

Answers to selected sample questions

3. Why would a bank not require a customer buying a cap to have a credit line, but would require a customer entering into a collar to have one?

[because customer may be obligated to make payments to bank under a collar if interest rates fall, while customer is never obligated to make payments to the bank with a purchased cap – hence no default risk]

Under what conditions is an interest rate collar the same as an interest rate swap?

[when cap rate and floor rate are identical]

What type of customer would benefit from purchasing an interest rate cap? An interest rate floor?

Why does a zero-cost interest rate collar have zero cost?

[because price of call purchased = price of put sold]

4. If the forward price of BP is 1.80, the spot price is 1.90, and the price of a 1 yr. put option with exercise price 1.80 is .05, what is the price of a 1 yr. call option with strike 1.80?

[.05 by put-call parity]

If the spot price of BP is 1.90 and the price of a 1 yr. put with exercise price 1.80 is .05, to what level must the BP fall for you to be happy that you bought the put option?

[1.75, ignoring interest lost on the price of the option]

5. Suppose Canadian one year interest rates are 5% and Japanese rates are 1%. If the spot exchange rate for Japanese yen is .0100 \$C/Y, what will be the current forward exchange rate for yen to be delivered 1 yr. from now?

[$.01e^{-.04} = .01048$ \$C/Y]

6. If 5 yr zero coupon bonds currently yield 10%/yr, and 3 yr bonds currently yield 8%/yr, what is the forward interest rate for 2 yr bonds to be delivered 3 yrs from now? Assume all rates are continuously compounded.

[13%/yr]

7. Suppose the (zero coupon) yield curve shifts up by the same amount for all maturities, and that the price of 10 yr zero coupon bonds falls by 15%. By how much will the price of 2 yr zero coupon bonds have fallen?

[approximately 3% because duration is one fifth that of 10 yr]

Which type of bond will be more sensitive to changes in interest rates: a zero coupon bond or a par coupon bond of the same maturity?

[zero coupon]

Suppose a bank has \$1 million of 1 year term deposits as liabilities, but the only loans it can make are 3 month loans and 2 year loans. How much should it make of each type of loan to leave it best immunized against fluctuations in interest rates? Assume all interest due on both deposits and loans are paid at maturity.

[4/7 million in 3 mo., 3/7 million in 2 yr]

8. Suppose that you had previously entered a forward contract to receive 10,000 pounds of copper one year from today at a price of 1.00 \$/pound. Suppose that the current forward price for delivery one year from now is 1.25 \$/pound and that the one year riskfree interest rate is 10 %/yr (continuously compounded). What is the fair market value of your forward position?

[\$2262.09]

9. Suppose that the price of a 6 month European put option on a stock with exercise price of \$10/share is \$2.00. Suppose the current stock price is \$9.00 and that the riskfree interest rate is 10%/yr (compounded semi-annually). The stock pays no dividends. What should be the price of a 6 month European call option with exercise price of \$10/share on the same stock?

[\$1.49 tough one!]

12. If the interest rate on a bond is 10%/yr compounded semiannually, what is its effective annual interest rate? What is its continuously compounded annual yield?

[10.25%, 9.76%]