The Market for Risk

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THE SACRED TEXT of Lilliput declared that eggs should be broken only at the "convenient" end, and the Littlenders and Bigenders fought passionately to determine which end that was. Today we know, of course, that what comes out of the shell is all that really matters. Or do we?

There has been much talk about tradable pollution permits and exchange in risk-abatement duties but remarkably little action. Under the Clean Air Act, for example, it remains the law that a polluter may not trade pollution abatement duties with anyone but itself, even though air quality does not depend on whose chimney emits the smoke. The polluter that invests in a modern, cleaner-than-required plant may not agree to relieve some other polluter of an offsetting regulatory burden—even if the two are eager to make the deal. Most other health and safety statutes are equally hostile to an even exchange in risk.

The Visible Hands

Other examples abound. Trade in risk between risk "producers" and risk "consumers" is most rigidly forbidden. A manufacturer may not sell a cheap lawn mower without a blade guard, even if he prints "Buyer Beware!" all over the blade. Your employment contract might state that you assume the risk of on-the-job injuries in exchange for a "risk premium" in your wages, but your employer would remain liable for your injuries nonetheless. An airline may not invite each passenger to choose between a life vest under the seat and more space for carry-on luggage. Regulatory agencies often ban such trades prospectively; when they have not, the courts uniformly refuse to make the trades binding after the risk is realized. The freedom to contract, in other words, ends abruptly at disclaimers of risk liability and waivers of risk-related rights to sue. Express agreements to transfer risks fall to the doctrine of "unconscionability," and when contracts are silent agreements *not* to transfer risk are found under the guise of "implied warranties."

Risk trading among risk producers is similarly banned. A nuclear power plant operator may not increase emissions of radiation from its modern plant by paying for offsetting radiation reductions from antiquated X-ray facilities operated by local dentists. An automaker may not trade off exhaust emissions from one of its models against those from another, even if its "corporate fleet" meets aggregate emission limits, nor may it trade two bumpers and a collapsible steering column for an air bag, even if the bag costs less and saves more lives. An employ-

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er may not trade higher cotton dust levels for safer weaving looms even if the current looms cause more injuries than the dust. A seller of diet soda may not substitute cyclamates for saccharin even if cyclamates are safer.

The obstacles to this type of intra- or inter-producer risk trading are codified in the various risk statutes. Within a single regulatory statute, as in the Clean Air Act, risk producers are given individual duties of risk mitigation that may not be bought or sold. Polluters must not only limit emissions—a duty potentially tradable with other polluters—but must also install specific types of pollution control technology—a duty that is inherently untransferable. Indeed, regulatory authority itself is often structured around the specific types of technology used rather than the nature of the risks created. Radiation is radiation, but dental X-ray machines (which radiate a good bit) are on the Food and Drug Administration's turf, nuclear power plants (which radiate little) on the Nuclear Regulatory Commission's. Administrative insularity takes care of the rest. We recently witnessed the unedifying spectacle of three agencies—the Environmental Protection Agency, the Occupational Safety and Health Administration, and the Consumer Product Safety Commission—reaching quite different conclusions about the safety of a single chemical, formaldehyde. Even when hazards of one type appear to be addressed in a single statute—such as the Toxic Substances Control Act—jurisdictional overlaps with other agencies prevent any effective inter-producer risk trade-offs.

Finally, trading off risks among goods that are interchangeable to consumers is also strongly discouraged. Since the regulator acts *in loco parentis* for the consumer in deciding how much and what kind of risk we consume, the barriers to this kind of trading are again found between the agencies. Completely interchangeable goods or services are often overseen by entirely separate regulatory agencies. No regulatory trade-off between the public risks of generating electricity by burning coal or "burning" uranium is permitted. The risks of one job are not deemed tolerable simply because they are lower than the risks of another job held by employees of similar skills. The risks of traveling by bus are not weighed—at least at the regulatory level—against the risks of traveling by car. When goods of one type—food, or pesticides, say—happen to be placed under a single regulatory umbrella, countless finer distinctions again preclude risk trade-offs. New artificial food additives are regulated more strictly than those that were already in use in the 1950s, which in turn are regulated more strictly than "natural" toxins. Occupational health risks must be regulated more strictly than safety risks, or so the Supreme Court suggested in its 1981 *Cotton Dust* decision.

