

# Supplementary problems: Arbitrage

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1. A two year, \$1,000 face value, annual payment coupon bond with a 7% coupon rate sells for \$1025. I have access to a bank account which pays me 7% per year with annual compounding.
  - (a) How much do I have to invest in the bank account today to replicate the payoffs on the bond?
  - (b) Construct an arbitrage. What is your riskless profit?
  - (c) Now suppose I can borrow at 8%, and that the same bond costs \$970. Construct an arbitrage. What is your riskless profit?
  - (d) Suppose the bond price is between \$982.17 and \$1000. Are there arbitrage opportunities?
  
2. A one-year zero coupon bond, with face value \$ 100, sells for \$ 96. The one year forward rate one year into the future is 5%. A two year zero coupon bond with face value \$ 100 trades at \$ 90.
  - (a) If I buy the one year zero coupon bond and, upon its maturing, invest the proceeds in a one year forward, how much will I have at the end of the second year?
  - (b) Construct an arbitrage.