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Markets and Commodities

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Keywords

- Cap and trade
- Coase theorem
- Externality
- Green certification
- Greenwashing
- Market failure
- Market response model
- Monopoly
- Monopsony
- Transaction costs

Chapter Menu

Environment and Society: A Critical Introduction, Second Edition. Paul Robbins, John Hintz, and Sarah A. Moore.

The Bet

Can using more stuff lead to the availability of more stuff? Can human population growth be *good* for both nature and society? By the end of the 1970s, when population-centered thinking was dominant, such questions were counterintuitive and hard to even ask. At that time, Paul Ehrlich was the most prominent spokesperson for the population crisis and was typically identified as the paramount and persuasive neo-Malthusian of the time (Chapter 2). His book, *The Population Bomb* (1968), was a cornerstone of the thinking and rhetoric of many environmentalists.

It may have seemed surprising, then, for Ehrlich to be challenged to a very public bet in 1980 by a thinker largely unassociated with environmentalism, at least in the public mind. The wager came from economist Julian Simon, who had long maintained that human population growth improved living conditions and environmental quality, because a) more people means more good ideas, and b) more demand for things (including clean air and water) produces an incentive to find, make, and creatively maintain the world. His thinking culminated in a controversial article in the journal *Science* in 1980, entitled "Resources, population, environment: An oversupply of false bad news" (Simon 1980), which maintained that things get progressively better, not worse, with the advent of every birth.

As a journalist for the *New York Times* recorded a decade later (Tierney 1990), the wager consisted of the men betting $1,000 on whether the prices of five metals selected by Ehrlich and his associates – chrome, copper, nickel, tin, and tungsten – would rise or fall in value over the next decade. If Simon was right and the planet was one where the future was always better than the present, the scarcity of these goods would actually decline, owing to increasing human ingenuity and economic growth. If Ehrlich was right and the planet was a finite place bedeviled by rampant consumption, prices should rise considerably. After all, the 1980s was predicted to be a decade of unprecedented growth, with more people born, more quickly, than at any time in human history.

Ehrlich lost the bet. The prices of all five commodities fell dramatically as new sources for each were found and new substitutions for each were developed in laboratories and factories around the world. For Simon, it appeared to vindicate a view of the world wholly different from that of end-of-the-world Malthusian environmentalism.

Of course, questions might be asked about the real environmental value of such a bet, and certainly have been in the decades since. To what degree had these two men really "bet the planet"? Had they not really only wagered on the commodity prices of a handful of relatively trivial ecological assets? What if they had bet on whether global temperatures or atmospheric concentrations of greenhouse gases would rise or fall? What would the future hold for these commodities and others as population continued to grow at an expanding rate?

Nevertheless, Simon had, in a very public way, conveyed a view of the relationship between nature and society that was rather different than that of population-centered thinking. Simon's essential economic worldview was reflected in this bet. Beyond its essential optimism, this view held at its heart the *creative potential* of human beings, the importance of *incentives* in producing outcomes, and the utility of *price* for not only measuring but also creating brave new worlds (Field 2005).

Sustaining environmental goods: The market response model

Contrary to population-caused visions of scarcity (Malthusian or otherwise), thinking economically suggests that scarcity does not set the limits of the relations between society and environment, but instead operates as the engine of their interaction. Here, scarce resources are made available, or indeed abundant, through the working of supply and demand, which inspires the creative potential of human imagination to be unleashed by economic incentives.

In this way of thinking, available resources, because they are valuable, are exploited and used for social good. Oil is burned to propel cars that take people to work, landfills are made to dispose of waste far away from populations, and vegetables are consumed to maintain people's health. Exploitation of environmental goods, even renewable resources like forests or fisheries, does tend to decrease their supply (just as any good Malthusian would insist!). But when things become scarce, their price in a market tends to rise; consider: people pay more for gold than lead. This increase in prices, rather than spelling immediate or imminent ecological disaster, presents producers and consumers with new and interesting choices (Figure 3.1).

Figure 3.1 Environmental scarcity drives markets. Shell gas station operator Steve Grossi's gasoline price board at his Shell station in Huntington Beach. *Source*: REUTERS/Robert Galbraith.

For producers, the increase in prices may open up innovative opportunities for finding new sources of resources or developing new technologies to extract, produce, or synthesize environmental goods, including those techniques previously too expensive, relative to the price of the resource, to consider. In the southwestern United States, for example, where it had dominated for a century, copper mining came to a sudden halt in the 1960s and 1970s. Mineral stocks had become too diffuse to merit the expensive effort of extracting them from the ground, where only traces remained. But when the price of copper rises, as it has in the last years of the first decade of the twenty-first century, applying more expensive extraction techniques to long-dormant surface mines begins to become profitable, leading to renewed mining and increased supplies.

Similarly, as the price of one good rises relative to the price of a less frequently used alternative, people might turn to this alternative as a cheaper substitute. History is full of such substitutions, from whale oil being replaced by carbon mineral oils to copper pipes giving way to polymer plastic ones. Innovations driven by such responses to scarcity create new economies in themselves, employing technicians, workers, and designers in new, previously unimagined production systems.

