

CHAPTER II

LITERATURE REVIEW

2.1 Theoretical Background

2.1.1 Bond

A bond is a debt instrument requiring the issuer (also called the debtor or borrower) to repay to the lender/ investor the amount borrowed plus the interest over a specified period of time (Horne, 2002). A bond is normally an interest rate-only loan, meaning that the borrower will pay the interest every period, but none of the principal will be repaid until the end of the loan (Ross, Westerfield, & Jordan, 2003).

(Fabozzi, 2000) A fundamental property of bond is that its price changes in the opposite direction from the change in the required yield. The reason is that the price of the bond is the present value of the cash flows. As the required yield increases, the present value of the cash flow decreases; hence the price decreases. The opposite is true when the required yield decreases: the present value of the cash flows increases, and therefore the price of bond increases. The expected cash flows are determined from bond characteristics or bond contract (Brealey, 2006).

Bonds are loans lasting from 12 months to over 30 years that normally pay interest at regular intervals and with repayment of their principal on the maturity date. Bonds are also known as debt, credit and fixed-income market (Mobius, 2012). Bond as a debt instruments requires from the issuer (debtor or borrower) to repay to the lender/

investor the amount borrowed (principal) plus interest over a specified period of time. A key feature of a bond is the nature of the issuer, which is usually divided in three groups: government, municipalities and corporations (domestic and foreign) (Ivanovskia, Stojanovskib, & Ivanovskac, 2013).

There are four main types of bond (Romzi, 2013):

1. Treasury bonds

These bonds are issued by the government. Some kinds of treasury bonds issued in Indonesia are Surat Utang Negara (SUN), State Sharia securities (Sukuk), Fixed-rate bond, the State variable bonds. This bond is risk-free rate means no default risk.

2. Corporate bonds

Corporate bonds are bond which is issued by corporate. These bonds have higher risk rather than Treasury bond. The higher risk of corporate bonds caused these bonds have higher coupon payment compared to treasury bonds.

Corporate bonds are debt obligating of a corporation to pay periodic interest with full repayment at maturity. Corporate bonds are classified by the type of issuer. The four general classifications are (1) Public utilities, (2) transportation, (3) banks/finance, and (4) industrial. The essential features of a corporate bond are relatively simple. The corporate issuer promises to pay a specified percentage of par values on designated dates (the coupon payments) and to

repay par or principal value of the bond at maturity. In order to estimate the ability of the issuer to live up to its future contractual obligations, professional money managers use various techniques to analyze information on companies and bond issues one of them is by using three rating systems. The commercial rating companies are (1) Moody's investors Service, (2) Standard and Poor's Corporation, and (3) FitchRatings. In Indonesia, the most outstanding commercial rating company is Pefindo.

3. Municipal bonds

These bonds are issued by local government (province). Municipal bonds have default risk as corporate bonds. Usually if the bondholders are local resident, it is free of tax for the coupon rates.

4. Foreign bonds

Foreign bonds are issued by foreign governments or foreign corporations. Additional risk exists if the bonds are denominated in foreign currency.

According to Brigham and Ehrhardt (2005) bonds have some characteristics:

1. Par value

It is the stated face value of the bond that represents the amount of money the firm borrows and promises to repay on the maturity date.

2. Coupon rate

It is the fixed payment of bond issuers to the bond holders in terms of certain amount of coupon (quarterly, semi-annually or annually).

3. Maturity date

It is a specified date on which the par value must be repaid by the bond issuers.

4. Provisions to call or redeem bonds

It is a right which gives the issuers to call the bonds for redemption.

5. Sinking funds

It facilitates the orderly retirement of the bond issue.

6. Other features

Some bonds have certain features, such as convertible bonds which can be converted into common stock, warrants, income bonds, etc.

2.1.2 Bond Yield

Return on bond investment is source of income for the investors who allocate their money to buy a retail bond/corporate bond/government bond. One of the important thing that is to be considered before they decide to invest in bond is the amount of bond yield as a measurement tool to know the annually rate of return. There are two terminologies in calculating yield, *current yield* and *yield to maturity*. (Fabozzi, 2000)

2.1.2.1 Current yield relates the annual coupon interest to the market price.

The formula for the current yield is:

$$\text{Current yield} = \frac{\text{annual dollar coupon interest}}{\text{Price}}$$

2.1.1.2.2 Yield to maturity (YTM) is computed in the same way as the yield (internal rate of return); the cash flows are those that the investor would realize by holding the bond to maturity.

$$P = \sum_{t=1}^n \frac{C}{(1+y)^t} + \frac{M}{(1+y)^n}$$

Explanation:

C = coupon

n = period of time to maturity (in year)

R = redemption value

P = purchasing value

2.1.3 Yield Spreads

Yield is return on bond investment in form of percentage. Yield to maturity is compounded rate of return investor get when they buy the bond in current price and hold it until maturity date. Yield to maturity is measure of yield reflects return and compounded rate of return which is expected by investor, if two assumptions are signalized can be fulfilled, then yield to maturity is expected same as realized yield. First assumption is investor will hold their bond until maturity date. Value that investor get if the first assumption is fulfilled called Yield to Maturity. Second assumption is investor re-invest their income generated from Yield to Maturity (Tendelilin, 2007).

