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bonds. In the absence of default risk, an FRN should be priced at par on the reset dates. Between reset dates, its value could fluctuate slightly in case of a movement in market interest rates, because the coupon is fixed until the next reset date. In the presence of default risk, the value of an FRN can move if the market-required credit spread becomes different from the spread that has been set at time of issue.

- Various complex bonds, often called structured notes, are issued on the international market. A structured note is a bond (note) issued with some unusual clause, often an option-like clause. These notes are bonds issued by a name of good credit standing and can therefore be purchased as investment-grade bonds by most institutional investors, even those that are prevented by regulations from dealing in options or futures. Structured notes are designed for specific investors wishing to take a bet on some forecasts. If the forecasts are correct, the yield on the note will be enhanced.

- The issuer will usually hedge the unusual risks (bets) of a structured note and end up with a plain-vanilla bond at a low cost.

- Some bonds offer plays on interest rates (bull and bear FRNs). Others offer play on currencies (dual-currency bonds, currency-option bonds).

- A collateralized debt obligation (CDO) is a structured product that allows creating securities with widely different credit risk characteristics.

Problems

1. Which of the following is the most appropriate term for the bonds issued in the United States by a European corporation and denominated in U.S. dollars?
   a. Domestic bonds
   b. Foreign bonds
   c. International bonds
   d. European bonds

2. Which of the following statements about the global bond market are true?
   I. Bonds issued in the United States by a non-U.S. corporation must satisfy the disclosure requirements of the U.S. Securities and Exchange Commission.
   II. Two bond indexes of the same market tend to be highly correlated, but their composition is somewhat different.
   III. It is not necessary that a bond be denominated in euros for it to be termed an international bond.

3. An international bank loaned money to an emerging country a few years ago. Because of the nonpayment of interest due on this loan, the bank is now negotiating with the borrower to exchange the loan for Brady bonds. The Brady bonds that would be issued would be either par bonds or discount bonds, with the same time to maturity.
   a. Would both types of bonds, par and discount, provide debt reduction to the emerging country?
b. Would both types of bonds, par and discount, have a lower coupon amount than the original?
c. Of the two types of bonds being considered, which one would have a lower coupon amount?

4. Consider a newly issued dollar/yen dual-currency bond. This bond is issued in yen. The coupons are paid in yen and the principal will be repaid in dollars. The market price of this bond is quoted in yen. Discuss what would happen to the market price of this dual-currency bond in the following situations:
   a. The market interest rate on yen bonds drops significantly.
   b. The dollar drops in value relative to the yen.
   c. The market interest rate on dollar bonds drops significantly.

5. A European corporation has issued bonds with a par value of SFr 1,000 and an annual coupon of 5 percent. The last coupon on these bonds was paid four months ago, and their current clean price is 90 percent.
   a. If the bond is an international bond, what is its full price?
   b. Would your answer to part (a) be different if the bonds were not international bonds but were issued in the Swiss domestic bond market?

6. a. Compute the yield to maturity (YTM) of a zero-coupon bond with nine years to maturity and currently selling at 45 percent.
   b. Compute the YTM of a perpetuity bond with an annual coupon of £6 and currently selling at £108.

7. a. Consider a bond issued at par. The annual coupon is 8 percent and frequency of coupon is semiannual. How would the YTM of this bond be reported in most of the European markets?
   b. The market price of a two-year bond with annual coupon is 103 percent of its nominal value. The annual coupon to be paid in exactly one year is 6 percent. Compute its
      i. YTM (European method), and
      ii. YTM (U.S. method).

8. Bonds A and B are two straight yen-denominated international bonds, with the same maturity of four years and the same YTM of 9 percent. Bond A has an annual coupon of 11 percent and is accordingly priced at 106.48 percent. Bond B has an annual coupon of 7 percent and is accordingly priced at 93.92 percent.
   a. Compute the simple yield for each of these bonds, as reported sometimes by financial institutions in Japan.
   b. What does your answer to part (a) indicate about the potential biases in using the simple yield?

