

ECON 410 Macroeconomic Theory
Homework 2 Solutions

(A) Multiple Choice Questions

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

(B) Essay Questions

1. Mankiw textbook, pages 186 #5

- a. The demand for labor is determined by the amount of labor that a profit-maximizing firm wants to hire at a given real wage. The profit-maximizing condition is that the firm hires labor until the marginal product of labor equals the real wage. $MPL = w$, where

$$MPL = \frac{\partial Y}{\partial L} = \frac{2}{3} K^{1/3} L^{-1/3} = w$$

Solve this for labor, L :

$$L = \frac{8}{27} K \cdot w^{-3}$$

Notice that this expression has the intuitively desirable feature that increases in the real wage reduces the demand for labor.

- b. We assume that the 1,000 units of capital and the 1,000 units of labor are supplied inelastically. In this case we know that all 1,000 units of each will be used in equilibrium, so we can substitute them into the above labor demand function and solve for w .

$$1000 = \frac{8}{27} \times 1000 \times w^{-3}$$

→ Real wage: $w = 2/3$.

In equilibrium, employment will be 1,000.

Output: $Y = K^{1/3}L^{2/3} = 1,000^{1/3}1,000^{2/3} = 1,000$ units

The total amount earned by workers: $w \cdot L = 2/3 * 1,000 = 667$ units.

- c. The congressionally mandated wage of 1 unit of output is above the equilibrium wage of 2/3 units of output.
- d. In this case, firms will use their labor demand function to decide how many workers to hire at the give real wage of 1 and capital stock of 1,000:

$$L = \frac{8}{27} K \cdot w^{-3} = \frac{8}{27} \times 1,000 \times 1^{-3} = 296$$

so 296 workers will be hired for a total compensation of 296 units of output.

- e. The policy redistributes output from the 704 workers who become involuntarily unemployed to the 296 workers who get paid more than before. The lucky workers benefit less than the losers lose as the total compensation to the working class falls from 667 to 296 units of output.
- f. This problem does focus the analysis of minimum-wage laws on the two effects of these laws: they raise the wage for some workers while downward-sloping labor demand reduces the total number of jobs. However, if labor demand is less elastic than in this example, then the loss of employment may be smaller, and the change in worker income might be positive.

- 2.
 - a. The velocity V is probably reduced because money change hands less frequently. Therefore, price would first be likely to be lower, and Y would finally be lower, leading to a recession.
 - b. In this equation, the inflation expectation would be lower, and the nominal interest rate would be lower as well.
 - c. To fight for a lower price and eventually a lower Y , Fed must increase money supply. As discussed in class and in my notes, Fed has increased money supply, banks have dramatically increased their borrowing from Fed, and Fed also has lowered it discount rate dramatically in 2008.