Producers and suppliers are not the only creative actors in such markets for environmental goods. Those who consume these goods, either firms that need them for production or individual people, also respond to prices. For consumers, an increase in the price of a good typically leads people to use that good less – decreasing demand. They may reuse or

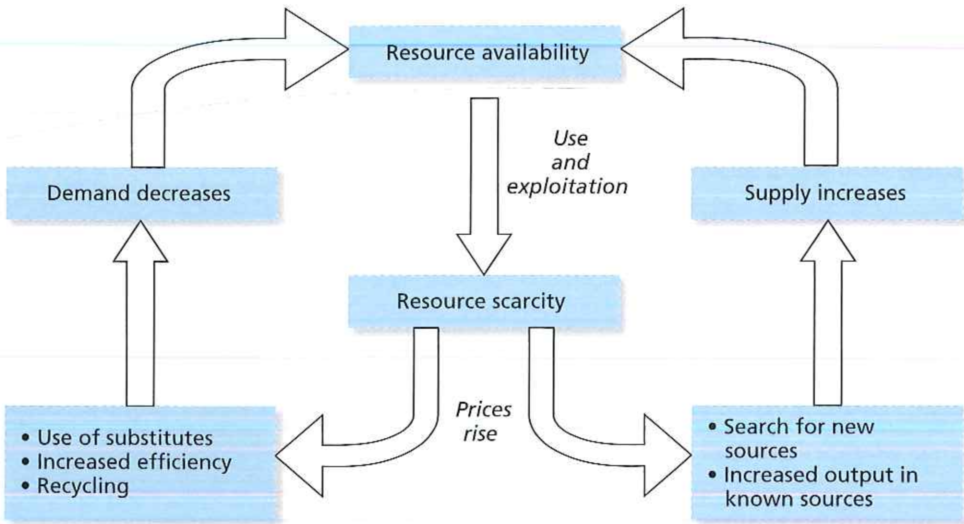

Figure 3.2 The market response model. In theory, scarcity of environmental goods and services sets into motion a series of adaptations to rising prices, actually resulting in increasing resource availability. *Source*: Adapted from Rees (1990), p. 39.

recycle the goods they have already used, come up with new substitutes of their own, or increase their efficiency of use. If the price of water rises to a point where it is too expensive to water the garden, consumers might abandon outdoor plants, substitute less water-demanding species, or reuse the "graywater" from their washing machine and sink to care for their landscape. All of these efforts at conservation, it should be noted, are driven not by altruism or green sensibilities, but rather by a simple response to market forces.

This process, where scarcity is relieved by laws of supply and demand, which together govern and sustain the relationship of people to nature, is what resource economists and geographers call the "**market response model**" (Figure 3.2). Here, price signals are translated into adaptations by rational and creative people in the market, providing abundance under conditions of scarcity. It is this logic that apparently allowed Simon to prevail over Ehrlich in their 1980 bet.

Market Response Model A model that predicts economic responses to scarcity of a resource will lead to increases in prices that will result either in decreased demand for that resource or increased supply, or both

Managing Environmental Bads: The Coase Theorem

Environmental problems and issues are not always about the scarcity of discrete, individual things, like copper or oil. How can market thinking apply to all environmental objects and conditions (e.g., swimmable streams, diverse rainforests, clean beaches), not just traditional commodities (e.g., milk, tungsten, codfish)? In theory, if human activity makes clean air or water scarce, and I value clean air or water, I should be willing to pay for remediation

of the situation. If *someone else* is polluting that air or water, however, and I am experiencing the effects of that deterioration downstream or further away, how could *my* willingness to pay be realized?

Many economists have addressed this problem, but the most prominent solution came from a Nobel laureate in economics, Ronald H. Coase. In 1960, Coase laid out one of the founding propositions of contemporary economics (often called the "**Coase theorem**"), which held that in cases of competing interests, the most efficient outcomes will occur through bargaining between property owners (Coase 1960).

Coase Theorem A thesis based in neoclassical economics, holding that externalities (e.g., pollution) can be most efficiently controlled through contracts and bargaining between parties, assuming the transaction costs of reaching a bargain are not excessive

What Coase proposes is that many environmental problems can be solved most effectively through contracts. Consider, for example, a family living in a beautiful valley spot in Montana next to a cattle ranch. As it turns out, the cattle ranch is both noisy and somewhat smelly. Such an effect, where one person's economic activity comes at the expense of another, is called an externality, and as we will see below and in Chapter 4, it is common to environmental problems. Such situations also cause lots of nasty arguments in Montana, moreover.

How can such a situation be regulated? One solution might be for the county government to ban ranching in the area, in order to protect homeowners, causing the ranch to shut down. Another would be to make it clear that cattle are more important than housing in rural areas, thus shutting down housing developments in the area. Alternatively, complex rules could be designed, telling developers how to build smell- and sound-proof housing and cattle ranchers how to move and keep their cattle more quietly. None of these solutions is necessarily socially fair or just to one side or the other. The last solution, while perhaps fairer, may be economically inefficient and far more expensive than the other alternatives. Who pays for these redesigning efforts and on what terms? What approach would produce an optimal outcome?

In Coase's way of thinking, it would be better to let the two parties sort the problem out themselves through contracts and, in the process, discover the *real* costs and values of ranching, mountain views, and cattle smells. By coming to terms with one another, *whatever they decide* is always the most efficient outcome, no matter what the initial rights are in the situation.

