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The Role of Economics in Achieving Welfare Gains for Animals

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CHAPTER

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Introduction

The demand for animal products and services is a powerful economic force in society, and multibillion-dollar industries are organized around this demand. These industries often face increased costs by improving animal welfare and are quick to use economic arguments against proposed welfare reforms (see sidebar on page 169). These arguments, while often specious, can influence consumers, voters, and policy makers. Citizens are less likely to support animal welfare reforms they've been told will double their shopping bill or impoverish family farmers.

Animal welfare advocates cannot respond to these economic arguments with moral rhetoric alone. Instead, non-governmental observers (NGOs) must challenge the economic assumptions, calculations, and conclusions of animal industries and produce reliable economic arguments of their own. To do so they should understand some basic economic principles, which we review below, and, when possible, enlist the help of economists.

The Economy

People often refer to "the economy" without much understanding of its fundamentals. There are two schools of economic study, macroeconomics and microeconomics. Most often references to "the economy" are related to macroeconomic concerns: interest rates, employment figures, trade balances, inflation levels, commodities prices, and other aggregate measures of market behavior. Macroeconomic figures are helpful for making broad comparisons between today's "economy" and that of earlier periods or the economies of other countries/regions/states. Those who study microeconomics focus on the behavior of, and interactions among, individual consumers, producers, and industries.

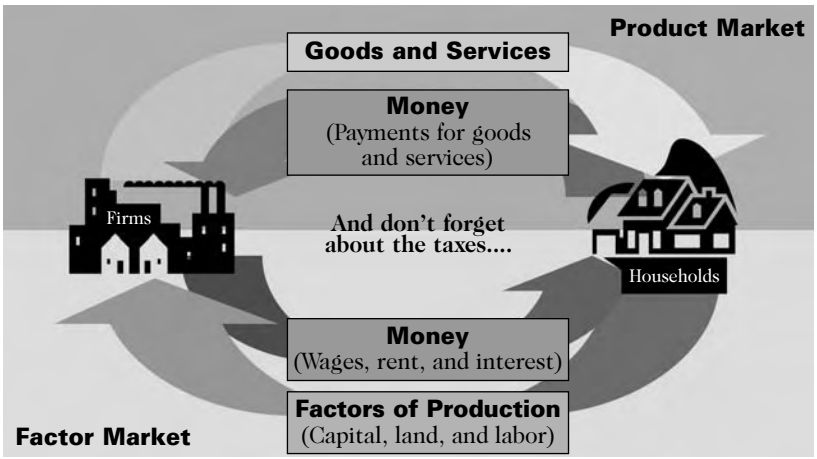
Changes in the welfare of animals—whether the animals are the products themselves (e.g., meat, hunting trophies, fur coats) or whether animals are used in process or production (e.g., eggs, dairy products, cosmetics testing, circus entertainment)—are made at the firm level in response to changes in costs (supply side) or consumer preferences (demand side). As such, we focus here on microeconomic principles.

In Figure 1, the economy is illustrated as two concentric circles. In a market economy, there are two markets: the factor market and the product market. In the factor market, households (or firms) that own the factors of production sell their labor, land, and capital to firms that produce products in exchange for wages, rent, and interest. In the factor market, households are the sellers, and the companies are the buyers.

In the product market, companies sell the products they have produced to households that pay money to purchase them. The money flows in the opposite direction this time: people buy products from firms that produce them. In this way, money flows circularly—creating an economic marketplace where money goes from the producers to the workers in the form of wages and back to the producers in the form of payment for products.

Consider the market for eggs. In the factor market, an egg farmer needs factors of production, including land on which to build structures and pens to house his hens; the hens themselves; equipment to collect, sort, clean, and package the eggs; feed and medicines to keep the hens alive; cartons and packaging; trucks to ship the cartons; and employees to assist with all aspects of production. Having invested in these factors, the farmer produces eggs for

Figure 1
"The Economy"



sale to the public. In the product market, when the eggs are sold, the payments received by the egg farmer go to pay for the costs associated with producing the eggs. The farmer pays wages to his employees, rent to a property owner (or bank, if there's a mortgage), and interest on any loans taken to purchase the equipment or otherwise manage cash flow.

The government's role in these markets is pervasive. Taxes are taken or expressly relieved at almost every juncture. The farmer may be exempted from sales taxes that would otherwise be levied on his equipment purchases and also may deduct business expenses from annual income taxes, but he pays taxes on wages paid to employees and any profits earned from the business. Households, which pay taxes on other nonfood goods, are expressly exempt from sales taxes on eggs because of government policy. The farmer's workers pay taxes on their income earned, and the banks, landlords, and equipment makers also pay taxes on any profits earned from their business dealings with the egg farmer. Finally, beyond the tax effect, the farmer may be eligible for various government programs and subsidies that may further alter his cost structure. We discuss the role of government in creating or eliminating distortions in markets through use of the tax system, subsidies, or other policies later.

Supply and Demand

The relative volume of products and money that flows between households and firms in the economy is driven by supply (availability of specific goods) and demand (desire for those goods). Each product has its own market and supply and demand characteristics. Each firm in a given product market has its own supply curve driven by its cost structure—that is, the firm can calculate for any given price what quantity of goods it can produce and still earn a reasonable profit margin. Each consumer in a given product market has an individual demand curve: each of us has a personal schedule of prices we're willing to pay for various quantities of that good.

In today's complex product economy, few buyers and sellers meet to negotiate specific terms. Instead, most products are sold in stores alongside thousands of other products, each with its own unique market at play. As such, firms cannot "price discriminate," that is, set a different price for every consumer's unique willingness to pay. Even though you might be willing to pay $2 for a bag of peanuts, and one of the authors is only willing to pay $1, the selling firm must select a single price–one it hopes will maximize its profits given our different preferences.

What becomes relevant then is the overall supply and demand schedules. Supply is measured as the sum of individual firm supply schedules, and demand is the sum of individual household demand schedules. The "market clearing" price and quantity for the good are set by the intersection of the willingness of suppliers to supply and consumers demand for the product.

