Compensating Wage Differentials

Econ 3470 Lecture 5

Labor Economics

2016-2017 Term 1

Outline

Compensating Wage Differentials

Adam Smith's *An Inquiry into the Nature and Causes of the Wealth of Nations (1976)* - "the wages of labor vary with the ease or hardship, the cleanliness or dirtiness, the honourableness or dishonourableness of the employment."

That is, all other things being the same, in order to induce people to accept jobs which are less amenable, it is necessary to offer a higher wage. Or in other words, jobs that come with many niceties, people are willing to accept them with lower wages.

Empirical evidence: show that other things equal, jobs with unfavorable job characteristics have higher wages.

Compensating Wage Differentials

Wage differentials for different jobs serve two functions:

1. Aggregate level - help to allocate workers to different production activities
2. Individual level - compensate workers for putting up with certain unfavorable aspects of the jobs

Compensating Wage Differentials

At the individual level, there are in fact 2 transactions in each employment relation that are carried out simultaneously

1. worker "sells" his productive service to the employer
2. employer "sells" a bundle of job attributes to the worker

Job attributes

1. goods - such as on-the-job consumption (subsidized food, nice office, and other fringe benefits)
2. bads - such as hardship and tedium of work, noisy, risky or dirty work environment, etc.

Compensating Wage Differentials

1. All workers are utility maximizing and all firms are profit-maximizing.
2. Everyone has perfect information about the availability and attributes of all jobs in the market.
3. Workers are perfectly mobile, and can switch jobs without any adjustment. Similarly, ignore adjustment cost on the part of the firms.
4. All workers are productively homogeneous.
5. Labor supply is perfectly inelastic and hours of work in each job are assumed to be fixed at the same level.

Compensating Wage Differentials

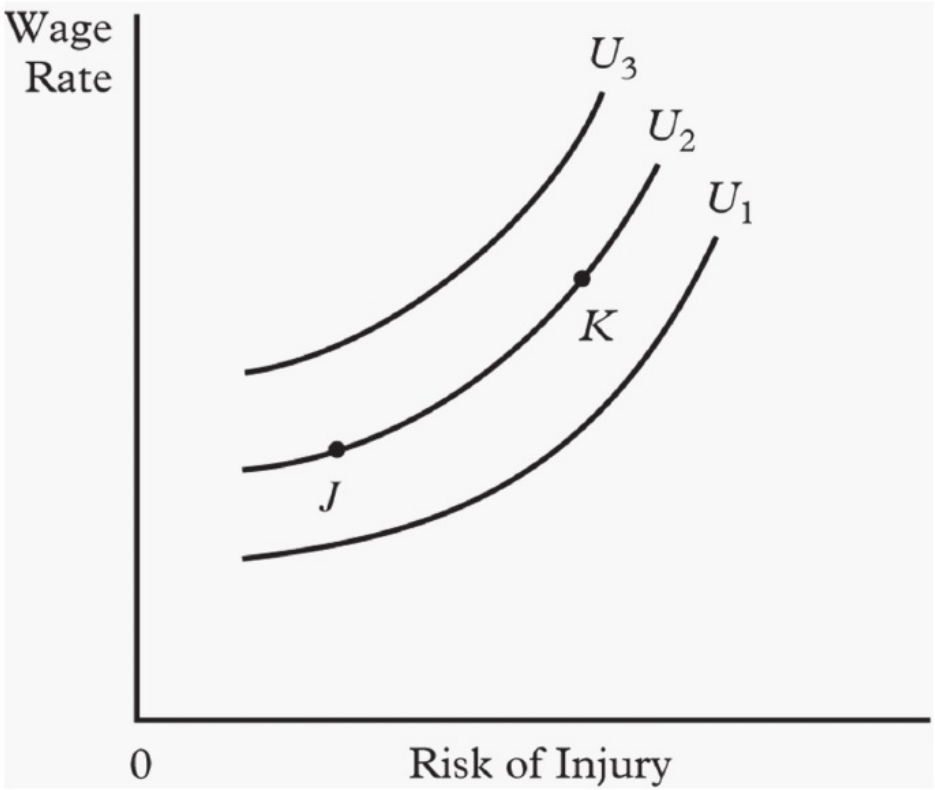


Figure 1: A Family of Indifference Curves between Wages and Risk of Injury

Compensating Wage Differentials

- At point J: low wage, low risk of injury
- At point K: high wage, high risk
- Slope at K is larger: willing to give up a lot to get risk $\downarrow$

Compensating Wage Differentials

People differ in their aversion to the risk of being injured.
More risk averse $\Rightarrow$ steeper $\Rightarrow$ more money required to get a unit $\downarrow$ in risk

