# JIMFE - Santosa

*by* JIMFE (Jurnal Ilmiah Manajemen Fakultas Ekonomi)

**Guarantee Portfolio Analysis**

Santosa[1], Noer Azam Achsani[2], Hendro Sasongko[3]
[1, 2, 3] School of Business, IPB University, Bogor 16151, Indonesia
Email: santosa_88@yahoo.com

Abstract

This study aims to analyze the performance of guarantees in the guarantee portfolio of PT Penjaminan ABC, which consists of custom bonds, counter bank guarantees, surety bonds, multi-use financing guarantees, general financing guarantees, construction financing guarantees, micro financing guarantees, and other guarantees. Testing of guarantee performance is carried out by the Sharpe ratio, Treynor ratio, and alpha Jensen methods.

This study also aims to optimize the guarantee portfolio. The method used in forming the optimal guarantee portfolio is the Markowitz method and the single index model method.

The calculation results of guarantee performance with Sharpe ratio show that all guarantee products are underperformed, which means their performance is below market performance. While using the Treynor ratio method, the results show that five guarantee products are in an outperformed condition, namely the construction financing guarantee, the general financing guarantee, micro financing guarantee, multi-use financing guarantee, and other guarantees. Whereas three other guarantee products are underperformed, namely custom bond, counter bank guarantee, and surety bond. Meanwhile, using the alpha Jensen method, shows that all guarantee products have suboptimal performance. This is in line with the calculation results with Sharpe ratio.

The results of the formation of optimal portfolios based on the Markowitz method show that there are five eligible guarantee products included in the optimal guarantee portfolio, namely construction financing guarantees, counter bank guarantees, general financing guarantees, micro financing guarantees, and multi-use financing guarantees. While custom bond guarantees, surety bonds, and other guarantees are not included in the optimal portfolio. In contrast to the Markowitz method, based on the single index model method, all guarantee products are not eligible to be included in the optimal guarantee portfolio.

From this study it can be concluded that there are five guarantee products included in the optimal portfolio, namely construction guarantee, general guarantee, counter bank guarantee, multipurpose guarantee, and micro guarantee. With an optimal guarantee portfolio, will increase the company's return which will further increase profits, then will increase the amount of equity in the company. An increase in the company's equity can keep the gearing ratio in accordance with applicable regulations.

Keywords: Optimal guarantee portfolio, Risk, Return, Markowitz, Single Index Model.

## INTRODUCTION

Businessmen that classified as Micro, Small, and Medium Enterprises (MSME) have a huge role in sustaining the national economy. However, the empowerment of MSMEs faces many obstacles, including accessing credit from banks, especially because MSMEs are unable to meet collateral requirements. The Guarantee Company assists MSMEs by acting as guarantors for debtors to banks. Guarantee is the activity of providing guarantees by the Guarantor for the fulfillment of Guaranteed financial obligations to the Recipient of the Guarantee.

In running its business, the guarantee capacity of a guarantee company is limited by the gearing ratio, which is the ratio between the guaranteed volume of the guarantee and its amount equity. In accordance with Financial Service Authority (OJK) regulations, the maximum gearing ratio is 40 times. Based on the results of management studies in 2017, the gearing ratio at the end of 2018 is projected at 38,07 times and at the end of 2019 at 42,85 times. This means that the gearing ratio in 2019 will violate applicable regulations. Based on this study, management submitted a request to shareholders to increase the paid-in capital of Rp50 billion. With this additional paid-in capital, the gearing ratio in 2018 will be 32,48 times and in 2019 it will be 36,95 times. The increase in paid-up capital in 2018 is not in accordance with the plans set out in the company's Long-Term Plan 2015-2019. In the company's long-term plan, there is no additional paid-up capital until 2019.

The need for additional paid-in capital to maintain the gearing ratio, which is not listed in the company's long-term plan indicates that the guarantee portfolio is not optimal. In order to ensure that the company can achieve its objectives according to the target and operate within the allowed guarantee capacity, it is necessary to form an optimal guarantee portfolio, considering the risk and return factors.

## LITERATURE REVIEW

Investment is one of the three main functions of financial management, in addition to financing and asset management. Investment is the placement of current funds by expecting future financial benefits. There are various kinds of investment instruments in financial assets in the money market, capital market, and derivatives market. Each investment instrument has different characteristics, both in return and risk.

In general, investments with high returns will be accompanied by high risks. In other words, investors are willing to pay a higher price if they have a higher expectation of return. This is where the risk-return trade-off occurs (Bodie and Kane, 2014). Because of the trade-off between risk and return it is necessary to diversify investments that produce an investment portfolio. Portfolio, which is a collection of several investment assets / instruments. The purpose of an investment portfolio is to maximize returns or minimize the risk of investment activities.

Modern portfolio theory (MPT) is a theory of how risk-averse investors can build portfolios to optimize or maximize expected returns at certain market risk levels, emphasizing that risk is an inherent part of profit. According to the theory, it is possible to build an efficient frontier from an optimal portfolio that offers maximum expected return at a certain level of risk. This theory was pioneered by Harry Markowitz in his Portfolio Selection paper, published in 1952 by the Journal of Finance. He was later awarded the Nobel Prize for developing MPT.

