

# Bond Markets

# Bond and bond markets

- Equity (stocks) and debt (notes, bonds and mortgages) instruments with maturities of more than one year trade in *capital markets*.

# Bonds

- Long-term debt obligations
- Issued by corporations and government

# Bonds

- Bond issuers promise to pay a specified amount in the future on maturity of the bond (the face value)
- +
- Coupon interest on the borrowed funds
- If terms not met by the bond issuer, bond investor has a claim on the assets of the bond issuer

# Bond markets

- Bonds are issued and traded
- Classified into
  - 1. Treasury notes and bonds
  - 2. Municipal bonds
  - 3. Corporate bonds

# Bond market securities

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# Treasury notes and bonds

- Issued by the government
- To finance national debt
- National debt reflects the historical accumulation of annual federal government deficit or expenditures (G) minus taxes (T) over the last 200-plus years.

# Treasury notes and bonds

$$ND_t = \sum_{t=1}^N (G_t - T_t)$$



# Treasury notes and bonds

- **Default risk free:** backed by the full faith and credit of the govt.
- **Low returns:** low interest rates (yields to maturity) reflect low default risk
- **Interest rate risk:** because of their long maturity, T-notes and T-bonds experience wider price fluctuations than money market securities when interest rates change
- **Liquidity risk:** older issued T-bonds and T-notes trade less frequently than newly issued T-bonds and T-notes

# Treasury notes and bonds

- T-notes have original maturities from over 1 to 10 years
- T-bonds have original maturities from over 10 years
- Issued in minimum denominations (multiples) of \$ 1,000
- May be either fixed principal or inflation-indexed

# Treasury notes and bonds

- inflation-indexed bonds are called *Treasury Inflation Protection Securities* (TIPS)
- Principal value of TIPS is adjusted by the percentage change in the Consumer Price Index (CPI) every six months
- Trade in very active secondary markets

# Treasury STRIPS

- Separate Trading of Registered Interest and Principal Securities (STRIPS), a.k.a. Treasury zero bonds or Treasury zero-coupon bonds
- Financial institutions and government securities brokers and dealers create STRIPS from T-notes and T-bonds

# Treasury STRIPS

- STRIPS have the periodic interest payments separated from each other and from the principal payment
- one set of securities reflects interest payments
- one set of securities reflects principal payments
- STRIPS are used to immunize against interest rate risk

# Treasury Notes and Bond yields

- $V_b = (INT/M) \left[ \frac{1 - \frac{1}{[1 + \frac{r_b}{2}]^{mN}}}{\frac{r_b}{2}} \right]$
- Where
- $V_b$  = Present value of the bond
- $M$  = Face value of the bond
- $INT$  = Annual interest payment
- $N$  = Number of years till maturity
- $m$  = Number of times per year interest is paid
- $r_b$  = Interest rate used to discount cash flows on the bond

# Accrued interest

- When an investor buys T-note or T-bond between coupon payments, the buyer must compensate the seller that portion of the coupon payment accrued between last coupon payment and the settlement date.
- Settlement takes place 1 to 2 days after a trade.

# Accrued interest

- That portion of the coupon payment accrued between the last coupon payment and the settlement day

$$\text{Accrued interest} = \frac{INT}{2} \times \frac{\text{Actual number of days since last coupon payment}}{\text{Actual number of days in coupon period}}$$



# Treasury Notes and Bonds

- The full (or dirty) price of a T-note or T-bond is the sum of the clean price (  $V_b$  ) and the accrued interest

# Municipal bonds

- Municipal bonds (Munis) are securities issued by state and local governments
- to fund imbalances between expenditures and receipts
- to finance long-term capital outlays
- Attractive to household investors because interest is exempt from federal and most local income taxes
- General obligation (GO) bonds are backed by the full faith and credit of the issuing municipality
- Revenue bonds are sold to finance specific revenue generating projects

# Municipal Bonds

- Compare Muni returns with fully taxable corporate bonds by finding the after tax return for corporate bonds:  $i_a = i_b(1 - t)$ 
  - $i_a$  = after-tax rate of return on a taxable corporate bond
  - $i_b$  = before-tax rate of return on a taxable bond
  - $t$  = marginal total income tax rate of the bond holder
- Alternately, convert Muni interest rates to tax equivalent rates of return:  $i_b = i_a/(1 - t)$