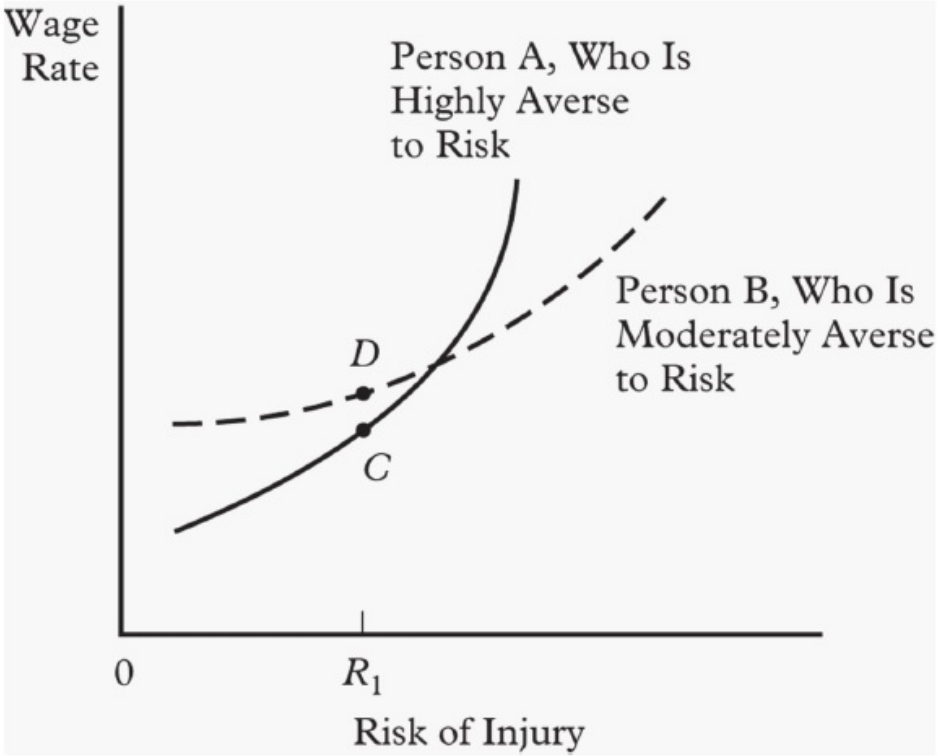


Figure 2: Representative Indifference Curves for Two Workers Who Differ in Their Aversion to Risk of Injury

Compensating Wage Differentials

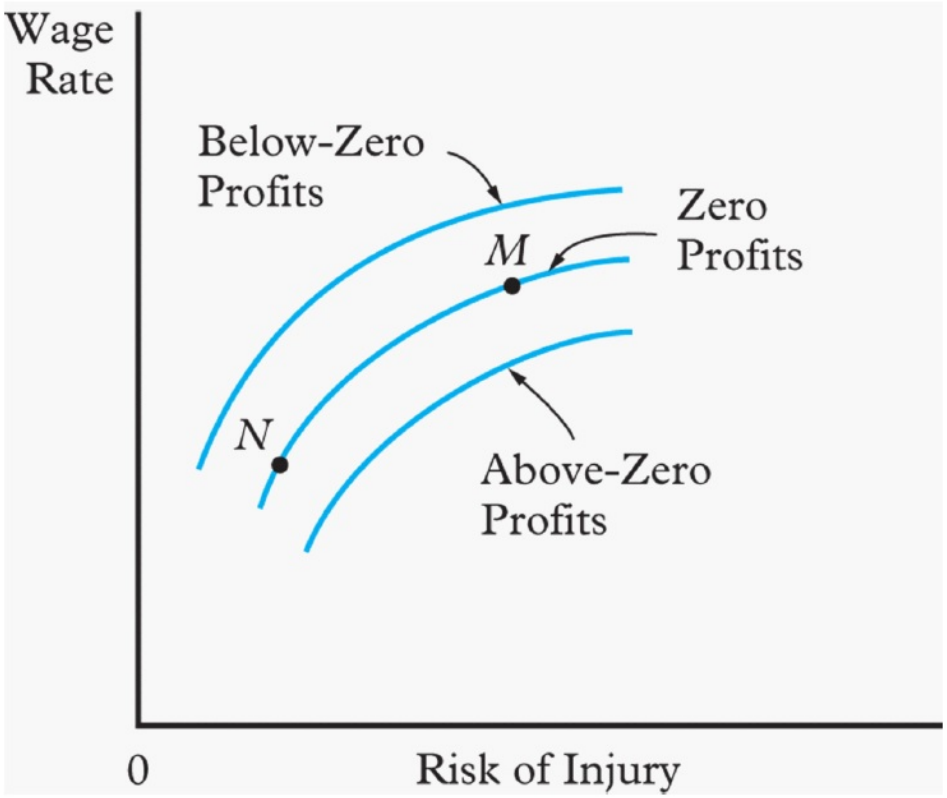


Figure 3: A Family of Isoprofit Curves for an Employer

Compensating Wage Differentials

Isoprofit map

- Southeast: higher profit
- Northwest: lower profit
- From M (flat) $\rightarrow$ N (steep) $\Rightarrow$ slope $\uparrow$ $\Rightarrow$ increasingly more difficult to reduce hazard.

Compensating Wage Differentials

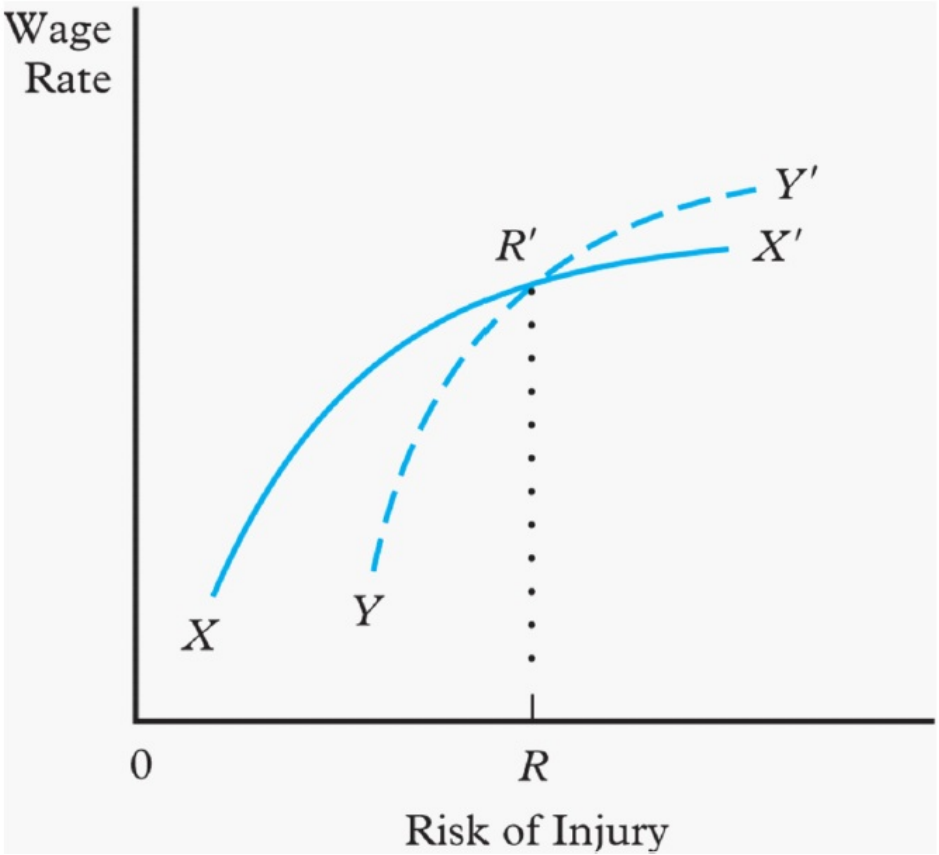


Figure 4: The Zero-Profit Curves of Two Firms

Compensating Wage Differentials

Firms also differ in the ease (cost) with which they can reduce hazard: see the slopes of the two curves.
Maybe nature of production differs, or technology differs.

