

Problem Set 6: Unions and Bargaining. Due Monday, 12/15/2014.

Setup: Suppose that revenue to firms as a function of labor is given by $R(L) = 15L - \frac{1}{20}L^2$, and that cost to workers as function of labor is given by $C(L) = 3L + \frac{1}{20}L^2$.

Case 1: Perfect competition. Suppose that workers and firms both behave competitively. Find the equilibrium wage (w), quantity of labor (L), firm surplus (π), and worker surplus (σ).

$$w = \underline{\hspace{2cm}} \quad L = \underline{\hspace{2cm}} \quad \pi = \underline{\hspace{2cm}} \quad \sigma = \underline{\hspace{2cm}}$$

Case 2: Surplus-maximizing union. Suppose that firms behave competitively, but workers form a union that sets the wage so as to maximize worker surplus. Find the equilibrium wage (w), quantity of labor (L), firm surplus (π), and worker surplus (σ).

$$w = \underline{\hspace{2cm}} \quad L = \underline{\hspace{2cm}} \quad \pi = \underline{\hspace{2cm}} \quad \sigma = \underline{\hspace{2cm}}$$

Case 3: Profit maximizing monopsonist firm. Suppose that workers behave competitively, but firms unite into a monopoly that sets the wage so as to maximize profit. Find the equilibrium wage (w), quantity of labor (L), firm surplus (π), and worker surplus (σ).

$$w = \underline{\hspace{2cm}} \quad L = \underline{\hspace{2cm}} \quad \pi = \underline{\hspace{2cm}} \quad \sigma = \underline{\hspace{2cm}}$$

Case 4: Bargaining between one union and one firm. Suppose that there is one monopolistic firm which aims to maximize profit, and one union that aims to maximize worker surplus.

a) Find the firm's isoprofit function, expressing w as a function of L and π .

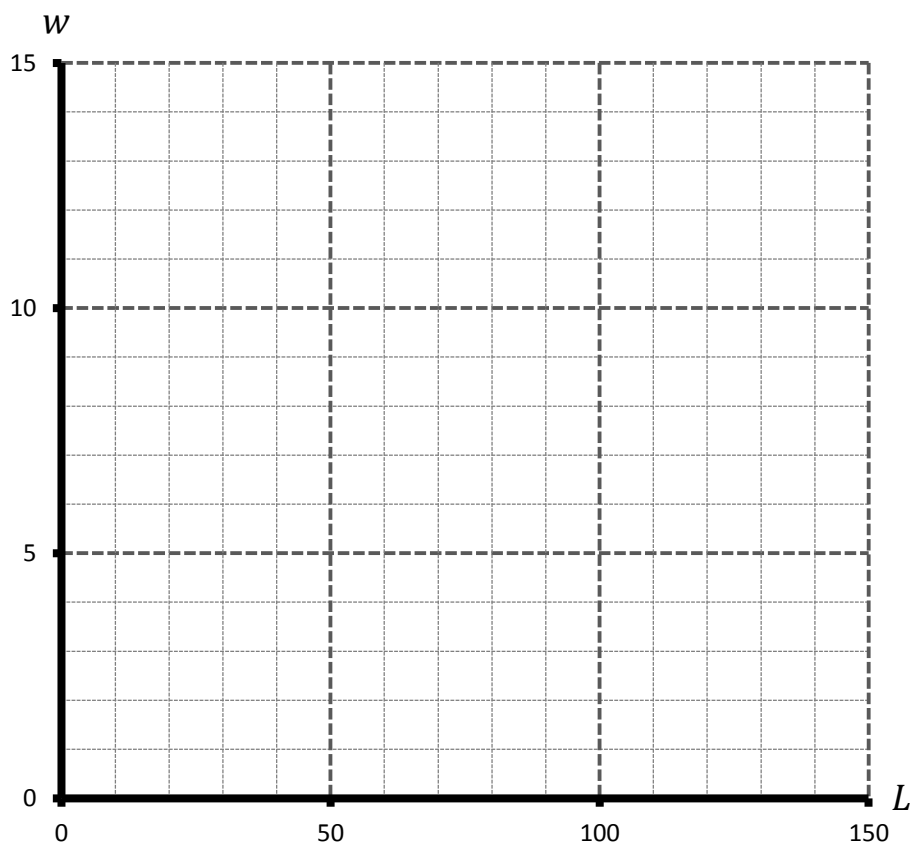
b) Find the union's iso-surplus function, expressing w as a function of L and π .

c) Find an equation in simplest form indicating that the isoprofit function and iso-surplus function have the same slope. Explain the intuition behind this equation.

d) What combination of L and w maximizes worker surplus subject to the constraint that firms get at least as much profit as they do in case 3?

e) What combination of L and w maximizes firm profit subject to the constraint that workers get at least as much surplus as they do in case 2?

Graphing. On the graph below, draw the marginal revenue product of labor curve (MRP_L), the marginal cost of labor curve (MC_L), and several isoprofit and iso-surplus curves. In particular, you should graph curves for all profits and surpluses realized in the various situations above.



As an alternative to graphing by hand, you can generate the graph in Excel and print it. Actually, I recommend that you do both; the computerized graph should help you draw the graph by hand much more accurately.