sion are almost wholly lacking."[5] Taxes will not resolve an externality if they are set at the wrong level, and they may even make matters worse.

Given that the price is set right, taxing the externality can make almost everyone better off. You pay a congestion tax one way or the other: if not in cash, it is in the time wasted and the frustration of sitting in traffic jams. Taxing road use would reduce congestion. For those who continue to drive at rush hour, the speedier trip is worth the fee.

Taxation and regulation are top-down externality solutions. Another solution is partly bottom-up, partly top-down. This is to define property rights (top-down) and then let people resolve their externalities by bargaining within a framework defined by the law (bottom-up). Any externality can be viewed as resulting from the incompleteness of property rights. If the air were private property, the owner could charge polluters for the "use" of it, and then there would be no externality. No one can own the air, of course, but in some other cases broadening property rights can be an effective solution.

Given clearly defined property rights, individuals may negotiate a mutually beneficial solution to an externality, as Nobel laureate Ronald Coase pointed out. Imagine a cattle rancher who harms his neighbor, a corn grower, by not maintaining the fence, so the cattle wander into the cornfield and damage the crop. Suppose that fixing the fence would create value (since the repair cost is smaller than the cattle's damage). If the corn grower has recourse to the courts, then the cattle rancher would fix the fence under the threat of being sued. Alternatively, depending on how the law assigns responsibility, the corn grower would pay for the fence to be fixed. Either way, an outcome that is better for both would be reached. Since correcting an externality results in extra value being created, the market participants themselves have an incentive to address it, and sometimes, given well-defined property rights, they can.

Similarly, the threat of being sued turns the cost of careless driving back on you. If you cause an accident through your own recklessness, those you harm can demand compensation, and chances are the courts will require you to pay it. Civil law creates an incentive for safe driving.

Free decision-making in the shadow of the law will not solve all externalities: air pollution is one example. Many drivers contribute to the pollution, so those harmed by it cannot identify who to sue. Since I cannot be sued, the courts provide me with no incentive to limit the harm I do. Taxes or regulation are the only workable solutions when the source of the damage cannot be pinned down.

Externalities are ubiquitous, so every one of them cannot and should not be taken into account, but where they are sizeable, they must be addressed if the market is to work as it should. Which externality solution is the best varies with the circumstances. The checkered history of ocean fishing, which I will turn to next, is a case study in externalities. Just about every possible solution has been tried—usually with a notable lack of success.

* * * *

In *Cannery Row* John Steinbeck portrayed the lives of workers in the pilchard canneries of Monterey, California, in the 1930s and 1940s. In the less well-known *Sweet Thursday* he returned to the Monterey of the early 1950s. By then the canneries had closed. The industry had collapsed, following the disappearance of the fish. There had been a natural decline in the fish population resulting from a drop in ocean temperatures. But in part the demise of the fishery, to Steinbeck's dismay, was man-made. "The canneries themselves fought the war by getting the limit taken off fish and catching them all. It was done for patriotic reasons, but that didn't bring the fish back. As with the oysters in *Alice*, 'They'd eaten every one.' . . . Cannery Row was sad when all the pilchards were caught and canned and eaten."[6]

Fisheries today are in a state of crisis. The management of marine ecosystems "has failed to achieve a principal goal, sustainability," according to marine biologists Louis W. Botsford, Juan Carlos Castilla, and Charles H. Peterson, writing in the journal *Science*. "Almost a half of the individual fish stocks are fully exploited, and another 22 percent are overexploited." As a result, "the global marine fish catch is approaching its upper limit." A subsequent study in *Science* by nineteen of the world's leading marine biologists concluded that the overfishing had been going on for many centuries, leaving many fish populations disastrously vulnerable, and concluded, "Even seemingly gloomy estimates of the global percentage of fish stocks that are overfished are almost certainly far too low."[7] In the United States alone, species such as red snapper, New England cod, Chesapeake Bay blue crab, swordfish, Atlantic billfish, winter flounder, shrimp, tuna, and shark suffer from overfishing. What causes the chronic overfishing?