How do workers and firms get matched in the market?

Workers search jobs and firms offer job $\Rightarrow$ sorting and matching

Market Equilibrium

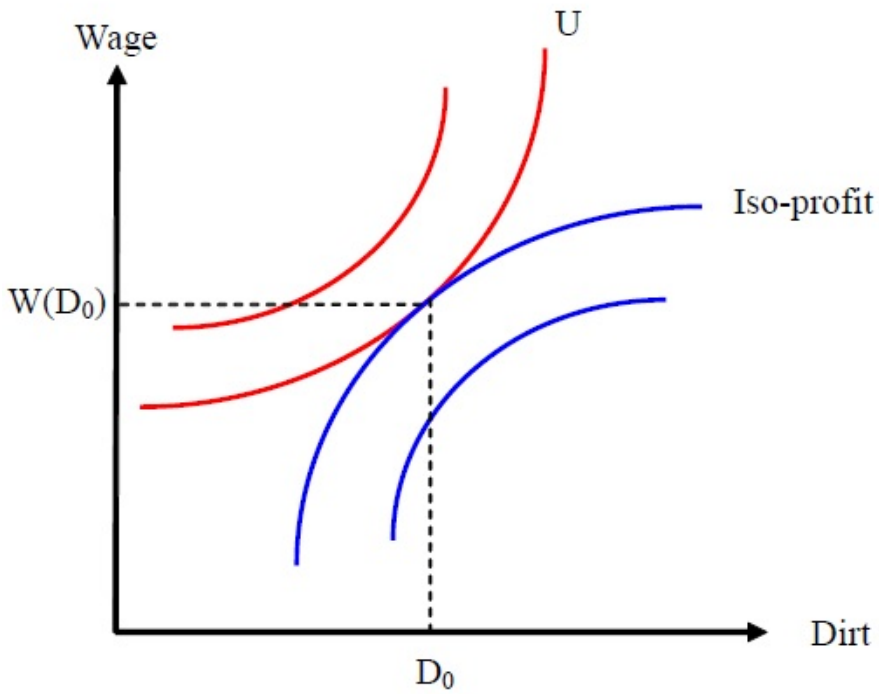
- Represented by tangency between indifference curves and isoprofit curves
- Equilibrium market wage function is simply the locus of points of tangency

For each pair of groups of workers and firms, there is an equilibrium wage function, $W(\text{dirt})$, such that at each level of dirt and for given distributions of technology and tastes, the demand for dirt is just equal to the supply.

Can we go from $W(\text{dirt})$ to tell the taste and technology structure?

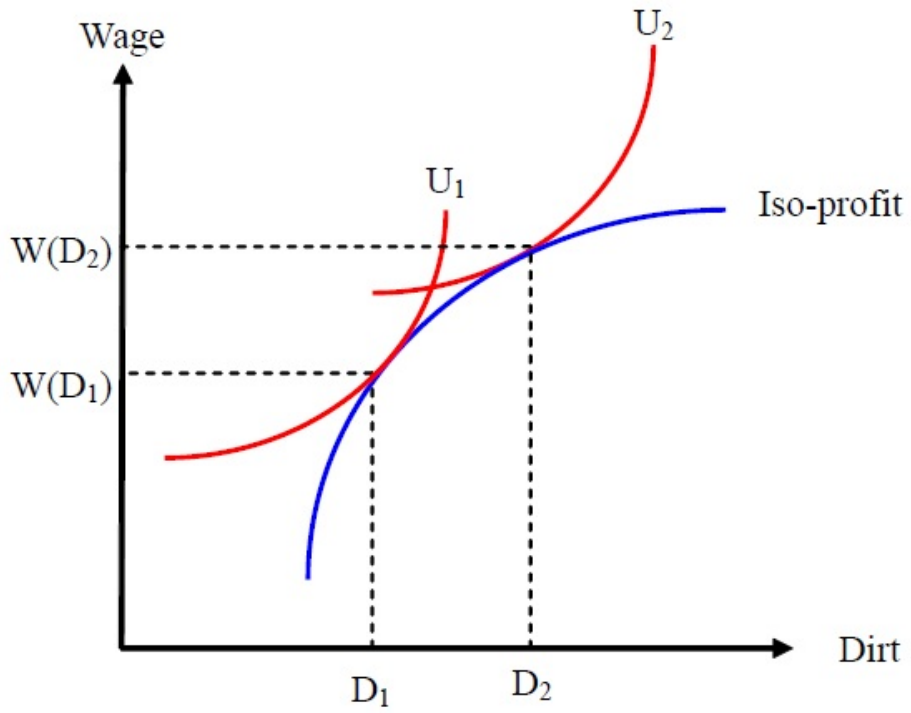
Market Equilibrium - Case 1

One type of job, firms and workers and indifferent with whom they are matched with $\Rightarrow$ no sorting or matching



