

University of Toronto
Economics 337 – Public Economics

Final examination
December 2015

You must not refer to books, computers, or any other aids. Pocket calculators and other aids are NOT permitted. You have 3 hours.

Part A. Answer SIX questions from this part. Keep your answers brief. (12 points each.)

1. A consumer's utility function is

$$U(X, Y) = 8X - \frac{1}{4}X^2 + Y$$

her income is \$30, and the pre-tax price of both goods is \$1. Compute the excess burden of a specific tax of \$1 imposed on good X. (You may use an exact formula or an approximation based on the Harberger triangle.)

2. Define the *excess burden* of a tax system. Using graphs or mathematical formulas (or both), show how the excess burden of a tax on a single commodity is related to its *elasticity of demand*. Does your answer depend on what tax rates apply in other markets?
3. Suppose that income tax rates were reduced and consumption tax (GST) rates were increased to maintain revenues. Explain how this would affect the *relative prices* facing taxpayers. Would this likely increase or decrease the long-run level of personal saving, or is the answer ambiguous?
4. Empirical studies show that the average income of those earning over \$250,000 is \$500,000, and the *elasticity of taxable income* is 0.2. What should be the marginal tax rate on incomes over \$250,000? Justify your answer.
5. List the external costs of driving considered in the Parry and Small (2005) study of the optimal tax on gasoline. In your opinion, can similar Pigouvian arguments justify high tax rates on cigarettes? Justify your answer.
6. Define a *carbon tax* and a *cap-and-trade system* for regulating greenhouse gas emissions, and explain the differences between them. Give two reasons why a carbon tax may be socially preferred to a cap-and-trade system. (Hint: Consider the arguments in the Metcalf (2009) article.)
7. Define *second-degree price discrimination*. Based on the theory of optimal public sector pricing, discuss ways TTC fares could be reformed to increase economic efficiency.

Exam continues overleaf...

Part B. You MUST answer this question. (28 points.)

8. (a) A consumer lives for two periods and has utility function

$$U(C_1, C_2) = (C_1)^{2/3}(C_2)^{1/3}$$

where (C_1, C_2) is consumption during the two periods of life. The consumer earns Y in period 1 and saves $S = Y - C_1$ in order to consume $C_2 = (1 + r)S$ in period 2. The lifetime present value budget constraint is therefore

$$C_1 + \frac{1}{1+r}C_2 = Y$$

Calculate the consumer's optimal savings as a function of the interest rate. What is the interest elasticity of savings? Explain your answer.

- (b) Under the Tax-Free Savings Account (TFSA) program, taxpayers can save up to \$5,500 annually without paying tax on the resulting capital income. How does this program affect the level of savings. How does your answer depend on *whether the taxpayer wishes to save more or less than \$5,500 in total during the current year?*