Econ 3021 – Urban Economics
Winter 2008
Assignment 4: Housing
We will go over problems 1. and 2. in class.
Please complete problem 3 and hand in.
The due date for problem 3. is Monday 17 March. Please deposit in course mailbox.

1. Suppose you are deciding between renting and buying a flat. If you rent, you pay £12,000 per year plus £1,200 per year council tax, plus £1000 moving costs on moving in or moving out. All payments are made at the beginning of the year. The initial payment is made at the beginning of year 0. If you move out after living in the flat 2 years, the final rental payment is made at the beginning of year 1 and the final moving cost is paid at the beginning of year 2. If you buy you pay £200,000 plus a £5,000 transaction cost to move into the flat. Additionally, if you buy you must pay £1,200 per year in council tax and £1,000 per year in maintenance costs. All payments are made at the beginning of the year. If you buy the flat, you may resell it any future date for the same price but must pay a transaction cost to sell. The selling transaction cost is £5,000. Assume you can borrow and lend freely at a real rate of interest of 5% and there is no inflation and no uncertainty about future prices.

   (a) What is the net present value of the cost of renting the flat forever?

   (b) What is the net present value of the cost of purchasing the flat assuming you never sell it?

   (c) What is the net present value of the cost of renting the flat for 5 years?

   (d) What is the net present value of owning the flat for 5 years? Is it cheaper to rent or buy?

   (e) How many years must you stay in the flat to make owning worthwhile?

   (f) If you only stay 5 years, what change in the property value would make you exactly indifferent between renting and owning?

2. A consumer lives for two periods. In the first period they have assets a_1 and choose how much to spend on consumption c_1, housing h, and savings s. First period consumption c_1 has price p_1 per unit. Savings has price 1 per unit. They also choose whether to buy or rent housing. If they buy housing, they must pay a fixed transaction cost f and then a per unit price of p_{h1}. If they rent housing, they must pay a per unit rental price of p_{r1}. If they buy housing, second period assets are $a_2 = rs + p_{h2}h$ where r is the gross interest rate and p_{h2} is the price of housing in the second period. Assume $p_{h1} - \frac{p_{h2}}{r} > 0$. If they rent housing, second period assets are $a_2 = rs$. Second period assets are spent on period 2 consumption which

has price p_2. Utility depends on c_1, c_2 and housing h. The consumer's utility function is

$$u(c_1, c_2, h) = 0.3 \ln c_1 + 0.2 \ln c_2 + 0.5 \ln h.$$

(a) If the consumer buys a house, what are the first and second period budget constraints? If they rent what are the budget constraints?

(b) If the consumer buys a house, what are the demand functions for (c_1, c_2, h)? What are they if they rent?

(c) If the consumer buys a house, what is their attained level of utility? If they rent, what is their utility?

(d) Explain what factors in this model determine whether the consumer prefers to rent or buy. Under what conditions is the consumer indifferent between buying and renting?

3. A government is worried about poverty and housing. Poor people have incomes $I = 2$ and spend money on two commodities, housing h and alcohol a. Utility is $U(h, a) = (h - 0.1)^{0.75} a^{0.25}$, the price of housing is $p_h = 1$, the price of alcohol is $p_a = 1$.

(a) If there are no subsidies on housing and no income transfers, what is the poor household's optimal consumption of housing and alcohol? What is their level of utility?

(b) Suppose the government offers a housing subsidy, offering to pay half of the housing expenditures of the poor. What is the new optimal choice of housing, alcohol, and level of utility of the poor?

(c) What is the cost of the subsidy program?

(d) Let c_0 equal the cost calculated in c. Suppose instead of the subsidy program in c. the government gave each poor household c_0. What is the poor household's optimal choice of housing, alcohol, and utility level in this case?

(e) Under these assumptions, why does the second policy yield higher utility for the poor?

(f) Why might a government prefer the first policy even though the poor prefer the second policy under the assumptions stated?