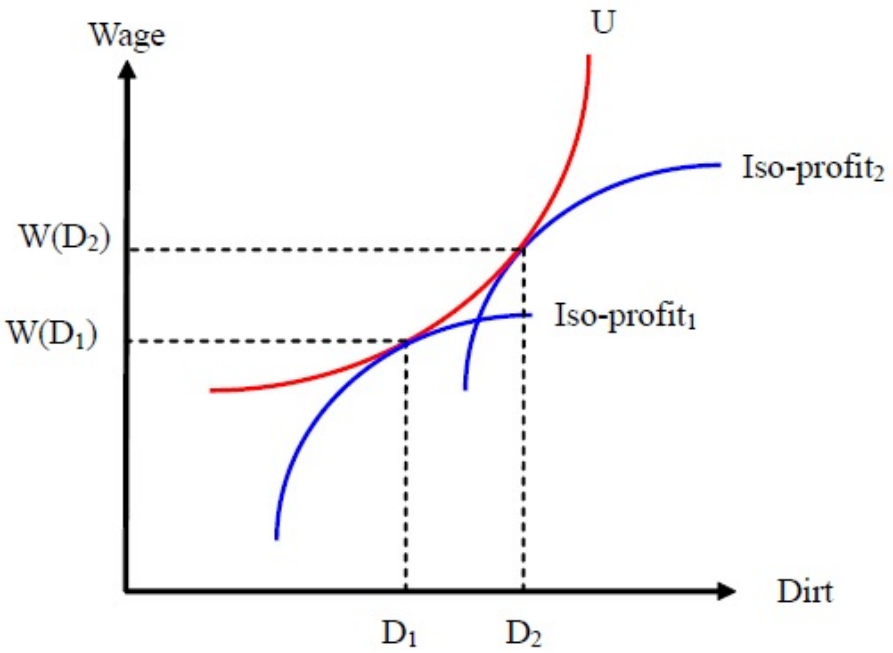
Market Equilibrium - Case 2

One type of technology but workers with different preference $\Rightarrow$ different types of workers choose their utility maximizing package of W and D along this locus.



Market Equilibrium - Case 3

Workers have same preference but firms differ in their technology $\Rightarrow$ equalizing different function would coincide with an indifference curve corresponding to the reservation level of utility



Market Equilibrium

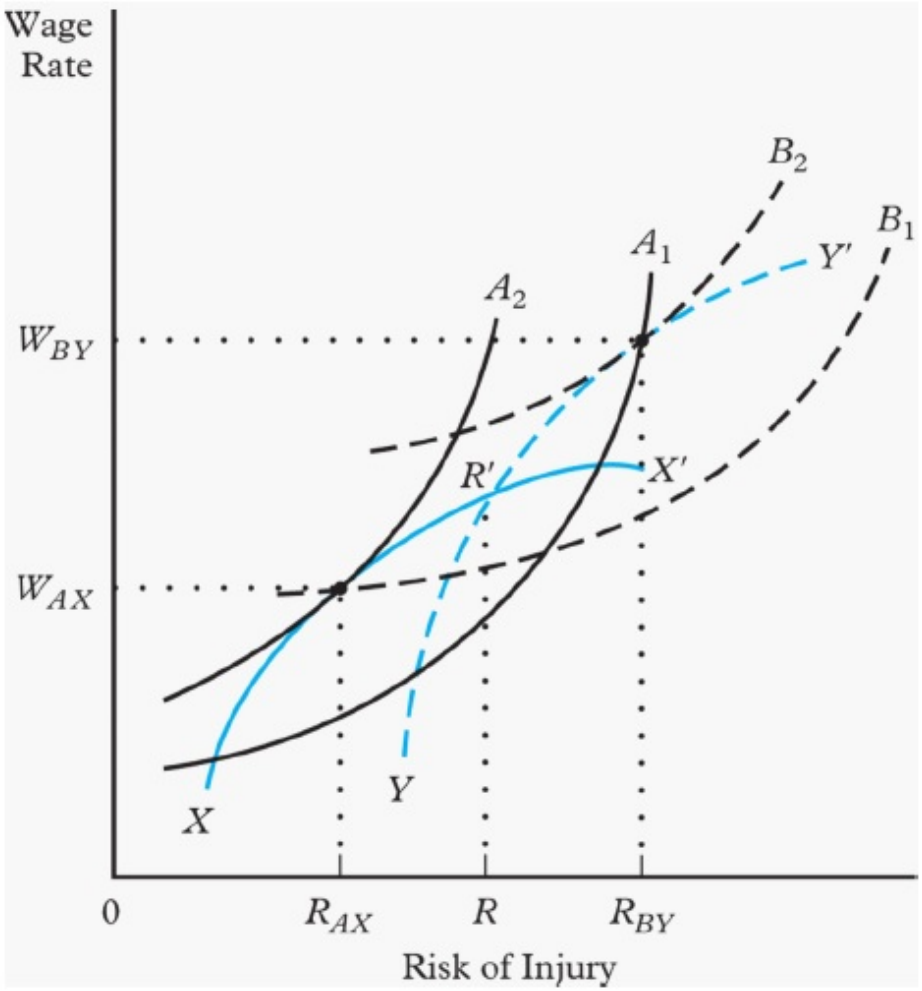


Figure 5: Matching Employers and Employees

Market Equilibrium

Long-run XX' and YY' are two zero-π curves.
Firm X: low risk, low wage $\Rightarrow$ attracts person A
Firm Y: high risk, high wage $\Rightarrow$ attracts person B

(Firm Y is more costly to produce safety than firm X.)

