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# THE EFFECT OF BOND AGE, INTEREST RATE AND INFLATION RATE OF RETURN ON BONDS

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**ABSTRACT**
Bonds selected investors as an investment instrument because it has a fixed return of interest or coupon and yield with a low level of risk. The formulation of the problem in this study is whether the life of the bond partial effect on government bond yields, whether the interest rate partially on government bond yields, whether inflation partial effect on government bond yields and whether the life of the bond, the interest rate and inflation influence simultaneously on government bond yields. The methodology used in this study is a quantitative research design. Sample of this research is of conventional government bonds listed on the Stock Exchange in 2018 period is determined using purposive sampling method. Data analysis method used in this research is the analysis of quantitative data to calculate and estimate quantitatively some independent variables on the dependent variable partially or silmultan. Results from these studies show that the partial term of the bonds does not significantly influence government bond yields, interest rates partially significant effect on government bond yields and partial inflation no significant effect on government bond yields. While simultaneously the life of the bonds, interest rates and inflation significantly influence government bond yields listed in BEI period of 2018. partial interest rate significantly influence the yields on government bonds and partial inflation no significant effect on government bond yields. While simultaneously the life of the bonds, interest rates and inflation significantly influence government bond yields listed in BEI period of 2018. partial interest rate significantly influence the yields on government bonds and partial inflation no significant effect on government bond yields. While simultaneously the life of the bonds, interest rates and inflation significantly influence government bond yields listed in BEI period of 2018.

**Keywords:** Age bonds, interest rates, inflation, bond yields

## INTRODUCTION

The stock market is one of the long-term market buy and sell investment instruments to investors. Investors can make such instruments as the investment field to get the desired yield. Investment is one of the important activities for companies and countries to encourage economic activity. One of the investment instruments that may be traded on the stock market is a bond. Bonds selected investors as an investment instrument because it has a fixed return of interest or coupon and yield with a low level of risk compared to investing in shares. Of the several types of existing bonds,

For a country, the bonds become one of the important financing alternative in addition to bank financing through loans(Paramita & Pangestuti, 2016), Investors who invest bonds can monitor the movement of government bond market developments with regard bond yields or the so-called yield. The higher the bond yield, the more feasible invested. But nature does not remain like a flower yield bonds because bond yields are likely related to the expected rate of return on the investor.

Age bonds become one of the characteristics of government bonds in investor consider. In general, the longer the maturity of the bonds the greater the degree of uncertainty that the greater the risk of maturity(Ma'arij & Zulbahridar, 2014), Therefore, the longer the maturity of the bonds is hoping investors will yield greater as a form of compensation for such risk. One factor that affects other bond yield is the interest rate. The amount of the interest rate used by investors as a basic reference rate of return expected(Purnamawati, 2010), In addition, the increase in inflation in an economy tends to encourage the rise of interest rates in general. So when investors estimate the increase in inflation, they will demand compensation in the form of a higher yield(Paramita & Pangestuti, 2016),

There are several studies that have analyzed the factors assessed affecting bond yields, such as the age factor bonds, interest rates and inflation.Yuliawati & Suarjaya (2017)in his research stating variable interest rates have a significant effect on bond yields, while the life of the bonds and inflation is not significant effect on bond yields. But the results of these studies is different from that performed byKurniasih & Restika (2015)where in the study stated interest rate and inflation significant effect on bond yields. Later in previous studies conducted by Purnamawati(2010) states expressed different results where the life of the bonds significantly affect bond yields.

## LITERATURE REVIEW

### 2.1 Bonds

Bonds according Namjudin and Amri (2016) is a debt security issued by the issuer (could be a legal entity or company, it could be from the government) which require funding for operational needs as well as expansion in promoting investments which they have followed

### 2.2 Age Bonds

Age bonds according Ma'arij and Zulbahridar (2014) is the date on which the bondholders will receive principal payment of the nominal value of the bond. The maturity date of the bond varies from 365 days up to over 5 years. In general, the longer the maturity of the bonds the greater the degree of uncertainty that the greater the risk of maturity

### 2.3 Interest Rate

The interest rate according to Boediono (1994) is the price of the use of investment funds (Loanable funds). The interest rate is one indicator in determining whether someone will make the investments or savings.

