meanwhile, the results of the Jensen method measurement amounted to 0.0503.

- Among the three optimal portfolios that have been formed, the optimal portfolio in the period before the crisis is the optimal portfolio that has the best performance than the optimal portfolio of the crisis period and after the crisis. This condition is proven by the Sharpe and Jensen index values in the optimal portfolio before the crisis shows a value of 7, 7370 (Sharpe) and 0, 0787 (Jensen). This value is the highest among other portfolio index values. The optimal portfolio after the crisis has the best performance based on the Treynor method with an index value of 0.0912 followed by the optimal portfolio before the crisis of 0.0726 and finally the optimal portfolio of the crisis period of 0.0695. The optimal portfolio of crisis periods has the lowest performance compared to other optimal portfolios because of the three performance measuring instruments provide a smaller index value compared to other portfolios.
- Hypothesis testing that has been done shows that there is no significant difference in the measurement of optimal portfolio performance in the period before, during and after the 2008 global crisis using the Sharpe, Treynor, and Jensen methods.

#### B. *Suggestions*

- If Investors prefer beta (sensitivity of security returns to market returns) as a measure of risk, the Treynor method is more suitable for measuring the performance of a portfolio. However, if investors prefer the difference between expected returns and actual returns, the Sharpe method is more suitable for measuring

optimal portfolio performance. Likewise, if investors consider the difference between portfolio risk premium and market risk premium, the performance measurement using the Jensen method is more appropriate to be used in measuring optimal portfolio performance.

- Future studies when taking the same research focus are expected to use methods other than the single index model in optimal portfolio formation. Models that can be used include Markowitz portfolio models and or constant correlation models.

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