Governments are part of the problem. Countries such as Spain and Taiwan subsidize their fishing fleets, in the name of preserving employment, resulting in an overcapacity that creates pressures to overfish. As a result of the U.S. and Canadian governments' subsidizing ever-larger boats, the Georges Bank fishery off New England, once highly productive, was fished out. Doling out subsidies is a way to avoid inducing the industry to adjust to new realities. It hastens the depletion of fish stocks. United Nations Food and

Agriculture Organization (FAO) statistician Christopher Newton said, "The history of fishing is to postpone problems until you run out of fish." So heavy is the subsidization that, according to the FAO, $90 billion is spent each year around the world to catch $70 billion worth of fish.[8]

The main reason for overfishing is not the subsidies, however, but an externality. Overfishing occurs primarily because the fishers respond to the incentives they face.

Fish swim freely, so fishing is different from farming. The open ocean and its contents cannot be parceled out as land is. Property rights are hard to monitor and enforce. No one owns the fish before they are caught. With ill-specified property rights, the market works badly. Biology sets a maximum extraction rate. If too many fish are caught, too few are left in the ocean to reproduce at a rate that maintains their population at a sustainable level. Free-market incentives, however, lead to overfishing.

"Right now, my only incentive is to go out and kill as many fish as I can," said John Sorlien, a Rhode Island lobsterman. "I have no incentive to conserve the fishery, because any fish I leave is just going to be picked by the next guy." His logic is watertight. The fish will be caught and will not reproduce, even if he behaves responsibly and refrains from catching them. He cannot by himself ensure the fish stocks are maintained. His choice is to catch either a large number today and few tomorrow, or a smaller number today but no extra tomorrow. Responsible behavior goes punished. There is a race to fish. The logic of the situation traps each fisher into taking as many fish as he can. There is an externality, in that others bear the costs of one's own overfishing.

The fishing industry takes 80 to 84 million tons of fish each year from the world's oceans. According to the World Wildlife Fund, fishing at a rate that would allow the fish to regenerate would mean catching just 60 million tons per year. Jim Leape of the wildlife fund said, "The oceans can no longer absorb the abuses we have piled on them."[9] How can overfishing be prevented? The various solutions that have been tried cover the full range of externality remedies.

If the ocean were controlled by a single owner who expected to continue to own it in the future, the problem would be solved. The single owner would recognize that his self-interest lay in conservation. A single-owner fisher benefits tomorrow from leaving fish in the ocean today.

The idyllic palm-fringed coral atolls of the Marshall Islands dot the Pacific Ocean five hours' flight west of Hawaii. Their population and landmass are tiny: sixty thousand people live on a total area of seventy square

miles. But because there are more than twelve hundred widely scattered islands and because all the ocean within two hundred miles of land is in their territorial zone, the Marshall Islands government controls a vast swathe of open ocean. The ocean is their main resource. Remote and unassuming as they are, the Marshall Islands are perhaps unique in the world in their fishery management. The government has implemented the single-owner solution to the overfishing problem. It made an exclusive agreement with a U.S. private company, Ocean Farming Inc., under which it alone may fish the Marshalls' eight hundred thousand square miles of ocean. In exchange, Ocean Farming pays the government a royalty of 7 percent of the value of the fish it harvests.[10]

Ceding control of the oceans to a single fishing company, however, is not usually practical or politically desirable. The Marshall Islands had no domestic commercial fishing industry, so there was little opposition to contracting out the entire ocean. (Local island fishers are permitted under the contract to continue small-scale fishing for their own needs.) Most fisheries around the world support many independent fishing boats, whose owners and crews would mobilize political opposition against a monopolization of the fishery. For this and other reasons, single-owner solution is usually not an option. A variety of other solutions to the problem of overfishing have been tried, both formal and informal, with varying degrees of success.

Communities of fishers sometimes devise informal solutions: collective mechanisms to counter overfishing. In the Bahia region of northern Brazil, fishers work within an intricate code of conduct governing both the total amount of fish that can be taken and how much each of them may take. The members of the community sanction those who violate the code, refusing to speak with them in social situations or sabotaging their boats and nets. In Tonga, fishers obey social norms requiring them to share their fish. Anyone who catches more than his family can eat must give it away according to rules that favor the needy and the elderly. The local fishing communities of Japan also manage their resources in a sustainable way. Because they have specific geographic boundaries and the same families engage in fishing from generation to generation, all understand the code of conduct and social sanctions effectively support it. In the U.S. state of Maine, some communities regulate lobster fishing in local waters, determining who may fish when and where. They back their conservation measures with force. Anyone who flouts the community's rules risks having his traps cut free or even having his boat sunk.[11]

Informal solutions work only within tight-knit fishing communities.