### 2.4 Inflation

Samuelson (2001) gives the definition of inflation as a situation where an increase in the general price level, whether goods, services and factors of production

### 2.5 Bond Yields

Situmorang (2017) gives the definition of the yield or return that will be earned from the investment expressed as a yield bonds, which results to be obtained by investors when placing funds to buy bonds

### 2.6 hypothesis

**a. Bonds Age influence on Bond Yields**
the longer the maturity of the bond, the greater the degree of uncertainty that the greater the risk of maturity(Ma'arij & Zulbahridar, 2014), The previous study by Purnamawati(2010) find the age variable bonds significantly influence bond yields

**b. Interest Rate effect on Bond Yields**
The increase in the interest rate is linked to bond yields, as it will cause the price of the bonds still in circulation falls, while the decline in interest rates will cause bond prices rise(Purwanti & Purwidianti, 2017), The previous study by Yuliawati & Suarjaya(2017) find variable interest rates in effect on bond yields

**c. Inflation effect on Bond Yields**
If inflation increase will affect the interest rate will also increase. The interest rate increases caused bond prices to decline and the yield will increase(Purwanti & Purwidianti, 2017), This is consistent with previous studies conducted byKurniasih & Restika (2015) stating the variable inflation effect on bond yields

**d. Age Bonds, Interest Rate, Inflation simultaneously affect the Bond Yields**
The previous study by Yuliawati & Suarjaya (2017) states that the age variable bonds, interest rates and inflation have a significant effect on bond yields.

## RESEARCH METHODS

### 3.1 Data Collection Techniques
Data collection methods used in this study is of Library Studies conducted by processing literature, articles, journals, results of previous studies, as well as other written media related to the topic of discussion of this study. Besides the collection of data by bringing together a secondary data and all the information that is used to resolve the problems that exist in the document.

### 3.2 Operational Definition of Variables
The dependent variables were used in this study is the bond yields, while the independent variable in this study is the term of the bonds, interest rates and inflation.

### 3.3 Sample Collection Techniques
The population in this study are all government-owned bonds listed in Indonesia Stock Exchange. Samples taken are the types of government bonds selected by purposive sampling method. Purposive sampling is a sampling technique with a certain consideration. The criteria for consideration and selection of samples in this study are conventional government bonds, government bonds that have a fixed rate, government bonds with semi-annual compounding, rupiah-denominated government bonds, government bonds listed on the Indonesia Stock Exchange as of August 2018.

### 3.4 Data analysis technique
The data analysis technique used in this research is multiple linear regression

## DATA ANALYSIS

### 1.1Result

**Multiple Linear Regression Analysis**

Multiple linear regression analysis is used to determine the direction of the influence of the life of the bond, the interest rate and inflation on government bond yields. This analysis is processed by using SPSS 22.0 for Windows.

**Table 1 Regression**

Coefficientsa

| Model | Unstd Coefficients | | Coefficients Std | | | collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | B | Std. Error | beta | T | Sig. | toll | VIF |
| 1 (Constant) | .026 | .008 | | 3130 | .004 | | |
| age Bonds | .000 | .000 | .154 | 1,851 | .073 | .963 | 1,039 |
| Interest Rate | .007 | .001 | .936 | 5,379 | .000 | .221 | 4,531 |
| Inflation | .000 | .001 | -.041 | -.234 | .816 | .219 | 4,568 |

a. Dependent Variable: YTM

Based on multiple linear regression table diproleh multiple linear regression equation as follows:

$Y = 0.026 + 0.000X1 + 0.007X2 + 0.000X3 + \varepsilon$

The multiple linear regression equation indicates the direction of each independent variable on the dependent variable, where the independent variable regression coefficient is positive, meaning a direct influence on the Yield to Maturity (YTM).