9. You hold a bond with nine years until maturity, a YTM of 4 percent, and a duration of 7.5. The cash (one-year) rate is 2.5 percent.
   a. In the next five minutes, you expect the market yield to go up by 5 basis points. What is the bond's expected percentage price change, and your expected return, over the next five minutes?
   b. Over the next year, you expect the market yield to go down by 50 basis points. For this period, estimate the following:
      i. The bond's expected price change
      ii. Your expected return
      iii. The bond's risk premium
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10. a. Discuss the statement that it is easy to estimate the credit spread of a corporate bond because it could be done by simply comparing the bond’s YTM with that of a Treasury bond that has identical cash flows.
b. There is a 0.5 percent probability of default by the year-end on a one-year bond issued at par by a particular corporation. If the corporation defaults, the investor will get nothing. Assume that a default-free bond exists with identical cash flows and liquidity, and the one-year yield on this bond is 4 percent. What yield should be required by risk-neutral investors on the corporate bond? What should the credit spread be?

11. An investor is considering investing in one-year zero-coupon bonds. She is thinking of investing in either a British-pound-denominated bond with a yield of 5.2 percent or a euro-denominated bond with a yield of 4.5 percent. The current exchange rate is £1.5408 per €.
   a. What exchange rate one year later is the break-even exchange rate, which would make the pound and euro investments equally good?
   b. Which investment would have turned out to be better if the actual exchange rate one year later is £1.4126 per €?

12. A French investor has purchased bonds denominated in Swiss francs that have been issued by a Swiss corporation with a mediocre credit rating. Which of the following is a source of risk for this investment?
   a. Interest rate risk on Swiss francs
   b. Currency risk
   c. Credit risk
   d. a and b only
   e. a, b, and c

13. A Swiss investor has purchased a U.S. Treasury bond priced at 100. Its yield is 4.5 percent, and the investor expects the U.S. yields to move down by 15 basis points over the year. The duration of the bond is 6. The Swiss franc cash rate is 1 percent and the dollar cash rate is 2 percent. The one-year forward exchange rate is SF1.4000 per $. 
   a. The Swiss investor has come up with his own model to forecast the SF per $ exchange rate one year ahead. This model forecasts the one-year ahead exchange rate to be SF1.3500 per $. Based on this forecast, should the Swiss investor hedge the currency risk of his investment using a forward contract?
   b. If the Swiss investor decides to hedge using a forward contract, give a rough estimate of his expected return.
   c. Verify for the hedged investment that the risk premium in Swiss francs is the same as the risk premium on the same U.S. Treasury bond for a U.S. investor.

14. In determining the composition of an international bond portfolio, the decision regarding the weights of different national markets/currencies is more critical than the decision regarding the weights of different bonds within a national market/currency. Discuss why you agree or disagree with this statement.

15. A company without default risk has issued a perpetual dollar FRN at LIBOR. The coupon is paid and reset semiannually. It is certain that the issuer will never have default risk and will always be able to borrow at LIBOR. The FRN is issued on March 1, 2007, when the six-month LIBOR is at 5 percent. The dollar yield curve on September 1, 2007, and December 1, 2007, is as follows:
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<table>
<thead>
<tr>
<th>September 1, 2007 (%)</th>
<th>December 1, 2007 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One month</td>
<td>4.25</td>
</tr>
<tr>
<td>Three months</td>
<td>4.50</td>
</tr>
<tr>
<td>Six months</td>
<td>4.75</td>
</tr>
<tr>
<td>Twelve months</td>
<td>5.00</td>
</tr>
</tbody>
</table>

a. What is the coupon paid on September 1, 2007, per $1,000 FRN?
b. What is the new value of the coupon set on the FRN on September 1, 2007?
c. What is the new value of the FRN on December 1, 2007?