This relationship is illustrated in Figure 2. At any given price, the firms in this product market are willing to supply some quantity of a good that is demanded by consumers. The higher the price people are willing to pay, the higher quantity a firm will be willing to supply. The converse is also true: if the willingness to pay for a given product is lower, firms will supply a lesser quantity. The demand curve declines because consumers are allocating among scarce resources. At higher prices for any given goods, fewer consumers are willing or able to purchase them. Conversely, as goods become widely available at lower prices, more people are willing or able to purchase them.

The market is said to "clear" at equilibrium: supply and demand intersect where the amount demanded equals the amount supplied, at what's called the "market clearing" price. In Figure 2, given $Demand_1$, this happens at a quantity of Q_1 and a price of P_1, the product of which determines the total revenue received by the firms.

The slope of the two curves is determined by the degree of

Figure 2
Supply and Demand

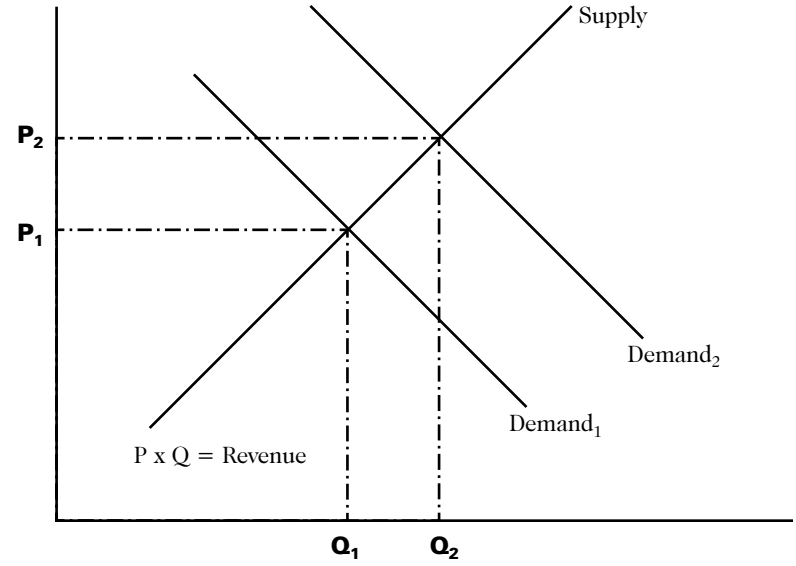
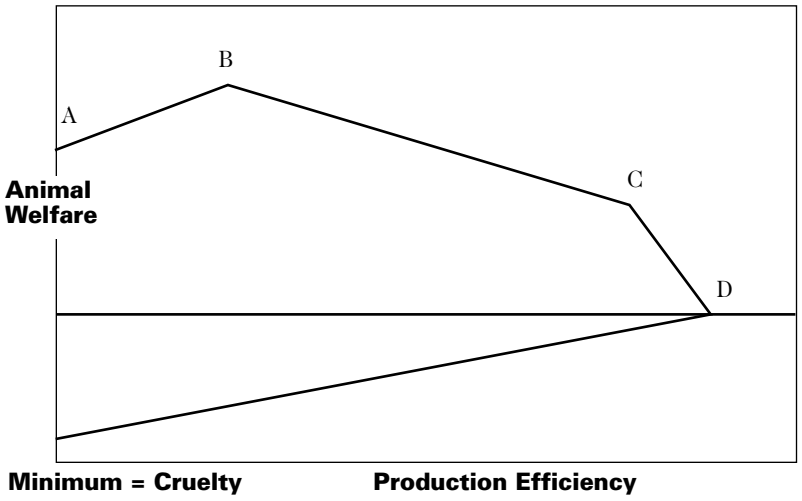


Figure 3
Trade-off: Welfare and Efficiency



"elasticity" in the market. Elasticity indicates the degree of flexibility in buying or selling an item at higher prices. On the demand side, consumers may have relatively inelastic demand for staples like milk, flour, or eggs and for items like gas for their car, prescription medications, or cigarettes (if one is a smoker). Because consumers of these products tend to "need" them, they are less sensitive to prices—as prices go up, they may purchase somewhat fewer goods, but they will likely continue to purchase them. A person has more elastic demand for less necessary (to them) goods. Luxury items or "splurge" products may quickly become off-limits if the price increases. If the price of freshly baked bread from the bakery rose somewhat, for example, many consumers would decide to switch to processed bread from the bread aisle.

On the supply side, firms have varying flexibility to respond to price changes with contraction or expansion of the number of goods supplied. For some products they may be able to expand supply rapidly to take advantage of higher prices in a market; for others, they might have more limited ability to react. Short- and long-term scenarios can adjust the price elasticity of both supply and demand over time, but measuring elasticity plays a key role in evaluating consumer and firm responses to changes in the market environment, including changing information, cost structures, and preferences relating to improving animal welfare.

The characteristics and observations that drive supply and demand curves can and do change in reaction to endogenous (within the market) and exogenous (beyond the market) factors. Endogenous factors might be new versions of products or marketing campaigns that alter supply or demand or both. Exogenous factors can include new information (e.g., independent research showing ill health effects associated with a given product), disasters (natural, disease outbreaks, terrorist attacks), or the introduction of competing products with different (better) characteristics. When changes like this occur, supply and demand can shift in or out, causing a new equilibrium to manifest. In Figure 2 demand is shown to be shifting out; for every given price of the good, a higher quantity is demanded. Suppliers, whose schedules did not change, react by shifting their production to the quantity Q_2 and charging P_2, and the total money involved increases.

Applying Economics to Animal Welfare

Economics in its application may seem a cold and hard science: in fact, it was famously deemed the "dismal science" by Thomas Carlyle in the mid-1800s. But at its most basic level, economics is fundamentally a study of what people value or prefer, thus it has its roots in moral philosophy. Whereas moral philosophy concerns itself with what preferences people *ought* to have, economics concerns itself with what preferences people *actually* have, and how they can best be satisfied.

