FN 201: Lecture Note 6
Interest rate and bond valuation

Dr. Winai Homsombat

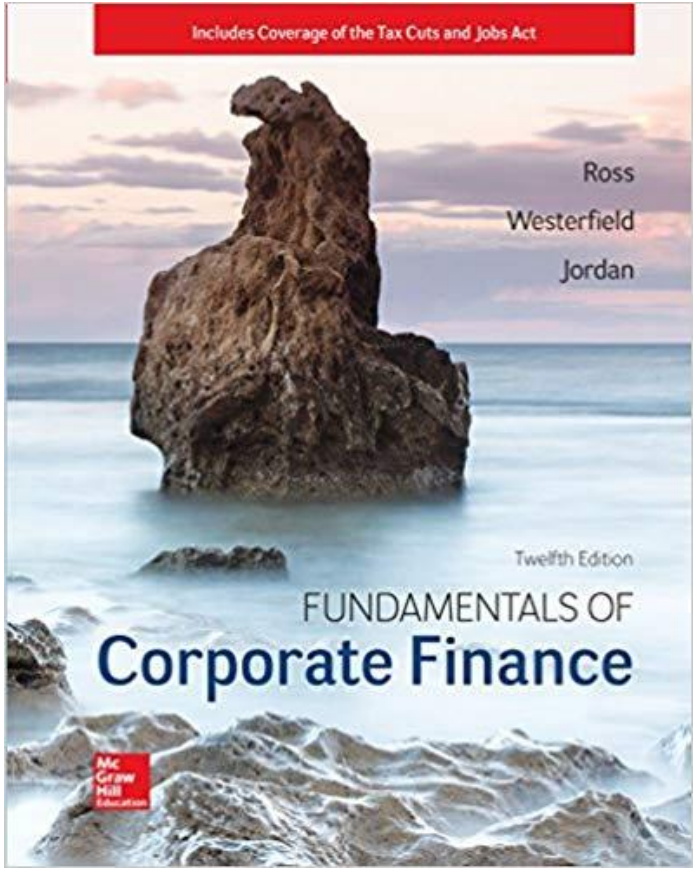
Bachelor of Economics, International Program

Thammasat University

Reading

- Ross, S.A., Westerfield, R.W., Jordan, B.D., (2012). Fundamentals of Corporate Finance. 10th Edition. New York: McGraw-Hill/Irwin.

Chapter 7



Key Concepts and Skills

- Define important bond features and types of bond
- Explain bond values and yields and why they fluctuate
- Illustrate the term structure of interest rates and the determinants of bond yields

Outline

- Bonds and Bond Valuation
- Determinants of Bond Yields

Bonds and Bond Valuation

Bond Definitions

= A long-term debt instrument in which a borrower agrees to make payments of principal and interest, on specific dates, to the holders of the bond.

- Par value (face value) = principal amount, repaid at maturity
- Coupon = stated interest payment
- Coupon rate = annual coupon divided by face value
- Maturity date
- Yield or Yield to maturity = rate of return required in the market for the bond

Examples of Thai Bonds

A204A : SECURED DEBENTURES OF AREEYA PROPERTY PUBLIC COMPANY LIMITED NO. 2/2560 DUE B.E. 2563 WITH THE ISSUERS RIGHT OF EARLY REDEMPTION

