Compensating Wage Differentials

EC 350: Labor Economics

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Winter 2022

Jardim et al. (2017)

Discussion about the Seattle minimum wage study

Q_1: What data did the authors bring to bear? How do these data differ from other studies?

Q_2: How did the authors estimate the impact of Seattle's minimum wage increase?

Q_3: What did the authors find?

Q_4: How do the findings compare to other studies?

Q_5: What are the weaknesses of the study? How might those weaknesses affect the results?

Q_6: What are the policy implications of the study?

Q_7: Did the study make you update your beliefs about the minimum wage? Why or why not?

Compensating wage differentials

Compensating wage differentials

Q: Why are some workers paid more than others?

- Differences in preferences?
- Differences in human capital?
- Discrimination?
- Differences in working conditions?

Even within the same industry, some jobs are riskier than others!

Compensating wage differentials

The idea? Wages can compensate for non-monetary aspects of a job.

> The whole of the advantages and disadvantages of different employment of labour and stock must, in the same neighbourhood, be either perfectly equal or continually tending to equality.
>
> — Adam Smith

Examples?

- Hazard pay for grocery store workers during the pandemic
- Wage premium for risky jobs (*e.g.*, *Deadliest Catch*)
- Wage penalty for fun/fulfilling occupations (*e.g.*, art, music, "lifestyle PhDs", *etc.*)

Market for risky jobs

Supply

Workers care about wages w and the risk of injury ρ:

$$U = f(w, \rho)$$

- Workers are risk averse.
  - Wages are a "good:" U increases with w.
  - Injury risk is a "bad:" U decreases with ρ.
- An employer would need to pay a **wage premium** to convince a worker to take a **riskier job**.

Demand

Employers care about profit, which depends on compensation bundles of wages w and injury risk ρ.

- Both wages and safe working conditions are costly.
  - To **increase wages** and keep the same profit, an employer would need to **cut back on safety** initiatives.
  - To **reduce injury risk** and keep the same profit, an employer would need to **cut wages**.

Risk preferences

An **indifference curve** shows all of the wage-risk bundles that yield the same utility.

1. **Upward sloping:** Additional risk requires additional pay to keep the same utility.
2. **Convex**
3. Wage-risk bundles on **higher indifference curves** yield **higher utility**.

Risk preferences

Different workers can have **different risk preferences**.

- Some workers dislike injury risk more than others.
  - Workers with steeper indifference curves are more risk-averse.
  - Workers with flatter indifference curves are less risk-averse.

Profit

An **iso-profit curve** shows all of the wage-risk bundles that yield the same profit.

1. **Upward sloping:** Safety and wages are costly.
    - To keep the same profit, increasing one requires reducing the other.
2. **Concave:** Diminishing returns to safety lead to increasing marginal cost of risk abatement.
3. Wage-risk bundles on **higher iso-profit curves** yield **lower profit**.

Equilibrium

In equilibrium, workers **match** with employers.

- Most risk-averse worker $\longleftrightarrow$ safest employer
- Least risk-averse worker $\longleftrightarrow$ riskiest employer

The **Hedonic wage function** describes the relationship between wages and job characteristics (*e.g.*, injury risk).

- Upward sloping for "disamenities."
- Downward sloping for amenities (*e.g.*, generosity of health insurance plan).

Safety regulation

Case 1: Workers fully aware of workplace hazards.

Safety regulation

Case 2: Workers misinformed about workplace hazards.

Value of a statistical life

Q: How much money are workers willing to give up in exchange for a marginal reduction in fatality risk?

- **Q:** Or, how much money would workers willingly accept in exchange for a marginal increase in fatality risk?

Other things being equal, **riskier occupations tend to pay more** than safer occupations.

- **Example:** Employer Y has a riskier work environment than Employer X, but workers at Y willingly accept this added risk because they are paid a compensating differential of $7,600 per year.

Employer	Probability of fatal injury	Annual wage earnings
X	p_X	w_X
Y	$p_X + 0.001$	$w_X + \$7{,}600$

Value of a statistical life

The **value of a statistical life**[†] (VSL) describes the strength of the relationship between fatality risk and wages.

- The **hypothetical amount of money** a person would accept to increase their probability of death from 0 to 1.
- Despite its dismal name, VSL is estimated from observed **responses to small changes** in fatality risk.

How is this useful? Helps governments weigh the tradeoffs of safety regulations and environmental policies.

- Safety regulations can save lives (benefit) in exchange for reduced economic activity (cost).
- Easy to ignore benefits when they aren't directly comparable to the costs!

[†] A prime example of how *not* to brand a useful concept.

Value of a statistical life

Estimation

Using data on wages and fatality risk for different occupations, a researcher can estimate a **Hedonic regression:**

$$\mathrm{Wage}_i = \alpha + \beta\,\mathrm{Risk}_i + \text{other variables} + \varepsilon_i$$

- Wage_i represents the annual wage for occupation i.
- Risk_i represents the annual probability of death in occupation i.
- β represents the value of a statistical life.[†]

[†] Previously published VSL estimates range from 1 to 12 million dollars. The Environmental Protection Agency uses a VSL of $10 million for cost-benefit analysis.

Value of a statistical life

Discussion

$$\text{Wage}_i = \alpha + \beta\,\text{Risk}_i + \text{other variables} + \varepsilon_i$$

Q_1: Estimates of β are often *negative* when researchers fail to include "other variables." Why?

Q_2: What "other variables" should a researcher include to isolate the causal effect of risk on wages?

Housekeeping

Assigned reading for Wednesday: The effect of human capital on earnings: Evidence from a reform at Colombia's top university by Carolina Arteaga (2018).

- Reading Quiz 8 is due by **Wednesday, February 23rd at 12:00pm (noon)**.
- The quiz instructions will include a reading guide.

Problem Set 3 is due by **Friday, February 25th at 11:59pm**.