People do not always express their preferences, making measurement difficult. Modern economics has sought to measure the preferences revealed by individuals' behaviors in markets, where goods and services are exchanged using money. For example, if one is willing to spend $2 for a bag of peanuts but only $1 for some popcorn, one is said to reveal a stronger preference for peanuts than for popcorn. More controversially, money may also be used as a common currency to compare the preferences belonging to different people. If one is willing to spend $2 on peanuts, but another is willing to spend only $1 on peanuts, then the first is considered to have a stronger preference for peanuts than the second has. (This is imprecise, since $1 may have more value for the second person than it does for the first, if, for instance, the second has a lower income. But economists argue about how such imprecision can be corrected.) A market is considered to be economically efficient when, on the whole, society is able to maximize the satisfaction of its members' preferences.

Because nonhuman animals do not participate in markets, within an economic framework, their preferences can be measured only indirectly by the extent to which human consumers value animal welfare when making their economic decisions. For instance, a hen's preference not to be caged has market value only when a consumer recognizes this preference, feels some obligation to respect it, and chooses not to buy eggs laid by caged hens.

Animal Production and Welfare

A production process transforms inputs into outputs. In the case of animal production, inputs such as animals, feed, housing, human labor, and veterinary services are transformed into outputs such as meat, eggs, milk, fur, zoo amusements, and product testing assurances. To maximize profits, animal producers may attempt to maximize the efficiency of this transformation. The implications for animal welfare are illustrated in Figure 3 (McInerney 2004). The vertical axis indicates animal welfare, while the horizontal axis indicates the efficiency of animal production in terms of some product for human consumption, such as eggs per unit of production cost. Point A represents a completely unmanaged, wild existence for animals. Arguably, there is some level of management that increases welfare above this level; for instance, providing food, shelter, and protection from predators to otherwise free-roaming animals. From the animals' perspective, the ideal level of welfare is B.

Beyond B, producers sacrifice animal welfare for the sake of increased productivity. This may involve intensive confinement, to decrease housing costs, and intensive breeding, to increase productivity per animal. As more of an animal's metabolism is dedicated to production, less is available to support central determinants of animal welfare, such as immune function or cardiovascular and skeletal health. Animal mortality caused by intensification is economically acceptable to producers, so long as the gains in efficiency outpace the increase in mortality. If unregulated, producers motivated solely by efficiency will operate at D. Beyond this point, animals begin to fall sick or die in sufficiently large numbers that total efficiency declines.

Presumably to the left of D is a point C, where the welfare of animals is socially optimal from humans' point of view. For reasons discussed below, C is likely to be much closer to B than it is to the existing level of welfare provided by producers in a free market.

Problems in the Market for Animal Welfare

A society's attitudes toward animal welfare could be revealed by consumer demand for animal welfare-friendly products. However, the socially optimal level of animal welfare may not be achieved through the market because the market suffers from a number of failures: aspects of animal use and production create "negative externalities"; the "opportunity costs" of animal use are rarely, if ever, factored in; the failure to consider "substitution effects" for competing or alternative products; the high and increasing market concentration of many animal-using industries; animal welfare, which has both public good and merit good characteristics; and consumers who are not well-informed about animal welfare.

Negative Externalities

A negative externality is a cost that a product causes to society that is not reflected in the product's price. For instance, a producer that causes pollution in manufacturing a product may cause a negative

externality if neither the producer nor the consumer is taxed to offset the pollution abatement costs. Externalities can be corrected by some form of government action. For instance, a government can restrict or tax pollution or the sale of polluting products. Left uncorrected, negative externalities push adverse impacts onto people who are not party to the production or consumption of the product.

Poor animal welfare causes several negative externalities. A number of consumers feel discomfort about other people's mistreatment of animals. People who live or work near concentrated animal-feeding operations (or CAFOs, where animals are raised indoors in large numbers at high densities), often are adversely affected by the air and water pollution generated. Not only is their health compromised, but often they find their property values are depressed, owing to the pollution caused by their CAFO neighbors. Both the discomfort and the pollution are negative externalities, genuine social costs that are not reflected in the market prices of the animal products.

Opportunity Costs

Justifications for animal use or reduced animal welfare rarely take "opportunity costs" into account. The opportunity cost of any decision is what was forgone in favor of what was selected. For example, state government agencies with purview over natural resources often claim that providing new hunting opportunities (e.g., new species, new seasons, lower age requirements, or increased bag limits) provides economic benefits to states. But these officials do not factor in the reduced opportunities for wildlife enjoyment that necessarily result from more hunting. According to the latest U.S. Fish and Wildlife Service national survey, wildlife watchers outnumber hunters by a factor of five to one and generate $38.4 billion per year relative to hunters' impact of $20.6 billion (U.S. Fish and Wildlife Service 2002). The opportunity costs of increased hunting, then, may be reduced wildlife watching, which brings with it an offsetting, unfactored economic impact.

Substitution Effects

In characterizing the economic impact of a proposed increase in animal welfare, firms, trade associations, or government officials often overlook the existence of "substitution effects." Consumer demand for a given good can and does change in response to changes in prices, laws, social mores, and the availability of alternative products. When the market contracts due to lower consumer demand, the reduced revenue in that product market does not show the whole picture. Consumers likely have shifted their purchases to another substitute product that is more desirable. To measure the true impact of an increase in animal welfare, these purchases must be included.

For example, local officials have defended continuing circus shows with exploitative animal acts in publicly owned arenas because such shows generate revenue for the city and for proximate restaurants, parking garages, and the like. But local officials rarely factor in the economic impact that might be generated by animal-free circuses or other children's entertainment that would substitute for the animal events. In some cases the substitution effect might be so great that it might more than offset the loss of revenue from the circuses, especially in light of the decreasing popularity of such shows with the public. In the absence of a traveling animal show, more families might opt to take advantage of local attractions that hire residents as employees, in contrast to the circus employees who reboard the train or bus and spend their incomes in other parts of the country. What's clear is that failing to account for substitution effects distorts the market and potentially reduces opportunities for increasing animal welfare.

Increasing Market Concentration

A truly competitive market is possible only when enough buyers and sellers participate. When many firms vie for the same consumers, competition doesn't just put downward pressure on prices—which is usually a good thing—but it also creates pressure for individual firms to react more quickly to changing consumer preferences. People are generally familiar with the notion of monopoly: a single firm produces a product, and no other firms find it profitable to enter the market (owing to patent protection, scale economies, first-mover advantages, or other factors). A monopoly allows a firm to control the entire supply curve, puts upward pressure on prices, and tends to be slower at innovation or product improvement (hence, the characterization of the "lazy monopolist").

