

Solutions for Problem Set 1

Unemployment Insurance

Question 1:

We need to compare the utilities from accepting the low offer and waiting for a high offer. The utility from accepting the low offer is:

$$u(\text{accept}) = \frac{w_{\text{low}}}{1 - \beta} = 30.$$

The utility of rejecting the offer has to satisfy:

$$u(\text{reject}) = b + \beta[.5u(\text{reject}) + .5(10w_{\text{high}})].$$

Plugging in numbers, this gives:

$$u(\text{reject}) = \frac{2 + 4.5w_{\text{high}}}{.55} = 3.64 + 8.18w_{\text{high}}.$$

The worker is indifferent if the following condition holds:

$$3.64 + 8.18w_{\text{high}} = 30,$$

or:

$$w_{\text{high}} = 3.22.$$

Minimum wages and substitution

Question 2:

The maximization problem for the firm is:

$$\max\{(l_S)^{.8}(l_U)^{.2} - w_S l_S - w_U l_U\}.$$

The first-order conditions give:

$$w_S = .8 \left(\frac{l_U}{l_S} \right)^{.2}.$$

$$w_U = .2 \left(\frac{l_S}{l_U} \right)^{.8}.$$

Therefore we have $w_S = .8$ and $w_U = .2$.

Question 3:

The first-order condition for unskilled labor is:

$$w_U = .2 \left(\frac{l_S}{l_U} \right)^{.8},$$

or:

$$l_U = \frac{.2^{1.25} l_S}{w_U^{1.25}}.$$

There are 50 skilled workers, and the unskilled wage is set to .3. We therefore we get:

$$l_U = 30.12.$$

Using the first-order condition for the skilled wage, we now get:

$$w_S = .8 \left(\frac{l_U}{l_S} \right)^{.2} = .72.$$

Thus in consequence of the minimum wage, employment of unskilled people falls. This in turn lowers the productivity of skilled workers, so that the skilled wage falls as the unskilled wage rises.

Unemployment Rates by Age, Race, and Gender

Question 4:

Group	Unemployment Rate
White males 20 and over	3.5
White females 20 and over	3.1
Whites 16 to 19	13.2
Black males 20 and over	7.9
Black females 20 and over	6.9
Blacks 16 to 19	25.0
Hispanics	6.1

Table 1: Unemployment Rates, February 2000

Question 5:

The main features of the data is that young people have higher unemployment rates, and Hispanics and Blacks experience more unemployment than whites. Unemployment insurance, unions, and hiring and firing restrictions should have similar effects for different groups, therefore they are probably not helpful for understanding the observed differences. Minimum wages increase unemployment among the least skilled. If it is the case that young people and Non-Whites are less skilled than adult Whites, the minimum wage could explain part of the differences. It is the case that people who enter the labor market at age 16-19 (instead of going to school or college) are relatively low-skilled, which explains their high unemployment rates. I am not sure about the relative skills of different racial groups. To the extent that Non-Whites go to schools of lower quality or are recent immigrants, skill might explain part of the differences, but discrimination might also play a role. A precise analysis would require more detailed information, especially about education and skill.