FIXED-INCOME ANALYSIS

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Fall 2019

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ADMINISTRATIVE STUFF

- Who am I
- Who are you
- Syllabus
- Reading
- Homework
- Mid-term and Final Exams
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1. INTRODUCTION
WHAT IS A FIXED-INCOME SECURITY?

- A fixed-income security is a financial obligation of an entity (the issuer) that promises to pay a specified sum of money at specified future dates.
- A fixed-income security is an instrument that allow governments, companies, and other types of issuers to borrow money from investors.
  - Any borrowing of money is debt.
- The terms “fixed-income securities,” “debt securities,” and “bonds” are often used interchangeably.

2. OVERVIEW OF A FIXED-INCOME SECURITY

- There are three important elements when investing in a fixed-income securities:

  - The bond features, including the issuer, maturity, par value, coupon rate and frequency, and currency denomination.
  - The legal, regulatory, and tax considerations.
  - The contingency provisions that may affect the bond’s scheduled cash flows.

- All bonds, whether they are traditional or securitised bonds, are characterised by the same basic features.

BASIC FEATURES OF A BOND

Creditworthiness

- investment-grade bonds
- non-investment-grade bonds

Issuer

- supranational organisation
- sovereign (national) government
- non-sovereign (local) government
- quasi-government entity
- company

BASIC FEATURES OF A BOND

Maturity

- The maturity date is the date when the issuer is obligated to redeem the bond.
- The tenor, also known as term to maturity, is the time remaining until the bond's maturity date.
  - Money market securities are fixed-income securities with maturity up to one year.
  - Capital market securities are fixed-income securities with maturity longer than one year.

Par value (principal) of a bond

- The par value of a bond is the amount the issuer agrees to repay the bondholders on the maturity date.

BASIC FEATURES OF A BOND

Coupon rate and frequency

- The coupon or nominal rate (yield) of a bond is the interest rate that the issuer agrees to pay each year until the maturity date.
- The coupon is the annual amount of interest payments and is determined by multiplying the coupon rate by the par value of the bond.
  - Plain vanilla bonds pay a fixed rate of interest.
  - Floating-rate notes (FRNs) or floaters pay a floating rate: a reference rate plus a spread.
  - Bonds that do not pay interest are called “zero-coupon bonds.”

BASIC FEATURES OF A BOND

Currency denomination

- Bonds can be issued in any currency, mostly US dollars and euros.
- Dual-currency bonds make coupon payments in one currency and pay the par value at maturity in another currency.

MINI-QUIZ #1

1. I am allowed to get help from my friends on homework, quizzes and exams? True or False?
2. Home mortgage is a type of fixed income security? True or False
3. A bag contains 2 marbles. The marbles are either red or blue. You draw from the bag 10 times (with replacement). How many blue marbles do you expect to get? What is the probability of getting 10 blue marbles?
4. A magic island has 100 tigers and 1 sheep. Tigers can eat sheep, but can also eat grass. If a tiger eats sheep, itself will turn into a sheep (they don't share). Assume tiger is smart. They want to eat sheep, but they also don't want to be eaten by other tiger (risk of death). Question: at the end of the day, how many tigers and sheep are left.

BREAK

3. LEGAL, REGULATORY, AND TAX CONSIDERATIONS

Bond indenture

- The trust deed is the legal contract that describes the form of the bond, the obligations of the issuer, and the rights of the bondholders.
- This legal contract is often called the “bond indenture.”
- The indenture is written in the name of the issuer and references features of the bond issue, such as par value, coupon rate and frequency, maturity date, and the funding sources for the interest and principal repayments, as well as any collaterals, covenants, and credit enhancements.

BOND INDENTURE

Legal identity of the bond issuer and its legal form

- The legal obligation to make the contractual payments is assigned to the bond issuer. The issuer is identified in the indenture by its legal name.

For sovereign bonds	• The issuer is usually the office responsible for the national budget.
For corporate bonds	• The issuer might be a holding company or a subsidiary.
For securitised bonds	• The legal obligation usually lies with special purpose vehicles.

SPV: issue some debt

BOND INDENTURE

Sources of repayment proceeds

Sovereign bonds

- Sovereign bonds are backed by the "full faith and credit" of the national government and thus by that government's ability to raise tax revenues and print money.

