Stock and Bond Valuation

Definition of Stock

Stock can be defined as a sign of capital participation of a person or party (business entity) in a company or limited liability company.

By including the capital, the party has a claim on the company's income, claims on company assets, and is entitled to attend the General Meeting of Shareholders (GMS). (Idx.co.id)

Types and Characteristic of Stock

PREFFERED STOCK	COMMON STOCK
A hybrid securities with the characteristics of common stock and bonds. Similar to common stock in that it has no maturity, dividends cannot reduce taxes, not paying dividends does not cause bankruptcy. SIMILAR to bonds because they provide a fixed amount of dividends.	Common stock represents ownership in the company.
Companies can issue more than one series or class of preferred stock with different priorities with respect to assets at the time of bankruptcy.	Does not have a maturity date, remains as long as the company exists.
Claims against assets Fulfilled AFTER Bonds and BEFORE common stock.	Common stockholders cannot claim assets before creditors, bondholders, and preferred stock.
Cumulative Traits Claims all unpaid preferred stock dividends before the common stock dividends are declared. (to guarantee the rights of preferred shareholders)	**Revenue Claim** have profit rights after taking into account the payment of rights to bondholders and preferred stock. **Claims Against Assets** If the company goes bankrupt, claims on the remaining assets after the bondholders and preferred stock are met.
Allows it to be changed to a number of common shares if the holder so desires	**Voting Rights** Selecting the board of directors. Preemptive rights give shareholders the right to maintain a percentage of share ownership in the company, period of 2-10 weeks at a price below the market price.

Stock Value

BOOK VALUE

Total equity divided by number of shares

INTRINSIC VALUE

- Variety of models are used for estimation
- Present value of all cash flows

MARKET PRICE

The value of the market mechanism

Stock Value

UNDERVALUED

If Intrinsic Value > Market Price
Decision : BUY

FAIRLY PRICED

If Intrinsic Value = Market Price
Decision : HOLD

OVERVALUED

If Intrinsic Value < Market Price
Decision : SELL

Stock Valuation

Preffered Stock

Preffered Stock Value, Vps = $\frac{D}{Kps}$

Example :
Microsoft has preferred stock with dividends paid out at $1,500 annually. The rate of return that investors want is 14%. What is the value of preferred stock now?

Vps = $\frac{D}{Kps}$ = $\frac{1500}{0,14}$ = $10.000

Stock Valuation

Common Stock

1. Single Holding
2. Dividend Discount Model
   - Zero Growth Model
   - Constant Growth Model (Gordon Model)
   - Two-stage Growth Model (Supernormal Growth Model)

Stock Valuation

Common Stock

1. Single Holding

$$\text{Common Stock Value, Vcs} = \frac{D1}{(1+Kcs)} + \frac{P1}{(1+Kcs)}$$

D1 = First year dividend
P1 = Market price for the first year
kcs= investors required rate of return

Example :
An investor plans to buy Telkom's common shares at the beginning of this year. The expected dividend at the end of the year is Rp. 400 and the market price at the end of the year is projected at Rp. 4.000. If the required rate of return for investors is 15%, what is the value of Telkom's shares?

$$\text{Common Stock Value, Vcs} = \frac{D1}{(1+Kcs)} + \frac{P1}{(1+Kcs)} = \frac{400}{(1+0{,}15)} + \frac{4000}{(1+0{,}15)} = \text{Rp. } 3.826$$

Stock Valuation

Common Stock

2. Dividend Discount Model

- Zero Growth Model

  Common Stock Value, Vcs = $\frac{\mathrm{D0}}{(Kcs)}$

Example :
Dividend Telecom is expected to be constant Rp. 300 each stock. If the expected rate of return on the stock is 15%, what is the value of the stock?