Symbol	A204A	Registration Date	5 April 2017
Issuer	AREEYA PROPERTY PUBLIC COMPANY LIMITED	Name (Thai)	หุ้นกู้มีประกันของบริษัท อารียา พรอพเพอร์ตี้ จำกัด (มหาชน) ครั้งที่ 2/2560 ครบกำหนดไถ่ถอนปี พ.ศ. 2563 ที่ผู้ออกหุ้นกู้สามารถไถ่ถอนได้ก่อนครบกำหนด
ISIN Code (Local)	TH077003U408	Put/ Call Option	CALL
ISIN Code (Foreign)		Collateral	1. Real Estate of THE AVA RESIDENCE SUKHUMVIT Valued THB 995,344,041 by agency for real estate affairs co. ltd 2. Real Estate of AREEYA SAWANA 3 Valued THB 300,393,760 by southeast asia international co. ltd 3.Land Deed No.13766,13767,14758,16037 of areeya property Valued THB 364,014,000 by southeast asia international co. ltd
Bond Type	[Senior][Secured]	Payment Frequency	Quarterly
Initial Par	THB 1,000.0000	Calculation Method	30/360
Current Par	THB 1,000.0000	Issue Term (Year)	3.0 Yrs.
Issue Size	THB 1,500.00 mln.	Issue Date	5 April 2017
Outstanding Size	THB 1,500.00 mln.	Maturity Date	5 April 2020
Distribution	Private Placement to 13 types of institutional investors plus high net worth investors	Prospectus	

Issue Rating

Rating Agency	Issue Rating	Rating Date

Issuer Rating

Issuer Name	Rating Agency	Issuer Rating	Rating Date

Guarantor Rating

Guarantor Name	Rating Agency	Guarantor Rating	Rating Date

Coupon Payment

Reference	Max.	Min.	From	To
Fixed: 5.950000%			5 Apr 2017	5 Apr 2020

Amortized Schedule

Coupon Date	Principal Amount

Registrar	CIMB THAI BANK PUBLIC COMPANY LIMITED	Debenture Holder Representatives	BANK OF AYUDHYA PUBLIC COMPANY LIMITED
Lead Underwriter(s)	ASIA PLUS SECURITIES COMPANY LIMITED CAPITAL NOMURA SECURITIES PUBLIC COMPANY LIMITED	Financial Advisor(s)	-

Examples of Thai Bonds

ABPSPV214A : Guaranteed Debentures ofAmata B.Grimm Power SPV1 Company LimitedNo. 1/2560Series 2Due B.E. 2564

Symbol	ABPSPV214A	Registration Date	21 April 2017
Issuer	AMATA B.GRIMM POWER SPV1 COMPANY LIMITED	Name (Thai)	หุ้นกู้มีผู้ค้ำประกันของบริษัท อมตะ บี.กริม เพาเวอร์ เอสพีวี1 จำกัดครั้งที่ 1/2560 ชุดที่ 2 ครบกำหนดไถ่ถอนปี พ.ศ. 2564
ISIN Code (Local)	TH7954031400	Put/ Call Option	-
ISIN Code (Foreign)		Collateral	-
Bond Type	[Senior][Secured]	Payment Frequency	Semi-annually
Initial Par	THB 1,000.0000	Calculation Method	30/360
Current Par	THB 1,000.0000	Issue Term (Year)	4.0 Yrs.
Issue Size	THB 600.00 mln.	Issue Date	21 April 2017
Outstanding Size	THB 600.00 mln.	Maturity Date	21 April 2021
Distribution	Private Placement to 13 types of institutional investors plus high net worth investors	Prospectus	

Issue Rating

Rating Agency		Issue Rating	Rating Date
Local	TRIS	A-	11 Jan 2019

Issuer Rating

Issuer Name	Rating Agency	Issuer Rating	Rating Date

Guarantor Rating

Guarantor Name	Rating Agency	Guarantor Rating	Rating Date

Coupon Payment

Reference	Max.	Min.	From	To
Fixed: 3.000000%			21 Apr 2017	21 Apr 2021

Amortized Schedule

Coupon Date	Principal Amount

Registrar	BANK OF AYUDHYA PUBLIC COMPANY LIMITED	Debenture Holder Representatives	BANK OF AYUDHYA PUBLIC COMPANY LIMITED
Lead Underwriter(s)	CIMB THAI BANK PUBLIC COMPANY LIMITED SIAM COMMERCIAL BANK PUBLIC COMPANY LIMITED, THE	Financial Advisor(s)	-
Remark	Financial Covenant will be maintain by guarantor		