If the family moved in after the ranch had long been in business, for example, or if the family had no legal right to limit the rancher's actions, they would simply have to tolerate it, or absorb the cost of the smell by paying some higher price for property elsewhere, and moving far away from the ranch. The difference in the price of their current house and the new one reflects how much the people are willing to pay to not live around cattle. Perhaps, however, the cost of the new home is far higher than the cost they might be able to pay the rancher for simply moving her cattle shed to the other side of the property. By paying the rancher a lower sum, the family maintains its pretty view and reduces the smell while offsetting the rancher's costs for doing so. In that case, the price of the environmental nuisance is discovered through the negotiation between the two parties (rather than by relying on a regulator), and everyone experiences an optimal outcome.

If, on the other hand, the family came first or it held some kind of county-given right to a non-smelly environment, other options emerge. In that case, the cattle owner might cease ranching, at whatever cost, and sell to a housing developer. It may be even cheaper for the rancher to directly pay the homeowners, essentially bribing them to put up with it. On the other hand, if it turns out to be even less expensive to move the cattle shed than it is to pay off the neighbors, the rancher can always choose this option.

Notably, it does not matter what the configuration of legal rights is at the outset of the scenario – ranchers might hold the right to ranch, families might have the right to be free of cattle smells, or neither may pertain. In any case, if contracts can be worked out and enforced between the two parties, they always reach a decision that is economically most efficient. Such a determination is fully in line with the market response model, but extends its crystalline logics to the complex world of environmental **externalities**.

Externality The spillover of a cost or benefit, as where industrial activity at a plant leads to pollution off-site that must be paid for by someone else

Coase stipulated two key assumptions, however, that were required to be true for such smooth efficiencies to prevail: property rights have to be exclusive and the transfer and protection of contracted rights has to be free. This means, for the efficiencies of Coase to be realized in the above example, 1) both the rancher and the homeowner must have the full ability to control their land and the decisions made on it and, more importantly, 2) their negotiations and contracts must not cost time or money to negotiate, write, and enforce. Put in other terms, a free market system is efficient to the degree that actually sorting out agreements, coming to understandings, and designing fair rules and restrictions are socially and economically free or cheap. Similarly, it depends on enforcement (policing, monitoring, and punishing violations) of contracts and rights having no costs.

And in reality, of course, this is totally untrue. For our rancher and homeowner, the time it takes to negotiate the contract, the possible cost in lawyers, and the hidden cost of maintaining county court houses and civil servants to process and administer the contract are indeed quite high. Defining property rights for more intangible goods and services (e.g., biodiversity) is even more daunting. Enforcing contracts over incredibly complex systems (e.g., global climate) appears all the more impossible. The problem comes in the practical difficulty of assigning private rights to "fugitive," mobile, intangible things – like air – clearly contracting the relations between owners, and enforcing the results. For an "air market" to function, the air must be owned by someone who paid for it, who can get value from it, who has an individual interest in keeping it clean, and who can legally challenge someone else who dirties it or violates a contractual agreement over its condition.

While in some ways such a market seems inconceivable (because it is difficult to enclose, see Chapter 4), recent evidence suggests that it may be possible. Rather than assigning rights to clean air, recent efforts in the United States and elsewhere have worked to give *rights to pollute*. In a specific example, in the early 1990s, the United States Environmental Protection Agency (EPA) set limits on industries for the emission of sulfur dioxide, a primary cause of acid rain. But rather than setting a limit on each factory, the total allowable level of pollution was divided into units and distributed to producers, in the form of credits that could be sold. Should a company find a cheap way to reduce their sulfur dioxide production below the level for which they held credits, they could sell the

spare credits for a profit. More radically, if environmental groups believe that the limit on total emissions provided in the credit system is too high, and they are *willing to pay* to reduce it, they have the right to buy credits on the market, like anyone else, and simply take them out of circulation. This also has the effect of raising the scarcity and cost of pollution credits, creating incentives for industry to become even more efficient. Such a market has been in operation for 15 years and is only one of many such efforts (see more on "cap and trade" below).

Whatever the flaws in such a system, it demonstrates that markets can function for all sorts of environmental goods and services, but that – as Coase suggests – to make them work, private property rights to nature must be clearly assigned to corporations or people. This is a logical and practical prerequisite to any market solution, but certainly one with serious social, environmental, and political implications, as we shall see.

Market Failure

There are several ways in which these market and contract-governed ways of living in nature might fail. Such **market failures** emerge from a mismatch between the assumptions of the market model and the real world. Chief challenges to market assumptions include the facts that 1) transactions are not by any means free (as per Coase's assumptions), 2) contracts and property rights have to be defined and enforced often at great legal and regulatory expense, and 3) not all parties to negotiations have perfect and equal information. This is especially the case for environmental goods and services that are spread across a large population of individuals.

