



Investment Decision Making: The System Performance of the Portfolio of Shares on Index Business 27 (2017-2018) using the Model of Constant Correlation

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ABSTRACT

Share capital market industry now is growing rapidly and significant value of their transactions reach hundreds of trillion rupiah with the risk can virtually so small that this is an opportunity to invest. But although have a small risk in investing needed a strategy or the right method to reduce a risk that will happen. One model that will be used to know the system performance of the portfolio is to use the model of constant correlation on business index 27th. This research is done with the period of 2 years i.e. early 2017 until the end of the year 2018 with stock data into Business index 27th. From the period of the research during 2 this year in the index heading 27th selected all shares are numbered 27 share. The results from the model of constant correlation on 27th Business Index is as follows: BBKA (44.76%), AKRA (35.91%), PTBA (12.10%) and BDMN (7.23%). Portfolio return (ERP) 27th Business index of 0.079917153, portfolios risk (σ) bisnis 27th of 0.03149347. The results of the measurement of the performance of the portfolio using sharpe index of 0.123296087, 0.007067026 Treynor index of index and Jansen of 0.0069643. The results of the analysis show that the performance of the portfolio of shares of Business index 27th better, but the level of portfolio volatility index shares Busines 27th vulnerable to changes in the market.

Keywords: Information System, Stock Portfolio Performance, Decession Support System

JEL Classifications: M4, M40

1. INTRODUCTION

The development of the investment stock trading shows the increasing number of the end of the year 2018 27th Business Index fell 9.66% (ytd) along with the decline that occurred in the market as a result of the dominance of negative sentiment external pressure. As comparison, IHSG also experienced corrections in the year to date of 8.18%, including the drop occurred on some other index. Investors expect the maximum return positive or from investment funds to invest because of the return there must be a risk of investment so that the risk of the most sought for at least. Return and risk have positive relationships the greater risk taken will be the greater return that must be compensated upon.

To get a maximum return and minimal risk that he made the optimal shares portfolio portfolio forms can be created by combining securities risk that can be reduced single. In this research take stock data Business 27th 2017-2018 Index during the period of 2 years i.e. from January 2017 until December 2018 using the method of constant correlation model (CCM).

After formed optimal portfolio then continued with the analysis of the portfolio return and risk portfolios and portfolio performance using methods Jensen, Sharpe and Treynor. From the three methods can search for return the higher the risk that smaller sehingga known the best performance and become the recommendations of the elect to invest.

Previous research 2015 that has been done by, Pratiwi and Yunita is comparison of the formation of portfolios with the single index model and CCM on the LQ 45 period of 2010-2015. By sharing the risk it said the method Sharpe, Treynor and Jensen in doing performance measurements. Kesmpulannya is the formation of portfolios with the single index model produces 6 shares into the optimal portfolio namely JSMR (32.17%), REQUIREMENT (30.84%), TLKM (18.17%), UNVR (14.30%), ASII (94.26%) and GGRM (0.26%) while the formation of the optimal portfolio with CCM produces a number of eight fruit of the shares into the optimal portfolio namely REQUIREMENT (32.24%), JSMR (29.49%), ASII (9.85%), TLKM (7.78%), UNVR (6.49%), BBNI (4.51%), BBKA (5.97%) and BBRI (3.67%).

Previous research the year 2008 which has never been done by Research Umanto Eko with the title: "Analysis and assessment of the performance of the Optimal Portfolio Shares The LQ45" that designing a simulation optimal portfolio of stocks likuid LQ-45 in BEI years 2002-2007 using a single index method and constant correlation. The results of the study showed that the optimal portfolio which is formed by using the single index and constant correlation recommends that investors allocate funds on its biggest share TLKM, and optimal portfolio is formed by the method of constant correlation to have better performance.

This research and Rifaldy and Sedana (2016) with the title of the Business Index Stock Portfolio Optimization 27th in Indonesia Stock Exchange, this research uses the Markowitz model approach. conclusion from this research is the stocks that fit into the optimal portfolio with Markowitz Model approach is as much as 5 shares from 27 shares Business Index 27 period May 2015 of October 2015 and the proportion of shares as follows AKRA (55.1%), ICBP (2.4%), LPKR (15.06%), SCMA (21.3%) and MNCN (5.06%). A variety of test results to the formation of optimal portfolio and the performance of the index that different encourage researchers to test the formation of optimal portfolio and the performance of the share index in Indonesia Stock Exchange. The research that has been done is a comparison between the stock index sharia shares such as ISSI, JII and conventional shares in Indonesia Stock Exchange Composite Index index, LQ45, Kompas index100 index and Sri Kehati as Comparison and testing of one stock index with two poaching the formation of portfolios.

