DETERMINANTS OF INDONESIAN GOVERNMENT BONDS PRICE

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Abstract
Discussion on bonds as a source of state development financing, including its effect on the size of the debt service to country risk remains an interesting topic for further study. The purpose of this study is to examine various variables that would affect the price movement of Indonesian government bonds. Some of the variables include coupon, maturity, yield, and liquidity. The analysis was conducted on Indonesian government bond data for the period of January 2015 - June 2016.Data sources were obtained from Indonesian Bond Market Directory 2016-2017.Sampling was done using purposive sampling technique and resulted in 40 samples of FR series bonds. The result of analysis shows that coupon rate and yield have significant positive effect to government bond price; maturity has significant negative effect to government bond price, while liquidity has significant effect to government bond price. For further research, research can be directed to the topic of comparing predictors of government bond prices among developing countries, or the topic of comparison of bond pricing predictors among developing countries with developed countries. In addition, research can be done both by increasing the number of bond price predictors and/or the number of observation periods.

Keywords: Bond price, coupon rate, Maturity, Yield, and Liquidity

INTRODUCTION

In line with the development of the Indonesian capital market, the bond market is also growing rapidly and offering various types of debt instruments to attract more investors. This fact is evidenced by the increasing number of investors and the variety of instruments offered in the market. Investors' interests initially dominated by conventional investments, such as savings deposits, deposits and the like, began to shift to securities or securities investments, including share ownership and derivative products, as well as investment in bonds. Investors can choose investment in corporate bonds or government bonds, both conventional and sharia.

Hast in et al (2013) argued that based on the risk aspect, government bonds have a lower investment risk compared to corporate bonds. Under these conditions, it is only natural that investors prefer to make government securities instruments as one of their investment portfolios. The choice of investors is clearly illustrated when observing the very rapid increase in government bonds, both in terms of the number of instruments traded, the variations of instruments, and their liquidity, which can be seen on the amount of trading frequency and transaction volume. Based on data obtained from Asia Bond Monitor, November 2017 edition, rupiah denominated government bond portion is 85.2% and far exceeds the corporate bond

portion of only 14.8%. The same comparison is also shown from Indonesian Capital Market Statistic data of December 2017, that is, the proportion of government bonds is 84.56% and the corporate bond portion is 15.44%. In addition to the risk factors mentioned earlier, the lagging segment of corporate bonds is also caused by other factors. According to Asia Bond Monitor, the high spread between government bonds and corporate bonds in Indonesia is partly due to the length of the bond issuance process, the absence of market makers, and the need for greater diversity in the investor base. All of the mentioned causes become an obstacle to accelerate the increasing number of corporate bonds in Indonesia.

From the perspective of state finance, the issuance of government bonds is one source of state financing. the purpose of holding government debt is generally used to cover budget deficits for funding development programs and / or to repay previous debts that are due (Chtourou, 2015). An increase in the amount of government debt has an impact on increasing country risk, which in turn has the potential to increase interest rates. However, on the other hand, government funding through bond issuance is seen as is seen as lower risk than borrowing directly from other countries or from organization or international financial institutions, such as the IMF or the world bank.This is given that government debt is directly viewed as more vulnerable in triggering the financial crisis. At the same time, an increase in the amount of debt is also seen as an opportunity to develop domestic bond markets, both corporate and government bonds, as it could have an impact on reducing debt costs and obtaining sources of development financing sourced from foreign exchange (McCauley and Remolona 2000).

When choosing a bond as an investment instrument, the yield promised by a bond is one factor that investors consider. The yield and coupon yields represent the potential risks faced by investors when holding certain bonds. Furthermore, risks, coupons and yields have a direct impact on the size of bond prices. As is known, the price is one of the factors that determine the buying interest of investors. In the context of bonds that have the same rating, the bonds theoretical price estimate can be made by taking into account some data, such as the recovery rate (Elton et al, 2004). Increased buying interest will have a positive influence on bond prices (Jovanovic and Rousseau, 2001). High bond prices, on the one hand, are the result of low risk, low yields and potentially lower bond liquidity. Therefore, it is necessary to consider various factors that have the potential to influence the movement of bond prices. Bond prices are an important factor for investors primarily related to timings to determine the entry or exit of the market (Ekak and Abundanti, 2013).

