

Department of Economics  
Queen's University

**ECON239: Development Economics**

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**Assignment #1**

Due Date: 2.30pm, Thursday October 8, 2009

**Section A** (40 percent): Briefly discuss the validity of each of the following statements. In your answer define or explain as precisely as possible any terms or concepts which are underlined, with particular reference to the context in which they are being used. The text for each answer should be no longer than a page, but you also should also include diagrams or examples where appropriate. All questions have equal value.

**A1.** In 1990, the country of Xanadu is characterized by almost zero trade with the rest of the world, so that most of its GNP consists of non-traded goods, and there is significant unemployment. Suppose that by 2000, Xanadu has started to produce a large quantity of manufactured goods (using its unemployed labour) that it exports to the US in return for US\$. Assuming that the production of non-traded goods remains unchanged, the rise in Xanadu's GNP measured in US\$ using official exchange rates will be under-estimated relative to that measured using purchasing power parity exchange rates.

**A2.** Using the World Bank's dollar-a-day poverty line, poverty has declined world-wide over the last 20 years. However, if we exclude China from such calculations, the picture looks very different.

**A3.** Economic transactions between people that take place over a period of time are likely to involve some kind of asymmetric information.

**A4.** The Harrod-Domar model is a simple, but useful guide for assessing the likely impact of foreign aid on the economic growth of an economy (see Easterly, ch. 2, "Aid for Investment").

**A5.** Countries A and B have the same rates of investment, population growth and depreciation. They also have the same levels of income per capita. Country A has a higher rate of growth than does country B. According to the augmented Solow model, it follows that Country A has the highest investment in human capital.

**Section B** (60 percent): Answer the following questions. They all have equal value.

**B1.** Suppose there are only two goods produced in the world: DVDs, which are traded internationally, and hair cuts, which are not. Assume that transport costs are negligible. The following table shows information on the production and prices of DVDs and hair cuts in the USA and China:

Country	DVDs Produced per Capita	Hair Cuts Produced per Capita	Price of DVDs in Local Currency	Price of Hair Cuts in Local Currency
USA	9	4	2	4
China	3	4	10	10

- What is the implicit market exchange rate between the currencies of the two countries?
- Calculate the ratio of GDP per capita in the USA to GDP per capita in China in US dollars, using the market exchange rate?
- Use the US basket of goods to calculate a purchasing power parity (PPP) exchange rate between the two currencies.
- Now use the world basket of goods to compute an alternative PPP exchange rate.
- For each of the exchange rates in (c) and (d), compute the associated ratio of GDP per capita in the USA to GDP per capita in China in US dollars, using the PPP exchange rate?

**B2.** The following income distribution data are for Brazil. The population is 150 million.

<u>Quintile</u>	<u>Percent share</u>
Poorest 20%	2.4%
Second quintile	5.7%
Third quintile	10.7%
Fourth quintile	18.6%
Richest 20%	62.6%
Richest 10%	46.2%

- Carefully plot the Lorenz curve, labeling the axes.
- Explain graphically how you might calculate the Gini coefficient.
- Brazil's national income is about \$300 billion. What is the approximate dollar income of the bottom 20% ? Bottom 40% ?
- Suppose that each household makes the average income for its quintile. What is the level of poverty (measure by the headcount index) if the poverty line is \$400 per capita ?
- Suppose ten percent of national income were transferred from the richest 20% of households to the poorest 20% of households. On the same diagram as in part (1), show the effect on the Lorenz curve.

**B3.** Suppose a hypothetical economy can be well represented by a Solow model. The production function is estimated to be

$$Y = K^{\frac{1}{2}}L^{\frac{1}{2}}$$

where  $Y$  represents output,  $K$  is capital and  $L$  is labour. The fraction of output invested each year is  $s = 0.25$ . The annual population growth rate is  $n = 0.02$  and the depreciation rate is  $\delta = 0.03$ .

- (a) What are the steady state levels of capital per worker and output per worker?  
 (b) In year 1 the level of capital per worker is 16. In a table like the following one, show how capital and output change over time (the beginning is filled in as a demonstration). Continue this table up to year 8.

Year	Capital per worker	Output per worker	Investment per worker	Depreciation per worker	Change in Capital per worker
1	16	4	1	0.8	0.2
2	16.2				

- (c) Calculate the growth rate in output and capital per worker between years 1 and 2.  
 (d) Calculate the growth rate in output and capital per worker between years 7 and 8.  
 (e) Comparing your answers from parts (c) and (d), what can you conclude about the speed of output growth as a country approaches its steady state.