# Municipal Bonds

- Primary markets
- *Firm commitment underwriting*: Issue of securities by an investment bank
- Investment bank guarantees the issuer a price for newly issued securities by buying the whole issue at a fixed price from the issuer
- It then seeks to resell these securities to suppliers of funds (investors) at a higher price

# Municipal Bonds

- *Best efforts underwriting*: Issue of securities in which the investment bank does not guarantee a price to the issuer and
- Acts more as a placing or distribution agent on a fee basis related to its success in placing the issue

# Municipal Bonds

- *Private placement*: A security placed with one or few large institutional buyers

# Municipal Bonds

- *Secondary markets:* Munis trade infrequently due mainly to a lack of information on bond issuers

# Corporate Bonds

- Corporate bonds are long-term bonds issued by corporations
- Bond indenture: Legal contract that specifies the rights and obligations of the bond issuer and the bond holder



# Corporate bonds

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Bond characteristics

# Bearer versus Registered bonds

- ***Bearer bonds:*** Bonds with coupons attached to the bond.
- Holder presents the coupons to the issuer for payments of interest when they come due.
- ***Registered Bond:*** A bond in which the owner is recorded by the issuer and the coupon payments are mailed to the registered owner.

# Term versus Serial bonds

- Term Bond: Entire issue matures on a single date.
- Serial bonds: issue contains many maturity dates, with a portion of the issue being paid off on each date.
- For economic reasons, many issuers like to avoid a 'crisis at maturity'.

# Mortgage bonds

- Bonds issued to finance specific projects, which are pledged as collateral for the bond issue.
- Bond holders may legally take title to the collateral to obtain payment on the bonds if the issuer of the mortgage bond defaults
- Equipment trust certificates are bonds collateralized with tangible movable non-real estate property such as railcars and airplanes.

# Debentures

- Bonds backed solely by the general credit worthiness of the issuing firm, unsecured by specific assets or collateral.

# Subordinated debentures

- Bonds that are unsecured and are junior in their rights to mortgage bonds and regular debentures.

# Convertible bonds

- Bonds that may be exchanged for another security of the issuing firm at the discretion of the bond holder.

# Corporate Bonds

- **Convertible bonds** versus **non-convertible bonds**

$$i_{cvb} = i_{ncvb} - op_{cvb}$$

$i_{cvb}$  = rate of return on a convertible bond

$i_{ncvb}$  = rate of return on a nonconvertible bond

$op_{cvb}$  = value of the conversion option

- **Stock warrants** give bondholders the opportunity to purchase common stock at a pre-specified price



# Corporate Bonds

- Callable bonds versus non-callable bonds

$$i_{ncb} = i_{cb} - op_{cvb}$$

- $i_{ncb}$  = rate of return on a noncallable bond
- $i_{cb}$  = rate of return on a callable bond
- $op_{cvb}$  = value of the call option
- A Sinking fund provision is a requirement that the issuer retire a certain amount of the bond issue early as the bonds approach maturity

# Corporate Bonds

- Primary markets are identical to that of Munis
- Secondary markets
  - the exchange market
  - the over-the-counter (OTC) market
- Bond ratings
  - bonds are rated by perceived default risk
  - bonds may be either investment or speculative (i.e., junk) grade

# Bond Market Indexes

- Reflect both the monthly capital gain and loss on bonds plus any interest (coupon) income earned
- Changes in values of bond indexes can be used by bond traders to evaluate changes in the investment attractiveness of bonds of different types and maturities

# Bond Market Participants

- The major issuers of debt market securities are federal, state and local governments, and corporations
- The major purchasers of capital market securities are households, businesses, government units, and foreign investors
- businesses and financial firms (e.g., banks, insurance companies, and mutual funds) are the major suppliers of funds for Munis and corporate bonds
- foreign investors and governments are the major suppliers of funds for T-notes and T-bonds

# International Bonds and Markets

- **International bond markets** involve unregistered bonds that are internationally syndicated, offered simultaneously to investors in several countries, and issued outside of the jurisdiction of any single country
- **Eurobonds** are long-term bonds issued outside the country of the currency in which they are denominated
- **Foreign Bonds** are long-term bonds issued outside of the issuer's home country
- **Brady Bonds** are bonds swapped for an outstanding loan to a less developed country
- **Sovereign Bonds** are Brady Bonds that have had their underlying collateral removed and the creditworthiness of the country is substituted instead