LITERATURE REVIEW AND HYPOTHESIS

*Coupon rate*and Bond Price

Coupon is the interest rate paid by the issuer company periodically until the maturity date to the investor. Tandelilin (2010) stated that the bond coupon is the interest paid periodically by the issuer of the bonds to the bondholder. Coupon bonds are expressed in percentage units. Generally, the type of coupon that applies can be fixed rate or variable rate. The difference between the two types of coupon lies in the flexibility of interest rate changes. Bonds with a variable rate coupon mean that interest paid to bondholders can be adjusted periodically in line with changes in the prevailing market rate or market rate index.

The amount of coupon rate is one of the variables that can influence the price of bonds. The higher the coupon rate, the more attractive a bond as an investment instrument for investors (Dewi et al, 2016). Increased investor interest in bonds is due to opportunities to obtain routine income potential. Therefore, the movement of the bond coupon rate is generally directly proportional to the price of the bond. The higher the coupon bonds offer, it will make the bond prices to rise.

The positive and significant influence of the coupon on bond prices was attested by Achmad and Setiawan (2007), Soebagyo and Panjawa (2016), Purnama and Sudjarni (2016), and Dewi et al (2016). The opposite result was found by Ekak and Abundanti (2013) which proves that coupons have a negative significant impact on the change of the price of high-rated bonds. Based on the description, it can be proposed the following hypothesis:

H1:   C*oupon rate* has a positive and significant influence on bond prices

Maturity and Bond Price

Each bond must have a maturity date, ie the date the principal amount of a bond must be paid or paid by the issuer. Maturity denotes the time it takes for a bond to maturity. This period is related to the potential cash flows received by investors, either in the form of coupon or in the form of bond value (Simu, 2017). The longer the bond period, the higher the potential bonds are exposed to the risk, both the risk that comes from internal company and market risk and macroeconomic conditions. Longer-term bonds will offer higher yields (Antwerpen et al, 2004), and this will automatically impact on offering lower-priced bonds.

Tandelilin (2010: 279) stated that maturity date negatively influences the price of bonds. This statement indicates that the price will be even higher when a bond approaches its maturity. In contrast, longer-term bonds tend to be offered at lower prices. Research by Azizah and Hidayat (2016) stated that the maturity period has a significant influence on the price of government bonds. Therefore, the hypothesis proposed is:

H2:   *Maturity has a negative and significant influence on bond price*.

*Yield*and Bond Price

One of the factors considered to have an influence on bond prices is the bond yields. Bond yields are the most important factor as investors consider buying bonds as their investment instrument. Bond yield is the return obtained from investing some funds in a bond. In addition, bond yields are a measure of bond revenue that will be received by investors (Tandelilin, 2010). In this case the yield to maturity is the result that will be obtained by investors when placing their funds to buy bonds and holding until maturity date.In evaluating the bonds, investors will generally consider the amount of yield to maturity (Gitman, 2015:299). The value of a bond depends on three components, ie (i) amount and timing of the cash flows to be received by the investors, (ii) the time to maturity of the bond, and (iii) the investor's required rate of return (Keown et al, 2014:255). One of the factors that determine the amount of the required rate of return investors is the prevailing interest rate. The higher the interest rate indicates the higher the loan risk and also

the higher the price of the loan. The high risk of a debt instrument should basically be balanced by a low price to maintain its appeal. Therefore, the prevailing interest rate movement will be inversely proportional to the bond price movement and is applicable to all debt instruments (Widajati, 2009). The same is stated by Antwerpen et al (2004) which states that when interest rates increase, the bond price will decrease.