Market Failure A situation or condition where the production or exchange of a good or service is *not* efficient; this refers to a range of perverse economic outcomes stemming from market problems like monopoly or uncontrolled externalities

Transaction Costs In economics, the cost associated with making an exchange, including, for example, drawing a contract, traveling to market, or negotiating a price; while most economic models assume low transaction costs, in reality these costs can be quite high, especially for systems with high externalities

Consider, for example, the problem of the ranch and residence provided above, but now imagine it with thousands of scattered homeowners and hundreds of ranches. Under such circumstances, the complexity of working out discrete contracted negotiations becomes enormous, as does the problem of monitoring and enforcing the rights of different ranchers each operating with different rules with differing property owners.

There is also always a temptation for some people to wait to accrue benefits from other people's negotiations without taking the time or energy to negotiate for themselves. Such a "free-rider" problem is typical of common property environmental problems (see Chapter 4). In such a case, the **transaction costs** of getting the problem sorted out contractually are simply much higher than the cost of the problem. Typically such cases lend themselves to regulatory and treaty-based, rather than market-based, solutions. For example, the system of tradable pollution credits that made acid rain reduction a success in the United States had to be created and enforced by the Environmental Protection Agency of that country, an entity with police powers paid for through federal taxation. Consider too, that reduction of sulfur emissions in Europe was managed through the creation of the "Helsinki Protocol," a treaty agreement to achieve 30 percent reductions by 21 nations signing the document. Efficient markets require public investments. Free markets are rarely free.

Monopoly A market condition where there is one seller for many buyers, leading to perverted and artificially inflated pricing of goods or services

Monopsony A market condition where there is one buyer for many sellers, leading to perverted and artificially deflated pricing of goods or services

Other asymmetries also plague markets. One of the most serious is that of **monopoly**, where many buyers face one service provider or owner, or **monopsony**, where many sellers face a single buyer. In either case, the individual or firm is in a position to set prices and buy and sell goods or services free from competition and with no incentive to be efficient. Neither are such cases rare; the histories of the American and European capitalist economies are filled with cases where monopolies and monopsonies emerged through the concentration of wealth (in railroads, meat packing, and communication, among many). For environmental goods and services, the record has been equally spotty. Most municipal water provision in the United States, for example, was developed by private companies in the 1800s. The failure of these utility monopolies to efficiently manage and price water, however, led to the transition of most such utilities to state control.

A further problem is raised if we consider that many of the potential parties in a contractual arrangement or in a market have not yet been born. People may negotiate with one another over the relative value of cutting down a forest or enjoying its timber for construction, but what about people a hundred years from now? Do they have a place in such a market? A strict adherent to market logics would make no provision for such people. Getting environmental economics right is difficult enough without considering future generations, after all! Alternatively, it could be argued that both economic development and conservation in the present, in whatever market-negotiated combination, are always in the interest of future generations, who benefit from better economic and environmental conditions.

Market-Based Solutions to Environmental Problems

We have seen that markets can fail and even vociferous supporters of market environmentalism admit the necessity of some form of regulatory guidance of the economy. Nevertheless, a range of market-based policy solutions have been introduced in recent years to solve countless environmental problems. These each, in some way, for better or for worse, use the concepts of incentives, ownership, pricing, and trading to address environmental problems (Table 3.1, p. 40).

Green taxes

One of the most direct ways to harness the market, and therefore to influence environmental decision-making by people and firms, is through artificially altering prices. According to the market response model, after all, it is increasing prices that drive providers to search for new sources, innovators to substitute, consumers to conserve, and alternatives to emerge. Taxing certain goods or services, and so increasing prices, should result in either

Box 3.1 Environmental Solution? Natural Gas as a Bridge Fuel

Consider a future where we get nearly all of the power needed for electricity, transportation, agriculture, and industry from renewable sources like wind, solar, geothermal, and tidal power. The fabled post-carbon economy represents (at least in theory) a great environmental win–win. Win #1: renewable fuels, by definition, cannot be depleted. A post-carbon economy would eliminate the need to endlessly pursue increasingly remote fossil fuels. Win #2: a post-carbon economy would reduce by orders of magnitude the total anthropogenic emissions of greenhouse gases that cause climate change.

But there is, of course, no free lunch. It will take decades to develop the technology and infrastructure necessary to power society primarily with renewable fuels and in the intervening years we cannot continue our current path. Three to six more coal- and oil-fueled decades would likely usher in a disastrous global temperature increase exceeding 4°C by the end of the century. The prudent course would be to transition to less carbon-intensive fuels that could serve as a "bridge" to a post-carbon future. Arguably, the most promising "bridge fuel" is natural gas.

Natural gas has several undeniable upsides over coal and oil. Converting coal-fired power plants to natural gas is feasible (and is indeed happening all over the world, in places where gas is available and inexpensive). Gas produces significantly lower carbon emissions than oil or coal (along with eliminating or greatly reducing airborne mercury, sulphur dioxide, and other pollutants). Moreover, natural gas is relatively abundant.

The problem, however, is that most of the remaining recoverable natural gas is so-called "tight gas," bound up within poorly connected pore spaces throughout a layer of sedimentary rock (usually shale). Recent advancements in an extraction technique known as hydraulic fracturing (or "fracking") enable the recovery of tight gas. This technology drills horizontal wells into gas-rich shale beds, and then injects water, sand, and chemicals under high pressure to fracture the rock and force the gas to the surface. Fracking has dramatically increased gas extraction in the past decade. In the United States, for example, gas production is up nearly 30 percent since the 1980s, and has unquestionably reduced the country's carbon footprint. Shale gas could meet energy demands in the United States for several decades, moreover.