Hartono (2013) suggested that the formation of an optimal portfolio with the Markowitz model approach was carried out by analyzing the relationship between risk and expected return. Risk is measured by the standard deviation or variance, while the expected return is determined by the average return. Therefore, this approach with the Markowitz model is also called the mean variance method.

Many researches have been done on optimal portfolios in the capital market and in the loan portfolio. However, there has not yet been any research on optimal portfolio in the guarantee sector. Research on the optimal portfolio in the guarantee sector needs to be done because the guarantee activity has different characteristics from credit activities and investment activities in the capital market. In credit activities, banks channel funds to debtors. Likewise in capital market activities, investors spend funds to buy shares or other investment instruments. While the guarantee activity, the guarantor company does not spend funds at the time of guarantee. Therefore, research on the guarantee portfolio needs to be done.

As a guarantee company, PT Penjaminan ABC is required to operate sustainably, generate profits on target, and operate in accordance with applicable regulations. The profit target according to company's long-term plan is not achieved, the projected gearing ratio in 2019 will exceed 40 times, which means it exceeds the maximum allowable provisions, so that it requires additional capital in 2018, indicating that the guarantee portfolio is not optimal and an analysis of portfolio performance is needed guarantees applied. Measurement of the performance of the guarantee portfolio is done by Sharpe ratio, Treynor ratio, and alpha Jensen.

Performance measurement with Sharpe ratio is done by measuring the difference in the rate of return of the portfolio reduced by the risk free rate, then dividing the results by the risk of rate of return, which is the standard deviation of the portfolio's rate of return. The greater the Sharpe ratio, the better the investment performance.

Almost the same as the Sharpe ratio method, portfolio performance measurement with Treynor ratio is done by calculating the difference between the portfolio's rate of return and the risk-free rate. Then the difference is divided by investment beta, which is a systematic risk to the investment in question. The greater the Treynor ratio value, the better the investment performance.

While the measurement of investment performance with Alpha Jensen is done by comparing the portfolio rate of return with the rate of return calculated based on the capital asset pricing model (CAPM). If the alpha value is positive it means that the investment has good performance, and vice versa.

Furthermore, the guarantee portfolio of PT Penjaminan ABC will be optimized by using the Markowitz method and single index model. In Markowitz's theory, research is conducted by examining returns, standard deviations, variances, covariance, and correlations of each guarantee product. Furthermore, optimal portfolio formulation will be carried out using the Markowitz approach, minimizing portfolio risk to obtain a certain level of return. The composition in the optimal portfolio of guarantee products produced will be analyzed and compared with the existing portfolio.

In the single index model approach, portfolio optimization starts with calculating the excess return of the guarantee portfolio, which reduces the rate of return of the portfolio by risk-free rate. The next step is to calculate excess return to beta (ERB), which is dividing excess return by beta. The next step is to calculate the cut-off rate and determine the cut-off point. The cut-off point is the limiting point between investment instruments that are feasible in the optimal portfolio and those that are not feasible. Investment instruments that have a ERB value greater than the cut-off point are eligible to be included in the portfolio and vice versa. The next step is to determine the portion of each guarantee product in the optimal portfolio. Based on the results of performance analysis and optimization of the guarantee portfolio, it can be seen the managerial implications of this study.

## RESEARCH METHOD

Data processing and analysis are carried out in three stages, namely the review of the historical guarantee portfolio, the measurement of the performance of the historical guarantee portfolio, and the establishment of an optimal guarantee portfolio.

1. **Analysis of Historical Guarantee Portfolio**
   a. Calculation of Product Guarantee Returns

Calculation of expected returns for each guarantee product is done by calculating the Guarantee Services Fee of a guarantee product against the allocation of guarantee products, with the formula:

$$E = \sum_{i=1}^{N} Xi\mu i \quad (1)$$

Explanation:
E = Expected return
$X_i$ = Percentage of assets allocated to investments i
$\mu_i$ = *Expected return* from investment i
N = number of types of investment

b. Calculation of Product Guarantee Risk

Guarantee risk is measured by Variance and Standard Deviation, with the following formula:

**Variance:**

$$V = \sum_{i=1}^{N} \sum_{j=1}^{N} \sigma ijXiXj \quad (2)$$

Explanation:
*$\sigma ij$ = covariance between returns from assets i and j*

With notes: $\sum_{i=1}^{N} Xi = 1$ dan $X_i \geq 0$

**Standard Deviation:**

$$\sigma = \sqrt{V} \quad (3)$$

Explanation:
σ = Standard deviation
V = *Varians*

c. Covariance of Guarantee Products

Covariance is the tendency of return of an investment instrument to move together with the return of other investment instruments. Covariance is calculated by the following formula:

$$Cov(w_D r_D, w_E, r_E) = E\{[w_D r_D - w_D E(r_D)][w_e r_E - w_E E(r_E)]\} \quad (4)$$

