Bond Markets

戴天時
HTTP://FINANCELAB.NCTU.EDU.TW

Course Information

- T.A.: 劉亮志
- tony919kimo@yahoo.com.tw
- Text Book: Bond Markets, Analysis, and Strategies
- 雙葉書廊 劉懷生
- 0932125906

Chapter 1 Introduction

Bond

Coupon

Principal

- A debt instrument that requires the borrower/issuer to repay to the lender/investor the amount borrowed plus interest over a specified period of time.

Term to maturity

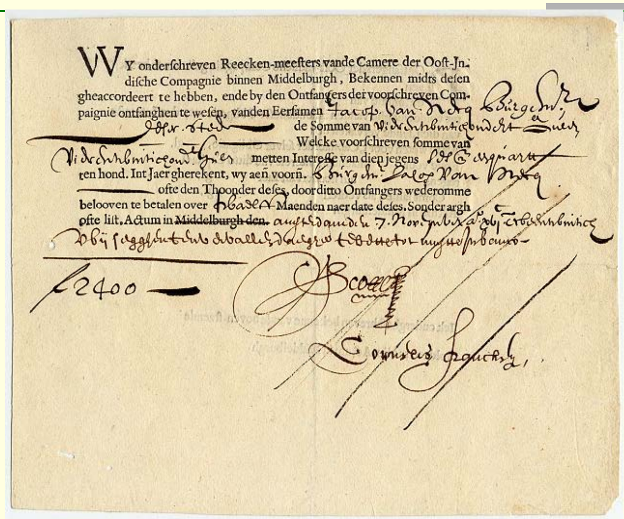
- Example:
  - Suppose today is 04/15/2002, a Treasury bond issued by the U.S. government, with face value 1,000,000, coupon rate 3.5% and maturity date 11/15/2006, bearing a semiannual coupon, will give the holder following cash flows

In the previous example, the cash flow schedule of the bond with $1 million face value is the following:

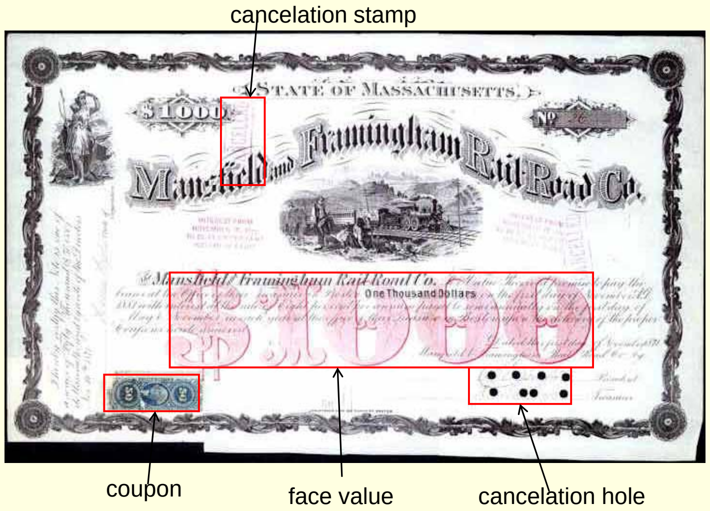
Date	Cash flow	Date	Cash flow	Date	Cash flow	Date	Cash flow
05/15/02	17,500	11/15/03	17,500	05/15/05	17,500	05/15/06	17,500
11/15/02	17,500	05/15/04	17,500	11/15/05	17,500	11/15/06	1,017,500
05/15/03	17,500	11/15/04	17,500				

1000000×3.5%/2

A Bond Certificate


Wy onderschreven Reecken-meesters vande Camere der Oost-Jn-dische Compagnie binnen Middelburgh, Bekennen midts desen gheaccordeert te hebben, ende by den Ontfangers der voorschreven Compaignie ontfanghen te wesen, vanden Eersamen ... de Somme van ... Welcke voorschreven somme van ... metten Interesse van dien jegens ... ten hond. Int Jaer gherekent, wy aen voorñ. ... ofte den Thoonder deses, door ditto Ontfangers wederomme belooven te betalen over ... Maenden naer date deses, Sonder argh ofte list, Actum in Middelburgh den ...