Common Stock Value, Vcs = $\frac{\mathrm{D0}}{(Kcs)} = \frac{300}{0{,}15}$ = Rp. 2.000

Stock Valuation

Common Stock

2. Dividend Discount Model

- Constant Growth Model (Gordon Model)

  Common Stock Value, Vcs = $\frac{D0\ (1+g)}{Kcs-g} = \frac{D1}{Kcs-g}$

$$g = ROE\ x\ r$$

g	= growth rate of future earnings
ROE	= return on equity
r	= profit retention rate (1- dividend payout percentage rate)

Example :
This year Telecom company paid dividends of Rp. 500 and dividends are expected to increase by 2% per year until t=∞. If the rate of return is 12%, what is the value of the company's shares?

Common Stock Value, Vcs = $\frac{500\ (1+0{,}12)}{0{,}12-0{,}02} = \frac{560}{0{,}10}$ = Rp. 5.600

Stock Valuation

Common Stock

2. Dividend Discount Model

- Two-stage Growth Model (Supernormal Growth Model)

$$Vcs = \frac{D_0(1+g_1)^1}{(1+k_{cs})^1} + \frac{D_0(1+g_1)^2}{(1+k_{cs})^2} + \ldots + \frac{D_0(1+g_1)^n}{(1+k_{cs})^n} + \left[\frac{1}{(1+k_{cs})^n} \; x \; \frac{D_{n+1}}{k_{cs}-g}\right]$$

Example :

Estimate the current value of Telecom's common stock. Assume: The most recent annual dividend payment of Telecom was $5 per share. The firm's financial manager expects that these dividends will increase at an 5% annual rate over the next 2 years. At the end of the 2 years the firm's mature product line is expected to result in a slowing of the dividend growth rate to 3% per year forever. The firm's required return, kcs , is 10% .

Common Stock Value, Vcs = $\frac{5(1+0{,}05)^1}{(1+0{,}10)^1} + \frac{5(1+0{,}05)^2}{(1+0{,}10)^2} + \left[\frac{1}{(1+0{,}1)^2} \; x \; \frac{5(1+0{,}05)^3}{(0{,}1-0{,}03)}\right]$ = 4,77 + 4,55 + 68,4

= $.77,72

Expected Rate of Return

Preffered Stock

Preffered Stock Expected rate of return, Kps = $\frac{D}{Po}$

Po = Preferred stock market price

D = Dividen

Example :
The current market stock price of the Telecom is Rp. 5.000 and pays a dividend of Rp. 400/stock on each year. What is the expected rate of return of the stock?

Preffered Stock Expected rate of return , Kps = $\frac{400}{5000}$ = 0,08 = 8%

Expected Rate of Return

Common Stock

Common Stock Ex Rate of Return , Vcs = $\frac{D1}{Po} + g$

Po = Common stock market price
D1 = Next period of Dividen
g = Growth of dividen

Example :
The current market stock price of the Telecom is Rp. 5.000 and last year, it paid a dividend of Rp. 400 per year with a growth rate of 10%. What is the expected rate of return of the stock?

Common Stock Ex Rate of Return , Vcs = $\frac{400\ (1+0{,}1)}{5000} + 0{,}1 = 0{,}188 = 18{,}8\%$

Definition of Bond

Bonds are **long-term contracts** in which the borrower agrees **to make payments** of interest and principal **on a certain date** to the bondholders.

Characteristic of Bond

1

The Face Value or Par Value is the stated par value of the bond for illustrative purposes, usually assuming the par value is $1,000 although any multiple of $1,000 (for example, $5,000 or $5 million) may also be used. The par value usually reflects the amount of money borrowed by the company and promised to be repaid at the maturity date.

Characteristic of Bond

2

Coupon Payment is a certain amount of interest that is paid annually.
However, in some cases, the coupon payments of a bond may vary from time to time.

- **Floating-Rate Bond**: a bond whose interest rate fluctuates according to changes in general interest rates.
- **Zero Coupon Bonds**: a bond that pays no annual interest, but is sold at a discount below par so as to compensate investors in the form of capital appreciation.
- **Original Issue Discount (OID) Bonds**: any bonds that are initially offered at a price below par.

Characteristic of Bond

3 **Maturity Date**: a predetermined date to pay off the par value of a bond.

4 **Sinking Fund Provision**: a provision in a bond contract that requires the issuer to pay off a portion of the bond's issuance annually. Generally, issuers can meet the redemption fund requirements in one of the two ways below.

