Compensating Wage Differentials: Second Lecture

LABOR ECONOMICS (ECON 385)

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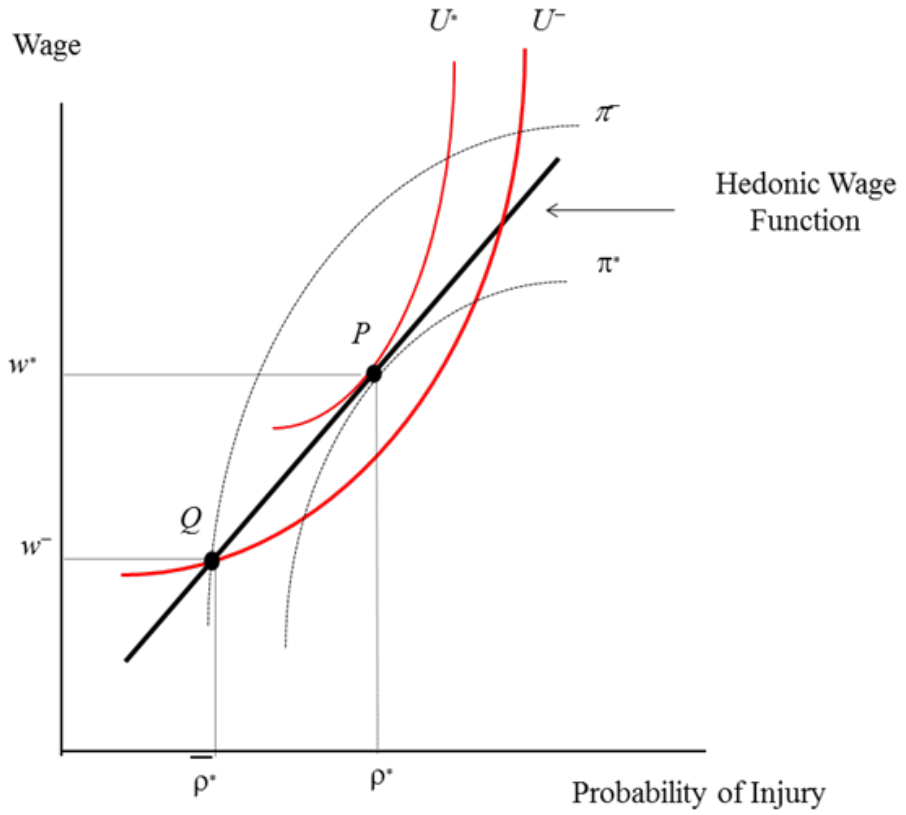
CWD application: safety and health regulations

Some jobs have high rates of injury and death associated with them. This is an economic bad that, demonstrably, some workers tolerate. It is likely that the probability of injury could be reduced on these jobs by incurring costs to make them safer. Presumably these costs are high, and it is less costly to pay workers a premium (CWD) to staff them, as is, instead.

- Would regulating the level of safety make agents better off in the market for risky jobs? It depends on how accurate workers are at judging the risks.
- The matching of risk-tolerant employees to risky jobs, graphically would look like the next slide.

Employee-firm matching according to preferences, costs

- Workers have upward-sloping indifference curves, since the probability of injury is a bad. Utility increases for a worker in the northwest direction.
- The employer's "isoprofit" lines slope upward as well, reflecting the trade-off of more costly labor versus more costly safety precautions. Profit increases in the southeast direction.
- Point P is where profits are maximized subject to the constraint of paying enough to attract a worker to the job. Also the worker's utility is maximized compared to the combinations of wage and injury risk offered by other jobs.