Research Nugroho (2017) with the title of the system of investment Decision making through analysys of stock portfolio performance based single index models (Comparison study of shari'a write and write arguments cogently). The performance comparison of the stock Portfolio show screened JII shari'a write have a portfolio rate of return of 0.01831 (1.831%) higher than IDX30 arguments cogently stock of 0.01594 (1.594%). While the portfolio rate of risk of JII shari'a write amounted to 0.00599 (0.599%) bothered lower than the arguments cogently stock IDX30 of 0.00849 (0.849%). The performance of the stock portfolio based on Sharpe index values for JII shari'a write amounted to 0.17407 higher than IDX30 arguments cogently stock at 0.12054. Treynor index values in JII shari'a stock at 0.00753 higher than IDX30 arguments cogently stock at 0.00719. While Jensen index value JII shari'a write of 0.01909 also higher than IDX30 write arguments cogently at

0.01595. The results of this analysis indicate that the portfolio performance of JII shari'a write is better than the IDX30 arguments cogently stock.

New in this research is to seek the optimal investment decision stock index in Indonesia Stock Exchange i.e. stocks Business Index 27 during the last 2 years (2017-2018) by the method of CCM to form the optimal portfolio and measure the performance of the optimal shares portfolio formed from each index with Sharpe method, Treynor and Jensen.

2. GENERATION OF THE DATA

2.1. Financial Management

The main purpose of Financial Management is to maximize the value of the wealth which means increases the value of the company which is the size of the value of the objective by the public and orientasi on the survival of the company. The value of wealth can be seen through the development of the share price (common stock) companies in emerging markets. (Harmono, 2011. p. 1).

2.2. Capital Market and Share

The Capital Market (CapitalMarket) is the market various long-term financial instrument that can be traded both in the form of debt share, derivatives instruments and others. The capital market is a means of financing for companies and other institutions (e.g. government) and means for investing activities. Thus the capital market facilitates a variety of infrastructure and buying and selling activities and other related activities (Darmadji and Fakhruddin, 2006).

In the capital market investors in order to get the right information and accurate information system is required. The system can provide information with the needs of users in the case of the quality of the measurement of the financial information must meet the following requirements: Accurate, relevant and on time. (Nugroho, 2015).

Share is bonds that shows ownership of the company so that the shareholders have the right claims on the dividend or other distribution is done by the company to other shareholders. "Share is a piece of paper that shows the rights of investors (namely parties who have paper) to obtain part of the prospect or the wealth of the organization that issued the securities and various conditions that allow the investors run their rights." The Share is one of the few alternatives that can be chosen to invest. (Husnan, 2015. p. 29).

Share price index is a number that is used to compare the stock price changes from time to time. What is a share price decline or increase compared with a certain time? Stock Index is used for the purpose of the analysis and avoid negative impacts from the use of share price in rupiah (Samsul, 2006. p. 179).

2.3. Index Business 27

PT Indonesia Stock Exchange working with Indonesia launched a business daily share price index is given the name of the Index business 27. As an independent party, Harian Bisnis Indonesia can

manage this index is more independent and flexible, where the selection of the index constituents based on the performance of the Issuer with a fundamental selection criteria, historical transaction data (technical) and accountability. The index is expected to become one of the market trend indicator that can help for investors to take a decision to buy, secure or sell some stocks in investing in the capital market in Indonesia.

2.4. Investment Decision

The investment is a fixed assets used by the company for the growth of wealth through the distribution of the return of investment as interest income, royalty, dividends, rent income and others - others), to an appreciation of the value of investment, or to other benefits for companies that invest, such as the benefits obtained through trade relations (Simamora, 2000. p. 438).

2.5. Return

The main purpose of investors in investing is to gain maximum return. Return is one of the factors that motivates investors in investing and is also the rewards courage investors to bear the risk on investment that he did. The source of the return of investment consists of two main components, namely yield and capital gains (losses). Yield is a component of the return that reflects the cash flow obtained periodically from an investment. In the investment in mortgage bonds, yields obtained in the form of bonds interest paid. On the stock securities, yield indicated by the price of Securities Dividends value obtained. While the capital gain (loss) is a change in the price of Securities shown through increase or decrease the price of a bonds that can provide benefits or loss for investors (Tandelilin, 2001. p. 47-48).

2.6. Risk

In the management of Investment Risk is the amount of the deviation between the expected rate of return (was much bigger return) with the current rate of return (actual return). The larger the deviation may mean the greater His risk level. When the risk is stated as to how far the results obtained can deviate from the expected results, then used the size of dispersion. The appliance statistics that is used as the size of the spread is varians or Standard deviation. The larger the value, means the greater the deviation may (Risk the higher) (Halim, 2015. p. 49).