- The company can repurchase to redeem (at par value) a certain percentage of bonds each year; for example, the company can redeem 5% of the total initial issue amount at a price of %1,000 per bond. The bonds are numbered sequentially, and the bonds to be repurchased for redemption will be determined by a draw arranged by the trustee.
- The company can buy the requested bonds on the open market.

Characteristic of Bond

5

Other Features

- **Convertible Bonds**: bonds that can be exchanged for shares of common stock at a fixed price at the option of the bondholder.
- **Putable Bonds**: bonds with conditions that allow investors to resell the bonds to the company before the maturity date.
- **Income Bonds**: bonds that pay interest only if the company has enough profit to pay the interest.

Types of Bond

Government Bonds (Treasury Bonds)

Bonds issued by the federal government, also known as state bonds.

Municipal bonds or muni

Bonds issued by state and local governments.

Corporate Bonds

Bonds issued by companies.

Foreign Bonds

Bonds issued by foreign governments and foreign companies

Bond Valuation

The value of a financial asset such as a stock, bond, lease, or even a physical asset such as an apartment building or machine. In the case of floating-rate bonds, interest payments will vary from time to time. For a zero-coupon bond, there are no interest payments so the only cash flow is the par value when the bond matures.

$$\text{Bond Valuation, VB} = \frac{\text{INT}}{(1+kb)^1} + \frac{\text{INT}}{(1+kb)^2} + \ldots + \frac{\text{INT}}{(1+kb)^{\text{N}}} + \frac{\text{M}}{(1+kb)^N}$$

$$= \sum_{t=1}^{N} \frac{\text{INT}}{(1+rd)^1} + \frac{\text{M}}{(1+rd)^N}$$

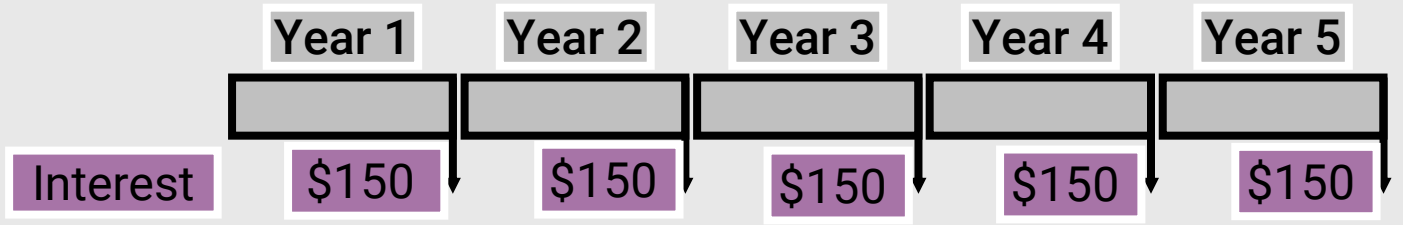
INT = Interest (coupon rate x par value)
Kb = Market rate of interest
M = Face value or Par Value
N = period of ..

Bond Valuation

Example :

A Bond has a face value of $1,000 and pays an annual coupon of 15% and will reach maturity in 5 years.

Market rate of interest (kb) is 10%. What is the issue price of the bonds?



$$VB = \frac{INT}{(1+kb)^1} + \frac{INT}{(1+kb)^2} + \ldots + \frac{INT}{(1+kb)^N} + \frac{M}{(1+kb)^N}$$

$$= \frac{150}{(1+0,1)^1} + \frac{150}{(1+0,1)^2} + \frac{150}{(1+0,1)^3} + \frac{150}{(1+0,1)^4} + \frac{150}{(1+0,1)^5} + \frac{1000}{(1+0,1)^5}$$

$$= 136,4 + 123,9 + 112,7 + 102,45 + 93,14 + 620,92$$

$$= 1.189,49$$

Bond Valuation

To evaluate **semiannual bonds**, we must change the valuation model to be as follows.

