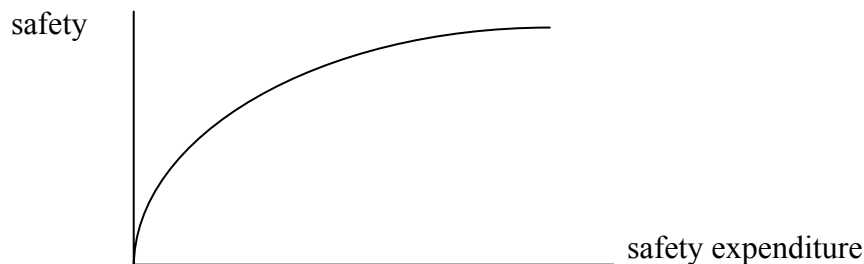
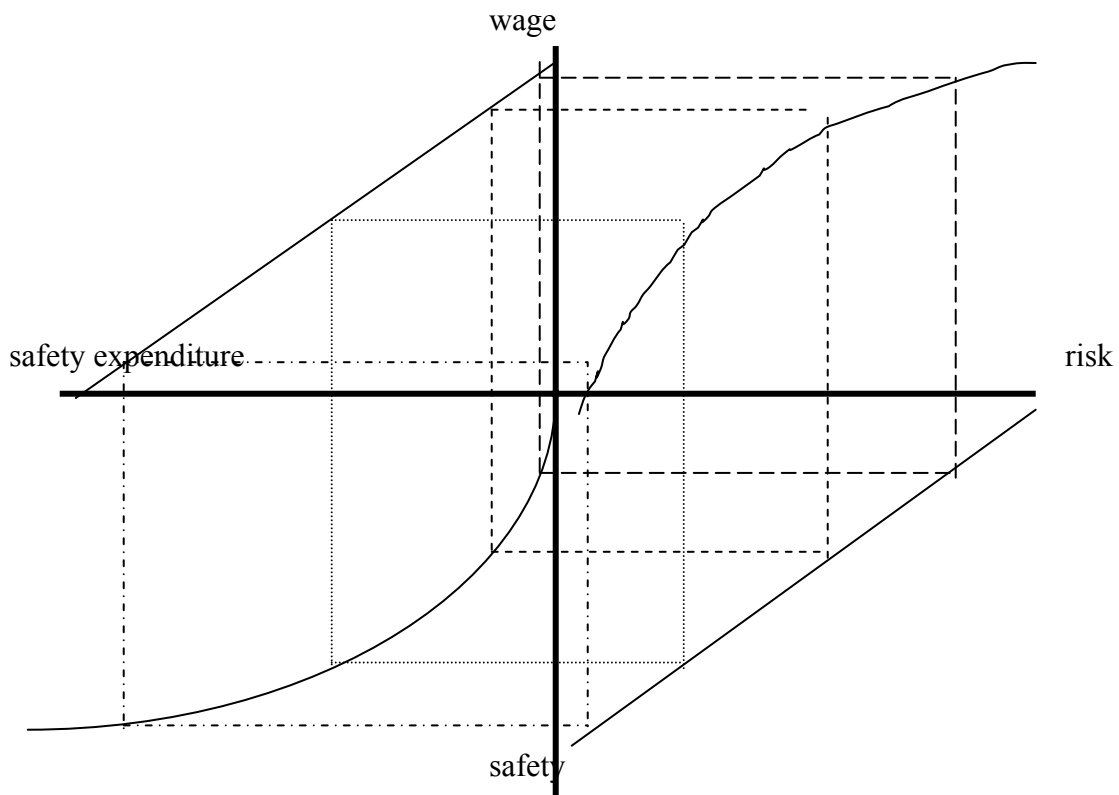


