

## Homework 1 solutions

### (A) Multiple choice questions:

1. B
2. C
3. B
4. C
5. B
6. A
7. D
8. A
9. B
10. C
11. D
12. C
13. D
14. A
15. D
16. A
17. C
18. B
19. B
20. C
21. D
22. D
23. D
24. D
25. A

### (B) Essay questions:

1. page 77, #9

*Note: in the posted homework assignment,  $T = 1,100$  while in the textbook  $T = 1,000$ . Using both would be acceptable. The solution here follows the textbook using  $T = 1,000$ .*

- a.  $S_{\text{private}} = Y - T - C = 750$ ,  $S_{\text{public}} = T - G = 0$ , total saving =  $S_{\text{private}} + S_{\text{public}} = 750$ .
- b. The equilibrium interest rate is the value of  $r$  that clears the market. We already know that total savings are 750, so we just need to set it equal to investment.  
 $S = I$   
 $750 = 100 - 50 * r$ ; then  $r = 5\%$

- c. When government increases its spending, private saving remains the same but public saving decreases. Thus,  $S_{\text{public}} = 1000 - 1250 = -250$ .  
 Total saving =  $S_{\text{public}} + S_{\text{private}} = -250 + 750 = 500$ .
- d. Now the equilibrium interest rate is such that  $500 = 1000 - 50 * r$ ;  $r = 10\%$ .

2. page 77, #6

- a.  $MPL = 1/3 K^{1/3} H^{1/3} L^{-2/3}$ . This equation is increasing in human capital: more human capital makes all the existing labor more productive.
- b.  $MPH = 1/3 K^{1/3} L^{1/3} H^{-2/3}$ . This equation is decreasing in human capital because there are diminishing returns in human capital.
- c. The labor share of output is the proportion of output that goes to labor. The amount of output that goes to labor is the real wage (which, under perfect competition, is the marginal product of labor) times the quantity of labor. Dividing this quantity by total output, the labor share is:  
 $(MPL * L) / Y = 1/3$ .  
 Similarly, human capital share is also 1/3.  
 Since workers own their human capital, it will appear that labor gets 2/3 of output.
- d. The ratio of skilled wage to the unskilled wage is:  
 $Wage_{\text{skilled}} / Wage_{\text{unskilled}} = (MPL + MPH) / MPL = 1 + L/H$ .  
 When H increases, the ratio falls because the diminishing returns to human capital lowers its return, while at the same time increasing the marginal product of unskilled workers.
- e. If more scholarships increase H, then it does lead to a more egalitarian society.  
 The policy lowers the returns to education, decreasing the gap between the wages of more and less educated workers. More importantly, the policy even raises the absolute wage of unskilled workers because their marginal product is higher when the number of skilled workers rises.