Research conducted by Fitriana and Rohayati (2013) stated that bond yield negatively influences the price of fixed rate government bond series. This indicates that the higher bond yields tend to have a decrease in the price of bonds. Vice versa, if bond yields are low, then bond prices will increase. Based on the above description it can be proposed the following hypothesis:

H3: *Yields has a negative and significant influence on bond prices*

Liquidity and Bond Price

Bond liquidity is an indicator of ease of bonds held by the owners of capital to be used as cash on the secondary market. Bond liquidity in general can be interpreted as the ability of securities to be traded quickly without significant price variations or the ability to conduct transactions at a low cost (Bagliano et al, 2000). Simply put, this concept can then be translated into transaction volume and transaction frequency as its measurement indicator. According to Elton et al (2004), liquidity has a more accurate impact in predicting bond prices. According to research conducted by Kempf and Homburg (2000) said that the liquidity of bonds influence the price of bonds. Bond prices that are stable and increasing tend to have high levels of liquidity (Damena et al, 2014; Dewi et al, 2016). Meanwhile, Favero et al (2010) stated that securities that are not illiquid will lead to trading costs and will also cause additional risks. The existence of these costs and risks is compensated by high expected returns that impact on low prices. Bonds with high liquidity will have an impact on stable bond prices with an upward trend. However, it should be remembered that, if the liquidity of such bonds is low, bond prices tend to weaken.

Liquid bonds are bonds that are widely circulated among holders of bonds and are often traded by investors in the bond market. Therefore, at the time of buying bonds one should choose a liquid bond that is always traded in the bond market and attracted by investors. High bond liquidity will make bonds more attractive given the availability of more buyers and sellers and this in turn will enable bondholders to sell their bonds at any time. Research conducted by Sukanto (2009), Soebagyo and Panjawa (2016), and Dewi et al (2016) found that liquidity had a significant influence on bond price. On the other hand, Ekak and Abundanti (2013) found the opposite, ie liquidity significantly negatively influence bond prices. Based on the explanation above, the hypothesis proposed is as follows:

H4: **Liquidity has a positive and significant influence on bond price**

RESEARCH METHOD

This research is causality quantitative research which is intended to explain the influence of predictor variables tothe response variable. The data processed for analysis is sourced from Indonesian Bond Market Directory 2016-2017. The population in this study are government

bonds of the Republic of Indonesia period January 2015 - June 2016 as many as 145 series of bonds. Meanwhile, the sampling was done by purposive sampling method. The criteria used to select the sample by purposive are: (1) Indonesian government bonds traded in the secondary market, (2) non-sharia bonds, (2) Indonesian government bonds with fixed coupon rate, and (3) Indonesian government bonds still outstanding until the date of data collection (March 2017). The result of the implementation of this criteria resulted in 39 series of government bonds of the Republic of Indonesia which were then used as research samples. The next step were data collection, data processing, and analysis. The main analysis tool used is multiple linear regression, followed by hypothesis testing using t-test.Data processing was done with SPSS v24 for windows software.

Table 1 below is the operational definition of variables and indicators:

Table 1: Variable Operational Definition

Variable	Concept of Variable	Indicator
BondPrice	Bond market price at any given time.	IBPA Fair Price of FR series Indonesian government bond, January 2015 - June 2016 period, in percentage.
Coupon	Interest income earned by investor based on agreement.	The coupon rate of FR series Indonesian government bonds that is listed on Indonesian Bond Market Directory, January 2015-June 2016 period, in percentage.
Maturity	The remaining term of circulation of a bond up to maturity.	The time difference between the date of collection (1 March 2017) to the maturity date of the FR series Indonesian government bonds, which is stated in the Indonesian Bond Market Directory, in days.
Yield	Return on the money invested by the investor.	Yield to Maturity in the form of IBPA Fair Yield of FR series Indonesian government bonds January 2015 - June 2016, in percentage.
Liquidity	Measurement of the frequency of a traded bond or indicator of bond liquidity.	Frequency of trading of FR series government bonds, contained in Indonesian Bond Market Directory, in frequency units

RESULTS AND DISCUSSION

This study aims to assess the impact of various factors on the movement of prices of Indonesian government bonds. Some of these factors include, coupon rate, bond period, yield rate, bond liquidity. The table 2 below shows descriptive statistics describing the variables analyzed in this study.