Explanation:
$Cov(w_D r_D, w_E, r_E)$ : covariance between investment instruments returns D and E
$w_D, w_E$ : weight (percentage) of investment instruments D and E
$r_D, r_E$ : *return instruments D and E*
$E(r_D), E(r_E)$ : *the expected return from investment instruments D and E*

d. Correlation of Guarantee Products

Correlation shows the significance of the relationship between one investment instrument with another. Value correlation (+1) means having a direct and strong relationship. Value correlation (-1) means it has an inverse and strong relationship. A correlation of zero (0) means there is no relationship. The correlation formula is as follows:

$$Corr(r_D, r_E) = \frac{Cov(r_D, r_E)}{\sigma_D \sigma_E} \quad (5)$$

Explanation:
$Corr(r_D, r_E)$ : the correlation coefficient between investment instruments returns D and E

$Cov(r_D, r_E)$ : covariance between investment instruments returns D and E
$\sigma_D, \sigma_E$ : standard deviation of investment instruments D and E

**2. Performance Measurement of Historical Guarantee Portfolio**

The measurement of the performance of the guarantee portfolio is carried out by comparing returns with risk. In this study, portfolio performance measurements using the Sharpe ratio, Treynor ratio, and Jensen ratio. The risk free rate used in this study is the interest rate of BI 7 Day Repo Rate.

a. Sharpe ratio

Sharpe ratio is a measurement of the performance of investment portfolios based on a comparison between the return generated and the total portfolio risk.

The Sharpe ratio formula is as follows:

$$S = \frac{\bar{r}_p - \bar{r}_f}{\sigma_p} \tag{6}$$

Explanation:
$S$ : Sharpe ratio
$\bar{r}_p$ : average portfolio return
$\bar{r}_f$ : average return on risk-free assets
$\sigma_p$ : standard deviation of the portfolio

b. Treynor ratio

Treynor ratio is also a comparison between the return generated and the risk of the portfolio. However, only comparable risk is systematic risk (market risk), i.e. beta value. The Treynor ratio formula is:

$$T = \frac{\bar{r}_p - \bar{r}_f}{\beta_p} \tag{7}$$

Explanation:
T : Treynor ratio
$\bar{r}_p$ : average portfolio return
$\bar{r}_f$ : average return of risk-free assets
$\beta_p$ : portofolio beta

c. Alpha Jensen

Alpha Jensen is a risk-adjusted return performance measurement that shows whether the average portfolio return of an investment is above or below the capital asset pricing model (CAPM), based on the portfolio beta and the average market return.

The formula for calculating alpha Jensen is:

*Alpha* = R (i) - (R (f) + B x (R (m) - R (f))) (8)

Explanation:
R (i) = portfolio or investment return
R (m) = return from the market index
R (f) = risk-free rate
B = beta of an investment portfolio

**3. Optimization of Guarantee Portfolios**

a. Markowitz Method.

The formula for optimizing guarantees is as follows:

Minimum guarantee portfolio variance:

$$\sigma p^2 = \sum_{i=1}^{n} wi^2 \sigma i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} wi\, wj\, \sigma ij \qquad (9)$$

Explanation:
σi = covariance of guarantee products
wi = proportion of guarantee products i (i = 1, 2, 3, ....n)
wj = proportion of guarantee products j (j = 1, 2, 3, ....n)
$\sigma i^2$ = variant of guarantee product i
σij = Covariance of guarantee products i and j
$\sigma p^2$ = portfolio variant

b. Single Index Model (SIM) Method

a) Calculate the Excess Return to Beta (ERB)

ERB is obtained by dividing excess return by beta. Excess return is the difference between the return of each investment instrument and the risk- free rate. The ERB formula is as follows:

$$ERB = \frac{r_i - r_f}{\beta_i} \qquad (10)$$

Explanation:
ERB : *Excess Return to Beta*
$r_i$ : expected return for investment instruments
$r_f$ : return of risk-free asset
$\beta_i$ : beta investment instruments

b) Determine the cut-off point

Investment instruments that make up the optimal portfolio are investment instruments with ERB values greater than or equal to the ERB value at point C *.

The cut off rate is calculated using the following formula:

$$C_i = \frac{\sigma^2_m \sum_{j=1}^{i} \frac{(\bar{r}_j - r_f)\beta_j}{\sigma^2_{ej}}}{1 + \sigma_m^2 \sum_{j=1}^{i} \left(\frac{\beta^2_j}{\sigma^2_{ej}}\right)} \qquad (11)$$