The Hazards of Inalienable Risk

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The trading ban, which can be seen as a ban on competition in the production of safety, makes safety unnecessarily expensive. Trading locates, unerringly and quickly, the person able to supply the most safety at the least cost (as Maloney and Yandle show in "Bubbles and Efficiency," *Regulation*, May/June 1980). Central planning and distribution of risk abatement duties do not. OSHA's asbestos standard, for example, saves lives at an estimated cost of $200,000 per life while its benzene standard costs $18 million. Highway maintenance, new guard rails, and so on cost $50,000 per life saved, air bags about $300,000. Lowering radiation from X-ray machines would cost $3,600 per life saved, compared with about $1 billion for better disposal of civilian nuclear waste. If trading were allowed, such vastly different prices for such very similar benefits would not persist.

For similar reasons the trading ban results in the production of too little safety. The stringency of regulation is usually limited by economic feasibility. If risk could be avoided more cheaply, stricter regulation would thus be possible. So long as health hazards in the work place must be regulated more strictly than safety hazards, we will produce, relatively speaking,

too much health and too little safety—and, in the aggregate, too many dead or injured employees. If carcinogenic pesticides are regulated more strictly than their poisonous (but noncarcinogenic) counterparts there will be few cancers but a more than offsetting number of other poisonings.

Finally, the ban on risk trade-offs by regulators can push consumption toward more hazardous products. I have discussed this at some length in *Regulation*'s pages before ("Exorcists vs. Gatekeepers in Risk Regulation," November/December 1983). Suffice it to say here that when interchangeable products are regulated by noninterchangeable agencies the less dangerous product often ends up regulated more strictly than the safer. This inevitably leads to a regressive shift in consumption. A "theory of the second best" operates in risk markets just as in economic ones; the second safest regime to universal and uniform risk regulation is not necessarily patchy regulation applied only here and there.

Beyond Property

In light of these substantial costs, why does our regulatory system so categorically reject risk trading? The first part of the answer lies in regulatory history.

Risk legislation is mostly reactive. There was a day when the law not only permitted but assumed that risk producers and risk consumers bargained for and traded risk burdens. An employee would "assume the risk" of doing his job, a buyer of a consumer product factored risk into the price unless some other arrangement was expressly agreed to, a person acquiring property near a polluter's "came to the nuisance" and so would not be heard to complain later about the smoke. Risk producers thus could and frequently did enter into binding agreements that shifted risks to consumers. Indeed, for a long time such transactions were thought to be constitutionally protected. State law could not, for example, infringe on an employee's "freedom" to work dangerously long hours, or so the Supreme Court declared in a notorious 1905 decision, *Lochner* v. *New York*.

Times changed. Today the prevailing view is that risk consumers are not competent risk traders. They are presumed to lack either the information needed to negotiate fair risk trades, or the organization needed to make collective decisions when dealing with "public" risks such as those caused by pollution. The regulator, acting as the consumer's agent in the risk market, can overcome both problems. Free trade in risk is therefore replaced by individual, inalienable entitlements to certain levels of safety, obtained from risk producers through the intercession of regulatory agencies. The agencies strive to secure for each of us an entitlement to "safe and healthful working conditions," food free of "any poisonous or deleterious substance which may render it injurious to health," drugs that are "safe and effective," consumer products that pose no "unreasonable risks of injury," and so on. That the individual consumer might wish to trade away such entitlements is a possibility that plays no part in the regulatory scheme. A person may no more sell his entitlement to safety than he may sell his right to vote or to receive food stamps. Given what came before, the inalienability of risk entitlements was probably inevitable.

