Market Failures:
When the Invisible Hand Gets Shaky

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- The enormously complicated problem of deciding where and how all of society's resources might best be used is usually solved by individuals following their own self-interest in markets largely free of government oversight.
- Markets fail when exchanges between willing buyers and sellers are impeded and efficiency is compromised.
- Overcoming such market failures is a role for government, but devising a solution that improves upon the status quo may not always be possible.

Every individual… neither intends to promote the public interest, nor knows how much he is promoting it…he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention.

Adam Smith, *The Wealth of Nations*, 1776

By "the invisible hand," Adam Smith refers to the notion that desirable social goals are usually reached by individuals following only their own self-interest. The self-interested interactions among individuals generate prices that coordinate complex economic undertakings, directing each individual's labor and capital to where it is most valued. Thus, public sector controls on economic activity are usually not needed, and such controls often degrade society's ability to produce and distribute goods and services. Smith argued against unnecessary government intervention into or regulation of markets. But Smith also recognized that there are circumstances where markets fail to coordinate economic activity.

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When markets fail, there may, indeed, be justification for some market regulation by government. Smith saw an obvious role for the public sector in national defense, provision of a system of justice and investment in public infrastructure, among others. More recently, the folly of unnecessary market regulation and the need to regulate markets that fail has been codified in a series of Presidential Executive Orders that require Federal agencies that propose regulatory actions to back up those actions by stating explicitly what market failure(s) they address. Thus, more than 230 years after Adam Smith wrote about government intervention, his ideas have found direct and practical application.

Agriculture is the textbook example of a sector that, being highly competitive, comprised of many buyers and sellers dealing in transparent markets, should result in an efficient allocation of resources without direct intervention by government. Yet, governments intervene in the agricultural and food sectors in a variety of ways. Commodity programs and food assistance are well-known interventions. Regulations aim to reduce runoff of animal waste into waterways, prevent further draining of wetlands, protect farmworkers from exposure to pesticides, and guard against unfair competition. USDA pays farmers and ranchers to improve water, air, and wildlife habitat quality, to restore wetlands, and to preserve farm and grasslands. Government entities also provide information to improve market efficiency. Science-based nutritional information supports food labels, inspections increase food safety, standards and certification increase consumer confidence in specialty products such as organic foods, and publicly funded research and development sustains growth in agricultural productivity.

Why Are Governments Important in "Free Market" Economies?

There are four generally recognized classes or causes of market failures that may call for government intervention:

1. **Externalities**, such as water pollution, arise when buyers or sellers are neither charged nor compensated for the economic impacts of their choices on others.
2. **Public goods**, such as national defense, do not lend themselves to market allocation because it is difficult to exclude individuals from enjoying the good or service once it is produced and because it costs nothing for an additional individual to use.
3. **Insufficient information** about the characteristics of a good or service may prevent markets from forming even though, with more complete information, consumers would be willing to buy and manufacturers would be willing to sell. For example, whether food is organically grown is not immediately apparent to consumers. Third-party assurances that the information provided on package labels is truthful may be necessary to make markets work.
4. **Market power**, where a few buyers or sellers are able to exert significant power over prices, can dampen production and exclude some otherwise willing market participants.

The following examples illustrate how markets relevant to agriculture might fail, and the corrective steps that governments may take. The examples also reveal that the evidence for failure is often mixed, and the most appropriate policy response for correcting the problem may not be clear cut.

Environmental Pollution—High Transaction Costs and Free Riders

Agriculture is the source of a variety of pollutants—like nutrients, pesticides, sediment, and greenhouse gases—and is routinely identified as the major source of impaired waters in much of the country. If markets allocate resources to their highest

and best use, is pollution from agriculture simply an undesirable but unavoidable outcome of doing business? Or is pollution a sign that markets are not operating as expected and resources are not being allocated efficiently?

As long as farmers can discharge agricultural chemicals into waterways without being charged for the costs their actions impose on other water users, the prices of the food they produce (and the chemicals they use) will not reflect full societal costs. And if prices are not accurate indicators of costs, markets cannot allocate resources efficiently. Market prices encourage farmers to produce more crops and more water pollution than if pollution's costs were reflected in those prices. This source of market failure is known as a negative externality.

One solution is for water users who are harmed by pollution to negotiate water quality with farmers. But doing so would be costly and complicated. Take the case of hypoxia in the Gulf of Mexico, a "dead zone" caused by excessive nitrogen coming down the Mississippi River. Simply identifying the numerous farmers in the Mississippi Basin who contribute nitrogen to the Mississippi River would be an enormous task. The large numbers of fishermen, water recreationists, and households affected by excess nitrogen in rivers and streams would make the costs of negotiating an efficient outcome even more onerous.