Explanation:
$C_i$ : cutt-off rate
$\sigma^2_m$ : market variant
$\beta_j$ : beta of all investment instruments (systematic risk)
$\sigma^2_{ej}$ : variance error of all investment instruments (unsystematic risk)
$\bar{r}_j$ : return of all investment instruments
$r_f$ : return of risk-free asset return of all investment instruments

c) Determine the portion of each investment instrument

After selecting investment instruments included in the optimal portfolio, the next step is to determine the portion (percentage) of each investment instrument in the portfolio. The formula for calculating the portion of an investment instrument is as follows:

$$w_i = \frac{Z_i}{\sum_{j=1}^{n} Z_j} \qquad (12)$$

On condition:

$$\sum_{i=1}^{n} w_i = 1$$

Whereas Zi is calculated as follows:

$$Z_i = \frac{\beta_i}{\sigma^2{}_i}\left[\frac{r - r_f}{\beta_i} - C*\right] \quad (13)$$

Explanation:

$w_i$ : the weight of investment instruments i

$Z_i$ : scale of weighting of investment instruments i

$\sigma^2{}_i$ : unsystematic risk investment instruments i

$\beta_i$ : systematic risk investment instruments i

C* : unique cut-off point

## RESULTS AND DISCUSSION

### Composition, Return, and Risk of Guarantees Product

The guarantee products at PT Penjaminan ABC consist of custom bond guarantees, counter bank guarantees, surety bonds, multipurpose financing guarantees, general financing guarantees, construction financing guarantees, micro financing guarantees, and other guarantees. Other guarantees are a combination of several guarantee products, each of which has a relatively small volume.

The composition, expected return, actual return, and risk of each guarantee product in the 2015-2018 period can be seen in table 1 below.

Table 1: Composition, expected return, actual return, and risk of guarantee products in 2015-2018

| Guarantee Product | Composition | Expected Return | Actual Return | Risk |
|---|---|---|---|---|
| | (%) | (%) | (%) | (%) |
| Custom Bonds | 5,39 | 0,24 | 0,23 | 0,10 |
| Counter Bank Guarantees | 26,58 | 1,17 | 1,09 | 0,36 |
| Surety Bonds | 21,78 | 0,38 | 0,35 | 0,13 |
| Multi-use financing | 20,50 | 2,82 | 2,66 | 1,34 |
| General Financing | 7,20 | 3,80 | 3,28 | 1,61 |
| Construction Financing | 1,79 | 1,24 | 1,21 | 0,26 |
| Micro Financing | 4,94 | 1,72 | 1,43 | 0,59 |
| Other Guarantees | 11,82 | 1,20 | 1,07 | 0,84 |
| Total/Average | 100,00 | 1,56 | 1,38 | 0,30 |

From table 1 it can be seen that the composition of guarantees is dominated by counter bank guarantee guarantees, surety bonds, and multipurpose guarantees. Whereas the expected return and actual return, the largest are general financing guarantees, followed by multipurpose financing guarantees, and micro financing guarantees. The expected average return is 1.56% and the average actual return is 1.38%. The biggest risk is general financing guarantees, followed by multipurpose financing guarantees, and other guarantees. The average risk is 0.30%.

Covariance and Correlation

Covariance shows the relationship between one guarantee product with another guarantee product. While the correlation shows how strong the relationship is. Covariance of each guarantee product can be seen in table 2 while the correlation can be seen in table 3.

Table 2 Covariance between guarantee products

| Guarantee Product | Custom Bonds | Counter Bank Guarantees | Surety Bonds | Multi-use Financing | General Financing | Construction Financing | Micro Financing | Other Guarantees |
|---|---|---|---|---|---|---|---|---|
| Custom Bonds | 0,00000095 | | | | | | | |
| Counter Bank Guarantees | 0,00000033 | 0,00001241 | | | | | | |
| Surety Bonds | -0,00000023 | 0,00000169 | 0,00000171 | | | | | |
| Multi-use financing | 0,00000002 | -0,00000218 | 0,00000146 | 0,00017657 | | | | |
| General Financing | 0,00000083 | -0,00000217 | -0,00000308 | -0,00006609 | 0,00025341 | | | |
| Construction Financing | -0,00000002 | 0,00000240 | 0,00000097 | 0,00000245 | -0,00000354 | 0,00000637 | | |
| Micro Financing | 0,00000045 | -0,00000272 | -0,00000013 | -0,00001821 | 0,00003337 | 0,00000087 | 0,00003383 | |
| Other Guarantees | -0,00000001 | 0,00000748 | 0,00000153 | -0,00000762 | -0,00000222 | 0,00000804 | -0,00000638 | 0,00006776 |

From table 2 it can be seen that custom bonds have a positive covariance with counter bank guarantees, multipurpose financing guarantees, general financing guarantees, and micro financing guarantees, as well as having a negative relationship with surety bonds, construction guarantees, and other guarantees. Counter bank guarantees have positive covariance with surety bonds, construction guarantees, and other guarantees, as well as having negative covariance with multipurpose financing guarantees, general financing guarantees, and micro financing guarantees. Surety bonds have positive covariance with multipurpose financing guarantees, construction financing guarantees, and other guarantees, as well as having negative covariates with multipurpose financing guarantees and micro financing guarantees. A multipurpose financing guarantee has a positive covariance with construction financing guarantees, and has a negative correlation with general financing guarantees, micro financing guarantees, and other guarantees. General financing guarantees have a positive covariance with micro financing guarantees and have a negative correlation with construction financing guarantees and other guarantees. Construction financing guarantees have a positive correlation with micro financing guarantees and other guarantees. Micro finance guarantees have a negative correlation with other guarantees.

