



# Risk in Perspective

## Evaluating Risk Reduction Programs

Photo by Lisa Green



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*... if we were to reallocate expenditures from the least to the most effective ways to save lives, we could save an additional 60,000 lives.*

People want better lives, including a greater feeling of safety. Government regulations affect our exposure to risks and, in turn, shape the environment in which we live, the goods and services we use, and the places where we work. Regulations can be useful if they are well targeted, designed, and enforced. This issue of **RISK IN PERSPECTIVE** discusses how regulatory programs intended to reduce risk may or may not make good use of their resources. I begin by summarizing how regulatory programs relate to the general policy objectives of efficiency and equity. I then identify things to look for when judging a regulatory program and describe cases where not following principles of efficiency have led to avoidable wasteful policy.

### Overview of Programs to Regulate Risk

Regulations place restrictions on behavior. Relevant examples include: maximum allotted pollution, such as limits to discharges of smoke or waste water; required safety features of a product, such as reasonably sturdy bumpers on cars; or required workplace characteristics, such as good ventilation or machine safety guards. A recent estimate places the cost of U.S. risk and environmental regulations at over \$150 billion annually, which is about double the cost of regulations involving monopoly pricing and anti-competitive behavior.

The logic behind safety regulations is that by prohibiting the behavior underlying the danger, the risk will go down. As logical as regulations may seem, if any of the three requirements for an effective regulation are missing—the regulation does not attack the cause of the safety risk, there are infrequent checks so that the regulation need not be obeyed, or detected violators receive trivial punishments—then the regulatory approach will be ineffective.

Safety standards must relate to the problem but acknowledge that total freedom from risk is unreasonable. We can eliminate auto crash deaths by having speed limits of one mile per hour, but that is too slow for most of us to drive. If we have infrequent inspections so that few rule breakers are caught, then safety regu-

lations will be ineffective. On the dreaded other hand, there are costs and a right to privacy to consider. Few of us would tolerate the constant personal surveillance we would be under or the taxes we would have to pay for enough inspectors to detect every scofflaw. The result is that we strike a balance that leaves costs reasonable while allowing some rule breaking to go unnoticed. Fines also have to be reasonably, but meaningfully, severe to encourage adherence to regulations. The death penalty imposed on employers could reduce workplace accidents, but applying capital punishment to a manager whose work force had an accidental death is excessive. It is often difficult to find a balance between a meaningful, but not too tough, penalty for polluters, unsafe drivers, or firms with dangerous workplaces. Even if a program has the three dimensions just mentioned that make it effective in reducing risk, it may not do it efficiently or equitably.

### Efficiency in Risk Reduction Programs

An efficient program does what it is supposed to do at low cost. If a program does not do what it is supposed to do, then most of us would be willing to eliminate it. There is much statistical evidence that OSHA has had no detectable effect on fatal and nonfatal workplace accidents. Most telling is that the historical patterns of fatal and nonfatal work-related accidents are the same before as after 1970, the inception of OSHA. A program that is ineffective is clearly inefficient because it has costs but not benefits.

If a program reduces risk, then we consider a second dimension. Can we get the same level of risk reduction more cheaply or achieve more reduction in risk for the same expenditure using another approach? The executive branch of the federal government has accepted regulations with a cost per life saved of up to \$140 million even though there are programs I will soon mention that can save lives for under \$10 apiece.

### Equity in Risk Reduction Programs

Equity concerns whether a policy distributes its benefits and costs among people fairly. Is it

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#### FURTHER READING

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the poor or the rich, the young or the old, men or women, or everyone equally who benefits? Ideally, one might first try to see that a program achieves the most risk reduction possible, then consider the identities of the beneficiaries. Until efficiency is achieved, there is the potential for everyone to benefit through reducing risks further. Once one is convinced the program achieves the most overall safety enhancement possible, one can consider the implications of whether safety has been improved equitably.

Environmental racism refers to the situation where residential or workplace locations may make the health hazards of pollution greater for African Americans or other minority groups. Another perceived inequity is that low-wage occupations also tend to be more dangerous than high-wage occupations. Interest in equity in risk reduction across racial and income groups is growing. Because there is still much perceived inefficiency in risk reduction programs, though, researchers have paid little attention to and in turn, have little concrete to say about the fairness aspect of risk reduction programs.

#### Recognizing Offsetting Effects

There are three ways a regulation to increase safety can have offsetting effects. First, people who use a safety device can change their behavior, which causes injuries in a different aspect of their lives and produces a direct "risk-risk" tradeoff. Child-resistant caps on analgesics have in many cases led to more total poisonings because parents take less care to put the drugs out of the reach of their children or leave the caps ajar for convenience. Chlorinated drinking water lowers infection risk but creates a cancer risk. Chemicals that reduce the flammability of children's sleepwear can be carcinogenic. Second, workers who make us safer may get injured or killed while doing it. Workers are hurt in factories while making improved highway crash barriers and in construction sites while building safer highways. Third, because society tries to reduce one type of risk, it cannot reduce or even raises others.

A recent estimate is that a regulation costing \$100 billion to implement generates \$14 billion of additional hidden costs from the second and third offsetting effects just mentioned. The \$0.14 in additional hidden costs for every \$1 of regulation cost are due to the injuries and lives lost during the manufacturing and construction activity required by the regulation and from the reduced spending on other life extending activities necessitated by the need to pay for the regulation.

#### Considering Diminishing Input Effectiveness

Diminishing marginal productivity means that the output you get from more use of an input

generally declines with the level of the input. The first five percent of expenditures by the EPA's Superfund to clean up hazardous wastes have eliminated about 99.5 percent of the total expected cases of cancers. The next 95 percent of expenditures have reduced cancer risk by about 0.5 percent, so that 95 percent of the Superfund expenditures could have been used more advantageously in other programs to reduce risk. The principle of diminishing marginal productivity is behind the "90-10" problem in risk prevention in general, where a government agency may inefficiently spend 90 percent of its resources to attack the last 10 percent of risk.

#### Equalizing the Marginal Values of Inputs

Taking resources away from one program and giving them to another more effective program will be risk reducing on balance. The inefficiency of having differing incremental benefits per expenditure across programs becomes clearer when we compare highway safety policy to environmental health policy. The EPA has used a ceiling of \$12 billion per case of cancer prevented to allocate Superfund cleanup efforts while the U.S. Department of Transportation has refused regulations costing more than \$3 million per life saved. For every case of cancer prevented by hazardous waste cleanup, identical expenditures on highway safety could have saved thousands of lives. Although funds may not seem to be transferable, Congress ultimately has the power make such reallocations of resources across agencies.

An incomplete list of other programs that have a cost per statistical life year saved of under \$10 includes mandatory motor cycle helmet laws, cervical cancer screening every three years for women 65 and older, annual stool guaiac cancer screening for persons 55 years and older, polio immunization for children ages 0-4, and automobile windshields installed with adhesive bonding rather than with rubber gaskets. More generally, it has been estimated that if we were to reallocate expenditures from the least to the most effective ways to save lives we could save an additional 60,000 lives.

#### Conclusion

Three principles of production help us understand efficient policy to reduce risk: (1) the more you produce of something the less you produce of something else, (2) marginal productivity diminishes, and (3) inputs need to be organized to equalize the benefits from the final bit of spending on each. Inattention to the principles of efficient production can lead to overreacting to unimportant risks, allocating resources to reducing risks well past the point of reason, and placing too much weight on some risks and not enough value on others.