Bond Price

$$PV = \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \ldots + \frac{Par + C_N}{(1+r)^N}$$

$$\text{Bond Value} = C\left[\frac{1 - \frac{1}{(1+r)^t}}{r}\right] + \frac{FV}{(1+r)^t}$$

Bond Value = PV of coupons + PV of par

Bond Value = PV of annuity + PV of lump sum

Example: Suppose you are reviewing a bond that has a 10% annual coupon and a face value of $1000. There are 20 years to maturity, and the yield to maturity is 8%. What is the price of this bond?

Bond Price – Example

- A Microgates Industries bond has a 10 percent coupon rate and a $1,000 face value. Interest is paid **annually**, and the bond has 20 years to maturity. If investors require a 12 percent yield, what is the bond's value?
- A Macrohard Corp. bond carries an 8 percent coupon, paid **semiannually**. The par value is $1,000, and the bond matures in six years. If investors require a 6 percent yield, what is the bond's value?
- Suppose ABC's bond will mature in 5 years. The redemption value is 1,000 Baht. Coupon is determined to be at 5% annually. The yield to maturity (required yield) is 7%. The coupon will be paid once a year (Frequency). What is the price of this bond?

Bond Prices: Relationship Between Coupon and Yield

- If YTM = coupon rate, then par value = bond price
- If YTM > coupon rate, then par value > bond price
  - Why? The discount provides yield above coupon rate.
  - Price below par value, called a discount bond
- If YTM < coupon rate, then par value < bond price
  - Why? Higher coupon rate causes value above par.
  - Price above par value, called a premium bond