But words pay no debts, and it takes more than a declaration of entitlement (inalienable or otherwise) to make the world safe. For every new right to safety a new duty to mitigate risk must be created. Unsurprisingly, these duties are created measure for measure with the new entitlements. X is given a new, inalienable entitlement to cleaner air, and Y is charged with a new, untransferable duty to reduce his emissions. It is all pleasantly symmetric.

And half of it is extravagantly inflexible. Although there may be good reasons to forbid risk trading by the individual consumer, they certainly provide no justification at all for imposing a ban on trading among risk producers. Worse still, the ban on risk trading among agencies often means that the agencies end up working actively against consumers' collective safety interests.

Inalienability and Equal Protection

Perhaps it was all just a mistake. We so rarely think in terms of trading "bads" that it is difficult to recognize, at first, that there are important benefits in allowing risk producers to do so. But I suspect the ban on risk trading has deeper roots.

The simpler objections to risk trading are easily rebutted. Some protest that a trade in social duties is immoral. No one may trade away a duty to sit on a jury or to serve in the army, and risk abatement is thought to belong in the same class. But a moral disdain for trade should crumble when the consequence of no trading is higher risk for all.

Others fear that trade in risk will erode the entitlement to safety. Before long, risk consumers might have to *pay* for safety entitlements, and this would be intolerable. But the right to trade a duty need not determine who bears the cost of the corresponding entitlement. Moreover, it is charmingly naive to think that because something is inalienable it is also free. Consumers obviously pay dearly for the benefit even if Congress announces each new safety entitlement with a pious proclamation of inalienability.

Still others link the inalienability of risk duties to the convenience of the regulator. Uniform, rigid, hardware-oriented duties are easier to enforce than shifting rights and duties traded in a dynamic market. This justification for untransferable risk-control duties has merit, but it too ultimately fails to persuade. Regulatory inconvenience is merely one among many elements of regulatory cost. Regulatees can be made to shoulder increased administrative expenses along with the other costs of regulation and will readily do so if the new expenses are more than offset by the cost savings that lie in risk trade.

So how *does* one explain the persistent opposition to the trading ban? The rigid inalienability of risk rights and risk duties seems to be grounded in a wishfully egalitarian new conception of "equal protection."

From the regulatees' point of view, the main objective is to avoid bearing any disproportionate share of the regulatory burdens. The one regulatory burden that all risk producers find utterly intolerable is the burden not shared by their competitors. As Robert Crandall points out in his *Controlling Industrial Pollution* (1983), a regulatory system built around specific, technology-based standards ensures absolutely equal treatment of classes of risk producers. Thus, under the Clean Air Act, new or modified pollution sources must be fitted with technology that ensures the "lowest achievable emission rates," while in clean areas the "best available control technology" is required. This certainly ensures equal treatment of new polluters, but the cost is high—large, unnecessary capital investment in areas where protection of air quality requires none. The irony is that if the equal treatment pact were found anywhere but in a federal statute, it would flagrantly violate the antitrust laws because it eliminates all incentives for polluters to compete in the production of safety.

Risk consumers may oppose trading among risk producers for somewhat different reasons. Some fear that trading may retard risk abatement by giving risk producers vested rights in current levels of risk generation. But steady risk abatement need not exclude trade. The rate at which current rights to pollute are devalued by regulatory fiat need not depend on who currently holds those rights. Indeed, the economic savings realized through trade would permit devaluation all the more swiftly. More commonly, the insistence on inalienability is linked to the fear of "hot spots." If the right to create risk were transferable, a food-carcinogen monopolist might corner the market and put all his risks in girl scout cookies. And then where would we all be? Risk consumers reflexively assume that their equal protection from predatory risk producers is ensured only by inalienable duties in risk producers. Inalienability is our anti-monopolization strategy for risk, with the ban on trading extending not just to monopoly-creating trades but to every exchange, no matter how small.