Despite all the environmental upsides of gas, fracking produces undesirable environmental impacts where it is employed. The chemicals injected into the ground include several toxic compounds that might pollute local water. Liberated methane often finds its way into groundwater aquifers near fracking operations. Compressor stations emit noxious airborne contaminants. These (and other) environmentally problematic aspects make fracking enormously controversial.

Perhaps the largest environmental challenge to emerge from the fracking revolution, however, is the one it presents to renewable energy. As more gas is produced, and infrastructure is dedicated to its distribution, its price falls dramatically. Cheap gas under-prices not only "dirty" forms of energy production, like coal, but also critically important renewable energy sources, including wind and solar. The larger the gas supply, therefore, the less economically competitive important alternative and sustainable energy options become. This market outcome confounds the benefits of cheap gas and suggests that, rather than acting as a bridge to renewables, increased fracking may further "lock in" the energy economy to technologies that drive climate change.

decreased use of these resources or creative innovation of new sources or options. The money raised through the tax can be used directly by the government either to provision services or to search for alternatives.

Many examples of such "green taxes" exist. Facing landfill costs, labor expenses, and related costs in the provision of garbage disposal, for example, some municipalities have required households to dispose of all waste in special trash bags, purchased by consumers

Table 3.1 Market-based solutions. An overview of some dominant environmental regulatory mechanisms that involve market components and are based in part on market logics. Note that in all cases the state remains an important player in making markets work and achieving environmental goals.

Regulatory mechanism	Concept	Market component	Role of the state
Green taxes	Individuals or firms participate in "greener" behavior by avoiding more costly "brown" alternatives	Incentivized behavior	Sets and collects taxes
Cap and trade	Total amount of pollutant or other "bad" is limited and tradable rights to pollute are distributed to polluters	Rewarding efficiency	Sets limits and enforces contracts
Green consumption	Individual consumers choose goods or services based on their certified environmental impacts, typically paying more for more benign commodities	Willingness to pay	Oversees and authenticates claims of producers and sellers

themselves, and often costing a dollar or more each. The results have been greatly increased recycling and more careful attention by consumers to packaging and waste. By internalizing the costs of trash to consumers, there has been an observed decrease in the flow of garbage from households.

More radically, such taxes have been proposed for the control of greenhouse gases that drive global warming. Sweden enacted a carbon tax in 1991, followed by other countries, including the Netherlands, Finland, and Norway. This tax is leveled against oil, natural gas, coal, and a range of fuels. Such taxes have also been considered in the United States and the European Union, although they face significant political opposition.

Trading and banking environmental "bads"

Also prominent among these market approaches are policy efforts that draw upon Coase's insights to reduce environmental problems as efficiently as possible, using contractual exchange. Such mechanisms usually take the form of "**cap and trade**." Here, the state determines a regulatory maximum for emissions of an environmental hazard and allows firms to meet the goal themselves or to pay other firms, who are able to reduce outputs more efficiently, to do so for them. This achieves the same results as traditional regulation, but does so at lower overall cost (and so economists describe this outcome as "more efficient").

Cap and Trade A market-based system to manage environmental pollutants where a total limit is placed on all emissions in a jurisdiction (state, country, worldwide, etc.), and individual people or firms possess transferable shares of that total, theoretically leading to the most efficient overall system to maintain and reduce pollution levels overall

As shown in Figure 3.3, regulation can be used to reduce emissions in an industrial setting by demanding a 30 percent cut in

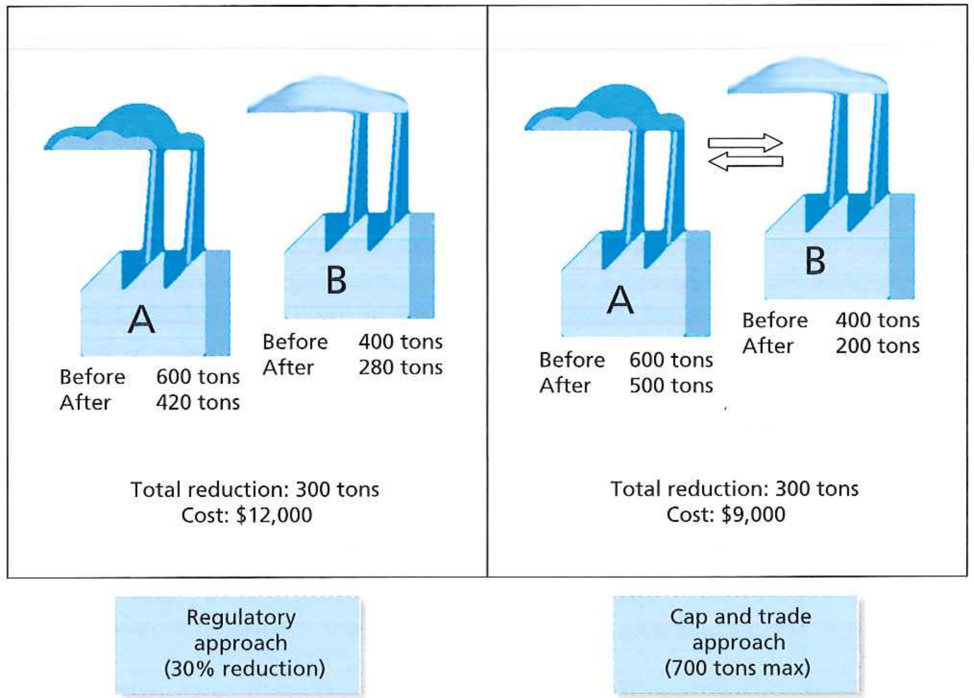

Figure 3.3 Regulation versus cap and trade. Both approaches result in net desired pollution reduction, but the cap-and-trade approach is theoretically cheaper overall.