Only those jobs along $XR'Y'$ have a chance of being accepted (jobs along YR' or $R'X'$ have no chance of being accepted by workers)

Offer Curve

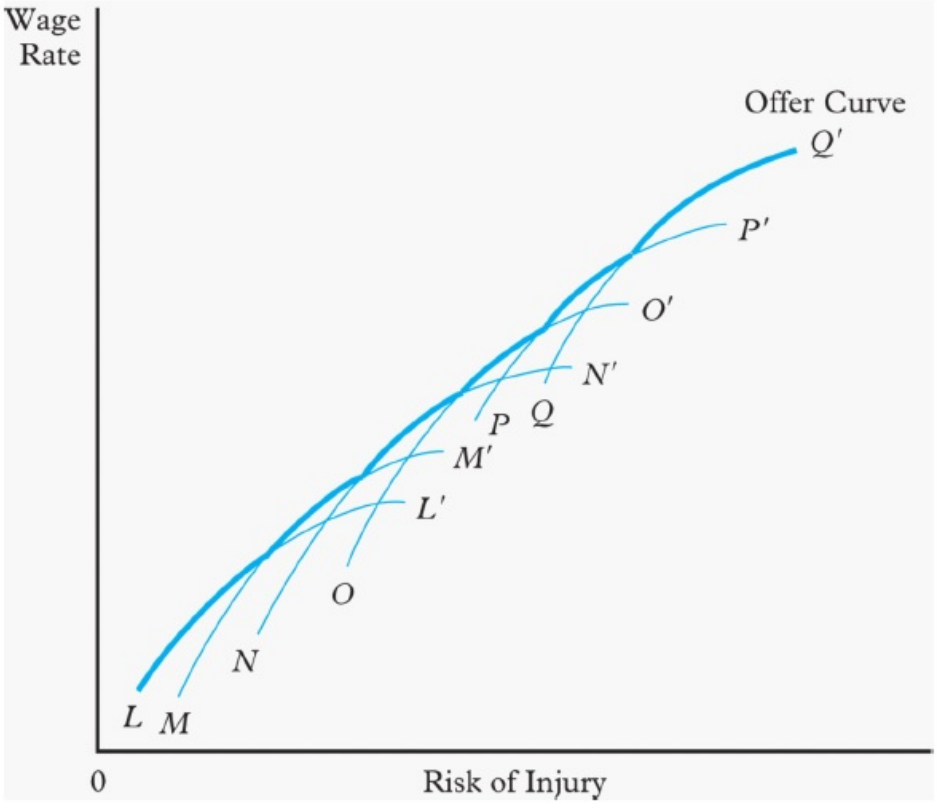


Figure 6: An Offer Curve

Offer Curve

- The most northwest segments of individual firms' zero-π isoprofit curves of firms L to Q.
- Short run
  - the number of firms of each technology is given
  - the wage at which the isoprofit curves and the indifference curves tangent can involve non-zero profits
- Long run
  - Free exit and entry, all firms must be opening at zero profit
  - so that the long-run equilibrium wage function is simply the upper envelope of the zero-profit isoprofit curves
- Slope at any point along the wage function represents the marginal price of dirt/risk of injury at that point.

Two Major Insights

1. risk/dirt increase $\Rightarrow$ wages increase
2. workers and firms sort out by themselves based on their strengths and preferences

Government Regulation of Job Attributes

People suggested that workers should be protected from hazardous or unhealthy working conditions.
Therefore, government should impose regulations that guarantee a minimum level of safety or health standard.

Result:
Reduce the utility of those workers who do not mind working under less amenable environment, for they would have preferred the higher wage to the lower dirt or risk of injury.

Government Regulation of Job Attributes

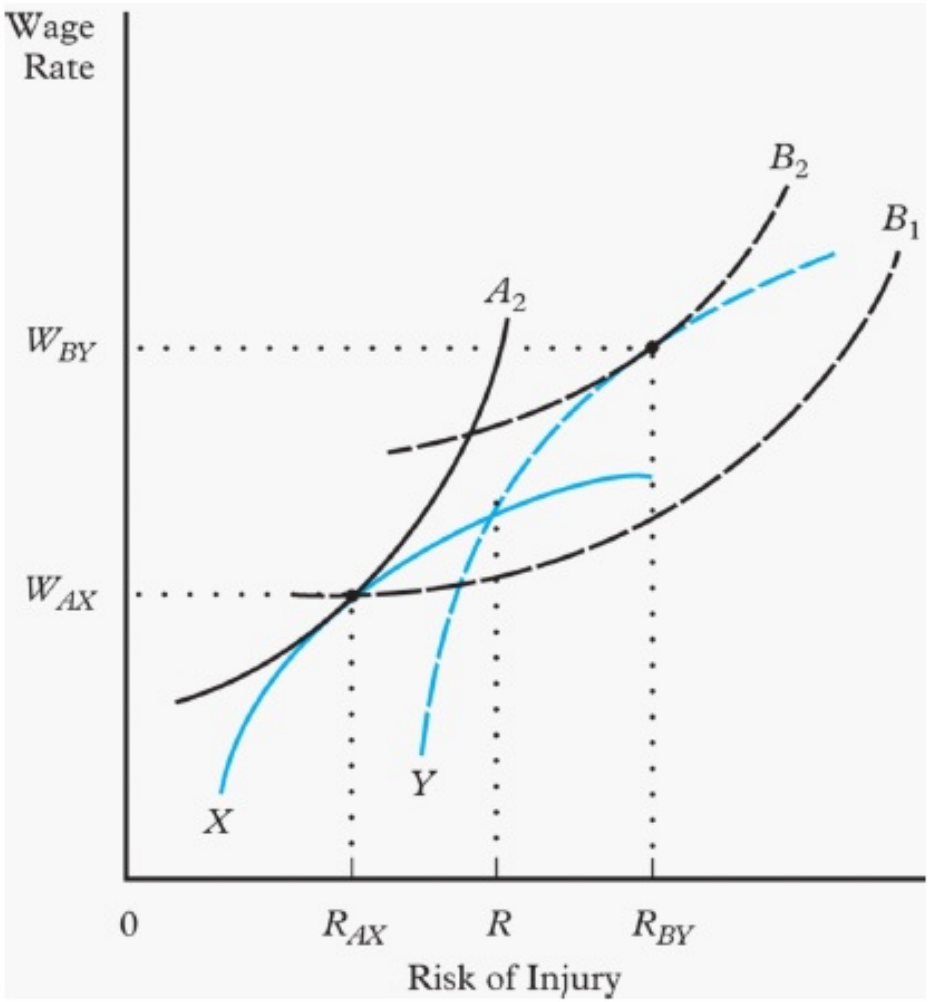


Figure 7: The Effects of Government Regulation in a Perfectly Functioning Labor Market

Government Regulation of Job Attributes

For Person A (W_{AX}, R_{AX}) is the optimal.
But for Person B, (W_{AX}, R_{AX}) gives a utility which is not the highest; the optimal point is (W_{BY}, R_{BY}) for B.
If the government impose a standard of safety such as risk level above R_{AX} is illegal.
$\Rightarrow$ people like B will be worse off.

