

.Benefit cost.

The cost of the Valdez oil spill cleanup was around 1,300,000,000 billion dollars. From the EPA website, we find “In the aftermath of the *Exxon Valdez* incident, Congress passed the Oil Pollution Act of 1990, which required the Coast Guard to strengthen its regulations on oil tank vessels and oil tank owners and operators. Today, tank hulls provide better protection against spills resulting from a similar accident, and communications between vessel captains and vessel traffic centers have improved to make for safer sailing.”

To make life simple, assume a four year planning horizon ($t=0, t=1, t=2,$ and $t=3$) with year zero being 1990, the undiscounted year and assume yourself back in time (poof!) to 1990 before the act was passed. Assume before the act was implemented, there was a $(1/1,000)$ chance of such a spill occurring each year. So the pre-act expected cost of a clean-up per year was $(\text{probability of a spill}) * \$1.3 \text{ billion} + (\text{probability no spill}) * \0 . Assume the impact of the act is to reduce the chances of a spill to $1/100,000$.

- a. What is the size of the economic benefit of the act as measured by a reduction in expected spill cleanup costs?

- b. If the cost of implementing the act is 3 million dollars in 1990, and 1 million dollars in each year 1991, 1992, 1993 ($t=1, t=2, t=3$) and the discount rate is 5%, do the benefits found in part (a) of the act outweigh the costs?

| | Benefits | Costs |
|-----|----------|-------|
| T=0 | | |
| T=1 | | |
| T=2 | | |
| T=3 | | |

c) From the encyclopedia of the earth, “Economists tried to estimate the damage to so-called non-use or existence value of the Prince William Sound region in the wake of the spill. This is an attempt to measure what cannot be observed in the market: the value to the public of a pristine Prince William Sound. They estimated existence value using contingent valuation, a survey approach designed to create the missing market for public goods by determining what people would be willing to pay (WTP) for specified changes in the quantity or quality of such goods....”. The results of the survey put total societal willingness to pay in the range of 4.9 to 7.2 billion dollars. Would using the lower range of this measure of the benefits change your answer if this is the annual amount people are willing to pay the costs are as outlined in part b?

| | Benefits | Costs |
|-----|----------|-------|
| T=0 | | |
| T=1 | | |
| T=2 | | |
| T=3 | | |

d. Compare your answers and discuss the merits and problems of each of the benefit measures proposed.