Introduction to Finance

Quiz 5 *November 20, 2018*

Show all work and clearly indicate your answer!

1. Suppose that today is November 15, 2019. State Farm issues a catastrophe bond with the following terms: It pays coupon interest annually and matures on November 15, 2024. It sells for par and has an 8% coupon. Payment is linked to named hurricane damage in Broward County Florida. The yield to maturity on 5-year US Treasury Bonds is 4% compounded continuously.

   (a) (**17 points**) Build a time line of the purchase and promised future cash flows on this cat bond (i.e., the cash flows that a buyer makes and would receive if there are no destructive hurricanes in Broward County during this bond's life).

   (b) (**17 points**) Build a time line of the "survival probabilities" for each of this cat bond's promised cash flows. That is, show the probability that the investor will receive each promised cash flow.

   (c) (**17 points**) Build a time line of the expected cash flows on this cat bond.

(d) (**15 points**) This question requires no numerical computations. What value will you get if you appropriately discount all of the cat bond's expected future cash flows using the continuously-compounded yield to maturity on the 5-year US Treasury Bond? **Explain.**

2. Consider that Jane owns a house on my street worth \$700,000. This house represents less than one-half of one percent of her wealth. Jim's house is also worth \$700,000, but this accounts for two-thirds of Jim's wealth. The hazard rate that describes fire risk to both houses is 1% on a continuous basis.

   (a) (**17 points**) Consider a two-year fire insurance policy that will replace the house in the event of fire over a two-year period. What is the actuarially fair price of this policy?

   (b) (**17 points**) Suppose that insurance companies offer a two-year policy for \$1,500 more than the actuarially fair price (this is the lowest available price for such insurance). How will this affect Jane's decision to buy the fire insurance? How will this affect Jim's decision to buy the fire insurance? Explain.