EC 11. Homework #7
NOTE DATE CHANGE: DUE MONDAY MAY 23

1. Define or explain the following terms:

(a) Pure rate of time preference [5]

(b) Arbitrage Profit [5]

(c) Explain why the interest rate equilibrates savings and investment.[5]

(d) Risk Aversion [5]

(e) A friend offers you an investment in a new company that makes caffeine free coffee ice cream that she swears will pay 20% annual return with no risk. Currently the rate on US Treasury Bills is 5.8%. Do you believe her? (5)

2. Explain how a rise in the interest rate would affect the following:

(a) The length of time paper mills allow trees to grow before harvesting them. [5]

(b) The demand for a four year college education.[5]

(c) The number of people blowing off work to go to the beach [5] today.

(d) The amount of money people deposit in the credit union.[5]

(e) The price of a house. (5)

3. Suppose that there are two states of nature, a and b and two risky assets, A and B. Suppose that the risk free rate of interest is 7% Asset A pays a 50% rate of return in state a and -30% in state b (i.e. you lose money in state b), while asset B payoffs are 20% in state b and 0% in state a. Is the asset market in equilibrium? Can you make a "risk-free" or what is called arbitrage profit in this market buy buying or selling the assets. [Hint try and construct a risk-free portfolio mixture of assets A and B.] [25]

4. Consider a student who has a bicycle of value $\$B$ and income $\$M$ assume that $M > B$ and she face a probability of bicycle theft of p. If her bike is not stolen then her utility is $U(M)$ and if it stolen her utility is $U(M - B)$. She has diminishing returns for money, so U is concave. That is; $U' > 0$ and $U'' < 0$. Assume that $U(0) = 0$. Suppose that she can purchase insurance at the price q per dollar of insurance coverage. If she buys $\$X$ coverage then her utility is $U(M - qX)$ if the bike is not stolen and $U(M - L - qX + X)$ if is stolen- as the insurance company will pay

her X.

(a) Suppose that she is an expected utility maximizer. Write down her optimization problem. (5)

(b) What are the first order condition for the optimal level of insurance, $X^*(q)$ given the price q and risk of theft p? [Just the FOC is OK - you do need to solve for the implicit function.] (10)

(c) What is the meaning of "Fair" or Actuarial Fair Insurance pricing. Prove that if Insurance is fairly priced then she will fully insure, that is $X^* = L$. (10)