债券

基本特征：

- 参与者
  - issuer：借钱的一方
  - investor：投资的一方
  - contract：合同
- 债券到期的日期：***maturity date***
  - 债券发行者必须在这天支付本金
  - 投资者此时还将收到他最后一次半年期的利息
  - 一般来说在10~100年之间，短期1~5年，中期5~12年，长期12年以上
- 票面价值：***par value***
  - 债券到期时债券发行人向投资者支付的金额，也称为本金或面额。
- 价值：***price***
  - 债券价格通常以票面价值（一般是1000）的百分比表示。
  - 假设债券的price=100，则价值1000
  - 假设债券的price=90，则价值900（***discount***）
  - 假设债券的price=110，则价值1100（***premium***）

> An investor purchased an 8% bond which matures in 10 years at 95.
>
> **How much did the investor pay for this bond?**
>
> - – $9.95
> - – $95
> - – $950
> - – $9,500
>
> [C]
>
> **This bond was purchased at a:**
>
> - – Discount
> - – Premium
>
> [A]
>
> **How much will the investor receive when the bond mature?**
>
> - – $800
> - – $950
> - – $1,040
> - – $1,080
>
> [C] 1000+1000*0.08/2=1040
>
> **A zero-coupon bond would be an appropriate investment for which of the following investors?** – A retired person who needs regular income to supplement social security – Someone who needs a lump sum in 10 years to pay off the balloon mortgage on his house

> [B]

- ***Coupon Rate（nominal yield)***
  - 在债券到期之前，发行人同意向投资者支付一定数额的利息，称为票面利率，通常一年付两次（***semiannually***）。
  - 假设花了900元买了债券，票面价值1000，如果CR=10%，则每半年收到100/2=50
  - ***Zero-coupon bond***：在到期前不付给一年两次的利息，所以价格比票面价格折扣很多。
  - ***Floating-rate bonds*** (reference rate + quoted margin) : 3 month Libor + 20 Basic Points

证券发行的特点

- 发行者
  - ***federal government*** 联邦政府
  - **agencies** 机构
  - **municipal government** 市政府
  - **corporations** 公司
- 摊销特征 ***Amortization Feature***
  - 债券发行的本金偿还可以要求在债券的整个有效期内偿还本金。
  - 利息+本金不变，但是随着时间，利息比例下降，本金比例上升。
- 嵌入式选项 ***Embedded Options***
  - ***Call provision***：发行人有权在到期前全部或部分偿还债务。
  - ***Put provision***：债券持有人有权以平价方式将该债券出售给发行人指定日期的价值。
  - ***Convertible bond***：债券持有人有权将特定数量的普通股交换债券。
  - ***Exchangeable bond***：债券持有人将该债券与债券发行人不同的公司的特定数量的普通股股票进行交换。

证券回报计算

- ***Nomial Yield***
  - 发行人承诺向债券持有人支付的既定利率
  - *Coupon Rate*是固定不变的
- ***Current Yield***
  - 衡量投资者从债券收到的利息与当前市场价格的比较
  - $Current\ Yield = Annual\ Interest\ Payment / Current\ Market\ Price$
- ***Yield to Maturity***
  - 衡量投资者的总体回报
  - 最广泛引用的债券收益率类型
  - 如果债券以今天的市场价格购买并持有至到期日并且假设再投资和复利，则表示总回报率
- ***Yield to Call***
  - 只考虑从今天开始到召回日

> Use the following information to answer questions 1 through 3.
>
> **An investor purchased an 8% Lemon Country Bond at 80. What is the bond's nominal yield?**
>
> - – 6%
> - – 8%
> - – 9%
> - – 10%

> [B]
>
> **What is the bond's current yield?**
>
> - – 6%
> - – 8%
> - – 9%
> - – 10%
>
> [D] CurrentPrice = 80%×1000=800 Current = 1000×8% / 800 = 10%
>
> **The yield to maturity will be:**
>
> - – The same as the nominal and current yield
> - – Greater than the current yield
> - – Less than the current yield
> - – Less than both the current and nominal yields
>
> [B] 不做要求Discount==>Coupon Rate<Current Yield<Yield to Maturity

风险与债券联系 Risks association with bonds

- 利率风险（***Interest risk***）是指如果利率上升，债券市场价格会下降的风险。随着利率上升，现有债券价值下降; 反之，随着利率减少，现有债券的价值增加。
- 与短期债券相比，长期债券更容易受到利率风险的影响。
- 对于以折扣价出售的债券，nominal yield (coupon) 低于当前收益率（current yield），低于到期收益率（yield to maturity）。
- 对于以溢价出售的债券，刚好与上面相反。