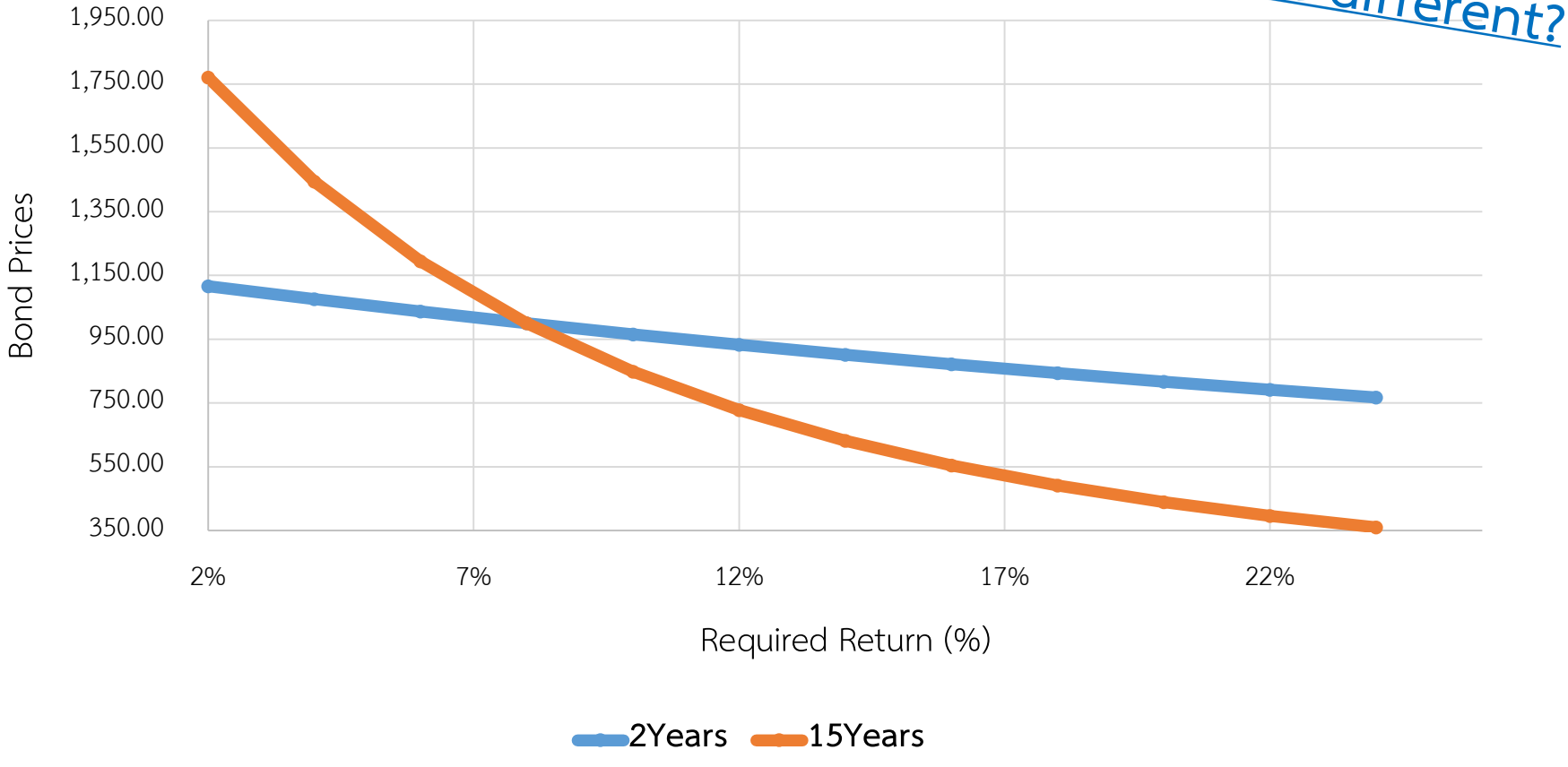
Interest Rate Risk

Both Bond Sam and Bond Dave have 8 percent coupons of the par value at $1,000 and make annual payments. Bond Sam has 2 years to maturity, whereas Bond Dave has 15 years to maturity. Currently, investors require 10 percent yield. If interest rates suddenly rise by 2 percent, what is the percentage change in the price of Bond Sam? Of Bond Dave? If rates were to suddenly fall by 2 percent instead, what would the percentage change in the price of Bond Sam be then? Fill in the following table:

8 percent coupon bonds	Price @ 10%	Price @ 12%	Price @ 8%	% change (+)	% change (-)
Bond Sam – 2 years	$965.29				
Bond Dave – 15 years	$847.88				

Interest Rate Risk

What if coupon rates are different?



Interest Rate Risk

- Price Risk
  - Change in price due to changes in interest rates
  - Long-term bonds have more price risk than short-term bonds.
  - Low coupon rate bonds have more price risk than high coupon rate bonds.
- Reinvestment Rate Risk
  - Uncertainty concerning rates at which cash flows can be reinvested
  - Short-term bonds have more reinvestment rate risk than long-term bonds.
  - High coupon rate bonds have more reinvestment rate risk than low coupon rate bonds.

Determinants of Bond Yields

Yield To Maturity (YTM)

- Yield to Maturity (YTM) is the rate implied by the current bond price.

YTM = Current Yield + Capital gains yield

- Current Yield = annual coupon / price
- Yield to maturity = current yield + capital gains yield
- **Example:** 10% coupon bond, with semiannual coupons, face value of 1,000, 20 years to maturity, $1,197.93 price

Yield to Maturity

Example

- A $1000 treasury bond expires in 5 years. It pays a coupon rate of 10.5%. If the market price of this bond is 1058.345, what is the YTM?