A Bond Certificate



Purposes of issuing bonds

- To finance its budget or investment projects
- Direct access the market
- Avoid the higher interest rates (costs) of borrowing from banks

Sectors of the U.S. bond market

- Treasury sector
  - Issued by federal government
  - Treasury bills, notes and bonds
  - The largest sector in the world
  - Determine the interest rate throughout the world
- Agency sector
  - Issued by federally related institutions and government – sponsored enterprises
  - Tennessee Valley Authority(田納西河谷管理局.負責水壩工程)
  - Fannie Mae (房利美)
  - The smallest sector

Sectors of the U.S. bond market

- Municipal sector
  - State and local government raise funds
  - Typically are exempt from federal income taxes
  - Also refereed to as the tax-exempt sector
- Corporate sector
  - Issued by corporations
  - Yankee bonds: foreign corporations

Sectors of the U.S. bond market

- Asset-backed security sector
  - Corporate issuers pool loans or receivables
  - Use the pool of assets as collateral for the issuance of a security
- Mortgage (抵押/房貸) sector
  - Bonds are backed by mortgage loans
  - Residential mortgage sector
  - Commercial mortgage sector
  - Mortgage-backed security (抵押擔保證券)
- Non-U.S. bond

Bond Indenture

- The bond indenture is the contract between the issuer and the bondholder, which sets forth all the obligations of the issuer.

Overview of bond features

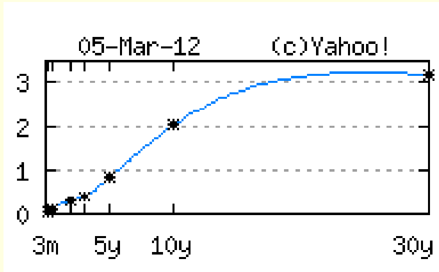
- Type of issuer
  - Federal government
  - Municipal (local) governments
  - Corporations

Overview of bond features

- Term to Maturity 到期期間
  - the number of years over which the issuer borrows from bond holders
  - 1-5 years: short-term
  - 5-12 years: intermediate-term
  - more than 12 years: long-term
  - the time period over which the bond holders expect to get pay
  - yield on a bond depends on the term to maturity
    - A yield curve which is not flat indicates different yields (returns) for different maturities
  - term to maturity affects the price volatility
    - The longer the maturity, the higher price volatility for a given change in the yield

US Treasury Bonds Rates

Maturity	Yield	Yesterday	Last Week	Last Month
3 Month	0.04	0.04	0.08	0.06
6 Month	0.11	0.10	0.13	0.08
2 Year	0.29	0.27	0.28	0.23
3 Year	0.41	0.38	0.40	0.32
5 Year	0.85	0.82	0.82	0.76
10 Year	2.01	1.97	1.92	1.92
30 Year	3.15	3.10	3.04	3.12



Overview of bond features

- Principal value 本金
  - the amount that the issuer agrees to repay at the maturity
  - par value, face value

Overview of bond features

- Coupon rate 票面利率
  - the interest rate that the issuer agrees to pay each year
  - Example: par value = 1000, coupon rate = 8%, annual coupon interest = 1000 × 8% = 80
  - two semiannual installments in US and Japan
  - once an year for European bonds
  - Zero-coupon bonds
    - bonds pay no interest, only the principal at maturity

Overview of bond features

- Floating-rate bonds
  - Coupon rates are reset periodically based on a formula
  - Coupon reset formula
    - Reference rate + quoted margin
    - The reference rate is an interest rate or an interest rate index
      - LIBOR, inflation index,…
    - 1-month LIBOR + 150 basis point
    - 3.5% + 1.5%
  - Inverse-floating-rate bonds / inverse floaters
    - The coupon interest rate moves in the opposite direction from the change in market interest rates

Overview of bond features

- Deferred-coupon bonds
  - Issuers avoid to repay interest for a number of years
  - Ease the burden of heavy interest payment
  - Used by leveraged buyout (LBOs) or recapitalization financed to reduce the heavy interest payment burdens
  - Three types
    - Deferred-interest bonds
      - Do not pay coupon interest for the first 3-7 years
    - Step-up bonds
      - Lower coupon at earlier age and higher at later age
    - Payment-in-kind bonds
      - the interest on the bond is paid other than in cash, most commonly by increasing the principal.