2.7. Optimal Portfolio

Optimal portfolio according to Tandelilin (2010. p. 157) is the selected portfolio investors from the many options on the efficient portfolio. The selected portfolio investors is a portfolio in accordance with the corresponding investor preferences to return and the risk that willing to illnesses. According to the Gitman (2009. p. 241) efficient portfolio is a portfolio of screened Mutlifunction Building return for given the level of risk or minimize risk for a given level of return. While Jogyanto (2010. p. 309). Mention that the efficient portfolio is a portfolio that has a maximum return with certain risk level or who have a minimum risk with certain level return.

2.8. CCM

The CCM has the assumption that the correlation coefficient between the couple shares is a constant, so that the value of the

correlation coefficient is the average of the value of the correlation coefficient the shares into the optimal portfolio (Elton et al., 2009. p. 195). This Model does not allow short-selling. Short-selling means sell shares not owned (Zubir, 2011:125). Correlation coefficient is a statistical measure that shows the movement of the same time relatively (relative comovements) between the two variables (Tandelilin, 2010. p. 117).

2.9. Performance Measurements Shares Portfolio

The purpose of assessment of the performance of the portfolio is to know and Analysis whether portfolios that formed has been able to increase the possibility of achieving the purpose of investasi. Thus the can be known which portfolio have a better kinerja if reviewed from the return and risk each portfolios. Then can be done revisiterhadap shares forming the portfolios if deemed tidaksesuai with investor risk preferences. (Halim, 2015. p. 69). The assumption that usually risk averse investors also make it said the risk-returns the relevant parameters for comparison. That is often used in the measurement of the risk of it said the return is the Treynor Index, Sharpe Index, and JensenIndex (Achsien, 2003. p. 101).

3. RESULTS

3.1. Research Design

The research done by the way as follows, the first step is to qualify the shares which consistently from 2 January 2017 and 31 December 2018 on Business Index 27th. From the data is going to share data is selected and processed more information. The second step is to collect data that is required in research is data the share price go in natural selection, The Composite Stock Price Index data (IHSG), data rate by Bank Indonesia Certificates (SBI) start date of 2 January 2017 until December 31 2018. The third step after the data obtained then carried out a data analysis Business index 27 to form the optimal portfolio. The formation of the optimal portfolio is done by using the Model method constant correlation. In the Model method constant correlation there are several procedures that home is three procedures that must be passed in the formation of optimal portfolio namely with how to calculate Excess Return to Standard deviation, continued to do next shares perangkaan specifies a constant correlation between stock using the method of cut-off rate (C^*) and the last is the determination of the optimal weight between share. Excess Return to Standard deviation is the excess return relative to one unit of risk cannot be in locale measured using Standard deviation. The ratio of the excess Return to Standard deviation (ERS) shows the relationship between the two determining factors in the investment return and risk. Then the shares are sorted from the highest value to the lowest value, shares that have values ERS negative will be issued from candidates and unbiased information to the next process. The optimal portfolio will be filled with stocks has value ERS high, so that shares that have the value of the ratio of the ERS low cannot be plugged in the optimal portfolio, it is done by cutting or trimming using the value of the Cut - off rate. In determining the value of the cut-off rate required the value of C_i in the optimal portfolio can be done the value of $C_i \leq ERS$ or where value ERS last larger with the value of C_i . That does not meet the persaratan shares

will be deleted. The next step is to perform an analysis of the performance of the portfolio using the Sharpe method, treynor and Jensen. After the known performance then can be taken taken a conclusion form the most optimal portfolio.

3.2. The Population and Sample

The population and sample in this research is all the shares listed on the IDX or indonesia stock exchange grouped on the group shares Business Index-27 which numbered 27 eminten in every period for 2 years i.e. 2017 until 2018 (Table 1).

3.3. The Subject and Research Period

Research subjects include shares-shares that have been registered on the Indonesia Stock Exchange (BEI) and shares-shares into the 27th Business Index in a period of 2 years i.e. since January 2017 until December 2018.

3.4. Data Analysis the Formation of Optimal Shares Portfolio

Data analysis to determine the optimum shares portfolio is done by using the CCM. While the calculations done using Excel program.