Table 3 Correlations between guarantee products

| Guarantee Product | Custom Bonds | Counter Bank Guarantees | Surety Bonds | Multi-use Financing | General Financing | Construction Financing | Micro Financing | Other Guarantees |
|---|---|---|---|---|---|---|---|---|
| Custom Bonds | 1,000000 | | | | | | | |
| Counter Bank Guarantees | 0,094257 | 1,000000 | | | | | | |
| Surety Bonds | -0,183498 | 0,366211 | 1,000000 | | | | | |
| Multi-use financing | 0,005903 | -0,045921 | 0,087944 | 1,000000 | | | | |
| General Financing | 0,181556 | -0,040246 | -0,152882 | -0,311293 | 1,000000 | | | |
| Construction Financing | -0,029503 | 0,366848 | 0,376973 | 0,071592 | -0,086566 | 1,000000 | | |
| Micro Financing | -0,002769 | 0,409926 | 0,190796 | -0,060893 | -0,015971 | 0,350350 | 1,000000 | |
| Other Guarantees | 0,287027 | -0,187632 | -0,022677 | -0,215390 | 0,352735 | 0,056714 | -0,124930 | 1,000000 |

From table 3 can be seen how strong the relationship between one guarantee product with other guarantee products, both the relationship is positive or negative.

## Measurement of Historical Guarantee Performance

Performance measurements on each guarantee product, in assessing returns and risks, are carried out using the Sharpe ratio, Treynor ratio, and Alpha Jensen methods. In this study, the risk-free rate used as an indicator of performance is the BI 7-day (Reverse) Repo Rate. Likewise, the rate of return used as benchmarking is also a 7-day (Reverse) Repo Rate.

1. **Sharpe ratio**

The results of performance measurement of guarantee products using Sharpe ratio can be seen in table 4 below.

Table 4 Sharpe ratio of each guarantee product

| Guarantee Product | Sharpe Ratio | Conclusion |
|---|---|---|
| General Financing | -1,56 | *Underperformed* |
| Multi-use financing | -2,29 | *Underperformed* |
| Micro Financing | -5,87 | *Underperformed* |
| Other Guarantees | -5,99 | *Underperformed* |
| Construction Financing | -10,05 | *Underperformed* |
| Counter Bank Guarantees | -13,22 | *Underperformed* |
| Surety Bonds | -41,18 | *Underperformed* |
| Custom Bonds | -54,13 | *Underperformed* |

From Table 4 it can be seen that all guarantee products have a negative Sharpe ratio. This happens because the rate of return of all guarantee products is smaller than the risk-free rate.

2. **Treynor ratio**

The results of performance measurement of guarantee products using Treynor ratio can be seen in table 5 below.

Table 5 Treynor ratio of each guarantee product

| Guarantee Product | Treynor Ratio | Conclusion |
|---|---|---|
| Construction Financing | 0,33 | *Outperformed* |
| General Financing | 0,17 | *Outperformed* |
| Other Guarantees | 0,15 | *Outperformed* |
| Micro Financing | 0,14 | *Outperformed* |
| Multi-use financing | 0,08 | *Outperformed* |
| Counter Bank Guarantees | -1,71 | *Underperformed* |
| Surety Bonds | -1,98 | *Underperformed* |
| Custom Bonds | -5,36 | *Underperformed* |

From table 5 it can be seen that custom bond guarantees, counter bank guarantees, and surety bonds have a negative Treynor ratio and other guarantee products have a positive Treynor ratio.

3. **Alpha Jensen**

The results of Jensen's alpha calculation can be seen in table 6 below.

Table 6 Alpha Jensen for each Guarantee Product

| Guarantee Product | Return (%) | E(r) CAPM (%) | Jensen Ratio (%) |
|---|---|---|---|
| (1) | (2) | (3) | (4) = (2) - (3) |
| General Financing | 3,28 | 5,80 | -2,52 |
| Multi-use Financing | 2,66 | 5,80 | -3,14 |
| Micro Financing | 1,43 | 5,80 | -4,37 |
| Construction Financing | 1,21 | 5,80 | -4,58 |
| Counter Bank Guarant | 1,09 | 5,80 | -4,71 |
| Other Guarantees | 1,07 | 5,80 | -4,73 |
| Surety Bonds | 0,35 | 5,80 | -5,45 |
| Custom Bonds | 0,23 | 5,80 | -5,56 |

From the results of measurements using the three methods above, it can be seen that Sharpe ratio and alpha Jensen provide the best performance values for the same three guarantee products, namely general financing guarantees, multipurpose financing guarantees, and micro financing guarantees. Both are different from the results of measurements with Treynor ratio which provides the best performance value of the three guarantee products, which are construction financing guarantees, public financing guarantees, and other guarantees.