But a market doesn't have to be strictly monopolized by a single firm to show signs of these failures. Markets with high levels of seller concentration (that is, with very few sellers) can significantly reduce their competitiveness and be slow to respond to changing consumer demands.

Livestock markets are particularly concentrated and increasingly vertically integrated along the supply chain (i.e., where once farmers sold to slaughterhouses, who sold to packers, now one company owns all three levels). Rapid expansion of industrial farming has dramatically reduced the number of meat, dairy, and egg producers, turning the family farm into a novelty. A March 2005 USDA study of market structure in the meat, poultry, dairy, and grain-processing industries concluded that

> [T]he drop in the number of plants, sharp rise in plant size,

> and a leveling or decline in the per capita consumption of red meat, fluid milk, and flour products led to a 50 percent increase in average four-firm concentration levels—to about 46 percent for all nine industries.(Ollinger et al. 2005, iv)

On average, four companies accounted for about half of the total production in each of these industries. Perhaps the most notable example of market concentration is the hog industry. Between 1975 and 2005, the number of hog farmers in America fell from 660,000 to 67,300—nearly 90 percent (U.S. Department of Agriculture, National Agricultural Statistics Service [USDA/NASS] 2005). This is not due to a decline in demand for pork products. The number of pigs raised on U.S. farms actually increased over that same period—from 69 million pigs per year to 104 million pigs per year (USDA/NASS 2006). Four major companies control more than 64.1 percent of the hog slaughter and packing industry in the United States (U.S. Congressional Research Service 2006).

Even the National Pork Producers Council, the trade association representing pork packers and producers, told Congress that this level of concentration raises issues:

> While not a guarantee of conduct that increases consumer prices and/or reduces producer prices, these levels and their trends increase the possibility of such conduct and provide ample incentive for heightened vigilance. (Caspers 2000, n.p.).

As of mid-2006, federal antitrust officials were reviewing Smithfield's proposed acquisition of its biggest rival, Premium Standard Farms, which followed on Smithfield's acquisition of ConAgra's refrigerated meats subsidiaries earlier in the year (Associated Press 2006).

Public and Merit Goods

Animal welfare has characteristics of both public goods and merit goods. A public good is a good valued by everyone in society, whose benefit is nonexcludable (it can be enjoyed by anyone) and non-rival (one person enjoying it has no effect on another enjoying it). Clean air is an example of a public good. When the air is clean, everyone can enjoy it: one person's enjoyment has no effect on another's. Wildlife is another example of a public good. One person admiring the neighborhood mourning doves does not diminish a neighbor's enjoyment from watching the same birds. In a free market, producers have no incentive to supply public goods in sufficient quantities, since they cannot capture full payment. As a result, public goods often must be provided—or protected—by governments or other collective bodies with the power to regulate their use. Using the mourning dove example, society must decide whether or how to balance the interests of those who favor watching or feeding the birds with the interests of those who enjoy shooting them.

A merit good is a good that is not valued by everyone in society but has broad social benefits. Public schools and vaccinations are examples of merit goods. All members of society indirectly benefit from provision of these goods, even if they are not a direct consumer of them. A merit good may be provided or subsidized by governments if there is sufficient public support for such action. Alternatively, governments may spend money increasing demand for merit goods by educating society about the good's merits.

Animal welfare has aspects of both public and merit goods. Some level of animal welfare is a public good: nearly everyone in society believes animals should not be starved or beaten, for instance. But some level of animal welfare is a merit good. While not everyone believes that CAFOs are inhumane, for example, those who do may believe it so strongly that aggregate social welfare, as a whole, might be increased by banning CAFOs.

Imperfect Information

The market for animal welfare also suffers from imperfect information. Producers and retailers do not have complete information about the degree of consumer demand for animal welfare; producers often lack full information about the costs associated with improving animal welfare; and consumers are not given (and often cannot obtain) accurate information about the animal welfare aspects of products they purchase.

Most consumers value animal welfare but may know little about how their purchases affect animals. For instance, a recent poll found that 71 percent of respondents believe "in general, farm animals are fairly treated in the United States" (Zogby International 2003). But when asked about standard farming practices in the United States, most of these same people deemed them objectionable. A 2000 Zogby poll found that 86 percent of adults feel the crowding of hens in commercial egg production is "unacceptable" (Yahoo News 2000). A 1995 poll by Opinion Research Corporation found that 90 percent of respondents disapproved of the standard practices of confining veal calves, pigs, and hens (Swanson and Mench 2000). The majority of Americans object to standard agricultural practices—but only after they're told what those practices are. This suggests that Americans are largely ignorant about factory farming, so their purchases do not accurately reflect their stated preferences.

The problem is exacerbated by the lack of transparency in animal products. Animal welfare is a quality characteristic of a product, an aspect that consumers value and use to differentiate competing

products. However, unlike some characteristics—like taste, smell, or touch—it can rarely be observed in the final product. Consumers cannot determine from an unlabeled product how animals were treated during production. As a result animal products are considered "credence goods," goods whose characteristics (in this case, animal welfare) cannot be discerned by a consumer before or after purchase.

Credence goods cause market inefficiency, since consumers may inadvertently buy lower-quality (in terms of animal welfare) goods and, therefore, drive higher-quality (in terms of welfare) goods from the market. The market failure surrounding credence goods is justification for government intervention, typically in the form of standards and labeling requirements. Some labeling programs have sought to provide information about animal welfare, though these are often found to be inadequate (at best) or deceptive (at worst). More complete and accurate labeling improves economic efficiency by helping consumers to target expenditures toward products they most want.

The use of animals in cosmetics testing provides a good example of improved labeling that has resulted in a more efficient market where consumers' purchases can accurately reflect their preferences. There are a number of different labels, each providing different levels of assurances about the use of animals (as testers or ingredients). Some labels indicate that animals were not tested for the finished product (meaning the individual ingredients themselves may have been tested on animals), while others assure not only no testing of the finished product or ingredients but also the absence of animals as an ingredient. These labels give consumers additional information about cosmetics products, which allows them to consider their preferences when they shop.[1]

Last, it is worth noting a fundamental market failure: the largest group of stakeholders in decisions affecting animal welfare—the animals, themselves—do not participate in the market. Their preferences, and their suffering, are of no direct account.

