

**University of Toronto**  
**Economics 336 – Public Economics**

**Midterm examination**  
**November 16, 2010**

**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. Under Canada's personal income tax system, marginal tax rates are increasing in income, and people are taxed on their individual incomes, regardless of whether they are married or not. Explain why this may violate *horizontal equity*. What reasons can you give in favour of the current approach?
2. In recent years, tax rates on labour income in Ontario have been reduced, while tax rates on housing have been increased. Is this change likely to increase or decrease the excess burden of the tax system in the long run? Justify your answer, and state clear your assumptions about demands and supplies of the relevant commodities.
3. (a) State the Second Theorem of Welfare Economics.  
(b) Government programs in aid of the poor in many countries are in the form of subsidies for food, housing, and medical services, instead of cash transfers. Give one reason for and against this form of aid to the poor.
4. The government of Pakistan pays a 40 per cent subsidy on sales of wheat and rice. That is, consumers pay 40 per cent less than the marginal cost of these goods. An econometrician has estimated that the price elasticity of wheat demand is -0.6, and the price elasticity of rice demand is -2.1. Based on the theory of optimal taxation, what changes to the subsidy rates would you propose? How would your answer change if the income elasticity of wheat demand is larger than the income elasticity of rice demand? Justify your answer.
5. 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.

6. A consumer's utility function is

$$U(X, Y) = 5X - \frac{1}{2}X^2 + Y$$

her income is 10, 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.)

7. The 2010 HST reform in Ontario has reduced sales taxes on business inputs by about \$5 billion annually. The Government has argued that this tax cut will be shifted forward to consumers in the form of lower prices. Do you agree? In your answer, explain the basic theory of tax incidence. Be sure to consider the cases of: (i) industries that compete with imported goods, and (ii) industries that are monopolistic.

8. Econometric studies have shown that the labour supply function of Mexican workers is

$$L = 20 \frac{P_f}{P_b} + 5 \frac{w}{P_b}$$

where  $L$  is hours worked per week,  $w$  is the hourly wage rate,  $P_f$  is the price of food, and  $P_b$  is the price of bus trips. (Assume that no other goods are consumed.) Based on efficiency considerations, is it better for the government to raise revenue with a labour income tax, or with differentiated taxes on food and bus trips? If the latter, should the tax rate on food be higher or lower than bus trips?