FINAL EXAM FOR EEP 100

ETHAN LIGON

Questions marked $(\mathbf{T}, \mathbf{F}, \mathbf{U})$ should be answered "True," "False," or "Uncertain," and your answer should be briefly justified. Note that points will be awarded based only on your reasoning, not on the answer itself, even if correct.

- (1) (**T**,**F**,**U**) Increases in interest rates are apt to be associated with increases in oil prices.
- (2) (**T**,**F**,**U**) Consider the competitive equilibrium for an exchange economy. If the endowment of each person increases by 10% for each good, everyone is better off at the new competitive equilibrium since everyone consumes more of each good.
- (3) (**T,F,U**) Suppose that at an initial cost of \$1000, a homeowner can insulate his house and save \$50 each year in heating bills. If interest rates are 6%, should the homeowner insulate or not?
- (4) (**T**,**F**,**U**) Privatizing the provision of some services such as mass transit is generally in the public interest, since publicly operated mass transit programs almost invariable operate at a loss.
- (5) (**T,F,U**) The City of Berkeley operates a recycling program which, among other things, collects certain kinds of plastic which have few commercial uses—among the most profitable uses of this plastic is melting it to make very solid, unattractive, plastic park benches. The costs of making all the plastic into benches exceeds the market price at which the benches can be sold by *more* than the cost of dumping the plastic at locally operated private landfills, so the city's finances would be in better shape if they simply dumped the plastic. However, given the scarcity of landfills in the East Bay, it's likely that using the plastic to make park benches is in the public interest.
- (6) (**T**,**F**,**U**) *De gustibus non est disputandum.*
- (7) (**T**,**F**,**U**) When demand curves are linear, price elasticity doesn't depend on price, since the slope of a linear demand curve is constant.
- (8) (T,F,U) An influential study of the cigarette industry notes that "In 1918, for example, Lucky Strike [cigarettes] were sold for a short time at a higher retail price than Camel or Chesterfield and rapidly lost half its business" (Tennant 1961). However, since a USDA study using the same data estimates that the price elasticity of cigarette demand is between 0.3 and 0.4, at least one of these studies must be mistaken.

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All the parts of the following longer question can be answered quite precisely. However, as above, it is **not** the precise answer that is critical; rather it is the quality of your argument. If pressed for time, you may find that you can use this to your advantage.

(9) Suppose that consumers value gasoline because, if they own a car, it allows them to produce travel services according to

$$s = a + bg,$$

where s denotes travel services produced, g denotes gallons of gasoline, and a and b are parameters which depend on the consumer's location and automobile. Whether or not the consumer owns a car, they can still produce travel services by walking (which costs nothing): in this case, s = 1.

Consumers derive utility from travel services via the utility function $u(x,s) = (1 - \beta) \log(x) + \beta \log(s)$. (you may regard x as expenditures on goods other than travel services, so that the price of x is 1). The the consumer has income equal to y, and gasoline costs p/gallon, including all taxes.

- a) Derive the consumer's Marshallian demand for gasoline.
- b) If $a = 0, b = 1, \beta = 0.1$, and p = 2, below what level of income will car-owners choose to walk?
- c) Assuming the same parameters as in the last question, if someone with an income of y = 10,000 doesn't own a car, what is the maximum amount they'd be willing to pay for a car?

Assume henceforth the parameters assumed above, and that the population includes two kinds of people: 120 million people who own cars, and have an income of \$10,000, and the remainder of the population, which owns no cars at all.

d) What is the aggregate demand for gasoline (G), measured in **billions of gallons**, as a function of price?

Assume henceforth that aggregate gasoline demand (measured in billions of gallons) is given by G = 120/p. Further suppose that in an effort to reduce U.S. reliance on oil from the Middle East, the government increases gasoline taxes by two dollars per gallon; the net prices faced by consumers increase by \$1.00.

- e) How much revenue does the government realize from the tax increase?
- f) If the supply of gasoline is a linear function of price, can you say anything about the aggregate supply of gasoline? If so, what?
- g) How much would the government need to rebate to gas consumers if it were to exactly compensate them for the increase in tax?
- h) Since the total rebate needed to compensate consumers is greater than the revenue raised from the tax, the government has to find someway to finance the difference (which will be equal to the dead-weight loss associated with the tax increase). Suppose the government decides to finance the difference (the total cost of which we'll denote by \$B) by auctioning bonds. If consumer's are willing to lend to the government at an interest rate of 10%, and the government only auctions bonds with a maturity of 1 year, then what will the total of the face-value of the auctioned bonds be equal to?