Data Analysis Techniques in more detail is described as follows:

1. Select the shares that will be involved in the portfolio.

At this stage is done selection of some samples of the shares based on Business index 27 to be involved in the formulation of the optimal Shares portfolio. The stages are as follows:

 - a. Register the shares including into Business Index 27 during the period 2017-2018.
 - b. Of all the shares of the incoming Business index 27, then done screening where the shares as candidates for the

Table 1: Population and sample

No.	Code	Name of issuers	IB-27
1.	AALI	PT Astra Agro Lestari Tbk	√
2.	ADRO	PT Adaro Energy Tbk	√
3.	AKRA	PT AKR Corporindo Tbk	√
4.	ASII	PT Astra International Tbk	√
5.	BBCA	PT Bank Central Asia Tbk	√
6.	BBNI	PT Bank Negara Indonesia Persero Tbk	√
7.	BBRI	PT Bank Rakyat Indonesia Persero Tbk	√
8.	BDMN	PT Bank Danamon Indonesia Tbk	√
9.	BMRI	PT Bank Mandiri Persero Tbk	√
10.	BRPT	PT Barito Pacific Tbk	√
11.	BSDE	PT Bumi Serpong Damai Tbk	√
12.	CPIN	PT Charoen Pokphand Indonesia Tbk	√
13.	HMSP	PT Hanjaya Mandala Sampoerna Tbk	√
14.	ICBP	PT Indofood CBP Sukses Makmur Tbk	√
15.	INDF	PT Indofood Sukses Makmur Tbk	√
16.	INKP	PT Indah Kiat Pulp & Paper Corp Tbk	√
17.	INTP	PT Indocement Tunggul Prakarsa Tbk	√
18.	MYOR	PT Mayora Indah Tbk.	√
19.	PGAS	PT Perusahaan Gas Negara Persero Tbk	√
20.	PTBA	PT Bukit Asam Tbk	√
21.	PWON	PT Pakuwon Jati Tbk.	√
22.	SCMA	PT Surya Citra Media Tbk	√
23.	SMBR	PT Semen Baturaja Persero Tbk	√
24.	SMGR	PT Semen Indonesia Persero Tbk	√
25.	TLKM	PT Telekomunikasi Indonesia Persero Tbk	√
26.	TPIA	PT Chandra Asri Petrochemical Tbk	√
27.	UNTR	PT United Tractors Tbk	√

Source: BEI

portfolio is the shares during the period of observation into the Business Index 27 in a row.

2. Arrange the optimal portfolio Model method with Constant Correlation.

In the draft Portopolio procedures that must be done to establish an optimal portfolio using the method of CCM is as follows:

- a. Determine the description of the data is data share prices, data IHSB and data SBI.
 - b. Count was much bigger return, variants and standard deviation of individual stocks, IHSB and SBI.
- i. Calculating Return realization of each share.

$$R_i = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Description:

R_i = Return the shares to i

P_t = share price period to t

P_{t-1} = The price of shares in the period to $t-1$.

The calculation of the return of each stock above using stock price data monthly, namely the price closing price at the end of every month during the period of research done. Return the shares above is a total return due to calculate the elements of the difference in the share price and dividends.

- ii. Count was much bigger return each shares

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

Description:

$E(R_i)$ = Was much bigger return the shares to i

N = The number of analysis unit.

Was much bigger return generally calculated based on historical data using the average method, namely Add R_i during the period of the analysis and divided by the number of the period of analysis.

In forming the optimal portfolio shares have $E(R_i) > 0$ will be included in the next analysis, while shares have $E(R_i) < 0$ will dibagikan, because based on the assumption that investors will be a rational person with did not choose to share that does not provide the benefits.

- iii. Calculate the market return and was much bigger market return.

$$R_m = \frac{IHSB_t - IHSB_{t-1}}{IHSB_{t-1}}$$

The calculation was much bigger market return data using the Composite Stock Price Index (IHSB) from Indonesia Stock Exchange taken with the close price marks the end of the month during the period of research namely start Januari 2017 until December 2018, generally use the average method, namely the total market return during the years of the analysis divided by the number of N analysis unit (monthly).

$$E(R_m) = \frac{\sum R_m}{N}$$

Description:

R_m = The level of market monthly return

$IHSG_t$ = IHSG at period t

$IHSG_{t-1}$ = IHSG at period $t-1$

$E(R_m)$ = Was much bigger market return

N = The number of the Unit.

iv. Calculating return risk free assets (R_f)

Return on risk free assets generally refers to the interest rate on the Bank Indonesia Certificates (SBI) monthly during the period of analysis. SBI is considered as a risk-free asset because it is a short term investment instrument is guaranteed payment by the state (Bank Indonesia). The value R_f is calculated from the average rate SBI during the period of analysis.

3. Calculate the value of the excess return to standard (ERS) individual stocks.

$$ERS = \frac{(\bar{R}_i - R_f)}{\sigma_i}$$

Description:

ERS = Excess return to standard deviation

R_i = Was much bigger return shares i

R_f = Risk free return

σ_i = Standard deviation shares to -1 .

4. The value of the ERS produced are sorted from the largest to the smallest.

5. Calculate the value of C_i .
Calculate cut-off rate (C_i)

$$C_i = \frac{\rho}{1 - \rho + i\rho} \sum_{j=1}^i \frac{(\bar{R}_i - R_f)}{\sigma_i}$$

Where:

$$\hat{\rho} = \frac{2}{(N-1)N} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij}$$

Description:

ρ = Correlation coefficient (assumed constant for all securities) ρ

C_i = Covarian shares to -1

R_f = risk free

R_j = return the shares to the j

σ_j = Standard deviation shares to the j .

