Practice Problem Set 3

Read each question in its entirety before beginning, then answer the question as clearly and concisely as possible. Make sure to answer all of the questions. You may find it helpful to outline the important points first, and then fill in the details.

1. Suppose that a firm's production function is given by:

 $q = 10\sqrt{N_A + N_B}$ (subscripts A and B indicate different groups in society e.g. male v.s. female)

It can be shown that the marginal product of labour is equal to:

$$MP_N = \frac{5}{\sqrt{N_A + N_B}}$$

Suppose the market wage for "B" workers is \$10, the market wage for "A" workers is \$15, and the price of output is \$100.

a) How many workers would a firm hire if it does not discriminate? What is the level of profits for the nondiscriminating firm?

b) Let's now consider the hiring practices of a firm that discriminates against "B" workers and has a discrimination coefficient of 0.3. How many workers would this firm hire and what would be its level of profits.

c) Finally, consider a firm that has a discrimination coefficient equal to 0.7. How many workers would this firm hire, and what would be its level of profits?

2. Suppose a firm's labour demand curve is given by:

w = 20 - 0.01E

where w is the wage and E is the firm's level of employment. Suppose also that the union's utility function is given by:

$$U = w \bullet E$$

The marginal utility of the wage for the union is given by E, and the marginal utility of employment is given by w.

a) What wage will a monopoly union demand? (Note: a monopoly union has an effective monopoly on the sale of labour to the firm. The union sets the price of its product -- the union wage -- and firms determine how many workers to hire at this price)

b) How many workers will be employed in this union contract?

Suppose the union has a different utility function. In particular, its utility function is given by:

 $U = (w-w^*) \bullet E$

Where w* is the competitive wage. The marginal utility of a wage increase is still given by E, but the marginal utility of employment is given by w-w*.

c) If the competitive wage is \$10 per hour what wage will a monopoly union demand?

d) How many workers will be employed in this union contract?

e) Contrast your answers in c) and d) to those in a) and b). Why are they different?

3. Figure 15.4 in the text shows that the efficiency losses from the wage distortion imposed by unions is triangle abc in the union sector plus triangle dgf in the nonunion sector.

Assuming linear demand curves, this is equal to

 $\frac{1}{2}$ (W_u-W₀)(E₁-E₀) + $\frac{1}{2}$ (W₀-W_n)(E₀-E₁), or $\frac{1}{2}$ (W_u-W_n)(E₁-E₀), since (E₁-E₀)=(E₀-E₁)

It can be shown that this efficiency loss can be expressed as a percentage of national income in the economy (Rees, 1963) as:

 $\frac{1}{2} \Delta W_u X \Delta E_u X D_u X L/Y$, where

 ΔW_u = percentage union wage impact ΔE_u =percentage reduction of employment in the union sector D_u =union density or percent of labour force that is unionized L/Y=labour's share of national income

Assuming that the elasticity of demand for labour is -0.5 (so as to calculate the employment reduction), that 0.30 percent of the labour force is unionized (as is the case in Canada), and that labour's share of national income is 0.75, calculate the efficiency loss as a percentage of GNP on the basis of the following scenarios:

a) A union wage impact of 0.15, which is an approximate "best guess" for Canada.

b) A union wage impact of 0.10, which may be the case in more recent years given international competitive pressures and other factors.

c) A union wage impact of 0.15, but only 0.15 of the labour force being unionized as is approximately the case in the United States.

d) A union wage impact of 0.15 and a unionization rate of 0.30, but an increase in the elasticity of demand for labour from 0.5 to 1.0 given increased foreign competition.

e) A union wage impact of 0.10, but in return for the concession of such smaller wage gains unions get guarantees of smaller employment adjustments that effectively reduce the elasticity of demand for labour from 0.5 to 0.25.

4. State whether you agree or disagree with each of the following statements. If you agree with the statement, explain why you agree, and if you disagree, explain why you disagree (include the correct statement in your answer). I encourage you to illustrate your answers using diagrams where appropriate.

a) Male-female wage differentials for equally productive workers will not persist in the long run because the forces of competition would remove these differentials.

b) The business cycle will likely influence the rate of unionization and union growth through its influence on both the supply and demand for union representation.

c) Because the firm maximizes profits at each point on its demand curve, Pareto Efficient wage and employment contracts must also be on the firm's demand curve.