Problem set 5, due Monday 11/10/2014

1. Compensating wage differentials. I have the (expected) utility function $U = w - 10r^{3/2}$, where w is the wage I receive, and r indicates the level of workplace risk I experience. I work for one of many perfectly competitive firms that have the per-worker profit function $\Pi = 120r^{1/2} + 100 - w$. Since these firms are perfectly competitive, they pay me a wage such that they make zero profit from hiring me, and I can choose my level of workplace risk.

a) Find my wage as a function of workplace risk.

b) Find the level of workplace risk I would choose to maximize my expected utility.

c) If I choose the risk level from part (b), find my wage w and utility U.

d) With r on the horizontal axis and w on the
vertical axis, sketch the firm's isoprofit curve
and my indifference curve at the agreed-on
wage-risk combination, to the right here →

d) Find my new wage and expected utility if the government makes it illegal for any workplace to have a risk level above $\bar{r} = 1$, but everything else remains the same as above.

e) Identify two strong assumptions in this model (as developed in chapter 8 of the Ehrenberg-Smith text), and explain why dropping each assumption could lead to different conclusions about the wisdom of workplace safety regulations.

2. Immigration and the labor market. Consider a market for a particular type of labor, in a particular place. Demand for labor can be represented by the marginal revenue product of labor function $MRP_L = 210 - L$, where L is the quantity of labor. Domestic supply of labor, supply of labor from immigrants, and total supply of labor can be represented by the marginal cost of labor functions $MC_L^d = 10 + L$, $MC_L^i = 10 + 2L$, and $MC_L^t = 10 + \frac{2}{3}L$.

a) Find the equilibrium wage, employment, firm surplus, worker surplus, and total economic surplus if immigrants are not allowed to work.

b) Find the equilibrium wage, employment, firm surplus, domestic worker surplus, immigrant worker surplus, total domestic economic surplus (excluding immigrants' surplus), and total economic surplus (including immigrants' surplus) if immigrants are allowed to work.

c) On the blank graph below, draw MRP_L, MC_L^d, MC_L^t, firm surplus (FS), domestic worker surplus (WS^d), and immigrant worker surplus (WS^i). Draw a thick boundary around the area of the graph representing the change in domestic economic surplus.
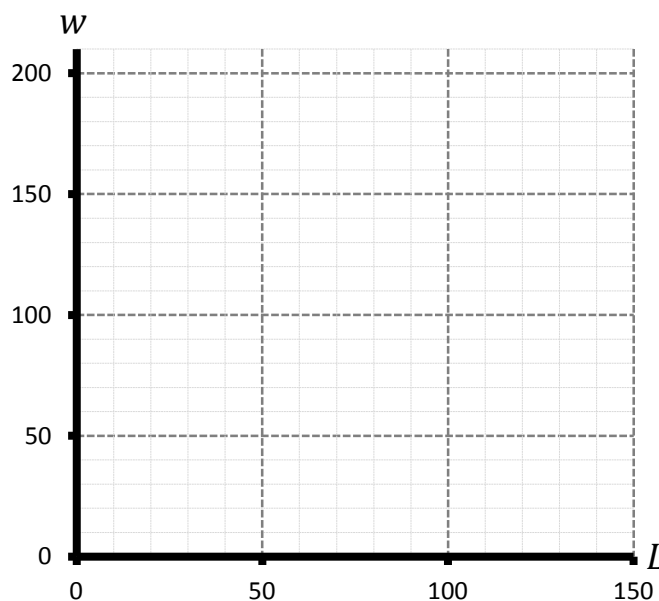
d) Quantify the gains and losses by different groups that result from immigration. Does allowing immigration increase or decrease domestic economic surplus? Aside from the numbers, explain the intuition behind your answer as clearly as possible.