6. Determine C^*

The greatness of C^* is the value of C_i to search with ERS deals still greater or equal to C_i

The purpose of the determination of the C^* is to separate the shares will go and that will be issued from the optimal portfolio. From the determination of the C^* is by observing the values of C_i and the values of the ERS for each share. If the values of the ERS greater and with the value of C_p , the shares into the optimal portfolio, instead if the values of the ERS is smaller than the value of C_p , then the shares are not included

in the optimal portfolio, or can be written (Elton and Gruber, 2003. p. 186):

The value of the cut off point (C^*) is the value of C_i where value ERS last time is still greater than the value of C_i . Shares in forming the optimal portfolio is the stock which has a value of ERS greater or equal to the value of the ERS in the point C^* .

- Specify the shares become candidates for optimal portfolio.
 $E(R_i) - R_f / \sigma_i$ consecutive patients C^* : Stocks into the optimal portfolio,
 $E(R_i) - R_f / \sigma_i \leq C^*$: stocks out of the optimal portfolio.

Share candidates forming the optimal portfolio is the stock which has a value of ERS greater or equal to the value of the ERS in the point C^* .

8. Calculate the proportion of the fund that will be invested in the optimal portfolio.

$$X_i = \frac{Z}{\sum_{j=1}^N Z_j}$$

$$Z_i = \frac{1}{(1 - \rho)\sigma_i} \left[\frac{\bar{R}_i - R_f}{\sigma_i} - C^* \right]$$

Description:

X_i = Proportion to every share i chosen

Z_i = Investment relative to each share.

3.5. Data Analysis of the Return and Risk of Stock Portfolio

Data analysis to calculate the level of return and risk of the optimal shares portfolio that has formed:

1. Calculate the level return portfolios optimal shares the index heading 27th.

Portfolio Return was much bigger calculated with equation as follows:

$$R_p = \sum_{i=1}^N X_i (R_i - R_f) + R_f$$

The value of X_i is the proportion of funds in invest in the portfolio that has been calculated during the formulation of the optimal portfolio. While ER_i is was much bigger return individual stocks also has been calculated at the time of the arrangement of the optimal portfolio

2. Calculate the risk level optimal shares portfolio Business Index 27th Risk Portfolios (σ_p) calculated with equation as follows:

$$\sigma_p = \sqrt{\sum_{i=1}^N X_i^2 \sigma_i^2 + \sum_{i=1}^N \sum_{j=1, j \neq i}^N X_i X_j \sigma_{i,j}}$$

Description:

$\Sigma P2$ = Variants portfolio

= Kovarian σ_{ij} between i and j

= Kovarian σ_i shares i ($i = 1.2$ this.... $i \neq j$)

X_i = The proportion of funds to the securities i

X_j = The proportion of funds to the securities by j .

3.6. Analysis of the Performance of the Optimal Shares Portfolio Investment

To know the performance of the optimal shares portfolio then done analysis of the optimal shares portfolio performance with the following steps,

1. Measure the performance of the optimal shares portfolio investment on Business Index 27th using Sharpe Index
Measure the performance of the optimal portfolio investment with Sharpe index (Reward To Variability/RVAR) is with common as follows:

$$S_{pi} = \frac{ER_{pi} - ER_f}{SD_{pi}}$$

Description:

The S_{pi} = Portfolio sharpe index

ER_{pi} = The average portfolio return

ER_f = The average return free Risk

SD_{pi} = Staandar deviation portfolio.

Basically the formula of this index measuring the slope of (-) line that connect the portfolio with the Risk Free interest rate risk, stated with $(ER_{pi} - ER_f) / SD_{pi}$. Thus, the greater the level of tilt the greater the value of the index Sharpe, then the better performance of portofolionya (Halim, 2015. p. 70).

2. Calculating the optimal shares portfolio investment performance on Business Index 27th and IDX30 with Treynor Index
Treynor index (Reward To Volatility/RVOL)

$$Places = \frac{ER_{pi} - ER_f}{\beta_p}$$

Description:

Places = Portfolio Treynor Index

ER_{pi} = The average portfolio return

ER_f = The average return free Risk

β_{pi} = Beta portfolios.

Beta portfolios (β_p) show the level of volatility in the portfolio to market. If the value of the positive Treynor index and the greater the performance of the portfolio of the better (Taureh, 2013. p. 1444-1457).