tons of pollutants for both factories A and B, resulting in a total removal of 300 tons of pollution from the atmosphere, leaving 700 tons overall. Significantly, however, Factory B, owing to its technology and system of production, can eliminate pollution at a cost of $25 per ton, while the older Factory A requires $50 per ton invested to do the same. Rather than spending an overall total of $12,000 to reduce pollution, therefore, it would be more efficient to simply cap the total amount of pollution at 700 total tons and allow the two firms to trade permits if they desire. In that case, Factory A might make some reductions of its own, but purchase the remainder of pollution credits from the more efficient Factory B, whose aggressive reductions result in meeting the net target. Both systems then result in the same amount of pollution reduction, but cap and trade does so more efficiently.

The basic idea is that firms who are able to reduce emissions more cheaply (because of available technology, know-how, or experience) can do so *for* other firms who are less able, and then be paid for the trouble. The US SO_2 "Acid Rain" trading system began in 1995 and reports significant emissions reduction. Proponents claim that the trading system yielded 30 percent more reductions than non-flexible methods, where every factory had to meet the exact same requirements (see the bold claims of the global shipping industry, for example, at www.seaat.org/).

Such systems are not without problems and limitations, obviously. No allowance here has been made for geography, for example. If individual factories are allowed to pollute on site, offsetting their emissions with reductions at faraway locations, the environmental effects might be locally disastrous, even if the overall reduction meets a target. The problems of actually setting the cap, determining the limits, and monitoring and implementing the reduction all remain as well. The use of the market tool also does nothing to depoliticize pollution control, since determining *how much* pollution is allowable requires difficult tradeoffs and regulatory experience.

In a variation upon this approach, some regulations allow markets to be extended to "banking" and "withdrawing" environmental services through third-party providers. Most notably, wetland protection in the United States has moved to a banking system. Here, a cap is set on the total amount of wetlands, enforcing no *net* loss of wetlands overall, but allowing that any local loss of wetlands can be offset by the creation of a wetland elsewhere, so long as it is approved by the EPA in terms of its delivery of similar "services." A new big-box retail chain, for example, which destroys a wetland in the construction of a new store, is required under law to create a similar one somewhere else. Since building wetlands is a specialized practice, however, probably out of the technical and ecological capacity of the person or firm who destroyed the original ecosystem, a third party might be called upon to create and manage the new wetland. More radically, a savvy developer might build an enormous wetland or set of wetlands – a kind of bank – speculating that new constructions will need to purchase portions or shares in the future to meet their obligations.

Such a system presents any number of practical problems, which raise questions about the ecological efficacy of any such effort. In the case of wetlands, it is necessary, for example, to assure that newly built environments actually deliver the ecosystem services lost in the destruction of the original landscape. Such monitoring and oversight demand extensive regulatory efforts, many ecological experts on site examining the system, and careful scrutiny over time. Indeed, a market-based approach, often vaunted for its ability to cut out government intervention, may demand an *extension* of state regulations, with increasing numbers of state scientists and monitors, paid at the public expense, assuring the legitimacy of transactions in the market (Robertson 2006).

Green consumption

Market-based solutions to environmental problems also tend to stress the power of consumer demand for changing environmental conditions. Pointing to an overall social shift toward green values, market advocates suggest that the most powerful way to change production systems is to allow consumers to "vote with their money," and select and purchase green products, often at a premium. The success of organic foods, which are now very much in the mainstream of consumer culture, provides an example of consumers paying extra and creating incentives for more producers to change their methods and technologies.

Such approaches have drastic limitations. How does a consumer know, after all, the specific environmental impacts of products that carry handsome green labels? How do they know such products and companies have not been merely "**greenwashed**," presented and advertised heavily as environmentally sound or benign with little substantive change in actual production practices, packaging, or disposal? Indeed, for many firms far more time and money are invested in green advertising than green practices (TerraChoice Environmental Marketing Inc. 2007).

> **Greenwashing** The exaggerated or false marketing of a product, good, or service as environmentally friendly

One way of confirming truth in green advertising is through the process of **green certification**, in which a third party monitors production of a range of products and provides a confirmatory "seal of approval" for products meeting specific standards. A number of governmental and nongovernmental green certification systems exist, including those for timber, organic foods, and energy-efficient appliances, among many others. As green certification systems continue to proliferate, however, their reliability and consistency become more questionable. Some certifications, for example, are established by companies themselves rather than third-party observers. Moreover, many countries have adopted their own standards. For example, the country of Malaysia has instituted its own independent certification for sustainable timber, which competes directly with international standards. This makes global trade in eco-friendly goods a confusing smorgasbord.