Willingness to Pay

A fundamental proposition in economics is that the extent to which society values a good is indicated by the level of consumers' willingness to pay (WTP) for it. Some consumers are not willing to pay much for animal welfare, while others are willing to pay a considerable amount. From the perspective of society, the optimal level of animal welfare is that which corresponds to society's aggregate WTP.

Many consumers willing to pay considerable amounts for animal welfare have no opportunity to do so in the market. This includes consumers who choose not to participate in a market (for instance, vegans); consumers who cannot participate in the market because the products they want to buy are unavailable; and consumers who participate, and are willing to pay some amount for welfare improvements, but not as much as what is currently charged.

Society's *revealed* WTP for animal welfare, as embodied in market behavior, may thus be significantly lower than its actual WTP. To capture the residual WTP, economists try to measure society's *declared* WTP by asking people what they would be willing to pay to see a specific improvement take place, for instance, "How much would you be willing to pay to see a ban on whaling?" WTP research typically involves the use of surveys of a large sample to represent the attitudes of society.

Society's aggregate WTP can be derived from estimates of average WTP multiplied by the total population size. This number represents the total benefit society receives from an improvement in animal welfare. If this number is greater than the total cost of the improvement, then the improvement is a net benefit to society and should be instituted.

Consumers report a willingness to pay more for products labeled with animal welfare assurances. In a 2004 poll, three-quarters of respondents said they were willing to spend two cents more for a fried-chicken meal with welfare assurances (Zogby International 2004). In fact, the KFC Corporation (parent of Kentucky Fried Chicken) has estimated that meeting NGOs' (nongovernmental observers) demands for welfare improvements would increase costs by less than this amount (Blum 2004).

Other research suggests that consumers are willing to pay an average 17–60 percent more for eggs from cage-free systems (HSUS 2006). One study found that consumers were willing to pay average taxes of $8 per person per year to fund practices they believed would improve conditions for hens (Bennett and Larson 1996). This WTP exceeds the additional cost of cage-free production, as discussed in the sidebar on page 170.

Consumers' statements do not always translate into actual purchases, as revealed by the low market shares of non-CAFO products. The misfit between consumers' intentions and their behavior might owe to the unavailability of non-CAFO products in many supermarkets and restaurants; absent or poor labeling; or perceptions that the responsibility for animal welfare lies with government, producers, or retailers (Blandford et al. 2000). There are also concerns about the accuracy of declared WTP. People who feel strongly about an issue could declare a WTP that is unrealistically high. Therefore, a number of research methods have been devised to improve the accuracy of declarations.

Taking Account of Free Trade

Animal welfare legislation in Europe and the states of Florida and Arizona outlawed the use of particular animal production systems within their national or state boundaries. However, both sets of legislation may have a limited effect on animal welfare as long as consumers continue to demand, and are supplied with, products imported from other nations or states that use the outlawed systems. Trade thus represents a special problem for animal welfare legislation. As the European Commission noted,

> [A]nimal welfare standards, notably those concerning farm animal welfare, could be undermined if there is no way of ensuring that agricultural and food products produced to domestic animal welfare standards are not simply replaced by imports produced to lower standards. (European Commission 2000, 1)

This concern applies just as readily to interstate trade within the United States.

As an example, the United Kingdom maintains higher animal welfare standards for sows than do most European Union (EU) countries. Since the country's ban on sow gestation crates and tethers went into effect in 1999, U.K. pork costs increased and production volume declined by 40 percent. In 2005 more than half of all pork products in British supermarkets were imported, and more than two-thirds of these imports were produced using systems illegal in the United Kingdom (*Meat News* 2005).

In one survey, 92 percent of British respondents believed imported meat should be produced to U.K. minimum standards (*Meat News* 2005). Similarly, 95 percent of respondents in an EU-wide survey said that imported products should be produced under animal welfare regulations at least as demanding as those applied in their own countries (*Poultry World* 2006). Trade restrictions are one way to solve the problem, but international trade rules limit the kinds of restrictions that are possible.

Rather than modify trade rules, the most practical means of protecting animal welfare may be to educate consumers and to convince retailers to carry only acceptable products. While trade agreements can force nations to allow imports, they can't force supermarkets or restaurants to sell them:

> Retailers are becoming the most potent force in setting animal welfare standards and will be the major engine for influencing animal welfare change. They can move faster than governments, can cut off a supplier's livelihoods by stopping contracts, and can ignore international trade agreements. While Europe as a whole has to adhere to the World Trade Organization and cannot bar imports on animal welfare grounds, retailers are free to do so. (Bayvel 2005)

In Switzerland compliance with animal welfare standards was limited until the major retailers selling eggs, following pressure from consumers and NGOs, announced they would sell only eggs from cage-free operations (Studer 2001). Sweden's ban on battery cages has also been helped by retailers' refusal to stock battery eggs (Agra CEAS Consulting 2004). Major Austrian supermarkets have volunteered to end the sale of cage eggs by 2007 (M. Balluch, personal communication with G.M., April 14, 2006). And in the United Kingdom, Germany, Austria, and Switzerland, McDonald's, Europe's largest food service operator, uses only free-range eggs (Pickett 2006).

The visibility and name recognition of retailers make them sensitive targets of animal welfare campaigns. As retailers compete with each other over public perception, successfully negotiating welfare gains with a major retailer can lead to a "race to the top" and to a push for harmonizing regulation so that costs are shared.

How Animal Welfare Campaigns Affect the Economics of Animal Production

NGOs can work to affect both the demand for and supply of animal welfare. On the demand side, NGOs can educate consumers about animal welfare. On the supply side, NGOs can educate producers and retailers about animal welfare; encourage voluntary production and retail standards; promote research on alternative production methods; promote subsidies for animal welfare improvements and challenge subsidies for animal welfare abuses; and help advance and enforce regulations governing the treatment of animals and the sale of animal products. These strategies vary in the level of distortion they introduce to the market.