**Significance Test Results Individual parameters (T-test)**

**Table 2 t test (Test Partial)**

Coefficientsa

| Model | Coefficients unstandardized | | Std Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | beta | | |
| 1 (Constant) | .026 | .008 | | 3130 | .004 |
| age Bonds | .000 | .000 | .154 | 1,851 | .073 |
| Interest Rate | .007 | .001 | .936 | 5,379 | .000 |
| Inflation | .000 | .001 | -.041 | -.234 | .816 |

a. Dependent Variable: YTM

According to the table on the results of t-test at age variable bonds, interest rates and inflation can be explained as follows:

**The influence of age bond (X1) to YTM (Y)**

Based on t test table can be seen that the age variable bonds, t obtained amounted to 1,851. T table value obtained from statistical tables with two sides df = 36-3-1 (32) at the 0.05 significance level is at 2.03693. That is, the smaller the t value t table is 1.851 ≤ 2.03693. Meanwhile, if viewed from the level of significance, the significance of which is greater than the specified significance level is 0.073> 0.05.

Based on this analysis, the decision on the first hypothesis is accepted H01. So we can conclude bond age variable has no significant effect partially on government bond yields.

**The influence of interest rate (X2) to YTM (Y)**

Based on t test table can be seen that the variable interest rate, t obtained amounted to 5,379. T table value obtained from statistical tables with two sides df = 36-3-1 (32) at the 0.05 significance level is at 2.03693. That is, the value of t is greater than t table is 5,379> 2.03693. Meanwhile, if viewed from the level of significance, a significance that is obtained is smaller than the specified significance level is 0.000> 0.05.

Based on this analysis, the decision on the second hypothesis is rejected H02. It can be concluded variable interest rates have a significant effect partially on government bond yields.

**The effects of inflation (X3) against YTM (Y)**

Based on t test table can be seen that the variable interest rate, t obtained amounted to -0234. T table value obtained from statistical tables with two sides df = 36-3-1 (32) at the 0.05 significance level is at 2.03693. That is, the value t is smaller than t table is -0234 ≤ 2.03693. Meanwhile, if viewed from the level of significance, the significance of which is greater than the level of significance is determined that 0816> 0.05.

Based on this analysis, the decision to a third hypothesis is accepted H03. So we can conclude inflation variable has no significant effect partially on government bond yields.

**Simultaneous Significance Test Results (F-test)**

F-test was used to test the effect of independent variables with or near-equal to the dependent variable. The testing procedure is as follows:

a. Using the calculated F and F table.
   F arithmetic can be seen from the output of the ANOVA table. While the F table can be searched in the statistics table at the 0.05 significance with DF1 = k-1 and DF2 = nk-1. Penambilan decision taken is if F arithmetic <F table then H0 is accepted. And if F arithmetic> F table then H0 is rejected.
b. Using the standard of 0:05 siginifikansi
   Pengamblilan decision taken is if significant> 0.05 then H0 is rejected. And if the significance <0.05 then H0 is accepted.

**Table 3 Test F (Simultaneous Testing)**

ANOVAa

| Model | | Sum of Squares | df | mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .010 | 3 | .003 | 39 247 | .000b |
| | residual | .003 | 32 | .000 | | |
| | Total | .012 | 35 | | | |

a. Dependent Variable: YTM
b. Predictors: (Constant), Inflation, Age Bonds, Interest Rate

Based on the test table F, F count obtained amounted to 39 247. F table value obtained from statistical tables with DF1 and DF2 = 3 = 32 at the 0.05 significance level is equal to 2.90. That is, the value of F count> F table (39 247> 2.90). Meanwhile, if viewed from the level of significance, a significance that is obtained is smaller than the specified significance level is 0.000> 0.05. So we can conclude age variable bonds, interest rates and inflation influence jointly against government bond yields.

**Analysis Coefficient of Determination**

R2 Analysis (R Square) or the coefficient of determination is used to determine the percentage of contribution of independent variables influence jointly on the dependent variable(Priyatno, 2016),

**Table 4 Coefficient of Determination**

Model Summaryb

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | .887a | .786 | .766 | .00907 | 1,930 |

a. Predictors: (Constant), Inflation, Age Bonds, Interest Rate
b. Dependent Variable: YTM
Source: Data were analyzed, 2019

Determination of the coefficient table can be seen the value of Adjusted R Square of 0766. So donations influence of independent variables (age bonds, interest rates and inflation) amounted to 76.6% while the remaining 23.4% is influenced by other factors not examined.

