

University of Toronto
Economics 336 – Public Economics

Final examination
April 16, 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. (10 points each.)

1. State the *Second Theorem of Welfare Economics*. In Toronto, low-income families may apply to live in government owned housing at subsidized (below-market) rents. Give one reason for and one reason against this form of aid to the poor.
2. Under the Goods and Services Tax (GST), consumer purchases of groceries are exempt from taxation, but restaurant meals are taxed. Discuss the effects on *efficiency and equity* of a tax reform that made groceries taxable, while reducing the tax rate on other things to keep revenues constant. (Hint: in your answer, define the *Corlett-Hague principle* and apply it to this situation.)
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. Define a *carbon tax* and a *cap-and-trade system* for regulating greenhouse gas emissions, and explain the differences between us. If the cost of reducing greenhouse gas emissions is uncertain, which is better: a carbon tax or cap-and-trade system? (Consider the Weitzman model of cost uncertainty, discussed in class and in the Metcalf (2009) article.)
5. State the *Samuelson conditions* for Pareto efficiency in the provision of public goods. Suppose there is one private good X and one public good G , and two identifiable types of citizens: type L citizens have utility functions

$$U_L(x_L, G) = x_L + \log G$$

Type H citizens have utility functions

$$U_H(x_H, G) = x_H + 2\log G$$

How does the level of public goods provision implied by the Samuelson conditions depend on the government's desire to redistribute from type L (low demand) to type H (high demand) citizens? Provide an economic intuition for your answer.

6. Define a *Lindahl equilibrium*. The City of Toronto is planning a new public park, but different citizens have different demand curves for park services. Explain how the government could set tax shares for the park in Lindahl equilibrium to determine the size of the new park. Is this outcome Pareto efficient? Is it Pareto superior to not building the park at all?

7. Define *third-degree price discrimination*. Based on the theory of optimal public sector pricing, are “seniors’ discounts” for the elderly on public transit fares justifiable? Discuss considerations of efficiency and equity.
8. Explain the *Tiebout hypothesis* about the advantages of decentralized government. In 1999, downtown Toronto and its suburbs (some with high property values and some with low property values) were amalgamated into a single city with uniform tax and spending policies everywhere. Discuss the effects of amalgamation on the efficiency of taxation and public goods provision in the Toronto region. (Hint: You may wish to discuss factors that violate the assumptions of the Tiebout hypothesis.)

Part B. You MUST answer this question. (40 points.)

9. Suppose that Canadians choose to live in Vancouver or Toronto based on which location yields higher utility. Furthermore, Vancouver is nicer than Toronto, unless too many people live there (causing congestion problems). In particular, the utility from living in Vancouver is

$$U_V(N_V) = 110 - N_V$$

if its population is N_V , and the utility of living in Toronto is

$$U_T(N_T) = 30 - N_T$$

if its population is N_T . Let the total population be 100, so that $N_T = 100 - N_V$.

- (a) Calculate the *equilibrium* population of the two cities, i.e. the point at which no one wants to move, if there are no restrictions on migration. What is the level of utility in each city in equilibrium?
- (b) Now calculate the population distribution that maximizes total welfare of Canadians

$$N_V U_V(N_V) + N_T U_T(N_T)$$

Use concepts from the economic theory of externalities to explain why the two answers are different. Now, calculate the level of utility in the two cities with this population distribution, and compare it to the utility levels from part (a).

- (c) Suppose again that there is free migration between cities. If the city of Vancouver imposed a tax on those moving to the city from Toronto, what would happen to equilibrium utility levels in Vancouver? in Toronto? For bonus points, what other policy could be used to control overpopulation but increase utility in *both* cities? Explain your answer using concepts from the theory of *fiscal federalism*.