With large, anonymous groups of fishers that outsiders can enter, social sanctions hold little sway and so government intervention is usually needed to prevent overfishing.

Regulating fisheries, governments have imposed controls on the number or size of boats. They have specified that fishing can take place only within a certain season. Each of these is a blunt form of control, and each leads to predictable distortions. Regulatory controls on inputs induce the fishers to compensate by overusing whatever inputs are unregulated.[12] Restrictions on the number of boats have brought bigger boats with extra equipment and crew. Restrictions on the length of the vessels have induced companies to build wider, heavier boats. Restrictions on the number of crew have resulted in investment in high-tech fishing gear; adding electronic devices for locating fish increases a vessel's catch dramatically. Restrictions on equipment, on the other hand, have meant extra crew being hired. A short fishing season induces firms to invest in high-capacity boats so they can catch as much as possible in the time allowed; the investments sit idle for the rest of the year. A short season also means that for much of the year the fish must be delivered frozen to the customer, providing less value than if it were fresh.

Recognizing these distortions from regulation, some governments have switched to a new, more market-based method of conservation. Rather than controlling inputs, the regulators assign to each fishing vessel a quota, defining how much it is allowed to catch. Quotas directly address the basic issue—that overfishing is a consequence of the fact that no one owns the fish—by establishing property rights. By eliminating the externality each fisher's decision imposes on the others, quotas eliminate the race to fish.

Quotas mean the fish are able to reproduce, making future fishing easier. Rick Garvey, a biologist who monitors quota compliance for the Australian government, said, "Fishing may be the only economic activity in which you can make more money by doing less work."[13]

The countries that have gone furthest in establishing fishery property rights—including New Zealand, Canada, and Iceland—allow quotas to be bought and sold like any private property. A new entrant or an incumbent wanting to expand needs to buy quotas. This means the quotas end up with the most efficient producers. Unlike under regulation, the fishers have reason to invest in productivity-improving skills and equipment.

Quota holders have a large stake in preserving the fishery in order to maintain the value of their quotas. In New Zealand, the fishers have formed associations to fund research aimed at conserving the stocks of scallops, snapper, and orange roughy.

Halibut fishing off British Columbia, Canada, was in a state of crisis in the 1980s.[14] Catches had plummeted. The regulators successively reduced the length of the fishing season in a vain attempt to prevent overfishing, to such an extent that by 1990 fishing was allowed for just six days of the year. The exceedingly short season meant that fishing was intense. Fights would break out among the fishers for the best areas. Safety was compromised as boats stayed out even in dangerous weather. After the regulators introduced individual quotas in 1991, the economic efficiency of the halibut industry improved significantly. The need for the short season disappeared, so fish were caught when needed and marketed fresh. The number of active boats fell. Fishing became a more profitable and less acrimonious activity. Conservation was achieved.

* * * *

The fishery illustrates the force of property rights. Overfishing occurs because no one owns the fish before they are caught. Creating property rights, by means of quotas, removes the incentive to overfish. But it is an imperfect solution, for the monitoring of the property rights is expensive and leaky.

Workable property rights in fish are not created by the stroke of a pen. Quotas do not eliminate the need for regulatory supervision. The regulator must devise rules on who initially receives the quotas. Dividing up the rights to the catch is inevitably a source of contention among the fishers. Ongoing and extensive government monitoring is needed to check that the catches do not exceed the quotas. This is intrusive and costly, for activities at sea are harder to monitor than most land-based activities. Official inspectors check catches upon landing, and there are stiff fines for exceeding quotas. In the British Columbia halibut fishery, every single fish is tagged with the vessel's code as it is landed on the dock so it can be traced through to final use. Some regulators require vessels to carry on-board observers or video cameras. Some countries, such as Australia, use military aircraft to patrol their waters, checking for boats that should not be there. Even the most sweeping solution to the problem of overfishing, granting monopoly rights as in the Marshall Islands, does not eliminate the need for oversight from the government, for it must be able to monitor the fishing company's catches to be sure it is receiving its due royalties. Property rights in ocean fishing come only if the government expends sizeable bureaucratic, investigative, and enforcement resources.