The least distorting strategy is to allow producers to treat animals however they wish and allow consumers to purchase any level of animal welfare they demand. Such an approach is likely to create a variety of welfare levels, catering to consumers who care strongly about animal welfare, those who care moderately, and those who care weakly. Such an approach is supported by farm assurance schemes that meet strictly enforced welfare standards and by government regulation of labeling. At the same time, NGOs and governments can work to educate consumers about the value of animal welfare, increasing demand for higher-welfare products.

Market distortions that now favor abusive industries can also be dismantled. For instance, feed grain subsidies disproportionately benefit

CAFOs that do not grow their own feed; research and extension services at land grant universities disproportionately study and encourage CAFO production; and CAFOs are offered tax breaks to purchase cages and pens. Similarly, state fish and game commissions subsidize hunting activities, including in many cases the purchase and provision of "stocked" animals (e.g., fish, pheasants) to provide recreational animal use activities that are in no way connected to conservation efforts. And in the United States, the U.S. Food and Drug Administration continues to require the institutional use of animals in repetitive, uninformative, or unnecessary testing of cleaning products, cosmetics, or medicines—where viable nonanimal alternatives or earlier research exists.

Because of the negative externalities of animal abuse, and the public good and merit good aspects of animal welfare, some level of market distortion is justified. Producers and consumers could be taxed (subsidized) at an amount equal to the negative (positive) externality they create. The aim of this tax (subsidy) is to compensate society (the producer or consumer) for the full value of the externality. In parallel to the "polluter pays" principle used in environmental policy, producers who abuse animals could be expected to compensate society in some way—for instance, through taxes on less humane producers. In parallel, humane producers could receive a subsidy for the benefit they provide society.

Last, governments can impose regulations that set minimum standards of care and/or limit the production or sale of certain products. Throughout the world, this has been the favored strategy for protecting the welfare of pets. In Europe this has also been the favored strategy for protecting the welfare of farm animals (supplemented by subsidies). To a limited extent, this is also true in the United States, where there are humane regulations concerning the slaughter and transport of some farm animals.

Cost-Benefit Analysis

Individuals, organizations, and societies have an unlimited number of preferences but have only limited resources to invest in satisfying these preferences. To satisfy the greatest number of preferences, people must choose the most efficient investments. Cost-benefit analysis (CBA) is an economic tool used to measure efficiency. Here we discuss how CBA can help organizations prioritize projects.

With CBA the marginal costs and benefits of a project are measured and discounted. Marginal costs are typically measured in dollars and include any additional expenses an organization incurs by funding a project. Future costs are often multiplied by a discount rate, as costs incurred in the present represent a greater loss for organizations, which could otherwise invest the funds.

A project's marginal benefit can be measured in dollars saved or gained (for instance, from increased donations); and in noneconomic measures, such as the number of animal lives or life-years saved or some quality-adjusted measure of animal welfare.[2] Like costs, future benefits are often multiplied by a discount rate, as benefits realized in the present can be reinvested.

Net marginal cost is the difference between discounted economic costs and discounted economic benefits. A cost-benefit ratio is calculated as the net marginal cost divided by the noneconomic marginal benefit. Projects with a lower cost-benefit ratio are more efficient than are projects with a higher cost-benefit ratio and, all other things being equal, ought to be prioritized.

For example, suppose an NGO has two projects, each of which lasts one year. Project A costs $100,000, brings in $80,000 in donations, and saves an estimated two thousand animals. Project B costs $200,000, brings in $50,000 in donations, and saves an estimated five thousand animals. The cost-benefit ratios for the projects are:

Project A:

($100,000–$80,000)/2,000 = $10 per animal saved

Project B:

($200,000–$50,000)/5,000 = $30 per animal saved

Project A has a lower cost-benefit ratio and is thus more efficient. All else being equal, the organization should invest its funds in Project A rather than Project B to save the greater number of animals.

Moving Forward

If the objective is to do the greatest good for the greatest number, then animal protection NGOs (and the donors who support them) should invest their scarce resources in projects that reduce misery most cost-effectively. Because farm animals represent 99 percent of all animals raised and killed in the United States each year, and because there is broad public ignorance about standard farming practices, efforts to improve farm animal welfare may be especially cost-effective.

Economists and policy makers generally prefer pull strategies over push strategies because they are less market-distorting. A pull strategy educates, informs, and promotes changes in consumer or producer behavior. A push strategy regulates, forces, and demands such changes. A note of caution: campaigns against individual producers, or groups of producers in individual regions, can be ineffective. If one producer is forced out of business, another may simply take its place, as long as the

demand for goods remains unchanged.

Targeted public education campaigns revealing standard animal abuse could make substantial progress toward improving animal welfare. Most Americans care deeply about animal welfare but know little about animal abuse. Most would be appalled to see how animals are treated in agriculture, research, entertainment, and other industries. NGOs can ask consumers to consume fewer of those products and services that cause animals the most misery. This advice is consistent with the "Three Rs" approach used in other animal welfare campaigns: refine, reduce, and replace (Russell and Burch 1959).

The low market share of welfare-friendly products probably has more to do with consumers' unawareness of these products and less to do with their limited availability at retail outlets. If retailers thought there was sufficient demand for welfare-friendly products, they would sell them out of self-interest. However, retailers can be encouraged to market actively welfare-friendly products to consumers, even in advance of significant consumer demand. They may be encouraged to do so to develop a brand image as a responsible retailer or to protect themselves against future animal welfare campaigns. Retailers—especially large ones—have considerable influence over production methods, are most vulnerable to consumer pressure, and are immune to trade agreements.[3] As more retailers require audits of their suppliers, the need for independent third-party auditing and for harmonized standards with simple, transparent labeling will increase (Thiermann and Babcock 2005).

Research Needs

Costs and Benefits of Animal Welfare

To argue that animal welfare improvements are not economically disastrous to producers, retailers, or consumers, better data are needed regarding the net economic effects of such improvements at each level of the market. Scant data exist on the production costs of welfare improvements in the United States. Better data are also needed on the producer share of retail prices for animal products to estimate the effect of production costs on these prices. There have been few studies evaluating consumers' WTP for animal welfare improvements, and even fewer studies have measured the actual behavior of such consumers in price experiments. There are no publicly available price elasticity data on welfare-friendly products, so it is difficult to estimate the profitability of welfare improvements for producers and retailers and the additional costs faced by consumers. Unfortunately, few economists are studying these problems.

