ECO2142 B
Fall 2013

Assignment #1

Due date : September 25, at the beginning of the class

1. Suppose the production function :

$$Y = AK^{0.2}L^{0.8}.$$

K denotes capital and L denotes labour. Assume that capital and labour are paid their marginal products.

a) Does this production function has constant returns to scale? Explain.
b) What fractions of income do capital and labour receive ?
c) Suppose that immigration increases the labour force by 10 percent. What happens to total output? The rental price fo capital? The real wage?
d) Suppose that a gift of capital from abroad raises the capital stock by 10 percent. What happens to total output? The rental price fo capital? The real wage?
e) Suppose that a technological advance raises the value of the parameter A by 10 percent. What happens to total output? The rental price fo capital? The real wage?

2. Consider an economy described by the following equations:

$$Y = C + I + G$$
$$Y = 6000$$
$$G = 1000$$
$$T = 1000$$
$$C = 250 + 0.75\,(Y - T)$$
$$I = 1200 - 50\,r$$

a) For this economy, compute private saving, public saving, and national saving.
b) Find the equilibrium interest rate.
c) Now, suppose that G rises to 1,250. Compute private saving, public saving, and national saving.
d) Compute the new equilibrium interest rate.

3. MA, #11, p. 77.

Total: 5/6

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(22)

1 (2) a) Yes as this is a Cobb-Douglas production function ($\alpha = 0.2$)

(2) b) $\alpha = .2 \Rightarrow$ 20% goes to capital
$\Rightarrow$ 80% " labour

(2) c) i. $L_1 = 1.1\,L$; $K_1 = K$

$$\%\Delta Y = \left(\frac{Y_1 - Y}{Y}\right) \times 100$$

$$= \left(\frac{AK^{.2}(1.1L)^{0.8} - AK^{.2}L^{0.8}}{AK^{.2}L^{0.8}}\right) \times 100$$

$$= \left(1.1^{0.8} - 1\right) \times 100 = 7.9\%$$

(2) ii. $\%\Delta MPK = \left(\frac{\alpha Y_1/K_1 - \alpha Y/K}{\alpha Y/K}\right) \times 100$

$$= \left(\frac{\alpha(1.079Y)/K - \alpha Y/K}{\alpha Y/K}\right) \times 100$$

$$= \left(1.079 - 1\right) \times 100 = 7.9\%$$

(2) iii. $\%\Delta MPL = \left(\frac{0.8Y_1/L_1 - 0.8Y/L}{0.8Y/L}\right) \times 100$

$$= \left(\frac{0.8\,1.1^{0.8}Y/1.1L - 0.8Y/L}{0.8Y/L}\right) \times 100 = \left(1.1^{-0.2} - 1\right) \times 100$$

$$= -1.9\%$$

(2) d) i. $K_1 = 1.1K$; $L_1 = L$

$$\%\Delta Y = (1.1^{0.2} - 1) \times 100 = 1.9\%$$

(2) ii. $$\%\Delta MPK = \left(\frac{0.8Y_1/K_1 - 0.2Y/K}{0.2Y/K}\right) \times 100$$

$$= (1.1^{-0.8} - 1) \times 100$$

$$= -7.3\%$$

(2) iii. $$\%\Delta MPL = \frac{0.8Y_1/L - 0.8Y/L}{0.8Y/L}$$

$$= (1.019 - 1) \times 100 = 1.9\%$$

} same approach as in part c

e, (2) i. $A_1 = 1.1A$; $K_1 = K$; $L_1 = L$ $\Rightarrow Y_1 = 1.1Y$

$$\%\Delta Y = \left(\frac{Y_1 - Y}{Y}\right) \times 100$$

$$= \left(\frac{1.1Y - Y}{Y}\right) \times 100 = 10\%$$

(2) ii. $$\%\Delta MPK = \left(\frac{0.2Y_1/K - 0.2Y/K}{0.2Y/K}\right) \times 100$$

$$= \left\{\frac{0.2Y/K\ (1.1 - 1)}{0.2Y/K}\right\} \times 100$$

$$= 10\%$$

(2) ii. %ΔMPL = 10%

2. (20) (2) a) $S_{private} = Y - T - C$

$= 6000 - 1000 - 250 - 0.75(5000)$

$= 1000$

(2) $S_{public} = T - G = 0$

(2) $S = 1000 + 0 = 1000$

(4) b) At equilibrium, $S = I$

$\Rightarrow 1000 = 1200 - 50r$

$r = 4\%$

c) $S_{private} = 1000$ (2)

$S_{public} = T - G = 1000 - 1250 = -250$ (2)

$S = 750$ (2)

(4) d) at equilibrium, $S = I$

$\Rightarrow 250 = 1200 - 50r$

$\Rightarrow r = 9\%$

(Note: question was not clear)

#3. MS, p. 84, # 11

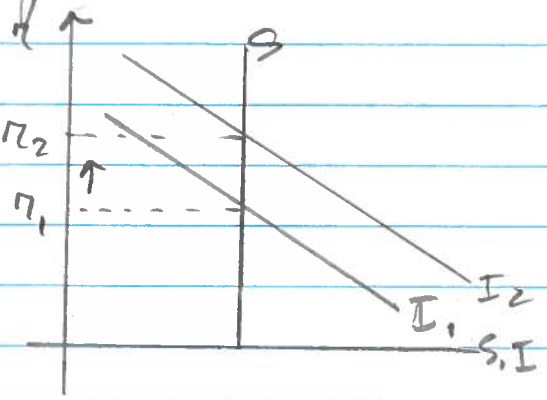
(14)

a) - The demand curve for business investment shifts to
(2) the right because business investment becomes more attractive.

(2) - The demand curve for residential investment does not change

b) Suppose investment tax credit is revenue neutral (i.e. $\Delta T = \Delta G = 0$) then S curve does not shift:

(6)



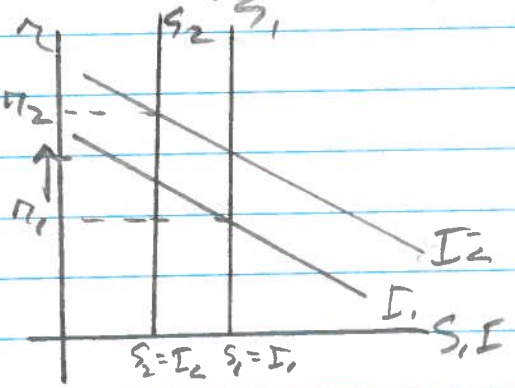
Answers to part a) ⇒ Demand for total investment ↑ (that is, I curve shifts upward)

⇒ ↑ r

c) Total quantity of investment does not change, but
(4) the composition changes: more business investment but less residential investment

Notes: because the question was not clear, some students may have assumed that the investment tax credit would not be revenue neutral that is, $\Delta T < 0 \Rightarrow$ National saving would decrease

These students should still receive full marks in part b) if they show that



- demand for loans ↑
- Supply for loans ↓
- r ↑

and in part c) if they answer

c) i) Residential investment ↓ because there is less total investment and because business investment is now favoured

ii) The impact on business investment is ambiguous. It depends on the drop in national saving. If the drop in national saving is > than the increase in the demand for business investment, then the quantity demanded of business investment ↓ (otherwise, it will increase)