

University of Toronto
Economics 336 – Public Economics

Midterm examination
October 13, 2009

WRITE YOUR NAME in block (capital) letters and your student number on all exam booklets you use. If you use additional booklets, place them inside the first one before handing them in. You may use pocket calculators (but you won't need to). You must not refer to books, computers, or any other aids. You have 110 minutes.

Answer FIVE of the following questions. Explain your reasoning carefully. You may use graphical or mathematical arguments where appropriate, but keep your answers brief. All questions have equal weight.

1. Joseph Harper owns an oil deposit in Canada, and he imports capital from other countries to extract the oil, which he sells in export markets. Studies have shown that Joseph's demand function for capital is

$$K(r) = A - r$$

where A is a parameter and r is the rental price he pays for capital. The government imposes a tax t on interest paid to foreigners. Assuming that *Canada is a small, open economy*, compute the impact of the tax on government revenues and on Joseph's profits. Based on your answer, what is the excess burden of this tax? Draw a graph to illustrate your answer.

2. Recent reforms have increased property taxes on older houses in the City of Toronto, while decreasing taxes on business properties there.
 - (a) Many houses in Toronto are used as rental accommodation. How is the burden of the tax increase shared between owners and tenants *in the short run* (say, two years) after the tax rate is increased? In the longer run?
 - (b) If business tax rates decrease in Toronto, *but not in surrounding cities*, what is the likely economic incidence of the tax reductions?
3. The Harberger triangle measure of the excess burden of an excise tax can be computed from the compensated demand function or from the Marshallian (uncompensated, market) demand function. Which of the two measures gives the correct measure of excess burden? Which of the two measures gives the larger number, or is the comparison ambiguous? Justify your answers.
4. Draw a graph of a *utility possibilities frontier* in a two-consumer economy and label points on the graph that corresponds to allocations that support the following statements:
 - (a) Points A and B are *Pareto efficient*, and Point C is Pareto inefficient.
 - (b) Point A is *Pareto superior* to Point C, but Point B is not.
 - (c) If Point C is Pareto inefficient and Pareto superior to Point D, then Point D is also Pareto inefficient.

Below your graph, provide an explicit formal definition in words of the THREE terms in italics.

5. A consumer's utility function is

$$U(X, Y) = 8\sqrt{X} + Y$$

her income is 156, and the pre-tax price of both goods is one. Compute the excess burden of a specific tax of one imposed on good X . (You may use an exact formula or an approximation based on the Harberger triangle.)

6. The demand for gasoline in a market is

$$G(p) = 200 - 5p$$

where p is the (after-tax) consumer price, and the marginal cost of gasoline production is fixed at one. Compute the economic incidence (on consumers and producers) of a specific tax at rate t on gasoline, assuming that the market is perfectly competitive. Next, compute economic incidence assuming that gasoline is supplied by a monopolist. Based on this, and anything discussed in class, what can you conclude about how market power affects the shifting of excise tax burdens?

7. A consumer supplies labour, which is untaxed), to purchase two goods with (compensated) demand functions

$$X(p_X, p_Y) = \frac{100}{p_X}$$
$$Y(p_X, p_Y) = \frac{50}{(p_Y)^b}$$

where b is a parameter of the utility function. For what values of b is it optimal to tax X at the same percentage rate as Y ? At twice the percentage rate as Y ? Justify your answers.