

Math 2FM3, Tutorial 8

Nov 10th, 2015

Sinking-Fund Method

- A loan calls n interest payments $L \cdot i$ and pay the single lump sum of amount L at time n .
- $L \cdot i$ is the payment in each period.
- $L/s_{n|i}$ is level sinking fund deposit.
- Outlay is $L(i+1/s_{n|i})$.

Bond Price

- P: price
- F: face amount
- C: redemption amount
- r: coupon rate
- j: yield rate
- $P = Cv_j^n + Fr(v_j + v_j^2 + \dots + v_j^n) = Cv_j^n + Fr^* a_{n|j}$
- When $F=C$, $P = Fv_j^n + Fr^* a_{n|j} = F + F(r-j) a_{n|j}$

Ex 3.3.6S

- John borrows 1000 for 10 years at an annual effective interest rate of 10%. He can repay this loan using the amortization method with payments of P at the end of each year. Instead, John repays the 1000 using a sinking fund that are equal to P minus the interest on the loan and are made at the end of each year for 10 years. Determine the balance in the sinking fund immediately after the repayment of the loan.

Ex 4.1.4

- A 6% bond maturing in 8 years with semiannual coupons to yield 5% convertible semiannually is to be replaced by a 5.5% bond yielding the same return. In how many years should the new bond mature? (Both bonds have the same price, yield rate and face amount).

Ex 4.1.12

- Two bonds, each of face amount 100, are offered for sale at a combined price of 240. Both bonds have the same term to maturity but the coupon rate for one is twice that of the other. The difference in price of the two bonds is 24. Prices are based on a nominal annual yield rate of 3%. Find the coupon rates of the two bonds.

Ex 4.1.14

- When a certain type of bond matures, the bondholder is subject to a tax of 25% on the amount of discount at which he bought the bond. A 1000 bond of this type has 4% annually paid coupons and is redeemable at par in 10 years. No tax is paid on coupons. What price should a purchaser pay to realize an effective annual yield of 5% after taxes?