3. Calculating the optimal shares portfolio investment performance on Business index 27th and IDX30 with Jensen Index
Calculate the Index Jensen

$$J_{pi} = (ER_{pi} - ER_f) - (ER_m - ER_f) \beta_{pi}$$

Description:

J_{pi} = The index Jensen portfolio

ER_{pi} = The average portfolio return

ER_m = The average return the market

ER_f = The average return free risk

β_{pi} = Beta portfolios.

4. THE RESEARCH RESULTS AND DISCUSSION

Research In the sample selected from the shares that have good kinerja and stable. The indicator used in this election was the shares were recorded continuously in business index 27th during 2 years period of the year 2017-2018. Selected 27 shares from business 27th namely AALI, ADRO, AKRA, ASII, (BBCA, BBNI, BBRI, BDMN, BMRI, BRPT, BSDE, CPIN, HMSP, ICBP, (INDF, INKP, INTP, MYOR, PGAS, PTBA, PWON, SCMA, SMBR, SMGR, TLKM, TPIA and UNTR.

4.1. Expcted Return Market (ERM)

The Data return market (Rm) and was much bigger return market (ERm) required as raw materials for the formation of the calculation of the optimal portfolio using the CCM and assessment of the performance of the shares then served with a recapitulation of the Composite Stock Price Index from the closure of January 2017 until with the closure of the month of December 2018. From the results if the data during the period of research obtained the result was much bigger value return the market (ERm) of 0,021807032 with standard deviation (σ) of 0,076526638 and variant (σ^2) of 0,005856326

4.2. Risk Free Asset (Rf)

The value of the risk free asset (risk free assets assumed from the value of the interest Sertifikat Bank Indonesia (SBI), to know gave suggestion return free risk (R) can be obtained based on the level of interest rates SBI. After taken data from the value of the interest SBI and done the calculation then obtained nila the average risk free assets (Rf) of 0.021746309 or 2.1746309% monthly *f*.

4.3. Return and Risk of the Individual Shares

The determination of the level of return of individual shares is calculated based on the change in closing price of each stock each month. Furthermore the value of monthly stock return is used to calculate the level of return expectations and risk of individual stocks.

From the data on the table above can be known shares Business index 27th which have positive return, follows a row based on ranked return is (BBCA, AKRA, PTBA, BDMN, PWON, BSDE, INTP, UNTR, PGAS, BMRI, TPIA, (INDF and HMSP. While the shares of business index 27th that return-him negative is share ICBP, BBRI, AALI, SCMA, TLKM, SMBR, BBNI, INKP, MYOR, BRPT, ASII, SMGR, ADRO and CPIN. The shares have return positive expectations is a proper shares as a means of investment.

4.4. Optimal Shares Portfolio Pembentukan

4.4.1. Exces return to satandard deviation (ERS) share index IB 27th

From the rating based on the sequence of the greatness of the value of the ratio of the ERS and can be known to the value of the highest ERS is (BBCA of 0.540874484 and value ERS low is the HMSP of 0.039304281, while the sequence of the stages of the shares is as follows (BBCA, AKRA, PTBA, BDMN, PWON,

Table 2: Stock rating business index 27 based on the value of the ERS

No.	The issuer	$E(R_i)$	$E(R_i) - R_f$	Σi	$\frac{E(R_i) - R_f}{\sigma_i}$ (ERS)	Rank
5	BBCA	-0.02478	0.027973584	0.051719	0.540874484	1
3	AKRA	-0.09822	0.108996533	0.214698	0.507674493	2
20	PTBA	-0.07336	0.090620299	0.20896	0.433673977	3
8	BDMN	-0.03171	0.02608458	0.077381	0.337093734	4
21	PWON	-0.06016	0.125926554	0.389461	0.323335499	5
11	BSDE	-0.03067	0.086166516	0.286506	0.300749192	6
17	INTP	-0.02317	0.027339593	0.097634	0.280020647	7
27	UNTR	-0.00484	0.004169686	0.021715	0.192022568	8
19	PGAS	-0.01768	0.049016977	0.302391	0.16209821	9
9	BMRI	-0.00087	0.01870172	0.117976	0.158521594	10
26	TPIA	0.004922	0.005667956	0.072527	0.078149174	11
15	INDF	0.000796	0.004304809	0.061781	0.069678038	12
13	HMSP	0.017153	0.012034562	0.30619	0.039304281	13
14	ICBP	0.000656	-0.00040234	0.101574	-0.003961017	14
7	BBRI	0.057673	-0.01169117	0.374839	-0.031189833	15
1	AALI	0.008421	-0.00581632	0.094356	-0.06164244	16
22	SCMA	0.072227	-0.02341519	0.279205	-0.083863897	17
25	TLKM	0.033732	-0.02127946	0.219984	-0.096731976	18
23	SMBR	0.004783	-0.01162606	0.111992	-0.103811195	19
6	BBNI	0.031564	-0.01302347	0.076942	-0.169264341	20
16	INKP	0.03813	-0.02651734	0.097197	-0.272821855	21
18	MYOR	0.074978	-0.04788344	0.163574	-0.292733175	22
10	BRPT	0.070075	-0.04779576	0.1624	-0.294309061	23
4	ASII	0.03867	-0.0416492	0.11407	-0.365121072	24
24	SMGR	0.049949	-0.04107288	0.110923	-0.370283231	25
2	ADRO	0.310329	-0.22024351	0.479251	-0.459557924	26
12	CPIN	0.140186	-0.13591444	0.21742	-0.62512394	27

