

SIMON FRASER UNIVERSITY  
Department of Economics

Econ 305  
Intermediate Macroeconomic Theory

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Spring 2012

PROBLEM SET 1  
(Due February 1)

1. (10 points). Using your knowledge of National Income Accounting, briefly describe why the current account deficit and the government budget deficit are often described as ‘twin deficits’. Can you think of any reason why they might not be twins?
2. (20 points). Suppose household preferences are described by the utility function

$$U(C, \ell) = 2\sqrt{C} + \alpha\ell$$

where  $C$  stands for consumption of market goods and  $\ell$  stands for leisure.

- (a) Assuming the market (real) wage is  $w$  and the total amount of time available is  $h$ , derive expressions for the household’s consumption and labor supply decisions as a function of  $w$  and  $h$ . (For simplicity, assume the household has no nonmarket income). Does the income effect ever dominate the substitution effect. How would things change if the household had some nonmarket income? Explain intuitively.
- (b) Now suppose output,  $Y$ , is produced by competitive firms with technology

$$Y = zK^{1/2}N^{1/2}$$

where  $K$  denotes (fixed) capital inputs,  $N$  denotes labor inputs, and  $z$  is an index of total factor productivity. Derive an expression of the firm’s labor demand, as a function of  $w$ ,  $K$ , and  $z$ .

- (c) Using your answers to parts (a) and (b), derive an expression for the market-clearing wage rate. (For simplicity, assume the firm’s profits do not accrue to the household, so that the labor supply curve is the same as in part (a)). How does the equilibrium wage change when  $z$  increases? How does the equilibrium wage change when  $\alpha$  increases? Use a Labor Supply/Labor Demand graph to illustrate these changes.
3. (20 points). Over the past 100 years or so, the development experience of many countries is described by two facts: (1) The economy’s capital/labor ratio rises, and (2) The share of labor and capital in national income are roughly constant. How can this be? What do these two empirical facts suggest about the form of the production function? (Hints: (1) The share of labor is  $w \cdot L/Y$  and the share of capital is  $R \cdot K/Y$ , (2) Assume factor markets are competitive, so factors are paid their marginal products).

4. (20 points). In the 1930's Keynes famously argued that the best way to stimulate employment was to pay people to dig holes and fill them up again. This question explores the logic behind that advice.

(a) Suppose households have the following preferences:

$$U(C, \ell, G) = \sqrt{C + G} + \sqrt{\ell}$$

where, as before,  $C$  is market consumption and  $\ell$  is leisure. The new element here is government purchases,  $G$ . Note that the above preferences imply that government-provided goods are perfect substitutes for private consumption. Of course, the government must pay for the goods it buys, and suppose it does so by imposing lump-sum taxes,  $T$ , on the household. Since there is only one period, the government budget constraint is just  $G = T$ . Now the household's budget constraint is

$$C + w \cdot \ell = w - T = w - G$$

For simplicity, suppose that the production takes the simple form,

$$Y = N = 1 - \ell$$

so that the marginal product of labor (and therefore the wage) is constant and equal to one. Given this information, solve for the household's labor supply curve. Does it depend on  $G$ ? Why or why not? What happens to output, employment, and consumption when  $G$  increases?

(b) Now suppose the government buys useless things (e.g., holes in the ground), so that the household's utility function is as follows:

$$U(C, \ell) = \sqrt{C} + \sqrt{\ell}$$

In other words, government purchases do not provide utility to the household. Does labor supply now depend on  $G$ ? Why or why not? (Hint: Your answer should refer to income and substitution effects). If  $G$  increases, how does output and employment respond? Was Keynes right? (WARNING: This is a neoclassical economy. There is no unemployment! Keynes had in mind a different sort of economy, but this example sheds some light on his thinking).