TA Info

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1 Review, Chapter 4

1.1 Present value

If you are entitled to a stream of cash flow, $CF_1, CF_2, \ldots, CF_n$ for n periods, and you know the interest rate is i, we can calculate the present value of this bond using the following formula:

$$PV = \frac{CF_1}{1+i} + \frac{CF_2}{(1+i)^2} + \ldots + \frac{CF_n}{(1+i)^n} \tag{1}$$

How should we interpret present value? For a lender/saver, the present value is the amount she would be willing to pay for an asset that returns the given cash flow. For a borrower, it's the amount he can borrow today if he pays it back with the given payments over time.

1.2 Yield to maturity

If we know the current price of an asset (PV) and the future cash flow from an asset we can compute and implied interest rate from 1. This is the **Yield to maturity**. Using this, we can compare the performance of differently structured assets.

- Simple loans: YTM = simple interest rate
- Fixed-payment loans: $LV = \frac{FP}{1+i} + \frac{FP}{(1+i)^n} + \ldots + \frac{FP}{(1+i)^n}$
- Coupon bond: $P = \frac{C}{1+i} + \frac{C}{(1+i)^n} + \ldots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$
  - If sold at face value ($P = F$) then YTM is coupon rate.
  - Price of coupon bond and YTM are *negatively* related. Higher price ⇒ lower YTM
  - If $P > F$, then YTM is less than the coupon rate
- Perpetuity/consol (Pays fixed payments forever): $P = \frac{C}{1+i} + \frac{C}{(1+i)^2} + \ldots = \frac{C}{i}$
- Discount bond $P = \frac{F}{1+i^n}$, so for a 1-year maturity ($n = 1$) we have $i = \frac{F-P}{P}$

Rate of return is the sum of payments plus the change in security's value as a fraction of current price of the asset. Put another way: R =YTM+asset price growth rate

- Return on a bond held for from t to $t+1$:

$$R = \frac{C + P_{t+1} - P_t}{P_t} = \underbrace{\frac{C}{P_t}}_{\text{current yield}} + \underbrace{\frac{P_{t+1} - P_t}{P_t}}_{\text{capital gain rate}}$$

Rate of return will typically differ from YTM on account of price fluctuations.

1.3 Maturity and Volatility of Bond Returns: Interest-rate Risk

Longer-term bonds are more volatile than shorter-term ones. (Why?)

1.4 Real vs. Nominal Interest Rates

Fisher equation: Nominal interest is real interest plus inflation rate $i = r + \pi$

1.5 Some Useful Formulae

Geometric sums: for $-1 < r < 1$

$$1 + r + r^2 + r^3 + \ldots + r^n = \frac{1 - r^{n+1}}{1 - r}$$

$$1 + r + r^2 + r^3 + \ldots = \frac{1}{1 - r}$$

2 Preview, Chapter 5

Change in **Quantity Demanded** (movement along a demand curve)
vs.
Change in demand (shift of demand curve)

2.1 Bond market

Suppliers of bonds: Borrowers/spenders
Demanders of bonds: Lenders/savers

2.1.1 Demand for bonds increases (shifts right) when

- Wealth (total resources, including all assets, owned by an individual) goes up
- Expected rate of return (return expected over next period) of **other** assets relative to bonds goes **down**
- **Expected** price of bonds in the future goes up
  - Expected inflation falls
  - Expected interest rate fall
- Risk of **other** assets relative to bonds goes **up**
- Liquidity (ease and speed with which an asset can be converted to cash) of bonds goes up relative to other assets

2.1.2 Supply of bonds increases (shifts right) when

- Expected future profit opportunities increases
- Expected inflation increases
- Government deficit increases

2.1.3 Note:

- Bond **prices** are negatively correlated with **interest rates** (see YTM equation)
- Fisher effect: If expected inflation increases, the demand for bonds decreases, and the supply of bonds increases ⇒ Prices fall/interest rates rise

3 Practice questions

1. A situation in which the quantity of bonds supplied exceeds the quantity of bonds demanded is called a condition of *excess supply*. Because people want to sell _____ bonds than others want to buy, the price of bonds will _____.

   (a) more; fall
   (b) fewer; fall
   (c) more; rise
   (d) fewer; rise

2. A factor that could cause the supply of bonds to increase (shift to the right) is:

   (a) a decrease in expected inflation.
   (b) a decrease in government deficits.
   (c) expectations of more profitable investment opportunities.
   (d) a business cycle recession.

3. Other things being equal, an increase in the default risk of corporate bonds shifts the demand curve for corporate bonds to the _____ and the demand curve for Treasury bonds to the _____.

   (a) left; left
   (b) left; right
   (c) right; right
   (d) right; left

4. Everything else held constant, if the expected return on U.S. Treasury bonds falls from 8 to 7 percent, and the expected return on corporate bonds falls from 10 to 8 percent, then the expected return of corporate bonds _____ relative to U.S. Treasury bonds and the demand for corporate bonds _____.

   (a) rises; falls
   (b) falls; falls
   (c) rises; rises
   (d) falls; rises

5. During a recession, the supply of bonds _____ and the supply curve shifts to the _____, everything else held constant.

   (a) increases; left
   (b) increases; right
   (c) decreases; right
   (d) decreases; left

6. A bond with default risk will always have a _____ risk premium, and an increase in its default risk will _____ the risk premium.

   (a) positive; raise
   (b) positive; lower
   (c) negative; raise
   (d) negative; lower