

## Unemployment and Labour Markets Supervision 1

### Short questions

- (1) Show graphically and explain how each of the following changes affects equilibrium employment and the wage in the version of the Shapiro-Stiglitz model seen in class
  - (a) a decrease in unemployment benefits.
  - (b) a recession (negative productivity shock).
  - (c) an increase in the probability that a shirker is detected.
- (2) (Mankiw, slightly modified) Consider an economy with the following Cobb-Douglas production function:  $Y = K^{1/3}L^{2/3}$ . The economy has 1,000 units of capital and a labour force of 1,000 workers.
  - (a) Derive the equation describing labour demand in this economy as a function of the real wage and the capital stock.
  - (b) If the real wage can adjust to equilibrate labour supply and labour demand, what is the real wage? In this equilibrium, what is employment, output, and the total amount earned by workers?
  - (c) Now suppose that the government, concerned about the welfare of the working class, passes a law requiring firms to pay workers a real wage of 1 unit of output. How does this wage compare to the equilibrium wage?
  - (d) The government cannot dictate how many workers firms hire at the mandated wage. Given this fact, what are the effects of this law? Specifically, what happens to employment, output, and the total amount earned by workers?
  - (e) Will the government succeed in its goal of helping the working class? Explain.
  - (f) Do you think that this analysis provides a good way of thinking about a minimum-wage law? Why or why not?

### Problems

- (3) Consider a one-period economy in which the representative agent maximizes the following utility function

$$U(C, \ell) = \frac{C^\gamma - 1}{\gamma} + \frac{\ell^\gamma - 1}{\gamma}$$

where  $C$  is consumption,  $\ell$  is leisure, and  $\gamma < 1$ . The agent is subject to the time constraint:

$$\ell + L = 1$$

where  $L$  is labour supplied by the agent at the exogenously given real wage rate  $w$ . The agent has to pay a proportional tax  $\tau$  on wage income as well as a lump-sum tax  $T$ , with  $0 < \tau < 1$ . In addition, the agent has some non-labour income  $\pi$ .

- (a) Assume that  $\tau = 0$  and  $\gamma = 1/2$ . Solve for the optimal labour supply as a function of real wage. Explain the effect of  $\pi$  on labour supply.
- (b) Now assume instead that  $T = 0$  and  $\pi = 0$ . Solve for the optimal labour supply and show the effect of an increase in the tax rate  $\tau$ . Does the qualitative effect depend on the value of  $\gamma$ ? Provide an intuitive explanation.

**Essay (800 words max)**

- (4) In the context of the search model of the labour market, Peter Diamond (1971) raised the following critique: Firms have no incentive to offer a wage higher than the reservation wage. Discuss. (max 800 words).

**Readings**

- Barro (1997) *Macroeconomics*, 5th edition, chapters 6 and 13.
- Jones, C. I. (2008), *Macroeconomics*, Norton, chapter 7
- Williamson (2008) *Macroeconomics*, 3rd edition, chapter 16.

**Further Readings<sup>1</sup>**

- Abel, Bernanke and McNabb (1998) *Macroeconomics*, chapters 8 and 13
- Blanchard (2005) *Macroeconomics*. 4th edition, chapters 6, 8, and 9.
- Carlin, W. and Soskice, D. (1990) *Macroeconomics and the Wage Bargain*, Oxford University Press.
- Diamond, P. A. (1971) A model of price adjustment, *Journal of Economic Theory*, 3(2), 156-168.
- Mankiw (2002) *Macroeconomics*, 5th edition.
- Shapiro, C. J. Stiglitz (1984) Equilibrium Unemployment as a Worker Discipline Device, *American Economic Review* 74(3), 433-44.

---

<sup>1</sup>Some of the listed papers are seminal works and therefore can be a bit dense to read.