Government Regulation of Job Attributes

Justification for government intervention:
- Workers are often not aware of the amount of dirt (or risk) they are exposed to, and are led by the employers to believe in a lower level of dirt than is actually the case, so that their actual utility, had they had perfect information, is lower than they thought.

Implicitly assumed that workers are too ignorant to understand, or cannot make the best decision for themselves.

Government Regulation of Job Attributes

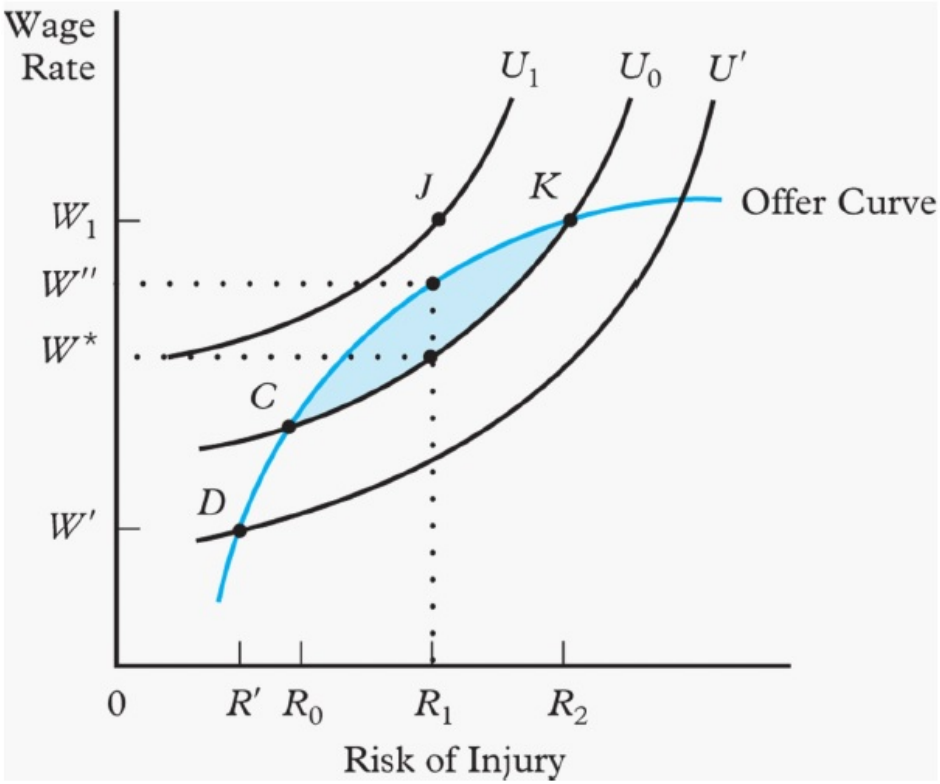


Figure 8: A Worker Accepting Unknown Risk

Government Regulation of Job Attributes

The person thought he/she was at J, but actually at K - at a lower utility U_0 (not U_1).
If government imposes a safety standard at R'
$\rightarrow$ the person would be worse off.
If the standard is between R_0 and R_2.
$\rightarrow$ the person would be better off.

Government Regulation of Job Attributes

Even if it is assumed that workers are capable of taking care of their own interest, some would still argue that unhealthy work place can have external social costs.
How much non-private social returns can be derived is questionable, especially since those who care most, e.g. the workers' family or friends might already have internalized much of these such costs and returns in influencing the decision of the worker.

Some have argued that government has a role in shaping preference and correcting socially costly habits, e.g. using safety devices, seat belt, cigarette smoking.

Hedonic Wage Theory and Employee Benefits

Hedonic: characterized by pleasure.
Hedonism: hypothesize that people pursue utility (pleasure), and avoid disutility.
$\Rightarrow$ willing to give up something good (e.g. income) for exchange to get reduction (rise) in something bad (else, also good).

Employee benefits - distinguishing feature of it is that they compensate workers in a form other than cash.

- Payment in kind, e.g. paid vacation, housing allowance
- Deferred compensation, e.g. pension, MPF (Mandatory Provident Fund System in Hong Kong)

