LABOR ECONOMICS (EE 471)

☺☺ Optional practice questions ☺☺

Chapter 5

1. Suppose there are 100 workers in the economy in which all workers must choose to work a risky or a safe job. Worker 1's reservation price for accepting the risky job is $1; worker 2's reservation price is $2, and so on. Because of technological reasons, there are only 10 risky jobs.

(a) What is the equilibrium wage differential between safe and risky jobs? Which workers will be employed at the risky firm?

(b) Suppose now that an advertising campaign, paid for by the employers who offer risky jobs, stresses the excitement associated with "the thrill of injury," and this campaign changes the attitudes of the work force toward being employed in a risky job. Worker 1 now has a reservation price of -$10 (that is, she is willing to pay $10 for the right to work in the risky job); worker 2's reservation price is -$9, and so on. There are still only 10 risky jobs. What is the new equilibrium wage differential?

2. Suppose a drop in the compensating wage differential between risky jobs and safe jobs has been observed. Two explanations have been put forward:

- Engineering advances have made it less costly to create a safe working environment.
- The phenomenal success of a new action serial "Die On The Job!" has imbued millions of viewers with a romantic perception of work-related risks.

Using supply and demand diagrams show how each of the two developments can explain the drop in the compensating wage differential. Can information on the number of workers employed in the risky occupation help determine which explanation is more plausible?

3. Consider Table 5-1 and compare the fatality rate of workers in the mining, construction, manufacturing, and financial industries?

(a) What would the distribution of wages look like across these four industries given the compensating differential they might have to pay to compensate workers for risk?

(b) Now look at average hourly earnings in 2006 by industry as reported in Table 614 of the 2008 *U.S. Statistical Abstract*. Does the actual distribution of wages reinforce your answer to part (a)? If not, what else might enter the determination of median weekly earnings?

4. The EPA wants to investigate the value workers place on being able to work in "clean" mines over "dirty" mines. The EPA conducts a study and finds the average annual wage in clean mines to be $42,250 and the average annual wage in dirty mines to be $47,250.

(a) According to the EPA, how much does the average worker value working in a clean mine?
(b) Suppose the EPA could mandate that all dirty mines become clean mines and that all workers who were in a dirty mine must therefore accept a $5,000 pay decrease. Are these workers helped by the intervention, hurt by the intervention, or indifferent to the intervention?

ANSWERS

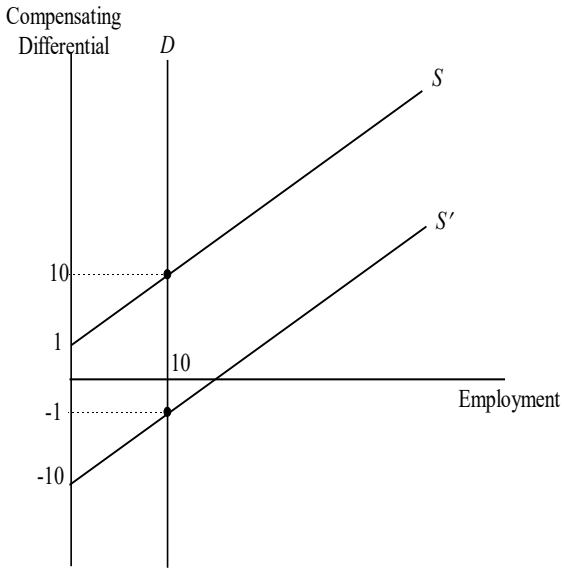
1. **Suppose there are 100 workers in the economy in which all workers must choose to work a risky or a safe job. Worker 1's reservation price for accepting the risky job is $1; worker 2's reservation price is $2, and so on. Because of technological reasons, there are only 10 risky jobs.**

(a) What is the equilibrium wage differential between safe and risky jobs? Which workers will be employed at the risky firm?

The supply curve to the risky job is given by the fact that worker 1 has a reservation price of $1, worker 2 has a reservation price of $2, and so on. As the figure below illustrates, this supply curve (given by *S*) is upward sloping, and has a slope of 1. The demand curve (*D*) for risky jobs is perfectly inelastic at 10 jobs. Market equilibrium is attained where supply equals demand so that 10 workers are employed in risky jobs; the market compensating wage differential is $10 (or, at least some number at least $10 at not yet $11) since this is what it takes to entice the marginal (tenth) worker to accept a job offer from a risky firm. Note that the firm employs those workers who least mind being exposed to risk.

(b) Suppose now that an advertising campaign, paid for by the employers who offer risky jobs, stresses the excitement associated with "the thrill of injury," and this campaign changes the attitudes of the work force toward being employed in a risky job. Worker 1 now has a reservation price of -$10 (that is, she is willing to pay $10 for the right to work in the risky job); worker 2's reservation price is -$9, and so on. There are still only 10 risky jobs. What is the new equilibrium wage differential?

If tastes towards risk change, the supply curve shifts down to *S′* and the market equilibrium is attained when the compensating wage differential is -$1. This is the compensating differential required to hire the marginal worker (that is, the 10th worker). Note that this compensating differential implies that even though most workers (from worker 12 onwards) dislike risk, the market determines that risky jobs will pay *less* than safe jobs.



2. **Suppose a drop in the compensating wage differential between risky jobs and safe jobs has been observed. Two explanations have been put forward:**

- **Engineering advances have made it less costly to create a safe working environment.**
- **The phenomenal success of a new action serial "Die On The Job!" has imbued millions of viewers with a romantic perception of work-related risks.**

Using supply and demand diagrams show how each of the two developments can explain the drop in the compensating wage differential. Can information on the number of workers employed in the risky occupation help determine which explanation is more plausible?

