

**University of Toronto**  
**Economics 336Y – Public Finance (Expenditures)**

**Christmas examination**  
**6 December 2004**

**General Instructions:** 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. Allocate your time appropriately, and be sure to attempt all parts of all the questions you choose. This exam will be graded out of 100 points.

*Part A. Short-answer questions: Answer **SIX** of the following **EIGHT** questions. Keep your answers very brief. Be careful to answer all of each question you choose: most have two parts. (Each question is worth 10 points. Total: 60 points.)*

1. TRUE, FALSE, or UNCERTAIN: According to the *Samuelson condition*, there is a unique level of spending on a pure public good which is *Pareto efficient*. Explain your answer, and define the terms in italics.
2. A good that is *non-excludable* in consumption is unlikely to be provided by private firms in the absence of government intervention. While a *non-rival* good may be provided by private firms, it is likely that too little of it will be provided in the absence of government intervention. Explain your answer, and define the terms in italics.
3. "The Microsoft Corporation may earn large monopoly profits, but that is a just reward for past research and development investments. A monopolist that can capture all the benefits from its inventions has efficient incentives to invest in R&D." Do you agree with this statement? Construct a numerical or graphical example to show whether a monopolist chooses the socially optimal level of investment in developing a new product.
4. "Some customers of Ontario Hydro (the electric utility) pay more for their power than others do. Not only is this unfair, it is also inefficient, since efficiency requires all firms and consumers face the same prices." Do you agree with this claim? Explain your reasoning and, in particular, explain your assumptions about the budget constraint of Ontario Hydro.
5. Explain how levels of carbon dioxide emissions are to be allocated among countries under the Kyoto protocol. What advantages does this system have over a traditional command-and-control solution? Discuss and compare two policy options available to Canada for meeting its commitments to reduce emissions under the treaty.
6. A polluting activity causes environmental damage. Explain how government can design a *Pigouvian tax* to restore efficiency, even if polluters' costs of abating pollution are not known by government. At what level should the tax be set? *Now give one example in which, in contrast to the standard theory, a Pigouvian tax on pollution alone might not lead to an efficient level of pollution.*
7. According to the *Coase theorem*, should air polluters have the right to emit pollution, or should victims have a right to clean air? Explain your answer. *Name one other factor, not considered in the Coase theorem, that would cause you to change your answer, and explain why.*

8. A group of 3 parents meets to determine the level of spending on education in their (small!) school district. Spending may be low, medium, or high, labelled  $l < m < h$ . One parent, named  $L$ , ranks the alternatives as  $l \succ m \succ h$  (where  $\succ$  means “is preferred to”) and another, named  $M$ , ranks them as  $m \succ l \succ h$ . The third parent wants high spending  $h$ , but if this is not available in the public system she will purchase private education instead; her ranking is therefore  $h \succ l \succ m$ . Does a *majority voting equilibrium* level of spending exist? If so, what is it? If not, why not?

*Part B. Problem-solving question: You **must** answer the following question. (Total: 40 points.)*

9. (a) In 2001, government spending in Canada equalled almost 39 per cent of Gross Domestic Product, compared to 19 per cent of GDP in 1950. Suggest *three* factors that have contributed to this growth in the size of government. (You may wish to cite the views of Dennis Mueller, 1989, “The size of government.”) Does your answer suggest that government decisions reflect the preferences of a majority of voters, or other considerations? (20 points)
- (b) The federal government is trying to decide how many hours  $G$  of new Canadian programming to produce for broadcast on CBC television next year. Surveys have determined that only three people watch the CBC in total, two with demand curves given by

$$G_i = 15 - p_i \quad (i = 1, 2)$$

where  $p_i$  is the price the individual pays for each hour of programming; and the third with demand curve

$$G_3 = 100 - p_3.$$

Calculate the *Pareto efficient* level of new programming  $G^*$ , when the marginal cost of an hour of new programming is 100 units of private consumption per hour (that is, the marginal rate of transformation is 100). (10 points)

- (c) In the model of part (b), suppose that the government instead holds a referendum among the three CBC viewers to determine how much new programming will be provided. If each voter expects to pay an equal share (one-third) of the total cost through the tax system, what do you expect will be the *majority voting equilibrium* level  $\hat{G}$  of new programming? Explain why  $G^*$  and  $\hat{G}$  differ, and comment on the use of democratic decision-making procedures in such cases. (10 points)