Source: The attachment data (processed)

Table 3: Values C_i business index 27

No.	Share	ERS	$P/(1-\rho+i\rho)$	$\Sigma E(R_i) - R_f / \sigma_i$	C_i	Ket.
1	BBCA	0.54087	202.20563	0.00914	0.540861	Enter
2	AKRA	0.50767	11.01363	0.17885	0.503523	Enter
3	PTBA	0.43367	9.93205	0.23217	0.429322	Enter
4	BDMN	0.33709	56.29688	0.05269	0.336987	Enter
5	PWON	0.32334	2.13170	1.45085	0.365015	Out
6	BSDE	0.30075	3.66384	0.90753	0.379898	Out
7	INTP	0.28002	29.37555	0.12157	0.379697	Out
8	UNTR	0.19202	407.23980	0.01279	0.292021	Out
9	PGAS	0.16210	1.77273	3.48001	0.222968	Out
10	BMRI	0.15852	11.38944	0.55387	0.257309	Out
11	TPIA	0.07815	14.85663	0.86130	0.177797	Out
12	INDF	0.06968	18.25492	0.78618	0.16947	Out
13	HMSP	0.03930	0.41924	60.68776	0.105875	Out

Source: Attachments (processed)

BSDE, INTP, UNTR, PGAS, BMRI, TPIA, (INDF and HMSP (Table 2). The sequence of stages berdasarkan ERS value required in the calculation of the value of cut- off rate (C_i) and the value of cut- oof point (C^*) to get the value of ERS that most of the selection of the shares into the optimal portfolio share. Shares of which has a value of the ratio of the ERS negative issued from candidates for the optimal portfolio so that each on Business Index 27 remaining 13 shares that have the value of the ratio of the ERS positive. The ratings are required to be able to calculate the cut-off rate (C_i).

4.4.2. Calculate the value of the cut-off rate (C_i) and determine the value of the cut-off point (C^*)

The next step is to calculate the cut-off rate (C_i) is calculated by using the value of the constant korelsi where before searching C_i first nharus search for the value of the constant correlation (ρ).

After the value of the constant correlation (ρ) is obtained then the next step is to calculate the C_i . The calculation of the required basic mentukan pointless to cut oof point (C^*) made restrictions on the shares in the optimal portfolio.

By entering the data that is present on the previous reckoning didapatkhasil result calculation of the value of C_i from each of the index is as follows. On Business index value C_i can be rendered 27 on the Table 3.

The next step is to determine the amount of the value of the cut off point (C^*) where the greatness of the value of the cut off point is the value of the largest C_i where value ERS still greater than C_i namely 0.540861 on Business Index 27. Shares in forming the optimal portfolio is the shares have ERS greater or equal with ERS

at the point C^* . Furthermore done comparison shares-shares that have values ERS positive dinadingkan with C^* , ERS that have a greater value from C^* on each stock index is, for Business Index 27 there are four stocks as stocks in the optimal portfolio namely (BBCA, AKRA, PTBA and BDMN).

4.4.3. Optimal stock portfolio and the proportion of shares

Share-shares to enter the optimal portfolio on each of the index has been determined, on Business index 27th four stocks namely (BBCA, AKRA, PTBA and BDMN). The next step is to determine the proportion of funds to be invested in each of the shares so acquired portfolio return and risk of the optimal portfolio. The greatness of the proportion can be seen as the table below: The proportion of optimal portfolio shares in the index heading -27 is as follows:

The Table 4 shows the proportion of shares on the optimal portfolio for Business Index 27th consists of four stocks namely (BBCA with the proportion of shares 44.76%, AKRA with the proportion of shares 35.91%, PTBA with the proportion of shares 12.10% and BDMN with the proportion of shares 7.23%).