## Optimization of Guarantee Portfolios

### 1. Model Markowitz

The composition of the guarantee product in the optimal guarantee portfolio using the Markowitz model approach can be seen in table 7 below.

Table 7 Optimal Product Composition

| Guarantee Product | Composition (%) |
|---|---|
| Construction Financing | 49,24 |
| Counter Bank Guarantees | 21,69 |
| General Financing | 12,66 |
| Multi-use financing | 9,49 |
| Micro Financing | 6,93 |
| Total | 100,00 |
| Return | 1,93 |
| Risk | 0,83 |

From table 7 it can be seen that the optimal guarantee portfolio consists of five guarantee products. Thus there are three guarantee products in the hitoris portfolio that are not included in the optimal portfolio, namely custom bonds, surety bonds, and other guarantees. An increase in return and risk in the optimal portfolio compared to the historical portfolio. For optimal portfolios, portfolio returns are 1.93% while historical portfolio returns are 1.43%. Optimal portfolio risk of 0.83% while historical portfolio risk of 0.30%.

**2. Single Index Model**

In the single index model method, excess rate to beta (ERB), cut-off rate, and cut-off point are calculated. A guarantee product with an ERB value greater than the cut-off point will be included in the optimal portfolio, and vice versa, a guarantee product with an ERB smaller than the cut-off point is not included in the optimal portfolio. ERB calculation results, cut-off rates, and cut-off points, and decisions in the portfolio can be seen in table 8.

Table 8 Cut off rates and unique cut off points

| Guarantee Product | ERB | Ci | C* | Conclusion |
|---|---|---|---|---|
| Custom Bonds | -5,35 | 4,78 | 4,78 | No |
| Counter Bank Guarantees | -1,71 | 2,03 | 4,78 | No |
| Surety Bonds | -1,98 | 2,03 | 4,78 | No |
| Multi-use financing | 0,08 | -0,14 | 4,78 | No |
| General Financing | 0,16 | -0,30 | 4,78 | No |
| Construction Financing | 0,32 | -0,40 | 4,78 | No |
| Micro Financing | 0,13 | -0,17 | 4,78 | No |
| Other Guarantees | 0,14 | -0,17 | 4,78 | No |

From table 8 above it can be seen that all guarantee products have smaller ERB values than the unique cut-off point value, so that based on the Single Index Model approach, all guarantee products are not eligible to be included in the optimal portfolio.

**Conclusion**

1. There are five guarantee products included in the optimal portfolio, namely Construction Financing Guarantee, Public Financing Guarantee, Counter Bank Guarantees, Multipurpose Financing Guarantees, and Micro Financing Guarantees. While the other three products are not included in the optimal portfolio, namely Custom Bond, Surety Bond, and Other Guarantees.
2. Comparison of the composition of guarantee products in the optimal guarantee portfolio with the historical guarantee portfolio can be seen in table 9.

Table 9 Comparison of guarantee product compositions

| Guarantee Product | Portfolio | | Increase (Decrease) (%) |
|---|---|---|---|
| | Optimal (%) | Historis (%) | |
| Construction Financing | 49,24 | 1,79 | 47,45 |
| Counter Bank Guarantees | 21,69 | 26,58 | (4,89) |
| Micro Financing | 12,66 | 4,94 | 7,72 |
| Multi-use financing | 9,49 | 20,50 | (11,01) |
| General Financing | 6,93 | 7,20 | (0,27) |
| Surety Bonds | - | 21,78 | (21,78) |
| Other Guarantees | - | 11,82 | (11,82) |
| Custom Bonds | - | 5,39 | (5,39) |
| Total | 100 | 100 | 0 |
| Return | 1,93 | 1,38 | 0,55 |
| Risk | 0,83 | 0,3 | 0,53 |

From table 9 it can be seen that in the optimal portfolio an increase in the rate of return is 0.55% and an increase in risk is 0.53%.

3. The comparison of nominal returns between the optimal portfolio and the historical portfolio can be seen in table 10.

Table 10 Comparison of nominal returns between optimal portfolios and historical portfolios

| Produk Penjaminan | Portfolio | | Increase |
|---|---|---|---|
| | Optimal | Historis | (Decrease) |
| | (Millions Rp) | (Millions Rp) | (Millions Rp) |
| Construction Financing | 256.419 | 9.319 | 247.100 |
| Counter Bank Guarantees | 101.316 | 124.178 | (22.862) |
| Micro Financing | 77.374 | 30.197 | 47.177 |
| Multi-use financing | 108.171 | 233.736 | (125.565) |
| General Financing | 97.422 | 101.183 | (3.761) |
| Surety Bonds | - | 32.618 | (32.618) |
| Other Guarantees | - | 54.093 | (54.093) |
| Custom Bonds | - | 5.377 | (5.377) |
| Total | 640.701 | 590.701 | 50.000 |

From table 10 it can be seen that in the optimal portfolio an increase in nominal return of Rp50 billion compared to the historical portfolio. This increase in nominal return will increase the amount of company profits and subsequently will increase the amount of equity.