Yield to maturity of bond is rate of return that investor achieved from investing in bond. The yield to maturity considers three sources of dollar return in investing in a bond – coupon interest, reinvestment income, and capital gain (or loss), but is deficient in assuming that all coupon interest can be reinvested at a rate less than the yield to maturity (Fabozzi, 2000).

Higher yield to maturity will cause higher return for investing. When the yield to maturity increase, the discount rate to the bond's remaining cash flows will increase, and then reducing the present value and the bond's price. Investor demands a lower yield to maturity. Lower yield to maturity will reducing the discount rate applied to the bond's cash flows and raising the price (Berk, DeMarzo, & Harford, 2012).

Yield to maturity is referred to as simply yield. The difference between the yields of any two bonds is called a yield spread. Usually the spreads describe in term of "basis point (bps). 1 percentage point is equal to 100 bps. Investor will be able to identify their opportunities by looking at the yield spreads. Higher the yield spread, the greater the difference between two securities or instrument.

2.1.4 Factors Affect Corporate Yield Spread

1. SBI (Certificates of Bank Indonesia)

Bank Indonesia Certificates is Bank Indonesia's tool to control the market operation and banking system which is denominated in Rupiah and issued by central bank as the recognition of short-term

debt. Based on form letter of Bank Indonesia no. 6/4DPM about the issuance and commerce of SBI, there are some characteristics of SBI rate :

- 1) The unit of SBI is Rp 1,000,000.0 (one million rupiah)
- 2) SBI tenor is in 1 month, 3 months, 6 months, 9 months and 12 months which are stated in number of days and calculated from the settlement date until the maturity date.
- 3) SBI issued and traded using discount system.
- 4) Cash transaction value is calculated based on true discount as follows:

$$\text{Cash value} = \frac{\text{Nominal value} \times 360}{360 + \{(\text{discount rate}) \times (\text{duration})\}}$$

- 5) Discount value is calculated as follows :

$$\text{Discount value} = \text{Nominal value} - \text{cash value}$$

- 6) SBI is issued in scriptless form.
- 7) SBI can be traded in secondary market.

Investment in government bonds or SBI is zero-coupon bond. For the tax purposes, the issuer of zero-coupon bonds deducts interest every year even though no interest is actually paid. Similarly, the owner must pay taxes on interest accrued every year, even though no interest is actually paid.

The risk that arises for bond owners from fluctuating interest rates is called interest rate risk. How much interest risk a bond has

depends on how sensitive its price is to interest rate changes. This sensitivity directly depends on two things: the time to maturity and the coupon rate. The longer the time to maturity, the greater the interest rate risks. The lower the coupon rate, greater the interest rate risk.

If a bond sold at par (at its face value), the only return investors will earn is from the coupon that the bond paid. Therefore, the bond's coupon rate will exactly equal its yield to maturity. As interest rate in the economy fluctuates, the yield (Berk, DeMarzo, & Harford, 2012) that investors demand to invest in bonds will also change.

The movement of interest rate (SBI rate) has a significant impact to the fixed income. Investor hopes that the rising interest rate will give the more investment alternatives because people prefer to buy SBI that provide higher interest. The higher interest rate will affect commercial rates. Bonds price have inverse correlation with interest rate, when the commercial rates increase, it will decrease bond price. Investor can realize their capital gains when government cut off the interest rate because the cut-off affects appreciation of bond's price.

A higher yield to maturity means that investors demand a higher return for investing. They apply a higher discount rate to the bond's remaining cash flows, reducing their present value and hence the

bond's price. The reverse holds when interest rates fall. Investor then demands a lower yield to maturity, reducing the discount rate applied to the bond's cash flows and raising the price. Therefore, as interest rates and bond yields rise, bond prices will fall, and vice versa, so, that interest rates and bond prices always move in the opposite direction (Berk, DeMarzo, & Harford, 2012).