It is not just the numbers of people involved that make negotiation impractical. Water quality is a public good; individuals may enjoy the benefits without paying the cost (see box, "Why Public Goods Defy Markets"). If one person pays farmers to reduce pollution, it is nearly impossible to exclude other downstream water users from benefiting as well. As long as water users believe that someone else is going to pay to reduce pollution, they have no incentive to pay for it themselves, or even to reveal that they benefit from the improvement. If every water user follows the same logic, water pollution persists.

Governments have approached the pollution problem in two ways. One is to offer conservation program payments to farmers as a substitute for consumer demand. Conservation programs encourage farmers to adopt practices that reduce the loss of sediment or chemicals to the environment. A more coercive approach is to use regulations such as the Clean Water Act, Clean Air Act, and Federal Insecticide, Fungicide, and Rodenticide Act to require farmers to adopt certain practices, or to ban the use of chemicals that are particularly harmful.

Foodborne Illness—Information Gaps Erode the Supply of Safety

In 1999, the U.S. Centers for Disease Control and Prevention estimated that annually, one in three Americans becomes ill from a foodborne disease, one in 700 is hospitalized, and one in 60,000 dies. Many foodborne illnesses are preventable. Some reduction in food contamination can be accomplished with low-tech basic sanitation—hand washing. Cooking deactivates many pathogens. High-tech methods like irradiation can reduce contamination in raw and unprepared foods. And pathogen monitoring and testing can confirm whether procedures have been successful. So why do food recalls and safety concerns continue to make headlines?

There are two possible explanations for the persistence of food-related illnesses. One explanation is that consumers are unwilling to pay higher food prices in return for increased safety. Suppliers have to be compensated for the added cost of labor and capital equipment that would increase safety. If the increase in cost would be passed on to consumers and consumers are unwilling to pay the additional cost, suppliers will stop investing in food safety.

Another possibility is that there is an information gap that is causing the market for food safety to fail. Information

Why Public Goods Defy Markets

Markets work best when goods possess certain characteristics. One is "excludability," where a producer can prevent someone who has not paid for the good from obtaining it. Another is that the good is "rival," where a buyer's purchase will not benefit any other individual. For instance, a farmer can obtain a tractor only by purchasing it from a dealer. And, once he obtains it, he alone enjoys the benefits. Goods with these characteristics are known as private goods. Markets evolve naturally to provide private goods.

Public goods lack one or both of these characteristics. With a public good, a provider cannot exclude someone from obtaining a good even if he or she has not paid a price. For example, a farmer contemplating the sale of improved water quality by establishing vegetative buffers on his or her farm cannot exclude downstream users from benefiting; the downstream users are "free riders." In this situation, the farmer does not have an economic incentive to provide the good.

Furthermore, when a good is nonrival—that is, exclusive ownership is not possible—a buyer's purchase does not reduce the benefits derived by others; the same benefits are available to all. For example, once a TV signal is broadcast over the air, one person viewing it does not diminish his neighbor's ability to also view the signal. The marginal cost of providing the good is essentially zero. Efficient resource use requires that price equals marginal cost, but if marginal cost is zero, price should be zero. No market will arise for a good with a zero price. When a market does exist for a good that is nonrival, such as satellite TV, the market is inefficient.

problems might choke off any financial incentive to offer consumers safer food. Microbial contamination that causes foodborne illness is difficult for consumers to detect. Contaminated food might look, smell, and taste no different from uncontaminated food.

The information gap means buyers are likely to be wary of sellers' claims. If food suppliers cannot convince consumers that they have gone to the trouble of producing very safe food, their compensation will not cover expenses and there will not be much safety offered to consumers.

Food suppliers have come up with ways to overcome information gaps. Having a well-known brand such as McDonald's, Burger King, and Wendy's creates an incentive to ensure that the food supplied to consumers is safe. A brand with a good reputation is a marketing advantage and represents an asset its owner has built through financial commitment. A single foodborne illness linked to the firm could damage the brand and reduce the value of the investment in brand building.

While food suppliers do not make explicit safety claims on retail food labels, safety claims do influence prices further back in the food supply chain. As agricultural commodities are transformed into foods, third-party certifiers are providing validation of quality attributes (including safety practices used in manufacturing plants), reassuring input buyers that a product's attributes are as advertised. In the private sector, firms like SGS and AIB International, as well as many more, offer services to validate safety procedures and bolster market differentiation with respect to food safety.

When food providers produce foods that are treated as undifferentiated commodities, those producers may not have a name brand or the incentive to guard it. Policymakers may thus decide to intervene in the market to enforce an acceptable level of food safety for all consumers. USDA's Food Safety and Inspection Service is responsible for the safety of meat, poultry, and egg products. As well as routine inspections of processing plants, it has promulgated rules requiring all meat and poultry establishments to develop and implement written sanitation standard operating procedures and to test for the harmful pathogens *E. coli* and *Listeria*. The U.S. Food and Drug Administration oversees food safety for all other foods.