4. The comparison of gearing ratios between optimal portfolios without additional capital, historical portfolios with additional capital, and historical portfolios without additional capital are as follows:

Table 11 Comparison of gearing ratios between optimal portfolios and historical portfolios

| Discription | Gearing Ratio 2018 |
|---|---|
| Optimal Portfolio without additional Paid-in Capital | 32,48 |
| Historis Portfolio with additional Paid-in Capital | 32,48 |
| Historis Portfolio without additional Paid-in Capital | 38,70 |

From table 11 above it can be seen that the value of the gearing ratio in 2018 on the optimal portfolio without the addition of paid in capital, is the same as the value of the gearing ratio on the historical portfolio with the addition of paid in capital of Rp50 billion.

**REFERENCES**


Bank Indonesia. (2015). *Profil Bisnis Usaha Mikro, Kecil, dan Menengah*.

Benjamin M. Tabak, Dimas M. Fazioy, at al. (2010). *The Effects of Loan Portfolio Concentration on Brazilian Banks' Return and Risk. Banco Central do Brasil*. October 2010.

Bodie, Kane, at al. (2014). *Investments.* Tenth Edition. McGraw-Hill Education, 2 Penn Plaza, New York, NY 10121.

Buddi Wibowo. (2016). Stabilitas Bank, Tingkat Persaingan Antar Bank dan Diversifikasi Sumber Pendapatan: Analisis per Kelompok Bank di Indonesia. *Jurnal Manajemen Teknologi*, 15(2), 2016, 172-195.

Elton JE, Gruber MJ. (1995). *Modern Portfolio Theory And Investment Analysis*. Fifth Edition. Toronto: John Wiley and Sons

Elton, Edwin J. and Gruber, at al. (1997). Modern Portfolio Theory, 1950 to Date (March 1997). *NYU Working Paper* No. FIN-97-003. Available at SSRN: https://ssrn.com/abstract=1295211

Financial Services Authority (OJK). (2018). *Direktori Lembaga Penjamin per 31 Maret 2018.*

Financial Services Authority (OJK). (2015, 2016, 2017, 2018). *Statistik Lembaga Penjamin.*

Financial Services Authority (OJK). (2017). *Peraturan Otoritas Jasa Keuangan Nomor: 1/POJK.05/2017 tentang Perizinan Usaha dan Kelembagaan Lembaga Penjamin.*

Financial Services Authority (OJK). (2017). *Peraturan Otoritas Jasa Keuangan Nomor: 2/POJK.05/2017 tentang Penyelenggaraan Usaha Lembaga Penjamin.*

Fischer DE, Jordan RJ. (1999). *Security Analysis and Portfolio Management.* Sixth Edition. New Jersey, USA: Prentice Hall International.

Government of the Republic of Indonesia. (1998). *Undang-Undang Negara Republik Indonesia Nomor: 10 Tahun 1998 tentang Perbankan.*

Government of the Republic of Indonesia. (2016). *Undang-Undang Negara Republik Indonesia Nomor: 1 Tahun 2016 tentang Penjaminan.*

Hartono J. (2013). *Teori portofolio dan Analisis Investasi.* Edisi ketujuh. Yogyakarta: BPFE.

Markowitz, Harry. (1952). Portfolio Selection. *The Journal of Finance*, Vol. 7, No. 1. (Mar, 1952), pp. 77-91.

M. Ivanova, L. Dospatliev. (2017). Application of Markowitz Portfolio Optimization on Bulgarian Stock Market from 2013 To 2016. *International Journal of Pure and Applied Mathematics* Volume 117 No. 2, 2017, 291-307.

Nasroen Yasabari dan Nina Kurnia Dewi. (2015). *Penjaminan Kredit*, Mengantar UMKM Mengakses Pembiayaan. PT Alumni, Bandung.

Sony Harsono WS. (2010). *Analisa Portofolio Kredit pada PT. Bank Rakyat Indonesia (Persero).* Thesis. IPB University..

Tetty Ika Kartika. (2007). Optimalisasi Portofolio Kredit Segmen Komersial dengan Efficient Frontier pada Bank X (Persero) Tbk. Thesis. IPB University.

Yani Kusnitarini. (2008) Pembentukan Optimalisasi Portofolio Kredit dengan Metode Markowitz (Studi Kasus PT. BPR Pusaka Dana, Tangerang, Banten). Thesis. IPB University.

Zulfikar Andiko. (2010) Analisis Kinerja Strategi Pengembangan Portofolio Kredit dengan Pendekatan Reward to Variability Ratio pada PT Bank XYZ Tbk. Thesis. IPB University.

