1. The stock PolarBear.com trades on both the South Pole Stock Exchange and the North Pole Stock Exchange.

   (a) Suppose the price on the North Pole is $18. What does the No-Arbitrage Condition say about the price on the South Pole? (Assume no trading costs.)

   (b) Suppose the price on the North Pole is $18 and the price on the the South Pole is $17? How can you make an arbitrage profit? (Assume no trading costs.)

   (c) Suppose that the price on the North Pole is $18, that buying or selling on the North Pole costs $2, and that buying or selling on the South Pole is free. What does the No-Arbitrage Condition say about the price on the South Pole?

2. Suppose that there are two securities RAIN and SUN. RAIN pays $100 in there is any rain during the next world cup soccer final. SUN pays $100 in there is no rain. Suppose that the world cup soccer final is 1 year from today (although this is not true), and suppose that RAIN is trading at a price of $23 and SUN is trading at a price of $70.

   (a) If you buy 1 share of RAIN and 1 share of SUN, what is your payoff after 1 year, depending on the weather?

   (b) What does the No-Arbitrage Condition imply about the price of a 1-year zero-coupon bond? (Assume no trading costs.)

   (c) Suppose that a 1-year zero-coupon bond is trading at $90. Show how you would set up a transaction to earn a riskless arbitrage profit. (Assume no trading costs.)

   (d) Suppose that trading zero-coupon bonds is costless, but trading RAIN and SUN each cost $2 per $100 face value. Can you still make an arbitrage profit?

3. Suppose you buy a five-year zero-coupon Treasury bond for $800 per $1000 face value. Answer the following questions:

   (a) What is the yield to maturity (annual compounding) on the bond?

   (b) Assume the yield to maturity on comparable zeros increases to 7% immediately after purchasing the bond and remains there. Calculate your annual return (holding period yield) if you sell the bond after one year.

   (c) Assume yields to maturity on comparable bonds remain at 7%, calculate your annual return if you sell the bond after two years.

   (d) Suppose after 3 years, the yield to maturity on similar zeros declines to 3%. Calculate the annual return if you sell the bond at that time.

   (e) If yield remains at 3%, calculate your annual return after four years.

   (f) After five years.

   (g) What explains the relationship between annual returns calculated in (b) through (f) and the yield to maturity in (a)?