1. **Divide the annual interest payment by 2** to get the dollar amount of interest paid every six months.
2. **Switch the number of years to maturity, N, by 2** to determine the number of semiannual periods.
3. **Divide the nominal (stated) interest rate, rd, by 2** to determine the periodic (semi-annual) interest rate

By making the changes above, it will produce the following equation to calculate the value of semi-annual bonds

$$VB = \sum_{t=1}^{2N} \frac{INT/2}{(1+rd/2)^{1}} + \frac{M}{(1+rd/2)^{2N}}$$

Bond Valuation

Example :

A Bond has a face value of $1,000 and pays a **semiannual** coupon of 6% (12% annually) and will reach maturity in 2 years. Market rate of interest (kb) is 10%.
What is the issue price of the bonds?

$$VB = \sum_{t=1}^{2N} \frac{INT/2}{(1+kb/2)^1} + \frac{M}{(1+kb/2)^{2N}}$$

$$VB = \frac{120/2}{(1+0{,}1/2)^1} + \frac{120/2}{(1+0{,}1/2)^2} + \frac{120/2}{(1+0{,}1/2)^3} + \frac{120/2}{(1+0{,}1/2)^4} + \frac{1000}{(1+0{,}1/2)^4}$$

$$= \frac{60}{(1+0{,}05)^1} + \frac{60}{(1+0{,}05)^2} + \frac{60}{(1+0{,}05)^3} + \frac{60}{(1+0{,}05)^4} + \frac{1000}{(1+0{,}05)^4}$$

$$= 57{,}1 + 54{,}4 + 51{,}8 + 49{,}4 + 822{,}7$$

$$= 1035{,}4$$

Bond Valuation

1. The value of a bond is inversely proportional to changes in the investor's desired rate of return (current interest rates). In other words when interest rates increase (decrease), bond values decrease (increase).

2. The market value of a bond will be smaller than its face value if the desired rate of return is greater than the bond interest rate (**Discount**); however bonds will be valued higher than face value if the desired rate of return is less than the bond interest rate (**Premium**)

3. The closer the maturity date of the bond, the market value of the bond will be closer to its par value (**Nominal Value**)

4. Long-term bonds have a higher interest rate risk than short-term bonds

5. The sensitivity of a bond's value to changes in interest rates depends not only on the length of time to maturity, but also on the pattern of cash flows generated by the bond.

Bond Yield

Yield to Maturity (YTM): the rate of return received on a bond if the bond is held to maturity. In other words, it is the internal rate of return (IRR) of an investment in a bond if the investor holds the bond until maturity, with all payments made as scheduled and reinvested at the same rate.

$$\text{YTM} = \frac{Coupon\ Payment + \frac{Face\ Value - Market\ Price}{N}}{\frac{Par\ Value + Market\ Price}{2}}$$

N = Number of years to maturity
Face Value = Bond's Maturity Value or Par Value
Market Price = The bond's Price Today

Example YTM:
A Bond has a face value of $1,000 and pays an annual coupon of 15%.
The bond's market price is $850 and will reach maturity in 7 years.

$$\text{YTM} = \frac{\$150 + \frac{\$1000 - \$850}{7}}{\frac{\$1000 + \$850}{2}} = 0.1853 = 18{,}53\%$$

Bond Yield

Yield to Call (YTC): the rate of return received on a bond if the bond is redeemed before its maturity date.

$$YTC = \frac{Coupon\ Payment + \frac{Call\ Price - Market\ Price}{N}}{\frac{Call\ Price + Market\ Price}{2}}$$

N = the number of years remaining until the call date

Market Price = current market price of a bond

Example :

consider a callable bond that has a face value of $1,000 and pays an annual coupon of 10%. The bond is currently priced at $1,175 and has the option to be called at $1,100 five years from now.

$$YTC = \frac{\$100 + \frac{\$1100 - \$1175}{5}}{\frac{\$1100 + \$1175}{2}} = 0{,}074 = 7{,}4\ \%$$

Bond Yield

Current Yield: the annual interest payments on a bond divided by the bond's current price.

Example :
A bond has a current price of $4,000 and a coupon of $300.

Current Yield = $\frac{\$300}{\$4000} = 0{,}075 = 7{,}5\ \%$