Compensating Wage Differentials

1. Consider a firm offering some wage premium for risky work, ΔW* and some risk level, P(I)*. Draw this firm’s isoprofit curve in wage-risk space. How will this isoprofit curve shift if technology improves such that it is cheaper to provide a low-risk work environment.

The isoprofit curve is upward sloping and concave. If technology improves, it will shift to the northwest implying that this firm can earn the same profits while offering a higher wage if it becomes cheaper to reduce risk.

2. Workers chose to work in a risky or a safe job. Suppose that there are 100 workers in the economy. Worker 1’s reservation price for accepting risky jobs is $2; worker 2’s reservation price is $4, and so on. Because of technological reasons, there are only 8 risky jobs.
   a. Assuming that the technological barrier imposes a binding constraint, what is the equilibrium wage differential between safe and risky jobs in this economy?

$16
   b. Which workers will be employed in the risky firm?

The 8 workers with the lowest reservation prices

c. 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 workforce towards 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 -$8, and so on. There are still only 8 risky jobs. What is the new equilibrium wage differential?

$4

3. Suppose a drop in the compensating wage differential between risky and safe jobs has been observed. Two explanations have been put forward: First, engineering advances have made it less costly to create a safe work environment; second, the success of the new reality TV show Die on the Job has given viewers a romantic perception of work-related risks.
a. Using supply and demand diagrams, show how each of the two explanations could lead to a drop in the compensating wage differential.

Scenario #1: Demand curve for risky jobs will shift in, compensating differential will fall
Scenario #2: Supply curve shifts to the right, differential will fall

b. Can information on the number of workers employed in risky jobs help determine which explanation might be the right one? Explain.

Yes. More workers in risky jobs implies #2, less implies #1

4. Consider the table below:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Fatal injuries per 100,000 workers</th>
<th>Median Wage (Weekly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>30</td>
<td>795</td>
</tr>
<tr>
<td>Agriculture</td>
<td>21</td>
<td>371</td>
</tr>
<tr>
<td>Construction</td>
<td>13</td>
<td>609</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>3</td>
<td>613</td>
</tr>
</tbody>
</table>

a. Given the fatality rates, how would you expect median weekly earnings across the four industries to compare given the compensating differential employers might have to pay to compensate workers for risk? Explain.

Miners should get paid the most, then agriculture, construction and manufacturing

b. Does the actual wage distribution reinforce your answer to part a? If not, what else might enter into the determination of median weekly earnings?

No. Skill levels, unionization may differ across jobs.

c. If technological innovations lower the cost of reducing risk in mining, what would you expect to happen to wages in mining over time? Explain.

Mining wages will fall

Human Capital

1. Megan has just finished high school and is about to decide which type of education to get. She has narrowed down her options to two alternatives. She can either become an artist or an accountant. Suppose that Megan lives 2 periods. In the first, she gets an education. In the second, she works in the labor market. If Megan becomes an accountant, she will spend $15,000 on tuition and books. She will then earn $53,800 in the second period. If she becomes an artist, it will cost her $5,000 in
the first period and she will earn $42,000 in the second period. Suppose that the interest rate, \( r \), is 10 percent. Which career will Megan pursue? What if the interest rate is 20 percent?

When \( r = .1 \), accountant
When \( r = .2 \), artist

2. People live for four periods. They can choose to work for all four periods, or can attend school in the first period and then work for the remaining three periods. If people do not attend school, their annual wage is $30,000 per period. If they do attend school, they earn $50,000. The cost of attending college is $28,000, the interest rate is 10 percent, and all people are identical. Do people go to school or not?

Do not go to school

3. Suppose that recent discoveries in medicine increase life expectancy. What will happen to the educational attainment of workers given this increase? Explain.

Educational attainment should increase since the number of years that people can earn a return on education will rise

4. Suppose that education does not increase an individual’s marginal productivity and that there are two types of people in the world: high- and low-ability. High-ability types don't really mind going to school and for them the cost of \( e \) years of school is \( e \). Low-ability types, on the other hand, find school more burdensome and for them the cost of \( e \) years of school is \( 2e \). Consider two different firms.

- Firm 1 offers to pay workers such that the present discounted value of their lifetime earnings is $16 if workers have at least 6 years of schooling, and $8 to all other workers
- Firm 2 offers to pay workers such that the present discounted value of their lifetime earnings is $16 if workers have at least 2 years of schooling, and $8 to all other workers.

a. For each firm separately, analyze whether its educational requirements will enable them to distinguish between high- and low-ability types.

Firm 1 will be able to separate workers, firm 2 will not

b. In the long run, why will firm 1 have to lower its educational requirement from the present level? What is the minimum educational requirement a firm can offer and still expect to be able to distinguish between high- and low-ability types given the wage scale?
5. In the Spence model, it is assumed that the costs of acquiring education are higher for low-ability than they are for high-ability workers. Discuss the effect that you would expect grade inflation to have on the signaling value of a person’s education. Will firms be able to distinguish between high ability and low ability workers as grade inflation continues? Explain.

Grade inflation will lower the value of the signal, requiring students to possibly obtain more education or find other ways to signal that they are high ability. As grade inflation rises, firms will be less able to differentiate between workers.

6. It declines.

7. .

8. No school.