Hedonic Wage Theory and Employee Benefits

Figure 9: An Indifference Curve between Wages and Employee Benefits

Hedonic Wage Theory and Employee Benefits

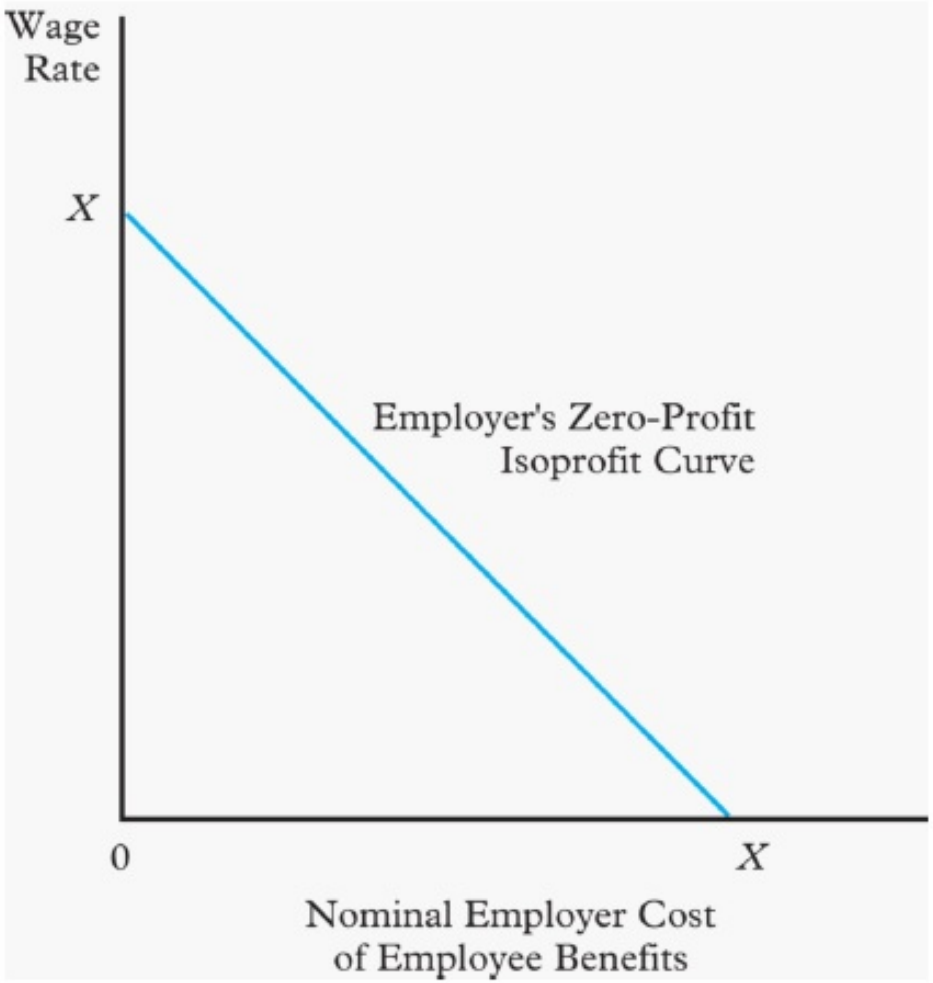


Figure 10: An Isoprofit Curve Showing the Wage/Benefit Offers a Firm Might Be Willing to Make to Its Employees: A Unitary Trade-off

Hedonic Wage Theory and Employee Benefits

The slope $= -1$: Employer is indifferent about the composition of compensation, e.g. \$50 dental insurance $\Rightarrow$ wage $\downarrow$ by \$50.
But some benefits are not in the dollar-for-dollar basis: certain taxes (e.g. social security taxes) rise with wage payment, so employers can save money if part of wage is given to workers in benefits.

Hedonic Wage Theory and Employee Benefits

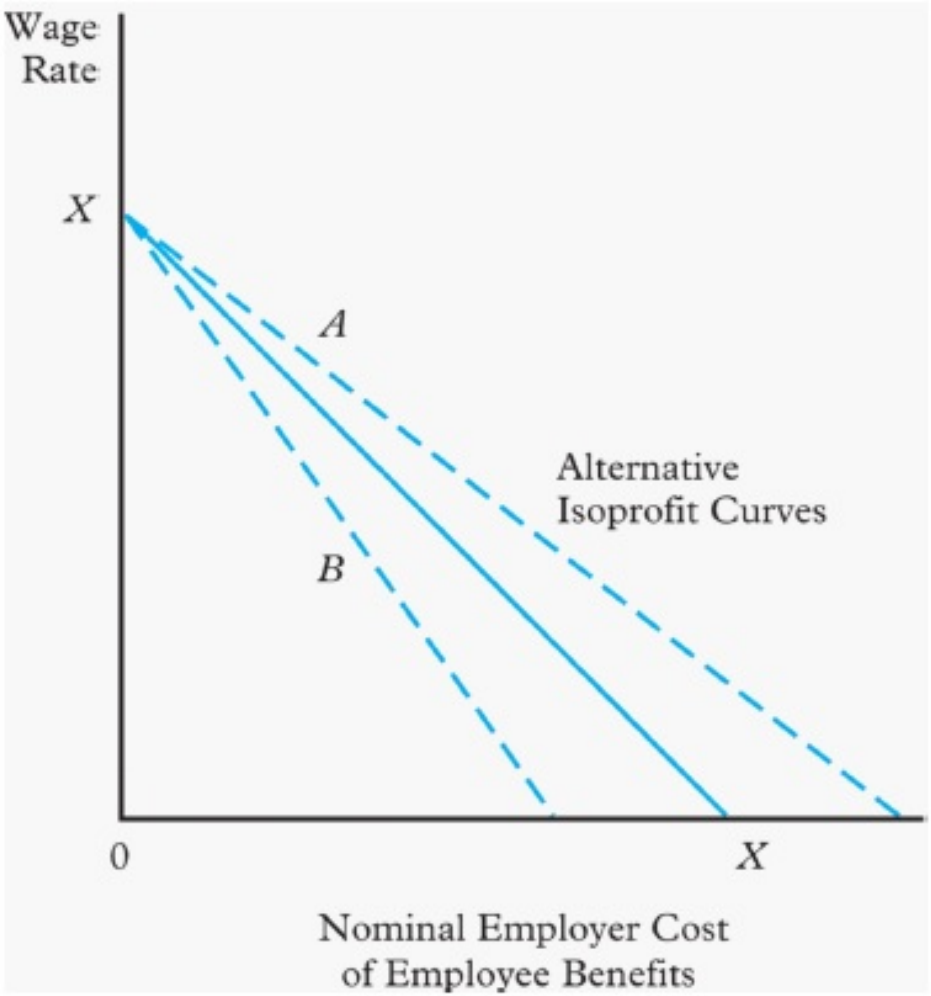


Figure 11: Alternative Isoprofit Curves Showing the Wage/Benefit Offers a Firm Might Be Willing to Make to Its Employees: Nonunitary Trade-Offs

Hedonic Wage Theory and Employee Benefits

Line A, $|\text{slope}| < 1$ flatter
\$50 $\downarrow$ in wage $\Rightarrow$ less than \$50 benefits for workers.
But some benefits may be more costly than wage reduction itself.
Line B, $|\text{slope}| > 1$: steeper
\$50 $\downarrow$ in wage $\Rightarrow$ more than \$50 in benefits.