Non-sovereign government bonds

- The major sources for repayment include the general taxing authority of the issuer, the cash flows of the project the bond issue is financing, and special taxes or fees established specifically for the purpose of funding the payments of interest and principal. Tax-free

Corporate bonds

- The source of payment for corporate bonds is the issuer's ability to generate cash flows, primarily through its operations

BOND INDENTURE

Asset or collateral backing

- Collateral backing is the way to alleviate credit risk.

Credit risk is affected by

Seniority ranking:

secured, unsecured, or subordinate (junior)

Credit enhancement:

internal or external

Bond covenants

(legally enforceable rules that borrowers and lenders agree on at the time of a new bond issue):

affirmative (positive) or negative

Types and quality of collateral backing:

mortgages, equipment or other physical assets, financial assets, and others

BOND COVENANTS

- Affirmative covenants enumerate what issuers are required to do.
  - For example, to comply with all laws and regulations, maintain their current lines of business

- Negative covenants enumerate what issuers are prohibited from doing.
  - For example, restrictions on debt, negative pledges, restrictions on prior claims

MINI-QUIZ #2

1. In most cases, senior secured bonds have lower credit risk than junior bonds?
   True or False
2. An example of sovereign bond is a bond issued by:
   A . the World Bank.
   B . the city of New York.
   C . the federal German government
3. A bond has a par value of £100 and a coupon rate of 5%. Coupon payments are made semi-annually. The periodic interest payment is:
   A . £2.50, paid twice a year.
   B . £5.00, paid once a year.
   C . £5.00, paid twice a year.
4. The major advantage of issuing bonds through a special purpose vehicle is:
   A . bankruptcy remoteness.
   B . beneficial tax treatments.
   C . greater liquidity and lower issuing costs
5. What is the value of 0.9 + 0.9^2 + 0.9^3 + … (show math, no calculator)

LEGAL AND REGULATORY CONSIDERATIONS

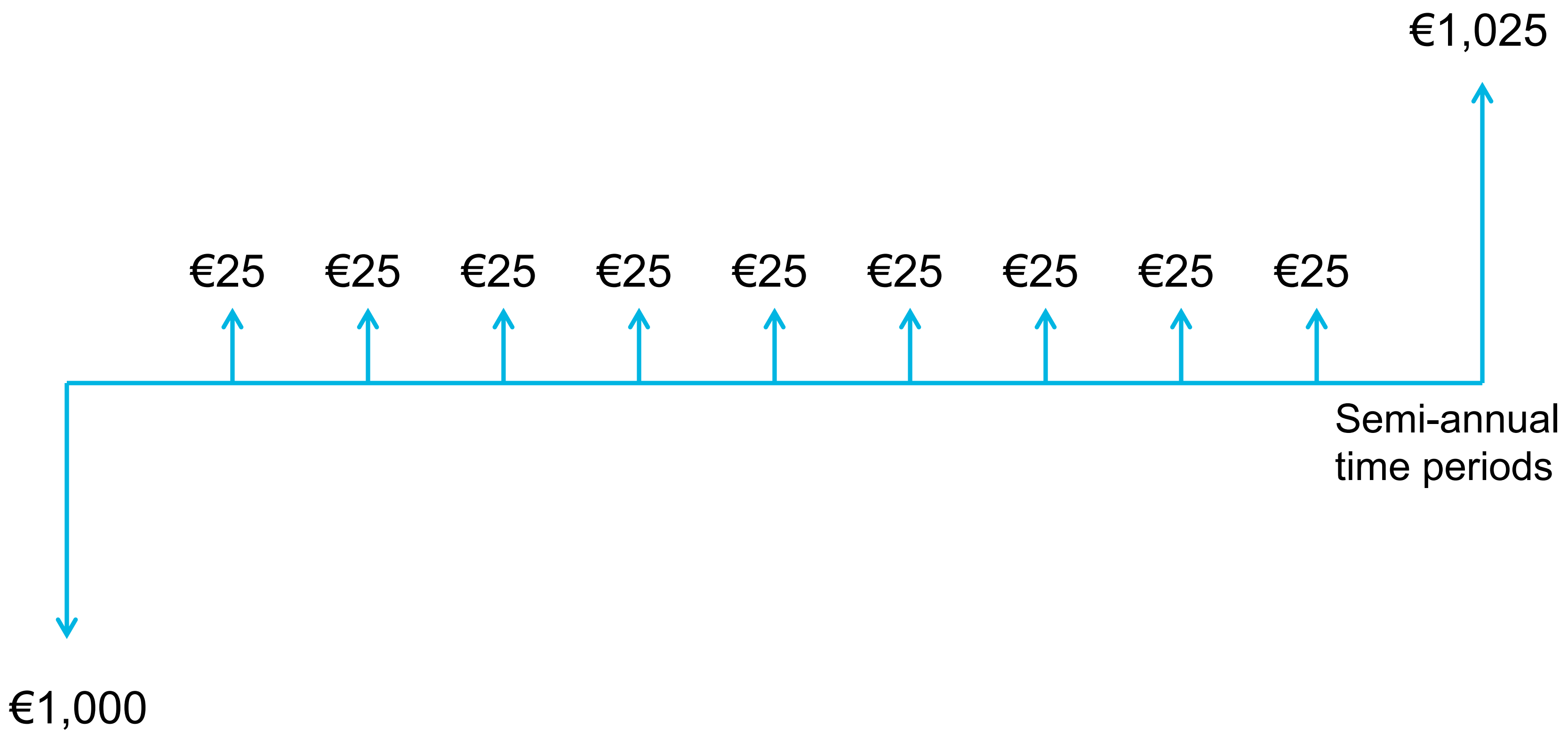
- Fixed-income securities are subject to different legal and regulatory requirements depending on where they are issued and traded as well as on who holds them.
- There are no unified legal and regulatory requirements that apply globally.
- The global bond markets consist of national bond markets and the Eurobond market.

