

EC387 Problem Set 5 Ellis

1. a) Imagine that there are only two countries in the world, Canada and the US, and that the demand for drug XYZ prescriptions in each country are as follows

$$Q^{US} = 10,000,000 - 1000 P^{US} \quad Q^{CAN} = 1,000,000 - 1000 P^{CAN}$$

Assume that the marginal cost is constant at \$100 per prescription.

- b) Suppose that you are a profit maximizing drug manufacturer able to choose prices separately in the US and Canada. What prices  $P^{US}$  and  $P^{CAN}$  do you choose in each country if there is no resale between countries? What profits are earned in each of the two countries?
- c) Suppose now that you are told that you must charge the same price in both countries. How does this change your optimal pricing strategy?
- d) Should Canada favor a single price policy? Explain.
- e) Should the US favor a single price policy? Explain.

2. This problem builds on the hurdle model for health care, as applied to developing countries by Ellis and Mwabu (1991). Suppose that you think you might have a cold, and can decide either to visit a primary care doctor or an urgent clinic. Your utility function of care is:

$$u = -(h - h_0)^2 - c,$$

Where  $h$  is your actual health state,  $h_0$  is your benchmark health state, and  $c$  is the cost of receiving health care.

Your options for receiving care either to visit a primary care doctor (A) or an urgent care clinic (B). Suppose that your cold is treatable (i.e., with antibiotics) with probability  $p_A = p_B = p$  at both your PCP and the urgent care; that is, with probability  $p$ , your health will be  $h_0$ , and with probability  $1 - p$ , your health will be  $h^- < h_0$  (i.e., you have a viral infection that cannot be treated). You pay flat copays at both locations, with  $c_A < c_B$ .

- a. Suppose that you decide to seek care from a primary care doctor A. Where would you get care? What is your expected utility of doing so? How does it depend on  $p$ ? (For ease of notation, let's let  $h_0 = 0$  and  $h^- = -10$ .)
- b. What is your expected utility if you don't seek care? How does it depend on  $p$ ?
- c. What conditions do  $p$ ,  $c_A$ , and  $c_B$  need to satisfy in order for you to seek care? How does the likelihood that you seek care depend on  $p$ ?
- d. Now suppose that the cost of receiving care depends on more than just copays—now, you must also factor in travel time and the opportunity cost of your time. For simplicity, assume that the copays  $c_A = \$20$  and  $c_B = \$50$ . Let your **travel costs** (TC) to the PCP and the urgent care be  $TC_A$  and  $TC_B$ . Define a condition under which you would choose the urgent care over the PCP (hint: let  $\Delta_{TC} = TC_A - TC_B$  to reduce the number of parameters).

- e. Now that it is ambiguous which provider a patient will choose, the decision of whether or not to seek care has two cases: what are they? In each case, what is the impact of increasing travel costs on the threshold probability? At what point would seeking care be entirely discouraged?
- f. Are people living in high-income or low-income areas likely to have higher travel costs getting to a clinic or doctor? What about rural versus urban areas? Why? What does this imply about the selected pool of patients who seek care?
- g. Propose an extension of this model that either makes it more realistic or highlights additional features about health care in developing / low-income areas. What insights would you gain from solving such a model (note: you don't actually need to solve your proposed model).