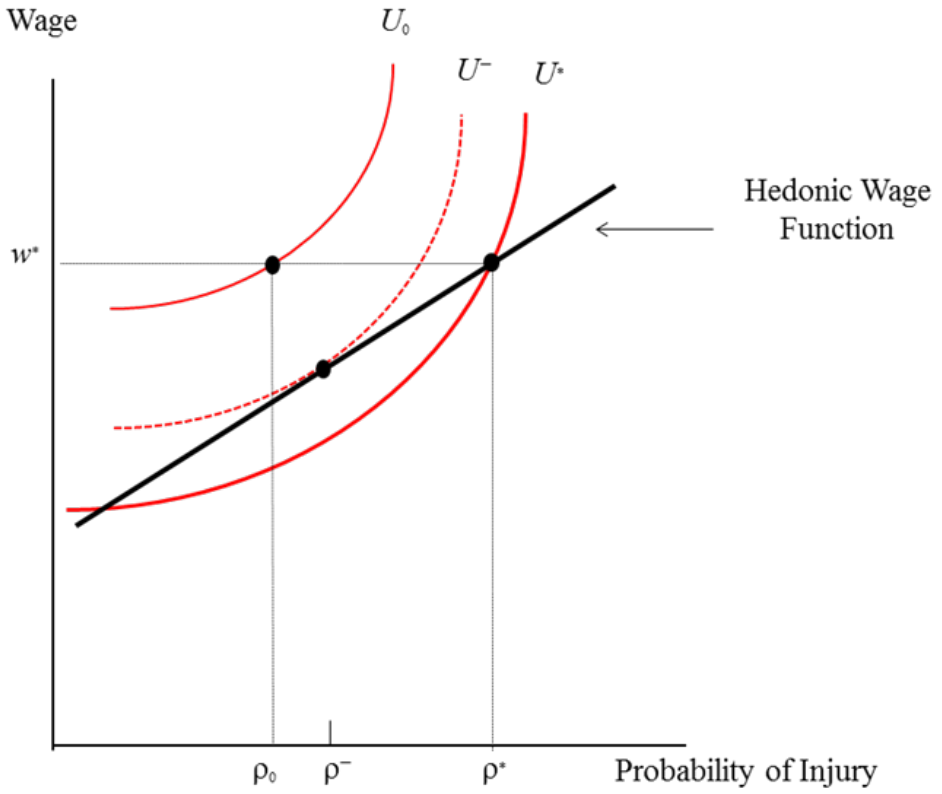


Regulations on injury risks

- A safety regulation, such as those imposed by the Occupational Safety and Health Administration (OSHA), could be illustrated by limiting the allowable injury risk to that at point Q.
  - Point Q is on a lower indifference curve and a lower isoprofit curve, which means it makes both parties worse off.
  - Though the regulation accomplishes its goal of improving safety, it does not make the worker better off. He would rather have a little less safety and more money instead.

Uninformed workers

- Safety regulations that constrain informed agents will not make them better off.
- But what <u>if workers underestimate the risks</u> associated with jobs?
  - Individuals would choose excessively risky jobs; for a given offer defined by {wage, risk}, employees may perceive the risk discounted by some factor $(0 \leq d \leq 1)$, i.e., they perceive {wage, $d * \text{risk}$}.
  - This leads them to conclude that the job puts them on a higher indifference curve than in actuality.
  - If the goal is to get these workers not to take uninformed risks, a limit on risk accomplishes this, moving them to a point with lower risk and wage, but in which they have higher utility.



CWD application: unemployment risk and unemployment insurance

With every job there is a risk of future unemployment. Layoffs related to cyclical forces, shifting product demand, technological change, et al., explain why the expected life span of a job is never infinite. Some jobs are, in fact, explicitly "seasonal" or "temporary".

- Risk of layoff and risk of unemployment are generally considered undesirable for workers, other things equal.
  - A job with risk of frequent (even if they are expected) layoffs requires the individual to work a lot (maybe "excessively") sometimes and to have an "excess" of leisure in during other times—or to have to seek out another job to occupy the time when the first one is idle. Neither of these extremes tends to be the utility-maximizing combination of labor and leisure.
  - The less predictable the timing and duration of layoffs, the more of an inconvenience they are.
  - For long or permanent layoffs, the costs of searching for a new job point to the desirability of steadiness and regularity when it comes to employment.

Unemployment insurance

- If a job has high risk of layoffs or of unemployment, workers generally will avoid taking it unless they are offered a CWD to do so.
  - As with other negative job attributes, risk should have a positive CWD.
  - Firms and industries that are highly cyclical (think construction) or subject employees to other steady employment risks should have to pay higher wages to attract employees.
- The system of Unemployment Insurance (UI) smooths out income by offering compensation to workers when they become unemployed.
  - Compensation is usually a fraction (replacement rate) of the lost wage.

UI and CWDs

- But it's performing the same function that CWDs would! Especially if the worker has good information about the probability and duration of layoffs, he gets an installment of his UI each week via the CWD. Even in the absence of universal UI, workers should be expected to self-insure in this manner by accepting larger CWDs for larger risks of unemployment, saving a portion of their wages, and spending those savings during periods of unemployment.
- Estimates by Robert Topel* that utilize a wage regression, unemployment probabilities, and UI replacement rates imply that typical replacement rates like 0.62 nearly wipe out the need to pay CWDs for unemployment risk and that complete replacement (1.0) UI would effectively make wages independent of unemployment risk—completely eliminating the CWD.
  - Workers pay for unemployment insurance with lower wages.
  - UI is like a mandated benefit!

*"Equilibrium Earnings, Turnover, and Unemployment: New Evidence." Journal of Labor Economics. Vol. 2 (1984): 500-522.

Optional extension: measuring CWDs

To measure the compensating differential for a job attribute, two crucial conditions must be met.