Table 2: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Fair_Price	39	64,48	125,79	103,07	14,47
Coupon	39	,05	,15	,0932	,022
Maturity	39	45	9847	3584,97	2674,479
Yield	39	,0575	,0872	,0815	,006
Liquidity	39	30	33489	4421,08	7401,077
Valid (listwise)	N 39				

The object of this research is the Indonesian government bonds with the FR series, which are IDR-denominated bonds with fixed interest rate(conventional, unsecured bond). Coupon payments are made on a regular basis, while the bond's nominal value will be paid at maturity. Based on the results in Table 2, the coupon rate and the yield rate of Indonesian government bonds is at an average of 9,32% and 8,15%, respectively. the average coupon rate and the yield rate of the government bonds are higher than the rates on the deposits of commercial banks or benchmark interest ratefrom Indonesian central bankin the same period. Similar conditions also apply if the coupon rate and the yield rate of Indonesian government bonds are compared with the coupon and average bond yields of Asian government bonds. Considering the bond coupon and bond yields, as well as Indonesia's stable country risk, marked by the granting of investment grade status from S & P, the attention of domestic and foreign investors to the performance of Indonesian government bonds shows an increasing trend. This condition can be seen in the average level of liquidity measured using trading frequency.During the observation period, January 2015-July 2016, the trading frequency of Indonesian Republic Government bonds FR series was at 4,421 times, with the trading frequency range between 30 times and 33,489 times.

The accumulation of some of these data and coupled with stable political and economic conditions of the country, it is reasonable that the average fair price of government bonds is still above 100, with the minimum and maximum price range of 64.48 and 125.79 respectively . Fair price above 100 is indirectly an indicator that demand for FR series government bonds exceeds the supply level. If observed in detail, the increase in demand is partly due to the flow of foreign funds into the Indonesian bond market. Once again, this condition proves that the interest on Indonesian government bonds from investors is still quite high, both by domestic investors and foreign investors.

The next step is conducting multiple linear regression analysis to get the regression equation model. A good regression equation model is an unbiased model or BLUE (best linear unbiased estimator) property. Classical assumption test consisting of normality test, autocorrelation test, multicollinearity test, and heteroskedastity test must be done to obtain BLUE equation.

Testing assumption regression model shown in table 3. Testing of data normality was done by using Kolmogorov-Smirnov test. From the table shows that the coefficient of Asymp Sig. (2-tailed) is 0.183 greater than α (5%). This indicates that the data is normally distributed. Furthermore, each variable shows no symptoms of multicollinearity because it has a Tolerance value> 0.1 and a VIF value below 5. The Glejser test shows that significant values on all variables are above α (5%) and which means there is no heteroscedasticity. Finally, the autocorrelation test shows a value of 1.844. The data are free of autocorrelation if dμ <d-w <4-dμ. The value of dμ is 1.7215 and the value 4-dμ is 2,2785.

Table 3: Regression Assumptions Test

Normality Test (One-Sample Kolmogorov-Smirnov Test)	
	Unstandardized Residual
N	39
Test Statistic	,118
Asymp. Sig. (2-tailed)	,183[c]

a. Test distribution is Normal.
b. Calculated from data.

Multicollinearity Test (Tolerance & VIF)		
Model	Collinearity Statistics	
	Tolerance	VIF
1 (Constant)		
Coupon	,907	1,102
Maturity	,884	1,131
Yield	,893	1,120
Liquidity	,849	1,178

Dependent Variable: Fair_Price

Heteroscedasticity Test (Glejser Test)					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
1 (Constant)	1,494E-14	14,002		,000	1,000
Coupon	,000	47,457	,000	,000	1,000
Maturity	,000	,000	,000	,000	1,000
Yield	,000	163,995	,000	,000	1,000

	Liquidity	,000	,000	,000		,000	1,000
Autocorrelations Test (Durbin-Watson)							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		Durbin-Watson	
1	,919[a]	,845	,827	6,016254		1,844	

a. Predictors: (Constant), Liquidity, Maturity, Coupon, Yield
b. Dependent Variable: Fair_Price