16. A company rated A has issued a perpetual dollar FRN. The FRN has a semianual coupon set at 6.5% LIBOR plus a spread of 6.5 percent. Six months later, LIBOR is equal to 6 percent, and the market-required spread for an A-rated corporation has moved up to 1 percent. Give an estimate of the value of the FRN on the reset date using the discounting method.

17. The yield curves on the dollar and yen are flat at 7 percent and 3 percent per year, respectively. An investment banker is considering issuing a dollar/yen dual-currency bond for Y150 million. This bond would pay the coupons in yen, and the principal would be repaid in dollars. The bond will make a principal payment of $1.36 million in two years, with interest paid in years 1 and 2. The spot exchange rate is 110.29 per $. a. What should the coupon rate be if the bond is issued at fair market conditions—that is, if the issue price is equal to its theoretical market value?
b. If the actual coupon rate is 9 percent, compute the percentage price.

18. The current dollar yield curve on the international bond market is flat at 6.5 percent for AAA-rated borrowers. A French company of AAA standing can issue straight and plain-vanilla FRN dollar bonds at the following conditions:

- Bond A: Straight bond. Five-year straight-dollar bond with a semianual coupon of 6.75 percent.
- Bond B: Plain-vanilla FRN. Five-year dollar FRN with a semianual coupon set at LIBOR plus 0.25 percent and a cap of 13 percent. The cap means that the coupon rate is limited to 13 percent, even if the LIBOR passes 12.75 percent.

An investment banker proposes to the French company the option of issuing bull and/or bear FRNs at the following conditions:

- Bond C: Bull FRN. Five-year FRN with a semianual coupon set at 12.75 percent—LIBOR.
- Bond D: Bear FRN. Five-year FRN with a semianual coupon set at 2 × LIBOR—6.5 percent.

The coupons on the bull and bear FRNs cannot be negative. The coupon on the bear FRN is set with a cap of 10 percent.

Assume that LIBOR can never be below 3.25 percent or above 12.75 percent.

a. By comparing the net coupon per bond for the following combination to that of a straight Eurobond, show that it would be more attractive to the French company to issue the bull and/or bear FRNs than the straight Eurobond.

i. Issue 2 bull FRNs + 1 bear FRN.
ii. Issue 1 plain-vanilla FRN (bond B) + 1 bull FRN.
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b. By comparing the net coupon per bond for the combination of 1 straight bond (bond A) and 1 bear FRN, show that it would be more attractive to the French company to issue the bull and/or bear FRNs than the plain-vanilla FRN.

19. An investment banker is considering the issue of a one-year Australian dollar/U.S. dollar currency-option bond. The currency-option bond is to be issued in Australian dollars (A$1,000), and the interest and principal are to be repaid in A$ or US$ at the option of the bondholder. The principal repayment would be either A$1,000 or US$549.45. The current spot exchange rate is A$1.82 per US$. The current one-year market interest rates are 8 percent in A$ and 5 percent in US$. A one-year put option on the A$, with a strike price of A$1.82 per US$, is quoted at 2 U.S. cents; this is an option to sell one A$ for 1/US$1.82.
   a. What should be the fair coupon rate set on this currency-option bond, according to market conditions?
   b. What is the value of the bond if it is issued at a coupon of 3.4 percent?

20. A French bank offers an investment product ("guaranteed bond with stock market participation") that has been extremely successful with European retail investors. This is a two-year bond with a zero coupon. However, there is an attractive clause at maturity. The bondholder will get full principal payment plus the percentage capital appreciation on the French CAC stock index between the date of issuance and maturity, if this capital appreciation is positive. So, a bondholder investing 100 will get, at maturity, either 100 (if the CAC index went down over the two years) or 100 plus the percentage gain of the index (if the CAC index went up over the two years).
   a. Assume that the stock market is expected to go up by 20 percent over the two years. What is the expected annual yield on the bond?
   b. At time of issue, the euro yield curve was flat at 6 percent. A two-year at-the-money call on the CAC index was quoted at 11 percent of the index value. What was the fair value of the bond at issuance?

Bibliography