1. Productive characteristics—that cause individuals to earn higher wages—must be “held constant”. This means things like training and experience. Remember we want to measure the consequence of the *job* characteristics—not the employees' characteristics. See Brown* (1980) for an excellent and accessible discussion.
2. The other aspects of the job must be “held constant” as well. Remember the general premise: job 1 and job 2 are the same except for one amenity.

*Brown, Charles. "Equalizing Differences in the Labor Market." The Quarterly Journal of Economics. Vol. 94, No. 1 (1980): 113-134.

Wage regression

- The latter is not extremely difficult to accomplish by controlling for industry, location, occupation, and other firm characteristics.
- If all the productive characteristics are observed, the problem is solved. Just regress wage on a variable indicating the attribute that has a CWD and control for all the other job and individual productive characteristics. A regression model, similar to Brown's, would look like the following:

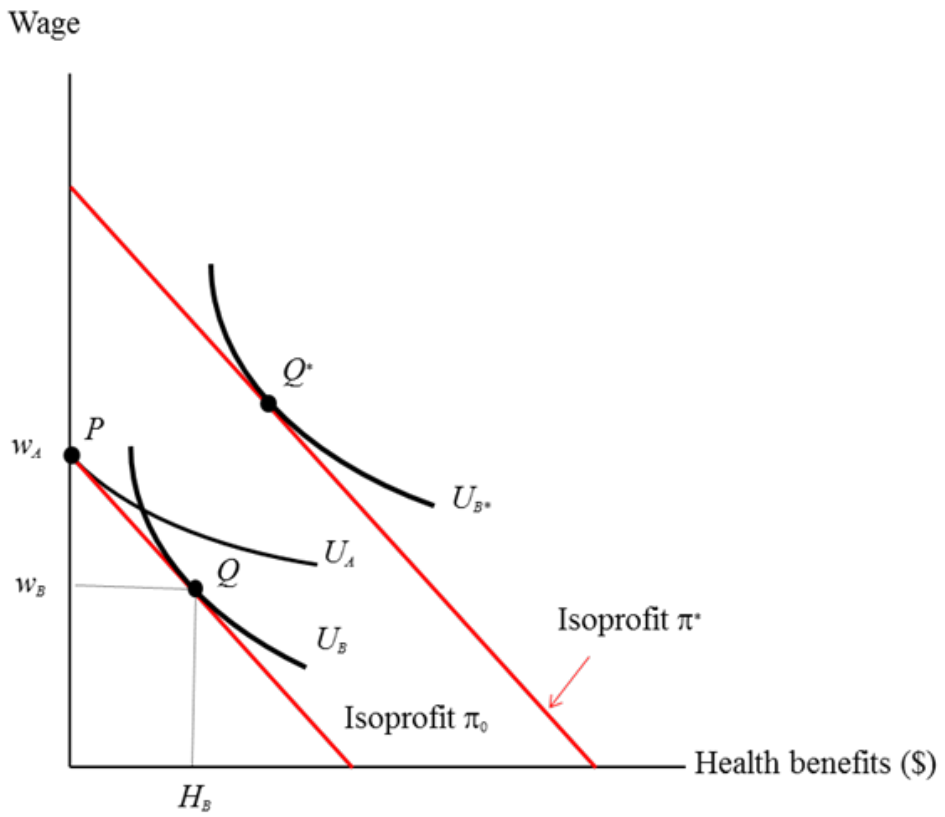
$$E(wage|X_1, X_2, Z) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + AZ$$

where the *X* variables are measures of worker productivity and job characteristics and *Z* is the disamenity of the job that has a CWD. CWD theory predicts that $A > 0$ for a disamenity (like injury risk) and $A < 0$ for a job amenity (like fringe benefits).

But . . .

- Many productive factors are difficult to observe, like “innate ability” or “communication skill” or “working well with co-workers”.
  - This leads to a bias on the coefficient of *Z* (and incorrect estimates of the CWD) when *Z* is correlated with the unobserved *X* variables. *Z* and X_1 are negatively correlated if more capable workers use their higher earnings to select into jobs that offer fewer disamenities (more amenities).

Bias in estimates of CWDs



- When individual ability (X_1) is unobserved, its effect gets "lumped in" with *Z*'s.

$$Estimated\ CWD = A + \beta_1 \frac{Cov(X_1, Z)}{Var(Z)}$$

- β_1 is positive because of ability's effect on wages, and the covariance of X_1 and *Z* is negative. So the estimate that omits X_1 will underestimate the "true" CWD (*A*) when *Z* is a "bad" job attribute.

$Estimated\ CWD < A$, given Z is a disamenity

And the CWD will be overestimated for a positive job attribute:

$Estimated\ CWD > A$, given Z is an amenity.