Table 4: Multiple Linear regression Estimation Results

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-32,44	14,002		-2,317	,027
	Coupon	448,66	47,457	,669	9,454	,000
	Maturity	-,001	,000	-,229	-3,200	,003
	Yield	1208,47	163,995	,526	7,369	,000
	Liquidity	-,00006	,000	-,031	-,424	,674

a. Dependent Variable: Fair_Price

The result of regression model estimation is shown in table 8 and present the following model of multiple linear regression equation.

$$Bond\ Price = -32,44 + 448,66\ Coupon - 0,001\ Maturity + 1.208,47\ Yield - 0,00006\ Liquidity + e$$

Referring to the above equation it can be seen that coupon and yield variables have the same movement with the movement of bond price. If an increase in coupon rate and yield, either individually or simultaneously, will result in an increase on bond price. Conversely, if there is a decrease in coupon rate and yield, there is also a decrease on bond prices. This shows that coupon and yield have a positive influence on bond price. Conversely, the opposite movement is seen in the variables of maturity and liquidity with bond prices. The decline in both maturity and liquidity variables will have an impact increasing on bond price. In other words, maturity and liquidity have a negative influence on bond price.

Hypothesis testing was done by comparing the value of Sig. in each variable with a significant level. If the value of Sig <α (5%), then there is a significant influence of the predictor variable to the dependent variable. Test results in table 4 shows that the value of Sig. for each variable coupon, maturity, and yield is smaller than the significant level of α (5%). This means that the

coupon and yield variables have a significant positive influence on the bond price. On the other hand, maturity variable has a significant negative influence on bond price. In the liquidity variable, the significance test shows different conditions. Sig value. obtained is equal to 0.674. This value is above α (5%). Thus it can be interpreted that the liquidity does not significantly influencethe bond price.

F-test was used as determining the goodness of fit of the model. The main purpose is to determine whether the resulting estimation model is appropriate to explain the influence of predictor variable, which consist of coupon, maturity, yield, and liquidity against response variables.

Table 5: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6729,571	4	1682,393	46,481	,000[b]
	Residual	1230,641	34	36,195		
	Total	7960,212	38			

a. Dependent Variable: Fair_Price
b. Predictors: (Constant), Liquidity, Maturity, Coupon, Yield

ANOVA test results in table 5 shows the Sig value of 0.000. Thus, the resulting model is a model said to be feasible because of the Sig value lower than α (5%). The final step of the test is to determine the amount of contribution of influence of predictor variable together to the response variable. Referring to table 1 the value of Adjusted R^2 is 0.827. This result shows that simultaneously the contribution of all predictor variables to the movement of bond price as the response variable is 82.7%.

Coupon is the interest rate promised by the issuer of bonds in each period, annually or semi annualy, to investors of bondholders as a fringe on the investment that has been made at the moment (Sari and Sudjarni, 2016). According to Edward (2007), the higher coupon rate offered by bonds, it will make the bonds become more attractive for investors. In addition, government bonds observed in this study are bonds that offer a fixed coupon rate. Since the coupon rate is fixed, it will be free of market interest rate fluctuations, something that investors do not like because they will make income unstable (Subagia and Sedana, 2016). This condition is understandable given the level of bond coupons is one of the factors that investors consider in investing in certain bonds. The combination of these two positive factors is high coupon and fixed rate, directly on the increasing demand for the bonds. Higher demand will cause the price of the bonds to increase. The results of this study are in line with research conducted by Dewi et al (2016). However, this study is in contrast to the results of research Achmad and Setiawan (2007) stating that there is no significant relationship between coupon and bond price.

According to Tandelilin (2010:279),maturity has a negative influence on changes in bond prices. The longer the maturity of a bond, the higher the possibility of a bond being exposed by risks.

