ECO2143 Macroeconomic Theory II
Final Examination: April 25, 2008
University of Ottawa
Professor: Louis Hotte
Time allowed: 3h 00min

Attention: *Not all questionnaires are the same. This is questionnaire* ***A****. On the answer sheet, you must indicate the letter of your questionnaire with the course's number as follows:* ***ECO2143A****. You must answer according to* ***the material seen in this course****. Read all answer choices before choosing your answer.* GOOD LUCK!

QUESTIONNAIRE A

I. MULTIPLE CHOICE QUESTIONS (4 points each)

ATTENTION: To simplify, whenever convenient, today's rich and industrialized countries such as Canada and Western Europe will be referred to as **ICs**, while today's poorer, less-developed countries will be referred to as **LDCs**.

(1) Suppose that the (total factor) productivity level A can be broken down into a technology level T and efficiency level E as follows: $A = T * E$. In the USA, the average growth rate of A is 0.81% per year while the efficiency level does not change. Productivity in Canada is 77% that of the USA. Suppose that Canada is five years behind the USA in terms of technology. What is the efficiency level in Canada relative to the USA?
 (a) 50%
 (b) 80%
 (c) 100%
 (d) 120%

(2) According to the data presented in this course, differences in productivity across countries of the world are largely due to
 (a) technology differences.
 (b) human capital accumulation differences.
 (c) physical capital accumulation differences.
 (d) attitude differences.
 (e) efficiency differences.

(3) According to the data presented in this course, changes in productivity across time are largely due to
 (a) technology differences.
 (b) human capital accumulation differences.
 (c) physical capital accumulation differences.
 (d) attitude differences.
 (e) efficiency differences.

(4) Which of the following is generally true?
  (a) With perfect capital mobility, a higher savings rate leads to a higher GDP per worker.
  (b) In a closed economy, a higher savings rate leads to a higher GDP.
  (c) With perfect capital mobility, a higher savings rate leads to a higher marginal product of labor.
  (d) With perfect capital mobility, GDP and GNP are equal.

(5) Which of the following is generally true?
  (a) Among ICs today, the correlation between savings and investment is low, thus suggesting that capital is rather immobile.
  (b) Among ICs today, the correlation between savings and investment is high, thus suggesting that capital is rather immobile.
  (c) Among ICs today, the correlation between savings and investment is low, thus suggesting that capital is quite mobile.
  (d) Among ICs today, the correlation between savings and investment is high, thus suggesting that capital is rather immobile.
  (e) The above are all generally false.

(6) The following table gives the degree of mobility between fathers and sons in Canada. Assuming that this degree of mobility was constant over two generations, what is the probability that a man whose paternal grandfather was in the highest income quartile would end up in the bottom quartile?

Father's earnings quartile	Son's earnings quartile			
	1st (lowest)	2nd	3rd	4th (highest)
1st (lowest)	.33	.28	.22	.17
2nd	.25	.27	.26	.21
3rd	.22	.24	.27	.27
4th (highest)	.20	.21	.25	.35

  (a) 0
  (b) .17
  (c) .24
  (d) .33
  (e) .35

(7) Which of the following is false?
  (a) The Kuznets curve says that as a country's GDP per capita increases, income inequality increases for countries with low levels of GDP per capita and decreases for countries with high levels of GDP per capita.
  (b) Economic growth does not seem to affect very much the income share of the poorest.
  (c) The Lorenz curve plots cumulative % of households income against cumulative % of households.
  (d) Economic growth is generally bad for the poorest of a country.

(8) Which of the following is true?
  (a) According to the evidence, inequality is undeniably good for growth.
  (b) There are no reasons to think that inequality may affect growth.

(c) With respect to physical capital accumulation, higher income inequality is suspected to be good for growth.
(d) With respect to human capital accumulation, higher income inequality is suspected to be good for growth.
(e) Higher intergenerational economic mobility is linked with lower equality of opportunities.

(9) Suppose that China and Canada are openly trading with each other. Due to its adoption of new technology, China is suddenly twice as productive in the production of *all* its goods and services. Productivity in Canada is unchanged. Based on the comparative advantage argument, what is the likely effect of this higher productivity in China?
(a) None because the opportunity costs of production are essentially unaffected.
(b) None because the absolute costs of production are essentially unaffected.
(c) Canadians will be richer because of the higher productivity of the Chinese economy.
(d) Canadians will be poorer because of the higher competitiveness of the Chinese economy.
(e) The Chinese workers will be worse off because higher productivity means that they will have to work harder.

(10) Which of the following is NOT an advantage of trade?
(a) It makes it more difficult for monopolies to survive.
(b) It produces a larger market that increases incentives for the creation of new technology.
(c) It allows firms to take advantage of economies of scale.
(d) It raises the wage of all unskilled workers worldwide.
(e) None of the above.

II. PROBLEMS

(1) **(40 points) Technological progress in the Solow model**
The aggregate output of an economy is given by $Y = AK^{\alpha}L^{1-\alpha}$, where all variables are as defined in the course. In order to analyze the effect of technological progress, let us introduce a new variable $e \equiv A^{\frac{1}{1-\alpha}}$. We thus have $Y = K^{\alpha}(eL)^{1-\alpha}$. Variable e denotes *effective* work due to existing technology. Parameters γ, δ, n and $\hat{e}$ respectively denote the savings rate, depreciation rate, population growth rate and technology growth rate.

(a) **(5)** Show that $y_e = k_e^{\alpha}$, where y_e and k_e denote output and capital per effective worker.

(b) **(15)** Give the expression that determines the change in k_e between two periods and derive the corresponding steady-state value for y_e.

(c) (20) Analyze graphically **and explain clearly** the effect of a permanent increase in the savings rate. (Assume that the savings rate jumps from γ_0 to γ_1.) Show what happens to per capita income over time?

(2) **(40 points) Trade and investments in the national accounts**
We have the following list of variables:

Imports: Q_t

Exports: X_t

Capital: K_t

Investment: I_t

Consumption: C_t

Constant labor: L

Net foreign asset holdings (*or* Net international investment position): B_t^f

Gross domestic product: $GDP_t = Y_t = K_t^{\alpha}L^{1-\alpha}$

Marginal product of capital: $MPK_t = \alpha K_t^{\alpha-1}L^{1-\alpha} = \alpha k_t^{\alpha-1}$

We have:

$K_{t+1} = K_t - \delta K_t + I_t$.

(a) **(20) The closed economy** Describe how future output can increase in a closed economy. Explain, with the help of the basic Solow model (either graphically or mathematically), how this can lead to a development trap.

(b) **(20) The open economy** Describe how opening up to trade and capital movements can allow a country to escape from a development trap. Assuming that the world interest rate is equal to r^W, what is the long-run per-capita output with perfect capital mobility?

(c) **(20)** Suppose that $t = 0$ now and a country has just opened up to the rest of the world, such that $B_0^f = 0$. It is presently coming out of a development trap. What would you expect the sign of its current account balance to be like? Explain how this sign can be attained and what it means for the future of this country.