C0	C1	C2	C3	C4	C5
-1058.345	105	105	105	105	1105

Ans. Calculate IRR = 9%

Yield to Maturity

- Macrohard Corp. bond carries an 8 percent coupon. The par value is $1,000, and the bond matures in six years. If the bond currently sells for $911.37, what is its yield to maturity?
- Giles Co. wants to issue new 20-year bonds for some much-needed expansion projects. The company currently has 7 percent coupon bonds on the market that sell for $1,062, and mature in 20 years. What coupon rate should the company set on its new bonds if it wants them to sell at par?
- The Brownstone Corporation's bonds have 5 years remaining to maturity. Interest is paid annually, the bonds have a $1,000 par value, and the coupon interest rate is 9%.

    a. What is the yield to maturity at a current market price of (1) $829 or (2) $1,104?

    b. Would you pay $829 for one of these bonds if you thought that the appropriate rate of interest was 12%? Explain your answer.

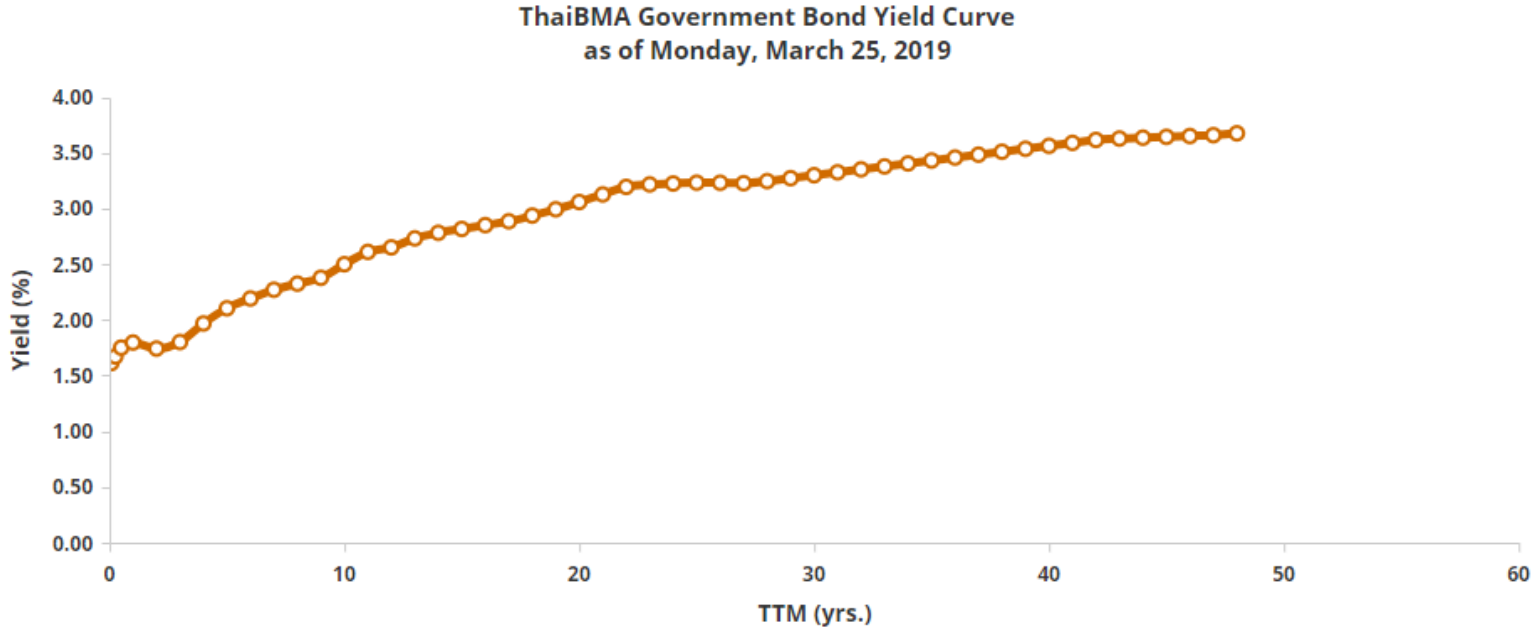
Yield Curve

Government Bond Yield Curve

Download Avg. Bidding Yield : 1999 Go

Download Yield Interpolation : 1999 Go

25/03/2019



Question?