> **Which of the following securities is likely to decrease the most in price if interest rates rise?**
>
> - – A bond maturing in 2 years
> - – A bond maturing in 15 years
>
> [B]
>
> **An investor recently invested $100,000 in bonds. What will happen to the value of his portfolio if interest rates increase?**
>
> - – It will decrease
> - – It will remain the same
> - – It will increase
> - – It cannot be determined from the information given
>
> [A] 利率与价格为反向关系

信用风险 Credit Risk

- 信用风险是购买固定收益证券的主要风险。
- 债券发行人可能违约（***default***）并且可能无法履行向债券持有人支付利息和本金的义务。

美国国债 US Treasury Securities

- 由美国财政部发行，不需要抵押，由美国信用担保，没有`Credit Risk`
- 美国国债的利率是整个美国经济的基准利率（***benchmark interest rates***）。
- 影响利率的因素

    - ***volume***：规模
    - ***liquidity***：流动性
- 类型
    - 固定本金证券（***Fixed-principal securities***）：***Treasury bills***，***Treasury notes***和***Treasury bonds***
    - 通货膨胀指数证券：国债通胀保护证券（***TIPS***）
        - ***Treasury Inflation Protection Securities*** 的计算

> **A TIPS, coupon rate is 3.5%, annual inflation（年通货膨胀率） is 3%. An investor purchases on Jan 1 $100,000 par value of this issue.**
>
> The semiannual inflation rate is 1.5%.
>
> The inflation-adjusted principal at the end of the first six-month period is
>
> $\$100,000 * (1 + 1.5\%) = \$101,500.$
>
> The coupon payment is
>
> $\$101,500 * 1.75\% = \$1,776.25$
>
> An inflation-adjusted principal is defined in terms of the ratio of the reference CPI

- ***Stripped Treasury Securities***
    - ***Treasury-STRIPS***不定期支付利息
    - ***Treasury-bonds*** 超过十年成熟，具有高风险
- 支付美国国债的利息在联邦一级征税，但免征州和地方所得税。
- ***Treasury notes***的成熟期为2~10年，***Treasury bonds*** 的成熟期大于10年。***T-bills***的成熟期一般在 4/13/26/52 个星期，不出售在2年成熟的***T-bills***
- 报价（***Price Quote***）
    - 作为其面值的百分比，以1/32的面值增量。
    - Example, if a US government bond is quoted at 97.08, its price is equivalent to 97.08/32 (97.25% of 1,000 par value) or $972.50

> **Jessica just received an inheritance from her Uncle Sam. She plans to use the money for a down payment on a house in six months, but she wants to earn some interest on the money in the meantime. Which of the following investments would suitable for her?**
>
> - – Treasury bills
> - – Treasury STRIPS
> - – Treasury bonds
> - – Common stocks
>
> [A] A一年一次，流动性高。B不定期，C成熟期是十年。
>
> **A U.S. government bond is selling in the market at 98.08. The dollar value of this bond is:**
>
> - – $980.25
> - –$980.80
> - – $982.50
> - – $9,808.00
>
> [C] 98.08--->98+08/32--->98.25---->98.25*1000--->982.5
>
> **All the following characteristics are true of Treasury bills EXCEPT:**

> - – They are sold at a discount from their face value
> - – Investors can purchase T-Bills that mature in two years
> - – T-Bills are negotiable securities that trade in the secondary market
> - – They are direct obligations of the U.S. Treasury
>
> [B] It does not sell T-bills that mature in 2 years

公司证券

- 公司发行的所有债务均由发行人的全部信誉和信用抵押
- 担保债券（***Secured bonds***）由特定公司资产支持
- ***Price Quote***为$1/8$
- > For example, a corporation bond is offered at 94 5/8. What is the cost for each 1,000 bond?
  >
  > 5/8 = 0.625
  >
  > 94 5/8 ->94.625->94.625%
  >
  > 94.625% X 1,000 = 946.25
- 没有抵押（***Unsecured***）
  - 前提是公司的信誉很好
  - 没有抵押的债券叫做***notes***或者***debentures***
  - Debentures are:
    - ***Unsecured corporate bonds***（无担保公司债券）
    - ***Municipal bonds***（市政债券）
    - ***Mortgage bonds***（抵押债券）
    - ***High-yield bonds***（高收益债券）

可转换债券 Convertible Bonds

- 是一种允许投资者以预定比率将债券转换为公司普通股的股票。
- 转换的价格在发行债券时设定。
- $Conversion\ Ratio = Par\ Value\ of\ Bond / Conversion\ Price$

> **Convertible bonds can be converted into:**
>
> - – Subordinated debentures
> - – Common stock
> - – Equipment trust certificates
> - – Warrants
>
> [B]
>
> **XYZ convertible debentures are convertible into 20 shares of XYZ Corporation common stock. If the bonds were selling in the market at $980, what would the common stock have to be selling at to be at parity?**
>
> - – $20
> - – $45
> - – $49
> - – $50

> [C] $980/$20 = $49 等值原理

- ***Arbitrage*** 套利
  - 一种从相同或类似债券的价格差异中获利的方法

> **A technique used to profit from price differentials in the same security is known as:**
>
> - – Arbitrage
> - – Dilution
> - – Forced conversion
> - – Tender offer
>
> [A]

信用评估 Credit Assessment

- 大多数公司债券都获得了 S&P, Moody和Fitch的信用评级服务。
- Bonds rated ***BBB*** or higher considered investment-grade bonds.
- Bonds rated below these levels are considered to be high yield bonds.

