Macroeconomics: Assignment 1

(Deadline: at the beginning of Lecture 2)

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1. Readings: we discussed the data of Macroeconomics in China, United State, Hong Kong and Singapore. Choose one country and write comments on the related news or macroeconomic data to show your understanding of the course material. (100 words)

2. Abby consumes only apples. In year 1, red apples cost $1 each, green apples cost $2 each, and Abby buys 10 red apples. In year 2, red apples cost $2, green apples cost $1, and Abby buys 10 green apples.
   a) Compare a consumer price index for apples for each year. Assume that year 1 is the base year in which the consumer basket is fixed. How does your index change from year 1 to year 2?
   b) Compute Abby's nominal spending on apples in each year. How does it change from year 1 to year 2?
   c) Use year 1 as the base year, compute Abby's real spending on apples in each year. How does it change from year 1 to year 2?
   d) Defining the implicit price deflator as nominal spending divided by real spending, compute the deflator for each year. How does the deflator change from year 1 to year 2?
   e) Suppose that Abby is equally happy eating red or green apples. How much has the true cost of living increased for Abby? Compare this answer to your answers to parts (a) and (d).

3. Suppose that an economy's production function is Cobb-Douglas with parameter $\alpha=0.3$.
   a) What fraction of income do capital and labor receive?
   b) Suppose that immigration increases the labor force by 10 percent. What happens to total output (in percent)? The rental price of capital? The real wage?

c) Suppose that a gift of capital from abroad raises that capital stock by 10 percent. What happens to total output (in percent)? The rental price of capital? The real wage?

d) Suppose that a technological advantage raises the value of parameter A by 10 percent. What happens to total output (in percent)? The renal price of capital? The real wage?

4. Consider a Cobb-Douglas production function with three inputs. K is capital (the number of machines), L is labor (the number of workers), and H is human capital (the number of college degrees among the workers). The production function is

$$Y = K^{1/3}L^{1/3}H^{1/3}$$

a) Derive an expression for the marginal product of labor. How does an increase in the amount of human capital affect the marginal product of labor?

b) Derive an expression for the marginal product of human capital. How does an increase in the amount of human capital affect the marginal product of human capital?

c) What is the income share paid to labor? What is the income share paid to human capital? In the national income accounts of this economy, what share of total income do you think workers would appear to receive? (Hint: Consider where the return to human capital shows up.)

d) An unskilled worker earns the marginal product of labor, whereas a skilled worker earns the marginal product of labor and the marginal product of human capital. Using your answers to parts (a) and (b), find the ratio of the skilled wage to the unskilled wage. How does an increase in the amount of human capital affect this ratio? Explain.

e) Some people advocate government funding of college scholarships as a war of creating a more egalitarian society. Other argue that scholarship help only those who are able to go to college. Do your answers to the preceding questions shed light on this debate?