The Black Market in Risk

And it is a strategy that is entirely unnecessary, unless we also believe in the eccentric consumer. If we all consume about the same mix of foods it should not matter much where we get our food carcinogens. But the regulator worries about the consumer whose only real pleasure is cookies, who consumes his own quota and yours and mine as well. So the regulator insists on regulating retail, not wholesale, and attempts to supervise each unit of risk production, each incident of risk consumption, drawing countless fine distinctions between different types of risks and the different demographic groups destined to bear them. The hope is to spread each type of risk uniformly, so that the

burden may be shared equally by all. Indeed, risk spreading becomes an affirmative regulatory strategy, spawning taller (but more polluting) smokestacks, decentralized (but more dangerous) electric power generation, distributed (but in the aggregate more harmful) occupational hazards.

Equal protection from risk nevertheless remains an entirely unrealizable aspiration. Though we might like the acid rain to fall equally on the just and the unjust, it never will.

First, equal treatment of *both* the producers and consumers of risk is impossible. If the risk producers tend to concentrate in particular geographic areas (as industrial polluters do), equal treatment for them translates inexorably into unequal treatment of the risk consumers. Notice that under the Clean Air Act it is equality for polluters—not for air-breathers—that has prevailed. Unless the uniformly risky products and services of producers end up uniformly distributed, unequal distribution of risk among consumers is inevitable.

Second, and more important, risk producers and risk consumers are remarkably agile and persistent in their efforts to trade. The result is a domestic black market in risk as vibrant as the market for blue jeans in Red Square. Risk generators, for example, craft elaborate schemes to deal only with those whose risk-related demands are modest. A manufacturer of mutagenic chemicals may decline to hire women in child-bearing years—unless they undergo sterilization. (Why won't a mere promise not to become pregnant suffice? Because the surgical contract, unlike a paper one, cannot be nullified by the courts.) Some industries relocate to places, here or abroad, where the risk demands of the general public are lower. Some employers may try to shift risk burdens to employees simply by using genetic screening to avoid hiring employees most susceptible to certain types of risk. As a result, markets subject to less strict risk regulation thrive, while their more strictly regulated counterparts wither.

The usual domestic response is, unsurprisingly, to create new equality-enhancing entitlements: a right to be hired regardless of procreative preference or genetic constitution, a ban on exporting hazardous products, safety entitlements vested in foreign workers, and so on. But new schemes for trading can usually be invented faster than new entitlements can be codified, and the black market in risk continues to flourish. The waves simply will not subside at King Canute's command.

Risk consumers, too, find ways to escape the cocoon of inalienable safety entitlements. Work-place safety standards go unenforced because employees decline to trade their entitlement to safety for the entitlement to unemployment compensation. Perverse consumers insist on buying the cheaper product or service, even when the low price reflects less strict regulation. Cyclamates can be purchased in Canada, laetrile in Mexico. And inevitably there are some destined to choose the most dangerous car *and* job *and* television *and* sleepwear, and they, of course, do not end up "equally protected." Some unlucky consumer always manages to stand up just as the slings and arrows of outrageous fortune come whizzing by.

Fortune, in fact, may be the key. Wealth has an unexpectedly important impact in determining how much risk we bear. A statistical study has shown that after removing the effects of age, race, sex, education, and other possibly extraneous factors, a 1 percent increase in income reduces mortality by about 0.05 percent. Put in proper perspective, this is a large number. For a forty-five-year-old man working in manufacturing, a 15 percent increase in income has about the same risk-reducing value as eliminating *all* hazards—every one of them—from his work place.*

This strong link between wealth and a risk-free environment should be very sobering. First, equal protection may be entirely unattainable without equal wealth. It appears that money is the ultimate transferrable safety permit, and money is far from equally distributed. Second,