Wage decrease:

- Steeper curve $\Rightarrow$ benefits increase a bit
- Flatter curve $\Rightarrow$ benefits increase a lot

e.g. paid sick leave $\Rightarrow$ absent from work $\uparrow$ $\Rightarrow$ additional cost on employers.

Hedonic Wage Theory and Employee Benefits

The offer curve: connecting the "outside portions" of individual firms' zero-π isoprofit curves.
Workers with different preferences choose the right points on the offer curve, and again workers and firms are sorted and get matched.
$\Rightarrow$ negative slope of the offer curve: workers pay for their own benefits.

Hedonic Wage Theory and Employee Benefits

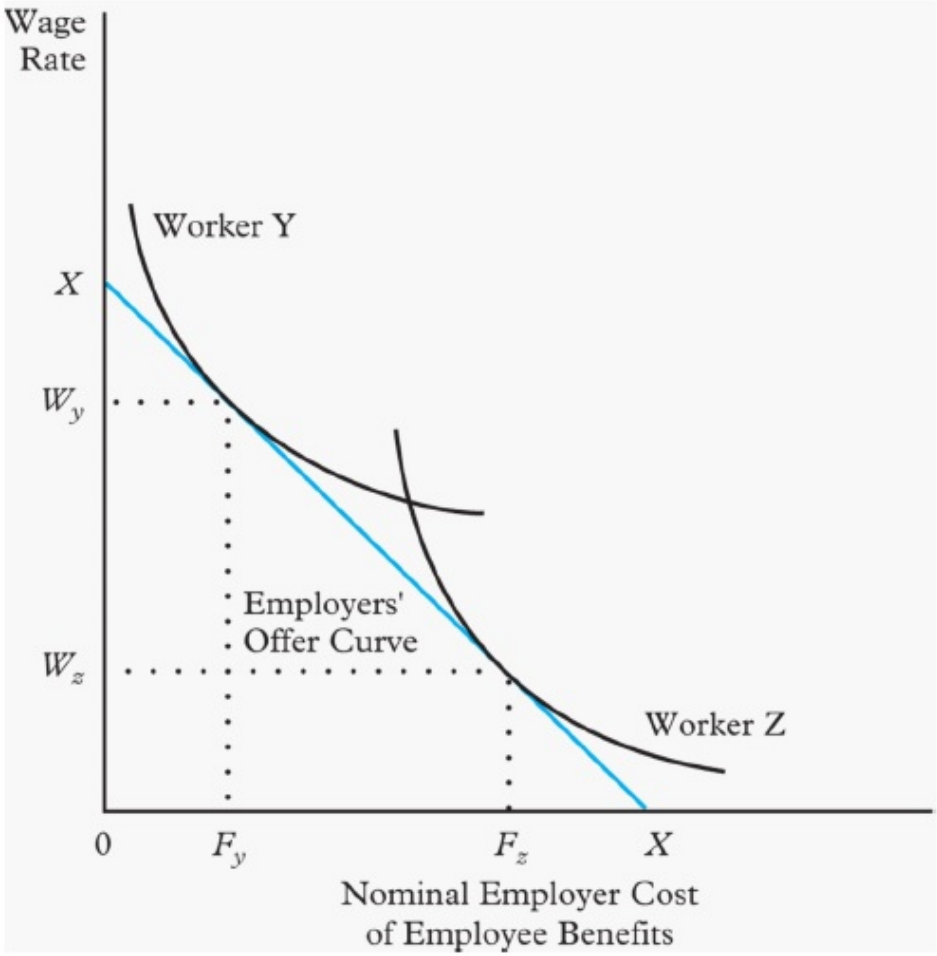


Figure 12: Market Determination of the Mix of Wages and Benefits

Hedonic Wage Theory and Employee Benefits

Actually observing the trade-off between wages and employee benefits is not easy.
Diagram: (W_X, F_Y) and (W_Z, F_Z), i.e. (high wage, low benefits) and (low wage, high benefits).
In reality we often observe high wages with very good benefits packages, i.e. observed that wages and benefits are positively related.

But this is misleading, as other factors, such as the demands of the job and the quality of workers involved, that influence total compensation are not considered.

Hedonic Wage Theory and Employee Benefits

The policy consequences of negative wage/benefits trade-off are important, because government legislation designed to improve employee benefits might well be paid for by workers in the form of lower future wage increases.

Example: increase MPF

impose of minimum wage, etc.

Policy Application: Pension Reform Legislation

Pension plans provided by employers are of two general types:

- Defined benefit plans
- Defined contribution plans

Defined Benefit Pension Plans

The employer promises employees a certain benefit upon retirement. This benefit may be a fixed sum per month or a fixed fraction of one's earnings prior to retirement.

Defined Benefit Pension Plans

The vesting provision of any pension plan are the rules about who becomes eligible to receive a pension.

If a plan is unvested, any worker who quits the compony before retirement age loses all rights to a pension benefit.
If a plan is vested, workers can receive a pension from company X even if they quit X before retirement age and work elsewhere. How much they receive from X at retirement, of course, depends on their length of service with X and their preretirement earnings; however, the point is that they receive something from X before retirement if they are vested.

Defined Contribution Pension Plans

The employer promises to contribute a certain amount each year to a fund of which the employee has access upon retirement. The fund is increased each year by employer's, and perhaps also employee's contributions and by returns from investment.

MPF in Hong Kong:
The Mandatory Provident Fund is a compulsory saving scheme (pension fund) for the retirement of residents in Hong Kong. The employer and the employee each contribute a sum equal to 5% of the salary of employee whose earnings are above a certain threshold to funds run by banks, insurers or fund houses. Total contributions are capped at HK$2,500 a month. Employees and self-employed are required to contribute 5% of their if their earnings to their MPF fund if these exceed HK$4,000.

Reference

- Ehrenberg and Smith (2015) *Modern Labor Economics: Theory and Public Policy, Chapter 8*