

ECON 101, Problem Set 5
Due Tuesday, July 12

1. Bob is founding a broadcast television company. He will broadcast free television channels in Astana. Let x denote the number of channels he decides to provide. Suppose his marginal cost of creating each channel is ten million dollars and that his marginal personal benefit is $MPB(x) = 1000/x$. You cannot create a fraction of a channel, i.e. x only takes integer values.
 - (a) How many channels will Bob create?
 - (b) If there are a million people (including Bob) that have identical MPB's to Bob, what is the socially optimal number of channels?
 - (c) If the government wants to induce the socially optimal outcome, how much of a subsidy should it give Bob for each channel he creates?

2. Suppose we have the following taxes:
 - A progressive income tax, with the following tax brackets and deductions:
 - $[0, \$20000] \rightarrow 10\%$
 - $(\$20000, \$40000] \rightarrow 20\%$
 - $(\$40000, \infty) \rightarrow 30\%$
 - All childcare expenses deductible.
 - Each person may deduct \$1000 per alligator in household.
 - A sales tax of 10% on all purchases (except childcare which is exempt). The sales tax is included in purchase prices.
 - (a) Al has an income of \$45000. He has two alligators and spends no money on childcare. He spends 50% of his after-tax income on consumption (NOT including the sales taxes). What is the total amount that he paid to the government in taxes?
 - (b) Beth also has an income of \$45000. She spent \$5000 on child care and has no alligators. She paid \$500 in sales tax. What are her savings (i.e. how much is left after taxes and consumption)?
 - (c) Colin earns \$28000. His consumption not including childcare and the sales tax was \$5000. He has one alligator. The total tax he paid to the government was \$3000. How much did he spend on childcare? *Hint: it is less than \$7000.*
 - (d) Deborah earns \$45000. She has 20 alligators and spends 5000 on childcare. What is her marginal income tax rate? What about her average income tax rate?

3. Suppose the market inverse demand for peaches is $p(q) = 100 - q/2$, there is perfect competition on the supply side, and each firm's marginal cost is $MC(q) = q/3$.
- (a) If the government taxes consumers with a \$20 tax per unit consumed, what is the new market outcome? Calculate CS, PS, TR and DWL. How much of the tax is paid by the consumers? How much by the producers? Show CS, PS, TR, DWL and the appropriate curves on a plot in (q, p) -space.
 - (b) If the government taxes producers with a \$20 tax per unit produced, what is the new market outcome? Calculate CS, PS, TR and DWL. How much of the tax is paid by the consumers? How much by the producers? Show CS, PS, TR, DWL and the appropriate curves on a plot in (q, p) -space.
 - (c) Suppose the government taxes all other food products at about the same rate as they tax peaches. Using the theory of the second best, give a qualitative argument that getting rid of just the taxes on peaches might be a bad idea for society.
4. For each of the following statements, say whether it is true or false and give a short explanation of your answer.
- (a) The principle of neutrality suggests that we should tax goods for which supply and demand are relatively elastic so that the tax is not distortionary.
 - (b) If bargaining transaction costs are low, there is no role for government in correcting markets for externalities.
 - (c) In the presence of a negative externality, the total surplus is identical whether the government simply mandates the socially optimal outcome or the government implements a Pigouvian tax that results in the socially optimal outcome.
 - (d) If all people consume the same percentage of their income, a flat-rate sales tax (say 12% on all purchases) is a proportional tax.