The large question for policy is the extent to which the private sector has overcome information gaps. If branding and third-party certification lead to food safety levels that are above minimum government standards, government intervention cannot be cost effective. But branding and third-party certification are not universal, so consumers' demands for safety may go unmet without government oversight.

Concentration in Agricultural Markets—A Level Playing Field Requires Some Officiating

Economies of scale lower per unit production costs and thus increase a firm's profit potential. These economies are one of the main factors behind increased consolidation in U.S. agricultural markets. For example, concentration in meat processing has increased dramatically since 1980, and the top four beef packers now account for 81 percent of fed cattle slaughter.

Vertical coordination along the supply chain between producers and processors is another important feature of modern agriculture. Production and marketing contracts have become important tools for vertical coordination that reduce income risks from price and production variability, ensure market access, and provide higher returns for differentiated farm products. The sales of many livestock commodities, sugarbeets, fruit, and processing

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tomatoes are now handled primarily through contracts. And agricultural contracts are often used in highly concentrated markets having relatively few buyers.

Increased consolidation and coordination, however, call into question whether a market with few buyers and numerous competitive sellers can still operate efficiently. The market system works best when there are many buyers and sellers acting independently and where no single actor or set of actors can influence prices. With only a few buyers, processors may have sufficient market power, individually or cooperatively, to exert downward pressure on the price they pay producers. If that were to happen, the quantity supplied and prices paid to farmers would ultimately be lower than under more competitive conditions. Setting a price lower than would be observed in a competitive market excludes some sellers from the market: they have no outlet for what they could have produced and sold. This "lost" production is a net loss to society.

In theory, buyers can structure contracts to take advantage of market power. A buyer can use long-term contracts to tie up a large share of local supply, discourag-

ing new entrants. Pricing formulas in contracts can be designed to stifle competition among rival buyers. Confidentiality clauses that require farmers to keep contract details secret from other farmers can also be used to suppress competition among rival buyers. Because contractors usually purchase from more than one farmer, this gives them a strong information advantage in negotiations.

Federal laws and regulations can limit firms' exercise of market power. Antitrust laws provide the Federal Trade Commission and the Antitrust Division of the Department of Justice with a wide set of policy options—including civil fines, criminal penalties, and preventive injunctions—to prevent collusion among firms and mergers that are likely to lead to monopoly, and to restrict the use of business practices that are likely to limit competition.

Other laws and regulations also aim to facilitate competition. For example, USDA has long had a program to collect, summarize, and disseminate timely market information to facilitate price discovery. The 2002 Farm Act placed limits on the use of confidentiality clauses in livestock and poultry contracts, and the 2008 Farm Act added further requirements for the disclosure of information to producers in such contracts.

What Does Market Failure Mean for Policy?

Market failure occurs when individual decisions guided by self-interest are at odds with an efficient allocation of resources from society's perspective. The examples provided here show how there may be more than one class of market failure affecting a market, such as the case of water pollution that demonstrates failures related to negative externalities and public goods.

Once a market failure has been recognized and described, policy officials still may have a range of approaches to resolving it through government intervention. Common options include prescriptive or prohibitive regulation; tax incentives to change behaviors leading to or exacerbating market failure; subsidies to encourage behavior that eases the effect of market failure; government provision of information that some market participants would not otherwise receive; and government establishment of standards. Ideally, the government's response should be based on the benefits and costs of intervention, and these may indicate that no form of intervention is called for, even when markets fail. For example, to resolve the failure of animal operations to control their runoff of manure nutrients, EPA put in place regulations requiring that the largest farming operations implement nutrient management plans. That these regulations were not extended to all animal operations was based on research indicating that the costs of doing so would not justify the benefits.

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This article is drawn from . . .

The Use of Markets To Increase Private Investment in Environmental Stewardship, by Marc Ribaudo, LeRoy Hansen, Daniel Hellerstein, and Catherine Greene, ERR-64, USDA, Economic Research Service, September 2008, available at: www.ers.usda.gov/publications/err64/

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"Creating Markets for Environmental Stewardship: Potential Benefits and Problems," by Marc Ribaudo, in *Amber Waves*, Vol. 6, Issue 4, September 2008, available at: www.ers.usda.gov/amberwaves/september08/features/creatingmarkets.htm

"Do Food Labels Make a Difference? Sometimes," by Elise Golan, Fred Kuchler, and Barry Krissoff, in *Amber Waves*, Vol. 5, Issue 5, November 2007, available at: www.ers.usda.gov/amberwaves/november07/features/foodlabels.htm

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