TAX CONSIDERATIONS

- Interest payments and capital gains are often subject to taxation. Tax treatment of both varies from jurisdiction to justification.
  - The income portion of a bond investment is typically taxed at the ordinary income tax rate. Tax-exempt securities are the exception to this rule.
  - A tax on capital gains may apply if the bond sale price exceeds the bond purchase price.
  - The original issue discount might be subject to a tax for discount bonds (such as zero-coupon bonds).

4. STRUCTURE OF A BOND'S CASH FLOWS

- The most common payment structure by far is that of a plain vanilla bond, as depicted below.



PRINCIPAL REPAYMENT STRUCTURES

Bond Arrangements

A bullet structure has all the principal repaid at the maturity date.

An **amortizing bond** has a payment schedule that calls for periodic payments of interest and repayments of principal.

A **partially amortized bond** also makes fixed periodic payments until maturity, but only a portion of the principal (called a "balloon payment") is repaid by the maturity date.

A **sinking fund** arrangement specifies the portion of the bond's principal outstanding (e.g., 5%) that must be repaid each year throughout the bond's life or after a specified date.

COUPON PAYMENT STRUCTURES

- Conventional bonds pay a fixed periodic coupon over a specified time to maturity, typically annually or semi-annually and occasionally quarterly.

Instruments with other coupon structures:

- floating-rate notes
- step-up coupon bonds
- credit-linked coupon bonds
- payment-in-kind coupon bonds
- deferred coupon bonds
- index-linked bonds

COUPON PAYMENT STRUCTURES

- FRNs typically pay a quarterly coupon.
- The coupon is determined by the formula

Reference rate + ***Fixed spread*** = ***FRN coupon***

FRNs are usually less affected by changes in interest rates.

FRNs may have additional features, such as a floor or a cap.

Inverse FRNs (inverse floaters) are bonds whose coupon rates have an inverse relationship to the reference rate.

COUPON PAYMENT STRUCTURES

Step-up coupon bonds

have a fixed or floating coupon, which increases by specified margins at specified dates

offer bondholders some protection against rising interest rates and may be an important feature for callable bonds

Credit-linked coupon bonds

have a coupon that changes when the bond’s credit rating changes

Are attractive to investors who are concerned about the future creditworthiness of the issuer

COUPON PAYMENT STRUCTURES

Payment-in-kind (PIK) bonds

- typically allow the issuer to pay interest in the form of additional amounts of the bond issue rather than a cash payment
- typically are favored by issuers who are concerned that the issuer may face potential cash flow problems in the future

Deferred coupon (i.e., split coupon) bonds

- pay no coupon for the first few years but then pay a higher coupon than they otherwise normally would for the remainder of their life
- are also common in project financing when the assets being developed do not generate any income during the development phase

COUPON PAYMENT STRUCTURES

Index-linked bonds

have their coupon payments and/or principal repayment linked to a specified index

- Bonds can potentially be linked to any published economic and financial variable/index.