Subsidies

To our knowledge there has been no research on the extent to which public subsidies for CAFOs and other animal industries distort the market for animal products and decrease animal welfare.

Externalities

Animal industries involve hidden costs to society. There has been no full accounting of these costs.

Market Concentration

More research on the impact of market consolidation in the agricultural sector would aid federal regulators considering antitrust and other merger concerns.

Trade

Only recently has there been some discussion of how international trade and trade agreements will affect animal welfare. The problem of substitution needs to be studied to assess the effectiveness of state and national legislation.

Evaluation Research

Few animal welfare NGOs have sought to evaluate the effectiveness of their projects. Cost-benefit studies can help NGOs focus their scarce resources on those projects that are most cost-effective in preventing misery.

Social Marketing

NGOs are likely to increase the cost-effectiveness of their programs by using tools already employed in market research. Increasing consumers' demand for animal welfare can be seen as a marketing problem similar to that faced by any company that wants to increase demand for its products. NGOs need to acquire better data about the lowest-hanging fruit in society—those consumers who can be persuaded with the least amount of effort to adopt more humane purchases, and better data on how best to educate these consumers about animal welfare. One approach would be to measure how WTP varies with the amount of information consumers are given about animal products.

Resources

The reports and research tools related to the economics of animal welfare listed below are available online, although they often require users to be university affiliates or purchase subscriptions and/or pay per-article fees. The descriptions below are taken from the producing organizations.

EconLit: According to the American Economic Association, *EconLit* indexes more than thirty years of economics literature from around the world. Compiled and abstracted in a searchable format, *EconLit*, a comprehensive index of journal arti-

Common Economic Fallacies

It's in producers' economic interests to protect animal welfare.

As suggested by Figure 3, producers have an incentive to maintain welfare only at point D, the point of maximum production efficiency. In cases where improvements in animal welfare decrease efficiency, efficiency usually wins. Animal morbidity and mortality are costly to producers but can be less costly than the improvements in breeding and management needed to reduce morbidity and mortality. As two poultry scientists asked,

> Is it more profitable to grow the biggest bird and have increased mortality due to heart attacks, ascites [another illness caused by fast growth], and leg problems, or should birds be grown slower so that birds are smaller, but have fewer heart, lung, and skeletal problems? (Tabler and Mendenhall 2003)

The researchers conclude that it takes only "simple calculations" to find "it is better to get the weight and ignore the mortality" (Tabler and Mendenhall 2003).

Rollin notes that it is:

> more economically efficient to put a greater number of birds into each cage, accepting lower productivity per bird but greater productivity per cage....[I]ndividual animals may "produce," for example gain weight, in part because they are immobile, yet suffer because of the inability to move....Chickens are cheap, cages are expensive. (Rollin 1995, 119)

And Mench (1992) states:

> It is now generally agreed that good productivity and health are not necessarily indicators of good welfare....Productivity...is often measured at the level of the unit (e.g., number of eggs or egg mass per hen-housed), and individual animals may be in a comparatively poor state of welfare even though productivity within the unit may be high.

Moreover, when animals are no longer productive—as is the case with sick, injured, or "spent" animals—there is no economic incentive for producers to care for them. It's typically cheaper to let these animals die than it is to treat them. For instance, 99 percent of farm animals receive no individual veterinary attention during their lives. In the whole United States, just 220 veterinarians are responsible for the care of ten billion farm animals (National Institute for Animal Agriculture 2005).

Increasing production costs will hurt producers.

Producers can pass increased production costs on to consumers in the form of increased prices. As long as the price elasticity of demand for a good is greater than –1 (as it is for all common animal foods), producers, as a group, can maintain or increase their revenue by raising prices. Producers are hurt only when competing producers incur lower costs for producing the same goods.

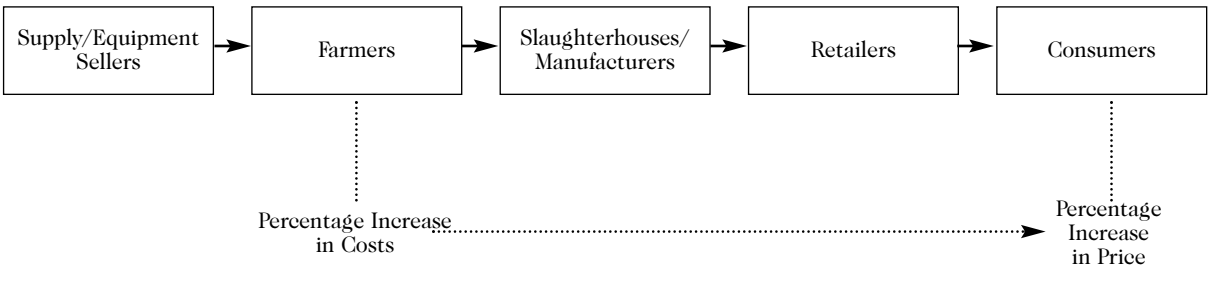
Increasing production costs will hurt consumers.

While consumers may have to pay more for animal-friendly products and services, this does not "hurt" consumers any more than consumers are "hurt" by paying more for safer automobiles. As McInerney (1991, 18) says,

> Good economic sense simply means ending up with the pattern of consumption goods and services that is preferred. It is very little to do with spending less money—if it were we would all die cold, naked, and unhappy surrounded by our cash!

Consumers value animal welfare. An efficient market is one in which the aggregate WTP of consumers equals the aggregate value of the animal welfare provided. WTP research tells us that such a market is likely to be one where consumers pay more for goods and services than they presently do.

Figure 4
Supply Chain Flowchart



The Economics of Farm Animal Production

Free-range meat and eggs are often sold at two to three times the price of conventional cage eggs. This has more to do with niche marketing and economies of scale in distribution than with production costs. In well-developed markets with significant competition, prices decrease significantly. For instance, in the United Kingdom, where free-range eggs enjoy a high market share, free-range eggs often cost less than cage eggs (Farming UK 2006). Production costs associated with many farm animal welfare improvements are modest and can be offset by marginally increased prices to consumers. As long as the playing field is leveled by regulation or adoption by producer or retailer associations, the effect on producers can be minimal.