> **Green Certification** Programs to certify commodities for the purposes of assuring their ecological credentials, such as organically grown vegetables or sustainably harvested wood products

Beyond Market Failure: Gaps between Nature and Economy

Leaving aside problems in implementing market-based environmental policy, larger questions loom. Adopting an economic logic for nature presents more basic problems: it makes it difficult to maintain ecocentric values (see Chapter 5), because there is a mismatch in the behavior of money and ecosystems, and because basic economic inequity presents a barrier for reconciling markets and the environment in a socially just way.

Non-market values

At bottom, the market response model can only be deemed to be operating successfully if success is measured in strictly economic terms. When sperm whale oil became scarce and was replaced with fossil fuels, as actually happened in the nineteenth century, the outcome for people was negligible or beneficial. New resources, propelled by the scarcity of old sources, were made available through the magic of the marketplace. But what is the lesson of this story for the sperm whale itself? Long before market responses "kicked in" to send humans in search of new oil sources, the sperm whale was driven to the brink of extinction, a result that was only forestalled by the creation of international bans on whaling in the twentieth century. Indeed, global green markets have proven slow to adjust to the decline of rainforests, the plunge in biodiversity, and the potential catastrophic implications of global warming, raising questions about the capacity of trade to capture the value of these things, at least within the urgent time frame in which they will need to be addressed.

The problem is therefore not simply that the market may fail on its own terms (and indeed it does by the admission of many of its most enthusiastic supporters), but that its success can only be judged in economic and therefore anthropocentric terms. If there are values that cannot be captured in a market, like the evolutionary, aesthetic, or moral "value" of a species, what difference does it make that its depletion eventually allows its *substitution* by something else? While economic valuation allows us to identify what people might be willing to pay for abstract and intangible goods and services (i.e., the presence of sperm whales somewhere on the planet), it does not necessarily point a way for them to be valued, in monetary terms.

Money and nature

Beyond this, the valuing of ecological conditions through the market, and specifically in money terms, is fraught with other very basic problems. First, the history of capitalism has shown that markets are highly volatile, and given to bubbles and busts. This is not necessarily a bad thing for capital, which travels from crisis to crisis, moving from investments in forestry to plastics to biofuels. But these rapid fluctuations of money values of different natural objects, typically driven by speculation, may be out of step with both cycles of environmental systems and changes in social values. Without recourse to some other system of valuation, however, these eruptive metrics are the sole measure in a market. As geographer David Harvey describes, this becomes "a tautology in which achieved prices become the only indicators we have of the money value of assets whose independent values we are seeking to determine. Rapid shifts in market prices imply equally rapid shifts in asset values" (Harvey 1996: 152). But the crashes and crescendos of historical markets continuously show that market volatility may not reflect the social values they are understood to measure. Can we trust a turbulent commodity exchange market to reflect the slow and steady pace of changing environmental values?

A commodity approach to the environment also tends to stress the exchange of discrete and specific items or services. The complex ecosystem of a river is most effectively managed in a market through the discrete components that can be valued by differing parties. For example, the river in one condition or another may be able to provide wetlands or offer flood control, or to maximize trout habitat, or to facilitate transport or recreation. In theory, to the degree to which these services are mutually exclusive, a market can best adjudicate what is most desired and provide it from the river. In reality, however, these functions are connected and interdependent in many ways, precisely because the ecology of streams is complex. Discrete markets are "anti-ecological" in that many of the river's unvalued parts may be valuable to other components, mutually produced, and interdependent. By separating the system into marketable services, these interrelations are severed, displaced, and divided. Can the functioning of whole ecosystems be assured in markets that capture only the value of discrete goods and services?

The crisis of equity: Turning economic injustice into environmental injustice?

Applying the logics of the market to the environment raises basic questions about equity and rights. This is because, to the degree that the environment is "marketized," the ability of individuals and groups to participate in environmental action and remediation, or indeed even to have access to basic environmental services (e.g., clean air or wilderness), is limited by their available capital. This holds implications for democracy. By "democratic" here, and elsewhere in this book, we refer to people's ability within a society to have an equal voice in political decision-making and outcomes. Market environmentalism is democratic, therefore, only to the degree that the financial resources available are equally distributed throughout the population.

Nothing, of course, could be further from the truth. Turning decisions over nature into decisions within a market can be considered undemocratic because money is almost never evenly distributed within a polity. In the United States, an enormously wealthy country by global standards, the richest fifth of the population received 49 percent of the nation's income in 1999, while the poorest fifth received less than 4 percent. In terms of overall wealth, in 1998 the top 5 percent of the population owned 60 percent of the country's wealth. Globally, the statistics are more striking; the richest fifth of the world's population earn 83 percent of all income and the richest 10 percent of adults control 85 percent of the world's total assets. The specific concentration of wealth and income in the hands of corporate entities, rather than people, is also notable. So, too, is the unevenness over control of money and finances within households around the world, where women may be excluded from access to and control of money, even though their labor and effort provide household income. Given this reality, making politically charged environmental decisions dependent solely on economic willingness to pay may represent a profound subversion of democracy, in a world where ability to pay is so widely uneven.