PART B: RISK IS NOT FIXED: Hedonic Model

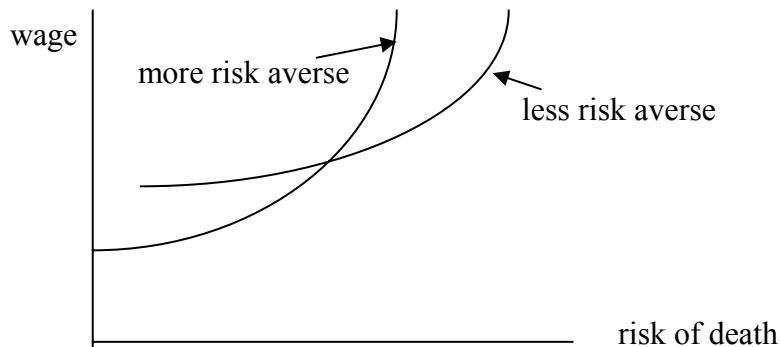
Hedonic equilibrium is not concerned with the relative number across different occupations, but the relative price for risk or the compensating differential for risk. The model accommodates differences in technology, differences in tastes for risk, while allowing more than just two levels of risk—indeed, a continuum of risks and compensating differentials for risks in the market. The firm's isocost curves are given by cost minimization behavior, with the curvature following from diminishing returns to safety expenditures as illustrated below:



The idea here is usual one: a firm spends its first few safety dollars on those projects that are most cost effective. Hence, the initial expenditures are those with the greatest return—that is, the greatest reduction in risks per dollar spent. Here, we define safety as the absence of risk (assume that it is an approximately linear relationship over the observed region of the risks). The other idea that is important in the derivation is that of costs: the firm is willing to offer workers a wage/risk tradeoff because the higher wages and more safety are both scarce goods. That is, the firm's budget can be spent on higher wages, or on more safety projects, but there is a tradeoff between the two. That is why we call the wage, risk tradeoff the “isocost” curves of the firm—it is a tradeoff corresponding to a given level of total costs. Putting all these elements together (the cost constraint, the diminishing returns to safety expenditures, and the inverse relationship between risk and safety), we derive the isocost “wage-risk” tradeoff in the northeast quadrant of the following graph:



The worker's problem is set up as before, where we simply replace Consumption with Wages on the vertical axis:



The expected utility(von Neuman-Morgenstern) model offers a simple way to derive the workers' indifference curves (their isoutility curves), and it begins with an expected utility model in the face of accident risk:

$$\text{Expected Util.} = q U(C \text{ if accident}) + (1-q) U(\text{no accident } C)$$

where C is consumption and q =probability of a fatal accident. Since we assume that accidents are fatal, and we don't have the gospel (or really weak testimonies, or really strong testimonies but a checkered past), then we let the utility of death be zero and

$$EU=(1-q) U(C)$$

Now if workers are employed full time (say, $T=H=1$) at wage= W , and all wage income is spent on C (so that $W=C$), then the marginal rate of substitution between wages and job risk is just

$$MRS = \left(\frac{dW}{dq} \right) = \left(\frac{dC}{dq} \right) = \left(- \frac{\frac{\partial EU}{\partial q}}{\frac{\partial EU}{\partial C}} \right) = \left(\frac{U(C)}{(1-q) \cdot \left(\frac{\partial U}{\partial C} \right)} \right)$$

How can you find about the curvature of the MRS? the location of the indifference curves?