*The -0.05 elasticity is from Jack Hadley and Anthony Osei, "Does Income Affect Mortality?" *Medical Care*, vol. 20, no. 9 (September 1982), p. 901. The calculation for the manufacturing employee runs as follows. For forty-five-year-old men, annual total mortality is about one in a hundred (Edmund Crouch and Richard Wilson, *Risk/Benefit Analysis*, Ballinger Publishing Company, 1982, p. 4). This means that a 15 percent increase in income will decrease the man's annual risk of dying by about $0.05 \times 0.01 \times 15 = 0.008$ percent. If the man works in manufacturing, his annual risk of dying a job-related death is about the same (see ibid., p. 178). Of course safety is worth relatively more to a younger man or to a person in an initially more hazardous occupation, and relatively less to an older man or one in an already safe occupation. But the numbers I have chosen are not atypical.

risk seems to remain highly tradable, despite our efforts to freeze it in place. How else do the wealthy manage to end up with so little? Finally, if wealth is so important in the risk market, perhaps we should be less quick to accept unnecessarily expensive risk control strategies. Cheaper regulation *could* mean more money not just for the producers but also for the bearers of risk. And money, not a gas mask or an organic garden, seems to be the key to the safer kingdom.

Risk Markets

Which brings me to risk "markets." Trade in risk, like trade in anything else, can generate wealth and so increase the production of safety. Increased safety for all lies in more risk trading, and in larger markets.

I do not propose a return to bargaining between the individual consumer and his butcher, baker, or candlestick maker, over the risks that food, jobs, or consumer products will contain. There are obviously good reasons—reasons quite consistent with reducing risk efficiently—to retain the regulator as the consumer's broker in the risk market. I am interested, instead, in the large volume of risk trading that could be conducted entirely among the experts, to the benefit of all.

There are, to start with, natural markets for risk producers. Although there are innumerable sources of risk, there are relatively few types of risk that are physiologically distinct. In the jargon of the risk business, the human body is a bubble too (turned inside out, I suppose, since we are interested in what goes in, not what comes out). The risk of radiation exposure may not belong in the same market as the risk of fire, but (to repeat) radiation *is* radiation, whether exposure comes from a dental X-ray or a nuclear power plant or a granite building. As a matter of fact most of the public's exposure to radiation comes from the X-rays, not the nukes. If dentists and nuclear-power-plant operators were allowed to trade, our radiation burden would go down substantially, and everyone would save money to boot. Likewise, chemical carcinogens may not be interchangeable with acute conventional poisons, but the benzene you breathe at the factory *does* have the same effect as the benzene you breathe when filling your tank at the corner station. Physiologically indistinguishable risks, in short, belong in the same risk markets.

Who should be allowed to trade in such markets? Under appropriate regulatory supervision—by a radiation review commission, a carcinogen control board, an office of traumatic injuries, and so forth—producers of a single type of physical hazard should be allowed to trade. To make sure that consumers shared some of the resulting benefits, one might require better than even trades: each time a risk-abatement duty is transferred it could also be slightly inflated, so that the new bearer of the duty has to do a little better than the old one. Trading would still occur, and life would get safer faster. If the factory and the local gas station were to agree on a shared benzene output lower than their present joint emissions, your body-bubble would certainly benefit. And I find something very attractive about permitting the operators of Three Mile Island to vent small amounts of radioactive gas in exchange for a more than offsetting upgrade in the X-ray facilities of local dentists. If you remain worried about fairly distributing risk burdens, keep in mind that though we all must breathe the same air, dental X-rays are aimed disproportionately often at children's heads.

Risk markets can also be built around interchangeable *goods* rather than interchangeable "bads." The consumer is faced with choices between a diet soda containing aspartame or one with saccharin, between electricity generated from coal or from nuclear fuel. There is no more sense in regulating separately the several risk components of the cookie, the car, or the electric power grid, than in distinguishing two chimneys in the same industrial plant. Even the cookie freak or the all-electric householder cannot be helped by the fragmented regulation.