As Sharon Beder has argued, moreover, the appearance of economic and scientific neutrality that market-based solutions possess may in part further disguise their fundamentally political characteristics:

> The portrayal of economic instruments as neutral tools removes them from public scrutiny and gives them into the hands of economists and regulators . . . A market system gives power to those most able to pay. (Beder 1996: 61)

Market advocates respond that individuals with even paltry means exercise significant power through market actions, especially when aggregated into large bodies of consumers. So, too, they argue that most environmental values are universally desired, and "we" lack only the means to efficiently achieve these global goals. Nevertheless, it is reasonable to ask whether current fundamental inequalities in income and capital should be the ground on which to construct environmental governance. Can markets produce not only efficient but also democratic relationships between people and the environment?

Finally, many observers insist that depending on markets to solve environmental problems is a problematic place to start considering the overall, and apparently unstoppable, growth of the global capitalist economy (see Chapter 6). As global trade continues to devour, mobilize, and dump resources, objects, and fuels at an accelerating pace, it becomes difficult to imagine how such energies could ever be harnessed and simultaneously controlled. And yet the language of "markets," "free trade," and "ecological economics" must be admitted to be the most dominant, widespread, and uncritically accepted ways of thinking about the environment in the early twenty-first century.

Thinking with Markets

In this chapter we have learned that:

- A dominant school of thought holds that, as long as environmental goods and services can be sold or traded, scarcity will be diminished by economic forces through the market response model.
- The market response model alleviates scarcity by creating incentives that either increase the supply of environmental goods and services or reduce demand for them.
- Environmental externalities can be mediated, in this theory, through private contracts more efficiently than through regulation.
- Many market-based mechanisms therefore may exist for solving environmental problems, including green taxes, markets for pollution, and green consumer choices.
- Markets, however, can fail, raising questions about holding faith in them for consistently solving environmental problems.
- Other problems face market-based environmentalism, including the fact that some environmental goods are difficult to value, that markets can be volatile and fickle, and that economic solutions are not necessarily democratic ones.

Questions for Review

1. Compare/contrast Julian Simon's and Paul Ehrlich's views on the general effects of human population growth on environmental conditions (include the term "scarcity" in your answer).
2. Provide an example of the "law" of supply and demand influencing the ways humans use or exploit a particular natural resource.
3. Which of the following environmental problems is better suited to solutions derived from the Coase theorem: a) land-use disputes on adjacent parcels of private property; or b) reducing water pollution across a region (explain)?
4. Review the market mechanisms available for environmental policy. Which require the most far-reaching levels of state enforcement?
5. How does the ecologically complex nature of a river (or any similar "piece" of nature, for that matter) make it difficult, if not impossible, to value in monetary terms?

Exercise 3.1 The Price of Green Consumption

Go to a grocery store or supermarket near you. Select four or five different types of products (for example: fruits, vegetables, packaged goods, meats, paper products, cleaners, etc.). Find a conventional version of this product as well as a "green" alternative. This may include an "organically" grown fruit or vegetable, a "free range" meat, "locally grown" produce, "green" or "eco-friendly" products, or products made from "recycled" or "recovered" materials, for example. What is the price difference (per unit where appropriate) between the "green" and conventional versions of each product?

What is the average percentage increase in cost of the groceries if your "green" products are selected instead of conventional ones? The average American family of four spends $8,500 per year on groceries (the average British family spends approximately $6,300). Assuming your percentage increase is typical and that all conventional groceries have "green" alternatives, how much more would the average family have to pay for only "green" groceries? Who can afford to pay such extra costs for groceries?

What is the benefit from this extra cost? Why are "green" alternatives more expensive to produce? Where does the extra money spent on each product go? How would you know? Where would you go to find out?

Exercise 3.2 Marketing Green Technology

In this exercise, you will identify a "green" innovation or new technology and consider ways to market it. First, name and describe an environmentally desirable technology or process that might be used on campus or by your friends or classmates. These might include devices like reduced-flow showerheads or efficient light bulbs, or it might entail a product that changes how people do things, like freely available shared bicycles. Next, consider how much this alternative might cost relative to current technologies or available alternatives. Is it a great deal more expensive or inconvenient? Why is this? Finally, develop a convincing marketing strategy for this product, which might include short text, photos, slogans, catch-phrases, or even a jingle. This will necessarily include some information to prove that your innovation is actually an environmental improvement over the status quo. What would actually make such an alternative compelling, especially if it is more expensive?

Exercise 3.3 Thinking Economically

Imagine a scenic canyon, visited by many local people as well as tourists from beyond the local area. Consider a scenario in which a mining company has proposed to the local authority that it be closed to the public and put into the production of coal. Thinking in terms of *economics* as a way of adjudicating the relative value of one use of the canyon over the other, what would you need to know in order to make a comparison or assessment? What kinds of quantitative data would inform your decision, and where might they come from? What kinds of things might you need to know that are hard to measure? Once you have listed the kinds of information and data that might be available to inform this decision, do you think it would be sufficient to making this decision, why or why not?

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Institutions and "The Commons"

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Keywords

- Common property
- Game theory
- Institutions
- Prisoner's Dilemma

Chapter Menu

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