The engineering advances make it cheaper for firms to offer safe jobs, and hence reduce the gain from switching from a safe environment to a risky one (or reduce the cost of switching from a risky environment to a safe one). This will decrease (shift in) the demand curve for risky jobs and reduce the compensating wage differential (Figure 1 on the next page). Note that the equilibrium number of workers in risky jobs goes down.

The glamorization of job-related risks may make people more willing to take these risks. This increases the supply (shift out) of workers to risky jobs and reduces the compensating differential (Figure 2 on the next page). Note that the equilibrium number of workers in risky jobs goes up.

Thus, information on whether employment in the risky sector increased or decreased can help discern between the two competing explanations: if employment in risky jobs went down then it is likely due to technology; if employment in risky jobs went up it is likely due to preferences.

Figure 1. Labor Market for Risky Jobs

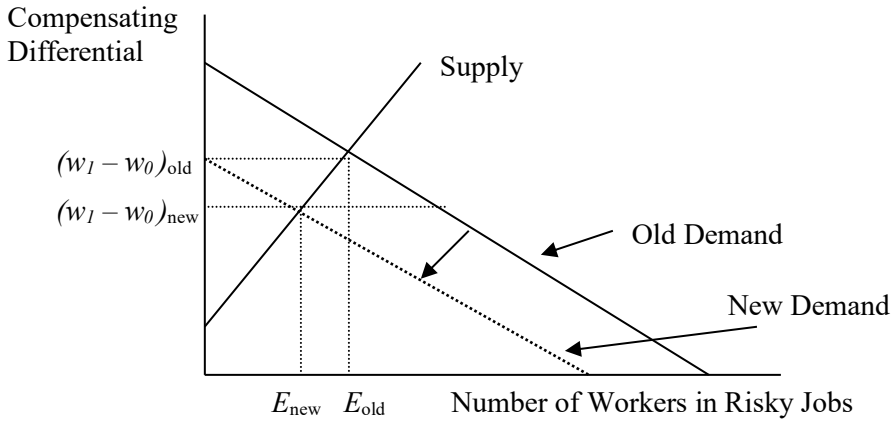
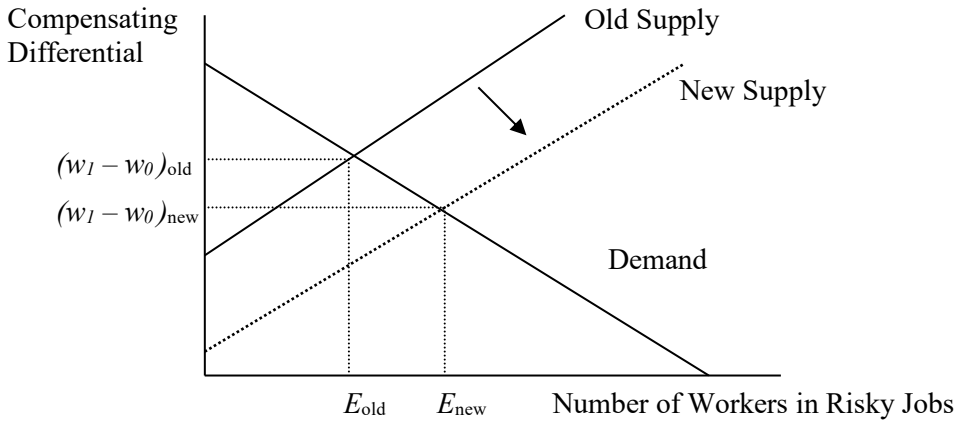


Figure 2. Labor Market for Risky Jobs



3. Consider Table 5-1 and compare the fatality rate of workers in the mining, construction, manufacturing, and financial industries?

(a) What would the distribution of wages look like across these four industries given the compensating differential they might have to pay to compensate workers for risk?

Construction would pay the highest compensating differential, followed by manufacturing and then the financial industry.

(b) Now look at average hourly earnings in 2006 by industry as reported in Table 614 of the 2008 *U.S. Statistical Abstract*. Does the actual distribution of wages reinforce your answer to part (a)? If not, what else might enter the determination of median weekly earnings?

Average hourly earnings by industry in 2006 were: $20.02 in construction, $16.80 in manufacturing, and $18.80 in finance. Thus, the distribution of wages does not perfectly reflect the compensating differential story. Many other factors than risk, however, probably explain the wage structure, including preferences (family farmers), unions (manufacturing), required skills and education, and the length of the average work week

4. **The EPA wants to investigate the value workers place on being able to work in "clean" mines over "dirty" mines. The EPA conducts a study and finds the average annual wage in clean mines to be $42,250 and the average annual wage in dirty mines to be $47,250.**

(a) According to the EPA, how much does the average worker value working in a clean mine?

The average value is $47,250 - $42,250 = $5,000.

(b) Suppose the EPA could mandate that all dirty mines become clean mines and that all workers who were in a dirty mine must therefore accept a $5,000 pay decrease. Are these workers helped by the intervention, hurt by the intervention, or indifferent to the intervention?

All except the marginal worker are hurt by the intervention. The workers who sort themselves into the dirty jobs are those workers who prefer to work in a dirty mine rather if they are to be paid $5,000 more than they would be paid in a clean mine. These workers, in essence, value working in a dirty job at more than $5,000. (Similarly, if all of the workers in the clean jobs were forced to accept dirty jobs for $5,000 more, all of them except the marginal worker would be hurt as they all value working in a clean job at more than $5,000.)