

SIMON FRASER UNIVERSITY
Department of Economics

Econ 305
Intermediate Macroeconomic Theory

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Fall 2008

PROBLEM SET 1
(Due September 29)

1. Briefly explain the difference between nominal GDP and real GDP. Why do economists care more about real GDP? Could it ever be the case that one increases while the other decreases? How?
2. Briefly explain why increases in the CPI tend to overstate increases in the cost of living, and why increases in the GDP deflator tend to understate increases in the cost of living.
3. Briefly explain the difference between GDP and GNP. Which is larger for Canada?
4. Prove mathematically that if the economy's aggregate production function has the "Cobb-Douglas" form, and factors of production are paid their marginal products, then the share of each factor in national income is constant. (Hint: A factor's marginal product is the partial derivative of the production function with respect to that factor). When will it be the case that the sum of these shares equals one?
5. Consider a Cobb-Douglas production function with three inputs: K is capital (e.g., number of machines), L is labor (e.g., number of workers), and H is "human capital" (e.g., number of college degrees among the workers). Normalizing the scale factor A to one gives us:

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

- (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 plus the marginal product of human capital. Using the answers to (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 way of creating a more egalitarian society. Others argue that scholarships help only those who are able to go to college. Do your answers to the above questions shed light on this debate?
6. Demographers predict that the fraction of the population that is elderly will increase over the next 20 years. What does Modigliani's 'Life-Cycle Hypothesis' predict for the influence of this demographic change on the national saving rate?
 7. Briefly explain how a temporary (deficit-financed) tax cut affects the national saving rate? How does your answer depend on the 'Ricardian Equivalence Hypothesis'?
 8. The 'Permanent Income Hypothesis' implies that increases in saving should predict recessions. Why? If possible, explain it verbally and demonstrate it mathematically (using Irving Fisher's two-period model of consumption, where you can assume for simplicity that the interest rate is zero and that individuals consume the same amount each period).