> **Bonds that are rated BB or below are called:**
>
> - – Short-term bonds
> - – Zero-coupon bonds
> - – High-yield bonds
> - – Callable bonds
>
> [C]

- 评级机构主要关注违约风险，评级高表示违约风险较低。
- A high rating indicates a low risk of default

> **Rating organizations are primarily concerned with the risk of:**
>
> - – Declining purchasing power
> - – Market price fluctuation
> - – Default
> - – Illiquidity
>
> [C]

Call Provisions 提前赎回条款

- 需要给债券的持有人一定的补偿
- ***Call Risk***
  - 债券一旦被赎回，债券持有人不太可能将他们的资金再投资于相同于之前收益的项目。
- ***Call Protection***
  - 为了保护投资者，可赎回债券通常包含对赎回的执行时间的限制，通常为自发行之日起5至10年
- ***Call Premium***
  - 对于可赎回债券，发行人通常需要向投资者支付超过债券面值的金额以补偿他们。
  - 发行人在赎回债券时必须向债券所有者支付的金额
  - 当利率下降并且能够以较低利率发行新债券时，发行人通常会召集未偿债券

> **A bond is purchased that is callable at 105 in five years. How much will the investor receive if the bond id called after five years?**
>
> - – $800
> - – $950
> - – $1,000
> - – $1,050
>
> [D] 105%*1000=1050
>
> **The call premium of a bond refers to the amount:**
>
> - – An investor must pay to buy a callable bond
> - – The issue must pay to exercise the call privilege
> - – The issuer must add to the semiannual interest payments to offset the call feature
> - – Added to the price at issuance to compensate for the call privilege
>
> [D]

Agency Securities

- 由联邦机构和政府资助的企业发行的债务工具
- 不是美国政府的直接债务
- 联邦机构发行的证券得到美国政府的信任和全力支持
- 政府资助的企业证券不受美国政府支持，但他们的违约风险是最小的
- 较低的信用风险
- 一些政府资助的企业有：
  - ***Federal Farm Credit Banks*** (FFCBs)
  - ***Federal Home Loan Banks*** (FHLBs)
  - ***Student Loan Marketing Association*** (SLMA or Sallie Mae)

> **All the following securities are backed by the U.S. government EXCEPT:**
>
> - – Government National Mortgage Association Certificates
> - – Treasury bills
> - – Student Loan Marketing Association certificates
> - – Treasury bonds
>
> [C]

市政证券 Municipal Securities

- 市政证券由州和地方政府发行
- 大多数未偿还的市政债券都是免税的。
- 类型和特征：
  - 一般债务债券（***General Obligation Bonds***）由发行人的无限征税权担保。
  - 收入债券（***Revenue Bonds***）由发行人的收入担保，例如机场收入债券，大学收入债券。

资产支持证券 Asset-Backed Securities

- 资产支持证券（ABS）是指特定资产池中的现金流抵押的债券或票据。

抵押贷款支持证券 Mortgage-Backed Securities

- ***Pass-through certificates***
  - 为投资者带来月收入
- Treasury STRIPS are a form of **zero-coupon** bonds that do not pay any income until they mature
- Treasury notes pay interest **twice a year**
- Common stock do not always pay dividends and, if they d, they are usually paid **quarterly**

> **Monthly payments from GNMA pass-through certificates represent:**
>
> - – Interest
> - – Principal
> - – Interest and Principal
> - – The performance of the mortgage pool
>
> [C]
>
> **Which of the following securities would you recommend to investors who need monthly income?**
>
> - – Treasury STRIPS
> - – GNMA pass-through certificates
> - – Treasury notes
> - – Common stocks
>
> [B]

货币市场证券 Money-Market Securities

- Commercial Paper
  - 公司企业短期融资的一种方法
- Banker's Acceptance
  - 用于促进对外贸易

> **Short-term money-market instruments guaranteed (accepted) by a bank or trust company in order to provide manufacturers and exporters with capital to operate and which are traded in the secondary market at prices that are discounted from the face value are:**
>
> - – Certificates of deposit
> - – Bankers' acceptances
> - – Commercial paper
> - – ADRs
>
> [B]

债券定价公式

$$P = \frac{C}{1+r_1} + \frac{C}{(1+r_2)^2} + \frac{C}{(1+r_3)^3} + \ldots + \frac{C+M}{(1+r_n)^n}$$