Overview of bond features

- Amortization feature
  - When principal is repaid over the life of the bond
    - Fully repaid at maturity, or
    - Repaid according to a schedule over the life of the bond
  - Amortization schedule
    - The schedule to repay the principal
  - Bonds created from loans that have an amortization feature
    - Automobile loans and home mortgage loans
  - Amortizing securities
    - Debt securities with amortization schedule
    - The bond’s maturity is less important
    - Weighted average life, or average life is measured

Overview of bond features

- Embedded Options
  - Call provision
    - Issuers have the right to retire the bond before the scheduled maturity
    - Allow issuers to replace an old bond issue with lower-interest cost issue
  - Put provision
    - Holders can sell the bond back to issuer at par value on designated dates
    - When interest rises after the bond issue

Overview of bond features

- Convertible bond
  - holders have right to exchange the bond for a specified number of common stock
  - Take advantage of favorable price changes of the issuers stocks
- Exchangeable bond
  - holders have right to exchange for other company's common stock

Risk of investing in bonds

- Interest rate risk
  - bond prices are inversely related to interest rates
  - increasing in interest rates causes capital loss
  - market risk / price risk
  - The major risk faced by bond investors
  - The degree of sensitivity of a bond's price to changes in market interest rates depends on various characteristics of the issue
    - Coupon rate
    - Maturity

Risk of investing in bonds

- Reinvestment risk
  - Coupon received is reinvested in prevailing market rates
  - Reinvestment incomes depend on
    - The prevailing interest rate levels at the time of reinvestment
    - The reinvestment strategy
  - Decreasing market interest rate reduces reinvestment income
  - Reinvestment risk is higher for
    - Longer holding periods
    - Bonds with large, early cash flows (high-coupon bonds)
  - Interest-rate risk and reinvestment risk have offsetting effects
    - Rising market interest reduce bond price but increase reinvestment income
    - Immunization: a strategy of reducing interest rate risk based on these offsetting effects

Risk of investing in bonds

- Call risk
  - Issuers may call the bond when current interest rates have dropped
  - Three disadvantages of investors
    - uncertain cash flow pattern
    - investors are exposed to reinvestment risk
      - the principal have to be reinvested at lower prevailing rates
    - the capital appreciation potential is limited
      - when interest is low, the bond may be called away
      - bond prices are limited by call possibility

Risk of investing in bonds

- Default risk / credit risk
  - the issuer of a bond may default
  - credit rating
    - A ranking system that measures the credit quality of bonds
  - An unanticipated downgrading results in a decline in bond price
  - Credit spread
    - the risk premium for compensation of holding bonds with higher default risk
    - relative to the default free bond: US. Treasury bonds
  - Credit spread risk
    - The risk that the price of a bond issue will decline due to an increase in the credit spread

Risk of investing in bonds

- Inflation risk
  - changes of purchasing power of money
  - Floating-rate bonds have a lower level of inflation risk
- Exchange-rate risk
  - foreign-currency denominated bonds
  - exchange rate loss occurs when the foreign currency depreciates
- Liquidity risk
  - whether bond can be sold at or near its fair market value
  - the wider the bid-ask spread, the larger the liquidity risk
  - Liquidity is unimportant when investors intend to hold the bond to maturity

Risk of investing in bonds

- Volatility risk
  - the effect of some embedded options depends on the expected volatility of interest rate
  - Example: the value of a callable bond is inversely affected if the expected volatility of interest rate increases
- Risk risk
  - wrong investment strategies because of not knowing what the risk of a security
  - investors should avoid security that are not clearly understood

Secondary Market for Bonds

- where securities that have been issued previously are traded.
- Secondary trading for common stocks:
  - centralized exchanges
  - the over-the-counter (OTC) market
- Quite different for bonds,
  - Only in OTC markets
  - a network of noncentralized market makers

Financial Innovation and the Bond Market

- surge of significant financial innovations since 1960
- Economic Council of Canada classifies financial innovations:
  - Market-broadening instruments
  - Risk-management instruments
  - Arbitraging instruments and processes
- many other classification systems … see text book.

Market-broadening instruments

- augment the liquidity of markets and the availability of funds by attracting new investors and offering new opportunities for borrowers.

Risk-management instruments

- reallocate financial risks to those who are less averse to them or have offsetting exposure
- Like CDO

Arbitraging instruments and processes

- enable investors and borrowers to take advantage of differences in costs and returns between markets.
- IRS