4.5. Analysis of Portfolio Return and Risk of the Portfolio

The formation of optimal portfolio which is used to maximize return and minimize the risk and it will be done by the establishment of an optimal portfolio using the method of CCM as has been done. After formed optimal portfolio and the proportion of the shares

Table 4: Proportion portfolio shares business index 27th

No.	The issuer	$E(R_i) - R_f / \sigma_i$	$1 / (1 - \rho) * \sigma_i$	Z_i	X_i (%)
1	BBCA	0.54087	67.162719	8.013971	44.76
2	AKRA	0.50767	89.897982	6.429820	35.91
3	PTBA	0.43367	38.376400	2.166415	12.10
4	BDMN	0.33709	65.864348	1.295458	7.23
				17.905664	100.00

Source: Attachments (processed)

Table 5: Return portfolios business index 27th

No.	The issuer	$E(R_i)$	R_f	X_i	$X_i * E(R_i) - R_f$
1	BBCA	0.0446405	0.0000451	0.1937072	0.0195417
2	AKRA	0.0429679	0.0000316	0.1063289	0.0125491
3	PTBA	0.0646610	0.0000633	0.0405825	0.0121431
4	BDMN	0.0391584	0.0000287	0.0229687	0.0089334
				The total	0.0531673
				R_f	0.026752041
				$E(R_p)$	0.079917153

Source: Attachments (Mixed)

Table 6: Risk business shares portfolio 27th

No.	The issuer	X_i	ΣZ_i	$X_i^2 \Sigma Z_i$	$\Sigma \Sigma X_i X_j \sigma_i \sigma_j$
1	BBCA	0.1937072	0.00125339	0.00004703	0.00037146
2	AKRA	0.1063289	0.000845798	0.00000956	0.00024515
3	PTBA	0.0405825	0.004362505	0.00000718	0.00022265
4	BDMN	0.0229687	0.001523044	0.00000080	0.00008800
			The number of	0.00006458	0.00092726

Source: Attachments (processed)

of the Business index 27 then carried out the calculation of the return and the risk of the portfolio.

4.5.1 Analysis of the optimal shares portfolio return

To know the value of the portfolio return was much bigger stake in the Business index 27th, then carried out the calculation of the optimal shares portfolio return result can be presented on the table as its-the Table 5.

From the table above can be seen the calculation was much bigger return portfolios (ERp) Index portfolio is 0.079917153 Bisnsis 27th.

4.5.2. Optimal shares portfolio risk analysis

In addition to be known the value of the return in the portfolio investment decisions must also known the value of the risk of portfolio to know the greatness of the risk of the portfolio of each stock index and done the calculation of the risk of the portfolio on the Table 6 as follows:

$$\begin{aligned} \Sigma 2p &= X_i^2 \sigma_i^2 + \Sigma \Sigma X_i X_j \sigma_i \sigma_j \\ &= 0.00099184 \\ \Sigma p &= 0.03149347 \end{aligned}$$

The risk of a portfolio of Business Index 27th is 0.03149347.

4.6. Optimal Performance

The data used in this research is the historical data so that there is no certainty that can be said that the stock performance is good in the past will ensure the same thing for the next period, but at least can be seen in the level of long term consistency of the performance of an investment fund shares that occurred in the past that can be used as a guide in seeing the potential of an investment fund in the future. Stock Performance assessment conducted through the index method, Sharpe and Treynor Index Jensen Index.

Sharpe index (RVAR) is the size of the portfolio performance based on the excess return shares in the portfolio of interest rate risk free assets compared to the standard deviation of return portofolionya. Treynor index (RVOL) measure the performance of the portfolio based on the excess return shares in the portfolio of interest rate risk free assets compared to beta portfolios that shows the volatility of portfolio return market. While the index Jensen is the size of the portfolio performance based on the excess return and portfolio against market risk free assets. The value of the index Sharpe, Treynor and Jensen from the portfolio shares Business Index 27th and the index IDX30 presented in the following Table 7.

Table 7: Values sharpe index, Treynor and Jensen

No.	Assessment method	27 th business
1	Sharpe index	0.199241
2	Treynor index	0.01142
3	Jansen index	0.011254

Source: Attachments (Processed)

From the table above shows the performance of the Business index stock portfolio 27th based on the index method, Treynor and sharpe Index method Index method Jansen. The results of the analysis of the value of the index, Sharpe and Treynor Index jansen portfolio performance Business Index 27th is sequentially 0.199241, 0.01142 and 0.011254.

5. CONCLUSION

The formation of optimal portfolio using the method of Constant Correlation in Model Business Index 27th 2017-2018 period there are four stocks as stocks in the optimal portfolio namely BBCA with the proportion of shares 44.76%, AKRA with the proportion of shares 35.91%, PTBA with the proportion of shares 12.10% and BDMN with the proportion of shares 7,23%.

Analysis of return and the risk of the portfolio shows the level of ekpektasi return portfolio on 27th Business namely 0.03149347 and analysis of the value of the index, Sharpe and Treynor index jansen portfolio performance Business index 27th is sequentially 0.199241, 0.01142 and 0.011254.

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