- Bonds linked to a rate of inflation are called “inflation-linked bonds” (e.g., Treasury inflation-protected securities, or TIPS, in the United States.

- Cash flows of the index-linked bond can be linked to the specified index by linking the interest payments (interest-indexed bonds), the principal repayment (zero-coupon bonds), or both (capital-indexed bonds and indexed annuity bonds).
- An equity-linked note (ELN) is a fixed-income security that differs from a conventional bond in that the final payment is based on the return of an equity index.

5. BONDS WITH CONTINGENCY PROVISIONS

- A contingency provision is a clause in a legal document that allows for some action if the event or circumstance does occur (i.e., embedded option).
- Some common types of bonds with embedded options include callable bonds, putable bonds, and convertible bonds.

5. BONDS WITH CONTINGENCY PROVISIONS

Callable bonds

- Callable bonds give the issuer the right to redeem all or part of the bond before the specified maturity date.
- The primary reason why issuers choose to issue callable bonds rather than non-callable bonds is to protect themselves against a decline in interest rates.

higher-interest rate

negative convexity for callable bonds

Putable bonds

- The bondholder has the right to sell the bond back to the issuer at a pre-determined price on specified dates.
- Putable bonds are beneficial for the bondholder by guaranteeing a pre-specified selling price at the redemption dates.

lower-interest rate

positive convexity for callable bonds

5. BONDS WITH CONTINGENCY PROVISIONS

Convertible bonds

- They are a hybrid security with both debt and equity features.
- The bondholder has the right to exchange the bond for a specified number of common shares in the issuing company.
- They are beneficial to bondholders.
- The bondholder has the ability to convert bonds into equity in case of share price appreciation and thus participate in the equity up side.
- At the same time, the bondholder receives downside protection; if the share price does not appreciate, the convertible bond offers the comfort of regular coupon payments and the promise of principal repayment at maturity.

5. BONDS WITH CONTINGENCY PROVISIONS

- The conversion price is the price per share at which the convertible bond can be converted into shares.
- The conversion ratio is the number of common shares that each bond can be converted into.

Current share price × Conversion ratio = Conversion value

Convertible bond price − Conversion value = Conversion premium

6. SUMMARY

Important elements to consider when investing in a fixed-income security

- the bond's features
- the legal, regulatory, and tax considerations
- the contingency provisions

The basic features of a bond

- the issuer, maturity, par value (or principal), coupon rate and frequency, and currency denomination

The bond indenture or trust deed

- The bond indenture is the legal contract that describes the form of the bond, the issuer's obligations, and the investor's rights.
- The indenture is usually held by a financial institution called a "trustee," which performs various duties specified in the indenture.

SUMMARY

Bond covenants

- Bond covenants are legally enforceable rules that borrowers and lenders agree on at the time of a new bond issue.
- Affirmative covenants enumerate what issuers are required to do, whereas negative covenants enumerate what issuers are prohibited from doing.

Legal and regulatory considerations

- An important consideration for investors is where the bonds are issued and traded because it affects the laws, regulations, and tax statuses that apply.

Bond arrangements

- An amortizing bond is a bond whose payment schedule requires periodic payment of interest and repayment of principal. This differs from a bullet bond, whose entire payment of principal occurs at maturity.

SUMMARY

Coupon payment structures

- fixed-coupon bonds
- floating rate notes
- bonds with step-up coupons
- bonds with credit-linked coupons
- bonds with payment-in-kind coupons
- bonds with deferred coupons

Bonds with embedded options

- Common types of bonds with embedded options include callable bonds, putable bonds, and convertible bonds.
- These options are “embedded” in the sense that there are provisions provided in the indenture that grant either the issuer or the bondholder certain rights affecting the disposal or redemption of the bond. They are not separately traded securities.