Nanyang Technological University
HE2001 Microeconomics II

Tutorial 5

1. You are the business manager of P. Bunyan Forests, Inc., and are trying to decide when you should cut your trees. The market value of the lumber that you will get if you let your trees reach the age of t years is given by the function $W(t) = e^{.20t-.001t^2}$. Mr. Bunyan can earn an interest rate of 5% per year on money in the bank.

   (a) Before what age that the rate of growth of the market value of the trees will be greater than 5%?

   (b) If he is only interested in the trees as an investment, how old should Mr. Bunyan let the trees get?

   (c) At what age do the trees have the greatest market value?

2. Fisher Brown is taxed at 40% on his income from ordinary bonds. Ordinary bonds pay 10% interest. Interest on municipal bonds is not taxed at all.

   (a) If the interest rate on municipal bonds is 7%, should he buy municipal bonds or ordinary bonds?

   (b) Hunter Black makes less money than Fisher Brown and is taxed at only 25% on his income from ordinary bonds. Which kind of bonds should he buy?

   (c) If Fisher has $1,000,000 in bonds and Hunter has $10,000 in bonds, how much tax does Fisher pay on his interest from bonds? How much tax does Hunter pay on his interest from bonds?

   (d) The government is considering a new tax plan under which no interest income will be taxed. If the interest rates on the two types of bonds do not change, and Fisher and Hunter are allowed to adjust their portfolios, how much will Fisher's after-tax income be increased? How much will Hunter's after-tax income be increased?

   (e) What would the change in the tax law do to the demand for municipal bonds if the interest rates did not change?

   (f) What interest rate will new issues of municipal bonds have to pay in order to attract purchasers?

   (g) What do you think will happen to the market price of the old municipal bonds, which had a 7% yield originally?

3. Dr. No owns a bond, serial number 007, issued by the James Company. The bond pays $200 for each of the next three years, at which time the bond is retired and pays its face value of $2,000.

   (a) How much is the James bond 007 worth to Dr. No at an interest rate of 10%?

   (b) How valuable is James bond 007 at an interest rate of 5%?

   (c) Ms. Yes offers Dr. No $2,200 for the James bond 007. Should Dr. No say yes or no to Ms. Yes if the interest rate is 10%? What if the interest rate is 5%?

   (d) In order to destroy the world, Dr. No hires Professor Know to develop a nasty zap beam. In order to lure Professor Know from his university position, Dr. No will have to pay the professor $200 a year. The nasty zap beam will take three years to develop, at the end of which it can be built for $2,000. If the interest rate is 5%, how much money will Dr. No need today to finance this dastardly program? If the interest rate were 10%, would the world be in more or less danger from Dr. No?