No system of monitoring, moreover, is infallible. New Zealand goes to

greater lengths than most countries to prevent out-of-quota fishing. It insists on full documentation, with paperwork recording each step of the fishes' journey from point of landing to final consumption or export. Fishers may not sell fish to anyone other than a licensed fish receiver. Catch reports, licensed-fish-receiver receipts, cold-storage records, and export invoices are all collated and checked for discrepancies. Overfishing and misreporting are criminal offenses. Fishery officers police the illicit trade in fish with a zeal that recalls Elliott Ness's crusade against alcohol sales in the prohibition-era United States. In a typical incident, a man was arrested for selling a sackful of unauthorized crayfish (or rock lobster) at a pub. Even so, the poaching persists. An estimated 450 tons of crayfish are sold on the black market each year.[15] This is one-seventh the size of the legal catch. It is almost impossible to perfectly enforce property rights in fish.

Quotas are still harder to implement if more than one country is involved. Many fish swim between jurisdictions. Swordfish, for example, migrate widely, back and forth between equatorial areas to cooler waters, so conserving their stocks requires international cooperation. More than thirty countries harvest swordfish, and genuine conservation requires that they all agree on the limits and on how cutbacks are to be shared. Where large sums of money are involved, international agreements are hard to come by, and negotiations often fail.

International confrontations over fishing periodically hit the headlines. A Russian gunboat once rammed a Japanese fishing boat in the Bering Sea. South African officials once detained a Spanish trawler for using illegal twenty-kilometer-long nets. Icelandic and Norwegian fishing boats have exchanged gunfire in the North Sea. Factory fishing in the South Pacific by Japanese and Taiwanese boats has led to regular disputes with various island states, sometimes with boats being seized. Declining fish stocks sparked a tuna war in the Bay of Biscay between Spain and the United Kingdom, a turbot war in the North Atlantic between Canada and Spain, and a cod war in the North Sea between the United Kingdom and Iceland.

Some international accords have been negotiated. The United States and Canada operate an agreement on sharing Pacific salmon. Japan, Australia, and New Zealand have an agreement that defines country-level quotas on the southern bluefin tuna. In both cases the negotiations were concluded only after animosity had undermined relationships between the contending countries.

Compliance with international quotas is still more uncertain than with domestic quotas, because enforcement is more problematic. In 1999, five

years after the bluefin tuna agreement was signed, Australia and New Zealand complained to an international maritime tribunal that Japan had overfished in violation of the agreement. "Japan is putting in jeopardy a very important, highly migratory stock that is already in a seriously depleted state," said Tim Caughley, a New Zealand government lawyer. Japan's officials defended its fishing as "experimental." The sixteen hundred tons of above-quota tuna that Japanese boats had caught in one year were "essential" to its research efforts to assess the bluefin tuna population. (The "experimentally" caught tuna ended up being auctioned in Japan's fish markets for use as sashimi, fetching up to $100 per kilogram.) The tribunal ruled against Japan. "It is regrettable that Japan's views were not fully understood," said Foreign Minister Masahiko Komura after the ruling. The "experimental" fishing beyond quota continued.[16]

The fishery, in summary, is impervious to perfect management. In a fixed and stable community of fishers, codes of behavior backed by social sanctions can confine fishing to a sustainable rate. But in most fisheries new fishers can enter, so there is no such stable community, and an absence of government oversight brings disastrous overfishing. Government regulation of fishing, on the other hand, causes distortions and in any case usually fails to avert the overfishing. The best feasible solution is catch quotas. By creating property rights, quotas directly tackle the externality of the fishers' decisions on how many fish to take. While this is the most market-oriented of the solutions, it can be implemented only with extensive government monitoring.

Let us turn to another market encumbered by an externality that is resistant to solution: the labor market for sports stars.

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A noisy demonstration took place in Kansas City in May 1999 over a curious kind of injustice. "Share the wealth," the protesters' placards demanded. What had aroused their anger was not world hunger or globalization or the environment or civil rights—it was a perceived inequity in baseball. The demonstration took place at a game between the Kansas City Royals and the New York Yankees, as some five thousand fans stormed out of the stadium. Some of them wore Yankees caps with dollar bills stuck to them, to symbolize that money rules baseball.

Odd as the incident was, the protesters had a point. The baseball players' labor market is skewed. The Yankees splurge on players. Lavish spending translates into on-field success. That success can be bought is illustrated by the Florida Marlins. Spending freely, the newly founded club won the 1997