**4.2 Discussion**

**Effect of Age Bonds against Government Bond Yields**

The results of this study found that the life of the bond has a value of regression coefficient of 0.000. T value obtained is smaller than t table is 1.851 <2.03693 and generated significant value greater than the specified significance level is 0.073> 0.05. So it can be concluded that the life of the bonds does not significantly influence government bond yields. In this case H01 Ha1 accepted and rejected.

The results of this study do not support the theory and previous pnelitian on the relationship between the age of bonds and bond yields. This study shows that inflation is not significant impact on government bond yields. The results of this recent research supported by the results of previous studies undertaken by Yuliawati & Suarjaya (2017)which states that the term of the bonds does not significantly

influence government bond yields. This is because government bonds included in a risk-free investment and guaranteed repayment by the state so that the risk of maturity is not so special consideration in government bond investing. Because of the level of risk government bonds lower than corporate bonds so that the confidence of investors was positive despite the specified time period is long term. In other words, investors believe that investment through government bonds do not undergo the risk of default.

**Influence of Interest Rate on Government Bond Yields**

The results of this study found that the life of the bond has a value of regression coefficient of 0.007. T value that is greater than t table is 5,379> 2.0369 and generated significant value smaller than the specified significance level is 0.000> 0.05. So it can be concluded that the interest rate significantly influence government bond yields. In this case H02 Ha2 rejected and accepted.

This according to the sign of the coefficient that has a positive direction indicates that the higher the interest rates, government bond yields are at greater and vice versa due to the current interest rate can be a reference investors in gaining an advantage over its investment. The higher the interest rate, investors want returns over the future of interest rates at this time. The results of this study supported previous research byYuliawati & Suarjaya (2017)which states that the interest rate on government bond yields. In this case the government helped to attract investors by offering higher yields than the interest rate of Bank Indonesia.

**Inflation Influence on Government Bond Yields hasi**

The results of this study found that the inflation variable has a value of regression coefficient of 0.000. T value obtained is smaller than t table is -0234 <2.03693 and generated significant value greater than the specified significance level is 0816> 0.05. So we can conclude that inflation does not significantly influence government bond yields. In this case H03 HA3 accepted and rejected.

The results of this study do not support the theory and previous pnelitian on the relationship between inflation and bond yields. This study shows that inflation is not significant impact on government bond yields. The results of this recent research supported by the results of previous studies undertaken by Yuliawati & Suarjaya (2017)stating that inflation does not significantly influence government bond yields. This is due to the value of inflation experienced significant changes in each period was not followed by changes in the yields offered. As happened in the year 2006 to the year 2007 when the government issues bonds series FR0040 and FR0042 changes in inflation during this period is very volatile but the returns on offer are not much different.

**Effect of Age Bonds, Interest Rate and Inflation Simultaneous to the Government Bond Yields**,

The results of this study found that the age variable bonds, interest rates and inflation have calculated F value is greater than F table is 39 247> 2.90 and generated significant value smaller than the specified significance level is 0.000> 0.05. So it can be concluded that the age variable bonds, interest rates and inflation simultaneously significant effect on government bond yields. In this case H04 Ha4 rejected and accepted.

Based on the test results of the coefficient of determination, the value of Adjusted R Square that was obtained amounted to 0766. So the influence of the variables age donations bonds, interest rates and inflation together amounted to 76.6% while the remaining 23.4% influenced by other factors not examined. Thus investors can use these three variables together as consideration in investing through government bonds as a percentage contribution of these three variables together large enough to influence government bond yields.

## CONCLUSION

The results of this study found the life of the bonds does not significantly influence government bond yields. Therefore the first hypothesis which states that the life of the bond significant effect on

government bond yields declined. Furthermore, that interest rates have a significant effect on government bond yields. Therefore the second hypothesis which states that interest rates have a significant effect on government bond yields acceptable. The results of subsequent studies find no significant effect of inflation on government bond yields. Therefore, the third hypothesis which states that inflation significantly influence government bond yields declined. On the other hand that the life of the bond, interest rates and inflation simultaneously significant effect on government bond yields. Therefore, the fourth hypothesis which states that the age variable bonds, interest rates and inflation simultaneously significant effect on government bond yields acceptable.

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