What Are Externalities?

What happens when prices do not fully capture costs

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CONSUMPTION, production, and investment decisions of individuals, households, and firms often affect people not directly involved in the transactions. Sometimes these indirect effects are tiny. But when they are large they can become problematic—what economists call externalities. Externalities are among the main reasons governments intervene in the economic sphere.

Most externalities fall into the category of so-called *technical externalities;* that is, the indirect effects have an impact on the consumption and production opportunities of others, but the price of the product does not take those externalities into account. As a result, there are differences between private returns or costs and the returns or costs to society as a whole.

Negative and positive externalities

In the case of pollution—the traditional example of a *negative externality*—a polluter makes decisions based only on the direct cost of and profit opportunity from production and does not consider the indirect costs to those harmed by the pollution. The social—that is, total—costs of production are larger than the private costs. Those indirect costs—which are not borne by the producer or user—include decreased quality of life, say in the case of a home owner near a smokestack; higher health care costs; and forgone production opportunities, for example when pollution harms activities such as tourism. In short, when externalities are negative, private costs are lower than social costs.

There are also *positive externalities,* and here the issue is the difference between private and social gains. For example, research and development (R&D) activities are widely considered to have positive effects beyond those enjoyed by the producer—typically, the company that funds the research. This is because R&D adds to the general body of knowledge, which contributes to other discoveries and developments. However, the private returns of a firm selling products based on its own R&D typically do not include the returns of others who benefited indirectly. With positive externalities, private returns are smaller than social returns.

When there are differences between private and social costs or private and social returns, the main problem is that market outcomes may not be efficient. To promote the well-being of all members of society, social returns should be maximized and social costs minimized. Unless all costs and benefits are internalized by households and firms making buying and production decisions, market outcomes can lead to underproduction or overproduction in terms of a society's overall condition (what economists call the "welfare perspective").

Consider again the example of pollution. Social costs grow with the level of pollution, which increases as production increases, so goods with negative externalities are overproduced when only private costs are involved and not costs incurred by others. To minimize social costs would lead to lower production levels. Similarly, from a societal perspective, maximization of private instead of social returns leads to underproduction of the good or service with positive externalities.

Taxation and externalities

Neoclassical economists recognized that the inefficiencies associated with technical externalities constitute a form of "market failure." Private market–based decision making fails to yield efficient outcomes from a general welfare perspective. These economists recommended government intervention to correct for the effects of externalities. In *The Economics of Welfare*, British economist Arthur Pigou suggested in 1920 that governments tax polluters an amount equivalent to the cost of the harm to others. Such a tax would yield the market outcome that would have prevailed with adequate internalization of all costs by polluters. By the same logic, governments should subsidize those who generate positive externalities, in the amount that others benefit.

The proposition that technical externalities require government regulation and taxation to prevent less than optimal market outcomes was intensely debated after Pigou's seminal work. Some economists argued that market mechanisms can correct for the externalities and provide for efficient outcomes. People can resolve the problems through mutually beneficial transactions. For example, a landlord and a polluter can enter into a contract under which the landlord agrees to pay the polluter a certain amount of money in exchange for a specific reduction in the amount of pollution. Such contractual bargaining can be mutually beneficial. Once the building is less exposed to pollution, the landlord can raise rents. As long as the increase in rents is greater than the payment to the polluter, the outcome is beneficial for the landlord. Similarly, as long as the payment exceeds the loss in

profit from lower pollution (lower production), the polluting firm is better off as well.

The possibility of overcoming the inefficiencies from externalities through bargaining among affected parties was first discussed in 1960 by Ronald Coase in "The Problem of Social Cost" (among the works that earned him a Nobel Prize in economics in 1991). For bargaining solutions to be feasible, property rights must be well defined, bargaining transaction costs must be low, and there must be no uncertainty or asymmetric information, when one actor knows more than the other about the transaction.

Against this backdrop, optimal government intervention might be the establishment of institutional frameworks that allow for proper bargaining among parties involved in externalities. Property rights—specifically intellectual property rights, such as patents—allow a firm to earn most if not all the returns from its R&D. But it is easier to assign property rights for innovations and inventions. When it comes to basic or general research, property rights are more difficult to define, and government subsidies typically are needed to ensure a sufficient amount of basic research.

Public goods

Problems in defining property rights are often a fundamental obstacle to market-based, self-correcting solutions, because the indirect effects of production or consumption activity can affect so-called *public goods*, which are a special kind of externality. These goods are both *nonexcludable*—whoever produces or maintains the public good, even at a cost, cannot prevent other people from enjoying its benefits—and *nonrival*—consumption by one individual does not reduce the opportunity for others to consume it (Cornes and Sandler, 1986). If the private benefits are small relative to the social benefit but private costs to provide them are large, public goods may not be supplied at all. The importance of the public good problem has long been recognized in the field of public finance. Taxes often finance governments' delivery of public goods, such as law and order (Samuelson, 1955).

The public good problem is especially notable in environmental economics, which largely deals with analyzing and finding solutions to externality-related issues. Clean air, clean water, biodiversity, and a sustainable stock of fish in the open sea are largely nonrival and nonexcludable goods. They are free goods, produced by nature and available to everybody. They are subject to no well-defined property rights. As a result, households and firms do not place enough value on these public goods, and efficient market outcomes through bargaining typically are not feasible. In other words, environmental issues often face a collective action problem.

High transaction costs and problems related to uncertainty are other obstacles that prevent parties involved in technical externalities from internalizing costs and benefits through bargaining solutions. Uncertainty problems are far reaching. In fact, the well-known *moral hazard* is a form of externality in which decision makers maximize their benefits while inflicting damage on others but do not bear the consequences because, for example, there is uncertainty or incomplete information about who is responsible for damages or contract restrictions. An often-used example is a situation in which an insured entity can affect its insurance company's liabilities but the insurance company is not in a position to determine whether the insured is responsible for an event that triggers a payout. Similarly, if a polluter's promised preventive actions cannot be verified because of a lack of information, bargaining is unlikely to be a feasible solution.

Today, the most pressing and complex externality problem is greenhouse gas (GHG) emissions. The atmospheric accumulation of greenhouse gases from human activity has been identified as a major cause of global warming. Barring policies to curb GHG emissions, scientists expect this problem to grow and eventually lead to climate change and its accompanying costs, including damage to economic activity from the destruction of capital (for example, along coastal areas) and lower agricultural productivity. Externalities come into play because the costs and risks from climate change are borne by the world at large, whereas there are few mechanisms to compel those who benefit from GHG-emitting activity to internalize these costs and risks.

The atmosphere, in fact, is a global public good, with benefits that accrue to all, making private bargaining solutions unfeasible. Identifying and agreeing on policies for internalization of the social costs of GHG emissions at the global level are extremely difficult, given the cost to some individuals and firms and the difficulties of global enforcement of such policies (Tirole, 2008).

Externalities pose fundamental economic policy problems when individuals, households, and firms do not internalize the indirect costs of or the benefits from their economic transactions. The resulting wedges between social and private costs or returns lead to inefficient market outcomes. In some circumstances, they may prevent markets from emerging. Although there is room for market-based corrective solutions, government intervention is often required to ensure that benefits and costs are fully internalized. ■

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