These risks include interest rate risk, currency exchange risk, economic and political risk that will shape the country's risk country issuing the bonds. The capital inflow from foreign investment is a driving force in raising bond prices, but on the contrary, outflow of funds can also sharply reverse the price of such bonds. The higher the risk of a bond, the greater the potential risk that will be faced by investors. This has a direct impact on the attractiveness of bonds. As a result, bond prices are declining. Conversely, the shorter the maturity of a bond, the lower the potential bonds are exposed to risk, especially the fundamental risks, so as to reduce the potential risks faced by investors, and therefore will result in higher bond prices. The result of this research is supported by research of Azizah and Hidayat(2016).

However, there is a group of investors who have preference on bonds with a certain maturity. Based on this preference, the coupon rate of these characteristics bonds will depend on the attractiveness between the total number of investors' requests and the amount of bids raised in the market. The power of attraction that drives coupon rates directly impacts the determination of bond price levels (Greenwood and Vayanos, 2010).

Yields have a significant positive influence on the price of Indonesian government bonds. High yields automatically make a bond more attractive and increase investor interest. The accumulation of investor interest that assumes that the bond is an attractive bond will drive buying pressure, and as a result will drive up the price. Andritzky (2012) found that there is a link between high participation of foreign investors and bond price increases. More and more foreign investors are likely to increase bond prices.Nevertheless, the presence of a stable domestic investor base, including the presence of institutional investors, is considered to encourage price stability and bond yields. Based on data released by Indonesian Bond Market Directory,the ownership of Indonesian government bonds consist of institutional and foreign investors with the order of ownership of the largest are commercial banks, insurance, mutual funds, pension funds, central banks and securities firms.. By percentage, ownership of the three largest investor bases (commercial banks, foreigners, and insurance companies) dominates with a portion of about 80%. Accordingly, the results of this study indicate that the yield has a significant positive influence on bond prices. On the other hand, the results of this study are not in line with research conducted by Fitriana and Rohayati (2013) which stated that bond yields negatively influence the price of government bonds.

Harris (2003: 398) stated there are three dimensions of liquidity generally used as a barometer by traders, the dimensions of immediacy, width, and depth. In this study, the dimension of liquidity used is the immediacy dimension, ie the ease of a bond to be used as cash on the secondary market at a certain cost. In other words, liquid bonds are the ones that can be traded in a relatively quick time and at a reasonable price. Therefore, in this study the frequency of transactions is a measure of bond liquidity. High liquidity or high trading frequency will make bond prices stable and tend to push prices to increase. The condition is in line with the opinion of Yuan (2001) in Sari and Sudjarni (2016) which stated that high bond liquidity will cause bonds more attractive because of the high interest of investors to buy bonds. This statement is also reinforced by Kempf and Homburg (2000) who said that the liquidity of bonds influence the price of bonds.

In this study, it was found that liquidity had no significant influence on the price of Indonesian government bonds. This condition can be seen in the relationship between the liquidity of bonds and bond prices that affecting each other. When the bond price is low it will attract investors to buy the bonds and make the frequency of transactions increased which means that liquidity also increases. Government bonds are low risk and relatively secure bonds, especially if they are associated with an investment grade rating given by international rating agencies. Therefore, government bonds still have a high level of attractiveness from the investors perspective. In other words, demand for government bonds do not depend on the price level of the bonds. If it is associated with the investor base of government bonds, institutional investors are investors who like stable investment types so it is not easy to get out or enter the market. Other than that, domestic investors are generally more loyal than foreign investors(Andritzky, 2012).

CONCLUSION

Based on the results of testing, analysis, and discussion in the previous section it can be concluded that coupon and yield have a significant positive influence on the price of government bonds, maturity has a significant negative influence on the price of government bonds. In addition, it is found that there is no significant influence of liquidity which is proxied with the frequency of trading on the price of government bonds of the Republic of Indonesia FR series.

As an alternative to funding sources for state financing, the government should consider several factors before deciding to launch certain types of bonds. These factors include coupon rate and bond maturity.

For the following research, it is advisable to examine topics related to the addition of predictor variables, such as country risk, debt service ratio or others, or compare the influence of predictor variable on the price of government bonds in different developing countries or with developed countries.

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