# JIMFE - Santosa

ORIGINALITY REPORT

| 14% | 6% | 5% | 11% |
|---|---|---|---|
| SIMILARITY INDEX | INTERNET SOURCES | PUBLICATIONS | STUDENT PAPERS |

PRIMARY SOURCES

| | | |
|---|---|---|
| 1 | www.investopedia.com<br>Internet Source | 2% |
| 2 | Dodi Devianto, Maiyastri, Randy, Masyhuri Hamidi, Sri Maryati, Afridian Wirahadi Ahmad. "Efficiency Analysis of Optimal Portfolio Selection for Stocks in LQ45 Index", 2018 International Conference on Applied Information Technology and Innovation (ICAITI), 2018<br>Publication | 1% |
| 3 | pt.scribd.com<br>Internet Source | 1% |
| 4 | Submitted to Universitas Ibn Khaldun<br>Student Paper | 1% |
| 5 | Submitted to University of Lancaster<br>Student Paper | 1% |
| 6 | Submitted to Dalhousie University<br>Student Paper | <1% |
| 7 | Submitted to Fakultas Ekonomi Universitas Indonesia | <1% |

Student Paper

| | | |
|---|---|---|
| 8 | Submitted to University of Exeter<br>Student Paper | <1% |
| 9 | Azwar Iskandar, Bayu Taufiq Possumah, Khaerul Aqbar. "THE INFLATION AND POVERTY IN INDONESIA: CONSEQUENCE OF USURY?", Jurnal Ilmiah Al-Syir'ah, 2019<br>Publication | <1% |
| 10 | Submitted to Monash University<br>Student Paper | <1% |
| 11 | Submitted to University of Hong Kong<br>Student Paper | <1% |
| 12 | Submitted to University of Southampton<br>Student Paper | <1% |
| 13 | Submitted to De Montfort University<br>Student Paper | <1% |
| 14 | Submitted to Universiti Teknologi MARA<br>Student Paper | <1% |
| 15 | Submitted to EPOKA University<br>Student Paper | <1% |
| 16 | docshare.tips<br>Internet Source | <1% |
| 17 | Submitted to University of Northumbria at Newcastle<br>Student Paper | <1% |

| | | |
|---|---|---|
| 18 | Mohammad Maholi Solin, Andry Alamsyah, Brady Rikumahu, Muhammad Apriandito Arya Saputra. "Forecasting Portfolio Optimization using Artificial Neural Network and Genetic Algorithm", 2019 7th International Conference on Information and Communication Technology (ICoICT), 2019<br>Publication | <1% |
| 19 | www.emeraldinsight.com<br>Internet Source | <1% |
| 20 | Submitted to Bahcesehir University<br>Student Paper | <1% |
| 21 | Submitted to University of Newcastle<br>Student Paper | <1% |
| 22 | Submitted to Hellenic Open University<br>Student Paper | <1% |
| 23 | businessperspectives.org<br>Internet Source | <1% |
| 24 | docplayer.net<br>Internet Source | <1% |
| 25 | Submitted to School of Business and Management ITB<br>Student Paper | <1% |
| 26 | Submitted to The Hong Kong Polytechnic University | <1% |

Student Paper

| | | |
|---|---|---|
| 27 | Submitted to University of Newcastle upon Tyne<br>Student Paper | <1% |
| 28 | "Risk Tolerance in Financial Decision Making", Springer Science and Business Media LLC, 2011<br>Publication | <1% |
| 29 | Submitted to American Intercontinental University Online<br>Student Paper | <1% |
| 30 | Submitted to City University<br>Student Paper | <1% |
| 31 | Submitted to University of East London<br>Student Paper | <1% |

| | | | |
|---|---|---|---|
| Exclude quotes | On | Exclude matches | < 3 words |
| Exclude bibliography | On | | |

# JIMFE - Santosa

PAGE 1

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

PAGE 2

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

PAGE 3

**Run-on** This sentence may be a run-on sentence.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Possessive**

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

PAGE 4

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active voice.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Missing ","** Review the rules for using punctuation marks.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Missing ","** Review the rules for using punctuation marks.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.



**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Frag.** This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Frag.** This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Missing ","**

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.



**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Sentence Cap.** Review the rules for capitalization.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Garbled** This sentence contains several grammatical or spelling errors that make your meaning unclear. Proofread the sentence to identify and fix the mistakes.

**Missing Apos.** Review the rules for using punctuation marks.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**Proper Nouns** You may need to use a capital letter for this proper noun.

PAGE 7

---

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proper Nouns** You may need to use a capital letter for this proper noun.

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**Missing ","** Review the rules for using punctuation marks.

**P/V** You have used the passive voice in this sentence. You may want to revise it using the active vo

PAGE 8

---

**Missing ","** Review the rules for using punctuation marks.

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Dup.** Did you mean to repeat this word?

PAGE 9

---

**Missing ","** Review the rules for using punctuation marks.

PAGE 10

---

**Sp.** This word is misspelled. Use a dictionary or spellchecker when you proofread your work.

**Frag.** This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.

PAGE 11

---

PAGE 12

---

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

**Proofread** This part of the sentence contains an error or misspelling that makes your meaning unclear.

PAGE 13

---