Good macro-economic rate will cause the interest rate getting lower, vice versa. Black and Scholes (1973) and Merton (1974) introduced structural model to describe corporate default risk and found that interest rate may change corporate yields spreads. The rise of loan interest rate has negative impact to issuer because it will increase interest expense and decrease net income. Lower net income cause the profit per stock decreases and the default risk increases for the issuer. Beside of that, higher interest rate will push the investor to sell the bond and then save their money in deposit form. The enlargement of yield spread may happen due to investor sell their corporate bond and buy government bond which is more secure rather than corporate bond or also known as flight to quality.

Based on Rose and Marquis (2009) interest rate has four functions for the economy of a country:

- 1) Interest rate facilitates the flow of current savings into investments that promote economic growth.

- 2) Interest rate allocates the available supply of credit to those investment projects with the highest return.
- 3) Adjustment in interest rate can bring the supply of money into balance with demand.
- 4) Interest rate is important tool for government policy through their influence on the volume of saving and investment.

2. Time to Maturity

According to Fabozzi (2000), the price of bond will fluctuate over its life as yields in the market change. The time remaining on a bond's life is referred to its term to maturity. The longer the term to maturity of a bond, the greater the price volatility resulting from a change in the market yields. Generally bonds are classified into three maturity sectors:

- (1) Short term : 1- 5 years
- (2) Intermediate term : 5- 12 years
- (3) Long term : > 12 years

A key bond-interest rate relationship is that bond prices are inversely proportional to changes in market interest rates. This means that all else equal, long-term bonds are more sensitive to interest rate changes than short - term bonds (Ivanovskia, Stojanovskib, & Ivanovskac, 2013). Bond with longer term to maturity has greater risk rate and caused the yield achieved by the investor will be different compared to the corporate bond with

shorter time to maturity. Generally, the change of bond price is caused by the period of time to maturity. Basically, when the interest rate changes, bond price with longer term to maturity will be more affected rather than bond with shorter-term to maturity.

According to Ziebart & Reiter (1992), they found that years to maturity are negatively affect the bond yields.

3. Coupon rate

The coupon rate, also called nominal rate, is the interest rate that the issuer agrees to pay each year. All bonds make periodic coupon payments. Zero-coupon bonds, the holder of a zero-coupon bond realizes interest by buying the bond substantially below its principal value. Interest then paid at the maturity date, with the exact amount being difference between the principal value and the price paid for the bond. Floating-rate bonds also exist, for these bonds coupon rates are reset periodically according to a predetermined benchmark (Fabozzi, 2000).

Coupon rate of bond has two characteristics:

(1) Fixed Rate Bond

A bond pays the same amount of interest for its entire term.

The benefits of owning a fixed-rate bond is that investors know with certainty how much interest earned and the duration. An investor who wants to earn a guarantees interest rate for a specified term could purchase a fixed-rate treasury

bond, corporate bond or municipal bond. A key risk of owning fixed-rate bonds is interest rate risk, or the chance that bond interest rates will rise, making an investor's existing bonds less valuable (Investopedia).

(2) Floating Rate Bond (variable rate bonds)

Bond Interest rate is adjusted periodically based on the Treasury Bills interest rate or the average time deposits of certain banks. Bond variable interest rate issued by the government in order to recap the interest rate determined every three months based on 3-month SBI interest rate (IDX, 2012).

(Romzi, 2013) Coupon rates are typically calculated on annual basis, known as the annual percentage rate, since coupon rate is a cost, firms tend to minimize it in order to be efficient in their financing decisions. Therefore, managers tend to time the issuance of bond based on the level of bonds coupon rate in the market.

If the coupon rate gets higher, at least there are two implications for the firms; (1) firms coupon expense will increase, especially for the firms which have higher bond, thus exposing the firms to bankruptcy, and (2) it is possible that common goods that are used in firms production increase too, this will increase the firms operational expenses. These two

implications lead to the potential of decreasing in firm's net income.

Graham and Harvey (2001) find coupon rate is the most important factor considered in borrowings. Their survey provides evidence CFOs attempt to time the coupon rates by issuing bond when they think that the market bond's coupon rates are occasionally low.

2.2 Previous Research

There are many empirical research focused on this study, Duffee (1998), Jacoby, Liao, and Batten (2009), and Morris, Neal, and Rolph (2000) investigated yield spread dynamics by estimating the effect of government rates on yield spreads not only over the long-run, but also over the short-run. Most researchers in this area apply standard regression analysis on changes over time in yield spreads as a function of changes in government rates (Duffee, 1998 and Jacoby et al, 2009). However, some argue that this approach lacks empirical power since they find evidence that the time series of yields on corporate and government bonds are non-stationary. To avoid problems associated with non-stationary, Duffee (1998) and Jacoby et al (2009) apply statistical analysis on changes in bonds' interest rates rather than their levels.