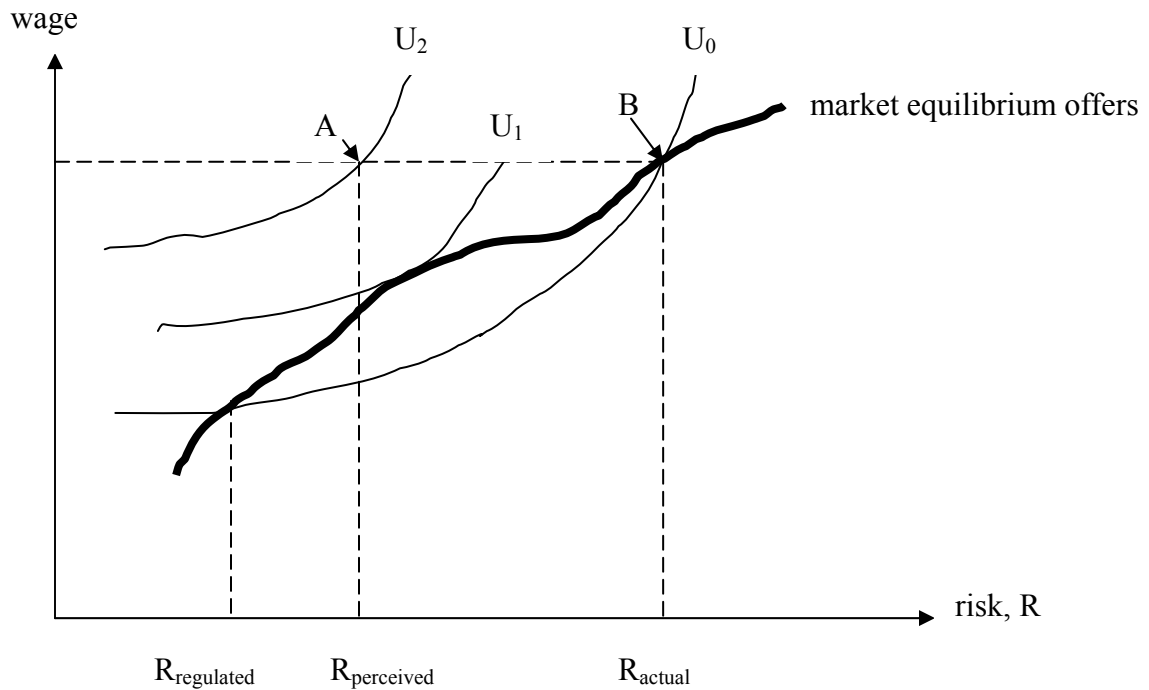
Putting this altogether, we get the Borjas figure 6.6. This provides a hedonic equilibrium in which:

1. there is no incentive to deviate
2. workers with tastes for risk are able to market those risks to firms with technologies in which risk is more profitable
3. there is not a single compensating wage, but a locus of compensating wages that is likely to be non linear (so the marginal compensation for risk depends on the level of risk)
4. in equilibrium, wages increase as risk rises
5. the estimated wage/risk relationship

$$\text{wage} = \beta_0 + \beta_1 \text{ experience} + \beta_2 \text{ education} + \beta_3 \text{ fatal injury risk} + \beta_4 \text{ potential workers compensation benefit} + \beta_5 \text{ (stuff)}$$

From the estimate of β_3 , (which should be positive under our theory), we can calculate the implied value of life. Suppose that “wage” is the annual wage income, and “fatal injury risk” is fatal injury risk per thousand workers in that occupation in that company. Then if $\hat{\beta}_3=4,635$, it means for each additional fatal injury (per thousand) the worker wants a compensating differential of \$4,635. Since there will be 1 fatal injury among 1,000 workers (and each worker presumably gets a \$4,635 differential for the risk), then the implied value of a life is \$4,635,000.

Compensating Wages and Risk Regulation: the effect on the uninformed worker



The worker is worse off than she realizes: she thinks she is at point A, with a relatively low risk when in fact she is at point B, facing a higher risk. She was uninformed about the true level of risk, and so while she initially thought that she was getting U_2 level of utils, she was actually only getting U_0 utils.

Regulation can, in principle, make her better off than U_0 utils by implicitly informing her about the risk. If risk is regulated to be less than R_{actual} but greater than $R_{perceived}$, her job will disappear and she will learn that she was mistaken. As drawn, any job offer along the equilibrium locus (in the dark line) between risk levels R_{actual} and $R_{perceived}$ will make her better off. Her best offer would be the one corresponding to U_1 utils, so that she would be better off than she actually was when she was misperceiving the risks.

Regulation can also inform her, and make her worse. This would be the case if the risk was regulated so that it was below the " $R_{regulated}$ " level, in which case she would have to be on another indifference curve even worse than (and Southeast of) the U_0 -curve.