Example 20.5
The Value of a Life*

In 2005, the U.S. Bureau of Labor Statistics ranked commercial fishing as the job occupation with the highest fatality rate, with 118.4 fatalities per 100,000 – almost 30 times the rate of the average worker. However, Alaskan crab fishing was even more dangerous, with over 300 fatalities per 100,000. Over 80% of these deaths are caused by drowning or hypothermia. The fishermen are also susceptible to crippling injuries caused by working with heavy machinery and gear. Given these statistics, the obvious question is why would anyone choose to be a crab fisherman in Alaska? *AlaskaJobFinder.com* has the answer. First on the list of reasons to work in a job in Alaska is the excellent earnings potential. An Alaskan crab fisherman can earn over $1,000 a day, more than most other fisherman, and far more than the average job pays to people with similar qualifications.

This trade-off between high fatality risk and high earning potential is at the heart of the main approach to obtaining an estimate of the value of a life for the purpose of social cost–benefit analysis. By choosing between different jobs with different levels of fatality risk and different wage rates, individuals reveal their willingness to trade a higher reward for a lower fatality risk – and thereby reveal something about how much they value their lives.

Placing a value on human life is one of the more controversial aspects of cost–benefit analysis. As discussed in Chapter 20, some such as John Broome have argued against making any such explicit monetary valuation on ethical grounds. Policy makers cannot avoid decisions about how much to spend in order to save lives, however. Decisions about the speed limit on motorways, about whether or not to require people to wear seatbelts in cars, and about what drugs to make available on prescription all involve making judgments about the price worth paying for changes in fatality risk. In the interests of rational policy-making it seems sensible to make these judgments more rather than less explicit and to use the same valuation across different areas of policy-making.

For the purposes of policy-making, the appropriate measure is the value of a statistical life. Policies are not normally about saving particular individual lives but about

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* Example prepared by Sarah Smith, University of Bristol.

reducing the probability of fatality or increasing the probability of survival. What we therefore want to know is individuals' willingness to pay to avoid small fatality risks, from which we can derive an estimate of the value of a statistical life. If people are prepared to pay £500 to eliminate a fatality risk of 1/10,000, then the estimated value of a statistical life is £5 million [£500 = (1/10,000) £5 million].

And as we have seen, this is exactly the kind of trade-off that people make in the labor market. By comparing the wages of individuals with similar characteristics in very similar jobs, but with different fatality risks, we can infer the value of a statistical life.

In practice, such estimates are obtained by using survey data on individuals and their socioeconomic characteristics and the characteristics (including fatality risk) of the jobs that they are in. These data are then used to estimate hedonic wage equations of the following form:

$$w_{ij} = \alpha + X'_i\beta_i + Z_j\phi_j + \gamma p_j + \varepsilon_{ij}$$

where w_{ij} = wage of individual i in job j

X_i is a vector of individual characteristics

Z_j is a vector of job characteristics

p_j is the probability of fatality risk.

The estimated coefficient γ captures the value of a statistical life.

The estimates from studies across different countries vary in a way that is plausible. For example, most of the 30 U.S. studies produce a fairly tight range of estimates (between $4.0 million and $10.0 million) and Japan estimates the value of a statistical live at $9.7 million. In contrast, Taiwan estimates the value at between $0.2 and $0.9 million[1]. It is likely that people living in poorer countries are willing to pay less to avoid fatality risk; willingness to pay inevitably reflects ability to pay to some degree. Some may be uncomfortable with the implications of this, but the concern is really a much wider one about the individualistic underpinnings of cost–benefit analysis.

In practice, these estimates may suffer from a number of potential biases.

- One of the main concerns is whether individuals accurately perceive the fatality risk associated with different jobs. The dangers associated with Alaskan crab fishing are fairly well known but it may come as more of a surprise to know that pizza delivery jobs are also in the top ten most dangerous. Fatality risk is typically measured objectively, but it is individuals' perceptions of risk that determine what additional wage premium they require. If individuals do not perceive risk accurately, the estimates of the risk coefficient γ will be biased.
- Another problem is that many surveys do not have full information on non-fatal injury risk. As well as the risk of death through drowning or hypothermia, Alaskan crab

[1] Source: See W. Kip Viscusi and Joseph E Aldy, 'The Value of a Statistical Life: A critical review of market estimates throughout the world', *Journal of Risk and Uncertainty* 27, No 1 (2003): 5 – 76. For concreteness single representative studies are drawn from their table 4. Estimates are in year 2000 US$.

fishermen face a high risk of crippling injury and their higher compensation reflects both types of risk.

- Finally, what we would ideally like to observe in order to derive an estimate of the value of a life is the same individuals making trade-offs between different jobs. In practice, it is estimated from the employment choices of different individuals and is therefore affected by the way individuals select into different jobs. Clearly, Alaskan crab fishing is not for everyone; it is likely to appeal particularly to those who love the sense of adventure, in other words to those who are risk-loving. That the riskiest jobs will typically be chosen by those who are less risk averse means that the value of a life will be systematically underestimated.

An alternative approach to estimating the value of a life is to pose hypothetical questions to ascertain the willingness to pay amount – known as *contingent valuation surveys* or *stated preference surveys.* Such surveys seek information regarding respondents' decisions given hypothetical scenarios. Rather than asking general question about individuals' value of life, such surveys have been found to work best when applied to specific and detailed scenarios – for example, after describing the risks involved in Alaskan crab fishing or pizza delivery, asking individuals how much they would need to be paid to induce them to take on such jobs. Survey evidence can be particularly useful in addressing issues that cannot be assessed using market data. How, for example, do people value death from cancer compared with acute accidental fatalities? Would people be interested in purchasing pain and suffering compensation, and does such an interest vary with the nature of the accident? Potentially, survey methods can yield additional insights into these issues.

Further Reading

Viscusi, W. K. The Value of a Life (2008) *The New Palgrave Dictionary of Economics*, (2nd edn) (Basingstoke: Palgrave Macmillan)