Duffee (1998) finds that the relation of both callable and noncallable bond yield spreads and treasury yields is negative. However, this negative relation is much stronger for callable bond issues. The relation is also found to be more negative for high-priced callable bonds than for low-priced callable bonds. This is

because the call option for high-priced callable bonds is deeper in the money. Lower coupon rates of treasury bonds as compared with corporate bonds reflect the higher duration of treasury bonds.

Ibrahim (2008) used multiple linear regression in testing the effect of interest rate, bond rating, firm size, and debt to equity ratio of 22 corporate bond yields period 2004-2006. He found that interest rate and DER positively related to the corporate yields, bond rating and firm size negatively related to corporate bond yield.

Longstaff and Schwartz (1995) find that yield spreads are negatively related to interest rates. They account for this result by presuming that the correlation between the value of the firm's assets and the risk free rate is negative, their regression analysis yields a negative yield spread-treasury rate relation, decreasing in magnitude as credit rating of the bond issue increases.

MNR (2000) use co-integration approach to model the relation between corporate and treasury yields. They use monthly averages of daily yields for 10-year constant maturity treasury bonds and Moody's Aaa and Baa seasoned bond indices obtained from the Board of Governors of the Federal Reserve System. The sample size of each data series sums to a total of 456 observations. They show that corporate rates are co-integrated with treasury rates. Theoretically, this result suggests that the dynamics of this relationship is time-varying-the relation between corporate and treasury rates is positive in the long-run and negative in the short-run. Intuitively, this pattern implies the same time-dependent relation for the relation between yield spreads and treasury yields. To confirm this, they compute

the separate impulse response functions for corporate and treasury yields as a result of a shock in the treasury yield. Then they find the implied change in yield spreads by taking the difference between the two functions.

Shiller (2012) applied two commonly used cointegration techniques to study the relation between corporate yields and government yields and derive implications for the relation between yield spreads and government yields. The hypothesis of non-stationarity for corporate and government yields is not supported. They found preliminary evidence of the existence of cointegrating relation between corporate and government yields based on the Engle-Granger method. The effect of a shock to the 10-year government yield appears to have a consistently negative impact on A and BBB yields spreads, both over the short-run and long-run.

Table 2.1
Summary of Previous Research

Title/ researcher/ year	Variable	Method of analysis	Result
The Relation between Treasury Yields and Corporate Bond Yield Spreads: an Empirical Analysis/Duffee/ 1998	Yield Spreads and the slope of the treasury term structure	Standard regression analysis,	The relation between the yields spreads and the slope of the treasury term structure is negative
Pengaruh Tingkat Suku Bunga, Peringkat Obligasi, Ukuran Perusahaan dan DER Terhadap Yield to Maturity Obligasi Korporasi di Bursa Efek Indonesia Periode Tahun 2004-2006/ Ibrahim/2008	Yields Spread, Interest rate, bond rating, firm size, and debt to equity ratio	Multiple Linear Regression	Interest rate and DER are positively related to the corporate yields, bond rating and firm size negatively related to corporate bond yield.
Analisis Pengaruh Likuiditas Obligasi,	Bond liquidity,	Multiple Linear	Bond liquidity and coupon rate are

Coupon dan Jangka Waktu Jatuh Tempo Obligasi Terhadap Perubahan Harga Obligasi di Bursa Efek Surabaya/Krisnilasari/2007	coupon rate, time to maturity, price of bond	Regression	positively related to the change of bond price. Time to maturity is negatively related to the change of price of bond.
A Simple Approach to Valuing Risky Fixed and Floating Rate Debt/ Longstaff and Schwartz/ 1995	Default Risk, credit spread and interest rate	Regression analysis	Credit spread is negatively related to interest rate
Canadian Interest Rate and Yield spread Dynamics/Shiller/2012	Corporate yield spread and government yields spread	Cointegration analysis	The effect of a shock to the 10-year government yield appears to have a consistently negative impact on A and BBB yields spreads, both over the short-run and long-run.
Interest rate and Yield Spreads Dynamics / Morris, Neal and Rolph/2000	Corporate and treasure yields	Cointegration analysis	The dynamics of the relationship is time-varying- the relation between corporate and treasury rates is positive in the long-run and negative in the short-run

Source: Duffe (1998), Ibrahim (2008), Krisnilasari (2007), Longstaff and Schwartz (1995), Shiller (2012), Morris, Neal and Rolph (2000)

2.3 Hypothesis Development

The hypotheses developed in this research are:

H_{a1} : There is cointegration between SBI rate corporate and yield spreads both in short-run and long-run relationship.

H_{a2} : There is cointegration between time to maturity and yield spreads both in short-run and long-run relationship.

H_{a3} : There is cointegration between coupon rate affects yield spreads both in short-run and long-run relationship.