In thinking about consumer risk markets we must remember that it is the regulator who is to act as surrogate shopper for the risk consumer. Consumers buy goods despite their attendant risks, not because of them, and the common assumption is that the consumer does not know or care enough to take risk into account. Ideally, then, we want the regulator to pick and choose among risky alternatives in the same way as an omniscient consumer might.

And here we run into the major difficulty. Under present law the individual regulator rare-

ly has the same range of choice as the consumer he is supposed to protect.

- Jobs of similar skills in similar geographic areas may well be interchangeable to employees, and therefore belong in the same risk market. Low-skill jobs may not be interchangeable with their high-skill counterparts, but factory jobs and agricultural work perhaps are. Yet OSHA's authority over occupational hazards is divided into safety and health channels, and is, moreover, shared with EPA (insofar as occupational hazards come from certain toxins—for example, pesticides) and with the NRC (for some radiation-related employment hazards). There is little coordination among the agencies on target levels of job safety.
- There are at least three means of controlling pests on crops—man-made pesticides, "nature's" pesticides synthesized by carefully bred pest-resistant strains of crops, and biological controls such as insect parasites, predators, and pathogens. But regulatory authority over these different means of control, all of which entail environmental risks of one type or another, is divided between EPA and the Department of Agriculture, impeding rational regulatory tradeoffs among these alternatives.
- Transportation by car, bus, and subway may be reasonably interchangeable, within the city at least, but the risks of the different technologies are regulated entirely separately. The very occasional subway accident evokes cries for costly improvements in safety, while the extent to which the associated price increases encourage commuters to drive is never addressed. Flying is thirty times safer than driving, yet the FAA continues to tighten its safety standards for short-haul jets. What effect this has on the cost of flying—and how many people therefore make the trip by car instead—is not known.
- To the consumer of electric power it makes no difference—insofar as the focus is on the good itself—how the power is generated. Yet EPA's and NRC's risk regulations are not structured around comparisons of the relative risks of different generating technologies. The current trend has been gross underregulation of coal power and extreme overregulation of nuclear, thus substantially increasing the risk of consuming electricity.
- Most foods are more or less interchangeable and so belong in a single risk market. But the FDA's statutory charter distinguishes between "natural" and "artificial" toxins, carcinogens and noncarcinogens, new food additives and old ones. The agency routinely accepts a substantial "natural" hazard in preference to a less significant but "artificial" one that might displace it.

Consumers, it must be recognized, actively choose among interchangeable goods in markets such as these, paying little heed (or so our regulatory system assumes) to the risk consequences of their choices. If the regulator's range of choice is not equally broad, things are dangerously wrong. And getting more dangerous. A regulator with tunnel vision may dutifully proceed to ban the dangerous product that falls on his particular piece of the regulatory turf, while a colleague decides not to place restrictions on the more hazardous substitute that he has to deal with. This regulatory failure to operate in natural risk markets, comparing risks and making the trade-offs that a rational, well-informed consumer would make, means that risk regulation is often entirely counterproductive.

Opponents of risk trading systems will often concede as much. But they insist that objectives other than risk minimization are at stake—spreading the costs of accidents, striving for more equitable distribution of risk burdens, and reallocating wealth. Risk regulation's honeycomb of inalienable rights and duties, we are assured, guarantees—or at least promotes—equal protection of risk consumers.

Experience teaches otherwise. The distribution of risk, as reflected in the mortality tables, remains highly uneven. The wealthy and the well-educated bear little risk; the poor and the uneducated, a great deal more. The regulator's aspiration for "equal protection" fails to yield a uniform distribution of risk, and instead insulates risk producers from all competition in the production of safety. Worse still, it fuels a tragically wasteful, incessant bickering about the distribution of risk duties and entitlements. Distributional objectives divert us from what should be the central issue—the aggregate degree and cost of risk abatement. While we debate about which particular chimney may emit the smoke the air remains dirty, killing in eastern urban areas an estimated 50,000 people a year. The wealthy, of course, move to the suburbs. ■