

ECON 410 Macroeconomic Theory Spring 2011  
Homework 2 Solutions

(A) Multiple Choice Questions

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

(B) Essay Questions

1. Mankiw textbook, Chapter 5, question 2, pp151:

(a) National saving:

$$\begin{aligned} S &= Y - C - G \\ &= 5,000 - (250 + .75(5,000 - 1,000)) - 1,000 \\ &= 750 \end{aligned}$$

$$\text{Investment: } I = 1000 - 50 * 5 = 750$$

Net exports equals the difference between saving and investment. Thus,

$$NX = S - I = 0$$

Having solved for net exports, we can now find the exchange rate that clears the foreign-exchange market:

$$\begin{aligned} NX &= 500 - 500 * \epsilon \\ 0 &= 500 - 500 * \epsilon \\ \epsilon &= 1 \end{aligned}$$

(b) Doing the same analysis with the new value of government spending we find:

$$\begin{aligned} S &= Y - C - G \\ &= 5,000 - (250 + .75(5,000 - 1,000)) - 1,250 \end{aligned}$$

$$= 500$$

$$I = 1,000 - 50 * 5 \\ = 750$$

$$NX = S - I \\ = 500 - 750 \\ = -250$$

$$NX = 500 - 500 * \epsilon \\ -250 = 500 - 500 * \epsilon \\ \epsilon = 1.5$$

The increase in government spending reduces national saving, but with an unchanged world real interest rate, investment remains the same. Therefore, domestic investment now exceeds domestic saving, so some of this investment must be financed by borrowing from abroad. This capital inflow is accomplished by reducing net exports, which requires that currency appreciate.

(c) With the new interest rate:

$$S = Y - C - G = 5000 - (250 + .75 * (5000 - 1000)) - 1000 = 750 \\ I = 1000 - 50 * 10 = 500$$

$$NX = S - I = 250, \text{ trade surplus.}$$

$$NX = 500 - 500 * \epsilon \\ 250 = 500 - 500 * \epsilon \rightarrow \epsilon = 0.5$$

Saving is unchanged from part (a), but the higher world interest rate lowers investment. This capital outflow is accomplished by running a trade surplus which requires that the currency depreciate.

## 2. Mankiw textbook, pages 188 #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.

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

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.