Intermediate Macroeconomic Theory I (ECON 303/2)

Final exam - Fall 2007

This exam is composed of three different questions for a total of 15 subquestions. All subquestions carry equal weight. Hence, do not waste all your time trying to answer just one subquestion.

Read each question carefully. All answers must be clearly justified using **economic theory**. Clear **explanations** must be given. Calculations must be detailed. Correct but unjustified answers will not get any credit.

With a fair understanding of the material seen in class, it is possible to answer each subquestion independently of the others, using the information provided in the preceding questions.

Question #1: Global warming

The cold Canadian winter means that parts of the construction industry and the farming industry have to come to a stop a for few months each year: During this time, machinery remains idle and some workers are laid off. Global warming, by reducing winter idle time, will permanently improve total factor productivity (TFP) in Canada. How will global warming affect the Canadian economy? In order to answer this question, use the two-period model seen in class (with consumers, firms, and a government) to examine the impact of increasing both z_0 and z_1 by Δz.

a) **Explain** what impact an increase in z_0 has in the labour market and in the goods market, **holding the interest rate constant**. Illustrate with graphs.

b) **Explain** why the interest rate must fall following an increase in z_0 and how this fact will affect the labour market and the goods market. Illustrate on the graphs drawn in a).

c) **Explain** what impact an increase in z_1 has in the labour market and in the goods market, **holding the interest rate constant**. Illustrate with graphs.

d) **Explain** why the interest rate must rise following an increase in z_1 and how this fact will affect the labour market and the goods market. Illustrate on the graphs drawn in c).

e) A renown economist claims: "Global warming will increase economic activity in Canada but the equilibrium interest rate will also increase." **Explain** how he can come to this conclusion. Illustrate with a graph.

f) A fortune teller (who took econ303 in the past) predicts: "Canada will be struck by a major tropical cyclone this winter (period 0). Yes, as a result of global warming, interest rate will rise in period 0 but economic activity will stay the same or even decline!" **Explain** how he can come to this conclusion. Illustrate with a graph.

g) Suppose that the fortune teller is right. Would anyone benefit from global warming then? **Explain**.

Question #2: Career choice

Consider a closed economy where there are two consumers with preferences over c_0 and c_1 described by the utility function $\ln(c_0) + \ln(c_1)$. At the beginning of period 0, consumers choose between two different occupations denoted by A and B. Consumers are not allowed to change their occupation between the two time periods. If a consumer chooses occupation A, he or she earns $y_0^A = 1.05$ in period 0 and $y_1^A = 1.10$ in period 1. However, if occupation B is chosen, he or she earns $y_0^B = 0.80$ in period 0 and $y_1^B = 1.45$ in period 1. There is also a government whose objective is to spend 0.10 in period 0 and nothing in period 1, i.e. $G_0 = 0.10$ and $G_1 = 0$. The total tax burden is shared equally between the two consumers. The government and consumers can issue bonds at the same interest rate r. Taxes in period 0 are equal to 0.02.

a) **Explain** why the marginal rate of substitution between c_0 and c_1 cannot be below $1 + r$.
b) **Explain** why all consumers will choose the same occupation.
c) **Show** that given an occupation choice, the equilibrium interest rate is given by $r = \frac{Y_1 - G_1}{Y_0 - G_0}$.
d) Calculate the utility associated with each of these two occupations. **Argue** that consumers will choose occupation A.
e) Determine the equilibrium interest rate. Calculate aggregate consumption in both periods, government savings, private savings, and taxes collected by the government in period 1.

Consider another closed economy. Everything is the same between the two economies except for their government expenditures. The government in the second economy prefers to spend nothing in period 0 and 0.10 in period 1. This government only collects taxes in period 1.

f) **Argue** that consumers will choose occupation B in this second economy.
g) Calculate the equilibrium interest rate in the second economy. Why is this economy's equilibrium interest rate higher than in the other economy? **Explain.**
h) The timing of taxes is different in the two economies. Does the fact that consumers make different choices in these two economies contradicts the Ricardian Equivalence Theorem? **Explain** why or why not.