Several welfare improvements increase production costs at the farm level (Table I). But even significant increases in production costs may not significantly increase retail prices, as farm costs typically represent less than half of the retail price of meat or eggs. Wholesalers and retailers add their own margins to each product (USDA Economic Research Service 2002).

For instance, given the 48 percent farm value share of retail price for poultry meat (USDA Economic Research Service 2002), a 5 percent increase in production costs would translate into a 2.4 percent increase in the retail price to the consumer—a few pennies more per pound of chicken to alleviate the "the single most severe, systematic example of man's inhumanity to another sentient animal" (Webster 1994, 156).

Assuming substitutable products were not available, increases in price would not be expected to decrease producers' profits. Demand for meat, eggs, and dairy products is said to be "price inelastic," meaning consumers are relatively unresponsive to price changes.[4] Producers as a group can pass increased costs on to consumers without a loss in profits, as the decrease in demand is more than compensated for by the increase in unit price (Huang and Lin 2000). It is ultimately consumers who bear the costs of improved animal welfare.

Assuming constant percentage marketing margins at the farm level and fixed marketing margins at the retail level, by purchasing slow-growth chicken meat, barn eggs, and pork from group-housed sows, an American's average annual food spending would increase by only $5 (HSUS 2006). Assuming free-range meat, eggs, and milk would increase production costs on average by 50 percent (an overestimate), purchasing only free-range animal products would increase average per capita food spending by only $3 per week (Blisard 2001).

Table 1
Costs of Welfare Improvements

Housing System	Cost Increase over Standard Practice (by percentage)
Group housing (sows)	0
Group housing (calves)	1–2
Slow-growth (broilers)	5
Free-range (turkeys)	30
Free-range (hogs)	8–47
Furnished cages (layers)	8–28
Barn (layers)	8–24
Free-range (layers)	26–59

Sources: Theuvsen, Essmann, and Brand-Sassen (2005); Eurogroup for Animal Welfare (2005); Andreasan, Spickler, and Jones (2005); The HSUS (2006).

cles, books, book reviews, collective volume articles, working papers, and dissertations, is available at libraries and on university websites throughout the world. It is licensed from information service providers, which provide search engines, links to libraries' full-text subscriptions, and other enhancements to assist users in document retrieval. More information: *www.econlit.org*.

AgEcon Search: A website developed and maintained at the University of Minnesota by Magrath Library and the Department of Applied Economics, *AgEcon Search* collects, indexes, and electronically distributes full-text copies of scholarly research in the broadly defined field of agricultural economics, including subdisciplines such as agribusiness, food supply, natural resource economics, environmental economics, policy issues, agricultural trade, and economic development. More information: *http://agecon.lib.umn.edu*.

CAB Abstracts: Available primarily through university libraries, *CAB Abstracts* is described as the most comprehensive source of international research information in agriculture and related applied life science. Updated monthly, *CAB Abstracts* provides current, in-depth coverage of global journal articles, academic books, abstracts, published theses, conference proceedings, bulletins, monographs, and technical reports. More information: *www.cabdirect.org*.

Hoovers Online: Hoovers provides qualitative company profiles that contain company overviews and histories (private company and international company coverage), product/brand-name listings, competitors, officers' names and salaries, product segmentation data, subsidiaries, and financial data, including access to annual reports and Securities and Exchange Commission (SEC) filings. Hoovers also profiles industries and has an IPO watch calendar. Financial data are available for public companies only. More information: *www.hoovers.com*.

USDA Economic Research Service (ERS): The ERS is a primary source of economic information and research in the U.S. Department of Agriculture. ERS conducts a research program to inform public and private decision making on economic and policy issues involving food, farming, natural resources, and rural development. ERS's economists and social scientists conduct research, analyze food and commodity markets, produce policy studies, and develop economic and statistical indicators. The agency's research program is directed at the information needs of USDA, other public policy officials, and the research community. ERS information and analysis is also used by the media, trade associations, public interest groups, and the general public. Many datasets, reports, and analyses are available online in real time and updates are available via email through free subscriptions. More information: *www.ers.usda.gov*.

U.S. Fish and Wildlife Service (USFWS): The USFWS has a Hunting Statistics and Economics section, which sponsors a National Survey of Fishing, Hunting, and Wildlife-Associated Recreation every five years. The questions are developed in concert with technical committee members from every state and with representatives of nongovernmental organizations. The latest survey was conducted in 2006. More information: *www.fws.gov/hunting/huntstat.html*.

The Humane Society of the United States: The Economic

Dollars and Nonsense

"Officials say Denver could lose $8 million if Ringling Bros. isn't allowed to visit the city."

—ABC 7 News, "Opponents to 'Circus Ban' Bill Rally in Denver Initiative 100 up for Vote in August Primary," July 14, 2004

"Voter Kim Douglas said the predicted economic impact affected her vote. 'The state has lost so much business and revenue, and I was convinced that this would be yet another blow,' she said."

—Bangor Daily News, "Bear-bait Measure Narrowly Rejected," November 3, 2004

Fiscal effects include: "[P]otential sales tax revenue loss, to the extent this bill results in fewer dog shows in California. For example, if 10 percent fewer dogs are shown in California, there is a potential for state and local sales tax revenue losses of more than $1 million annually."

—California State Assembly, Committee on Appropriations, Analysis of AB 418 (Koretz), April 13, 2005

"This year's dove season will bring an additional $87 million to Michigan's economy."

—National Rifle Association news release, "Michigan Dove Hunting Legislation Headed to Governor," June 8, 2004

"Pigs are their bread and butter and they must be treated humanely to be profitable for the company."

—Snowflake, Arizona, Councilwoman Sharon Tate, quoted in "Snowflake Council Opposes Initiative Concerning Treatment of Female Pigs," AZJournal.com, July 19, 2006

Research Department maintains a searchable database of more than a thousand collected articles and reports focused on animal welfare and economics issues. Since the department's inception in mid-2006, two relevant reports have been issued (one dealing with the economic impact issues related to circuses in Massachusetts, the other with mourning dove hunting in Michigan). The Farm Animal Welfare Department research library contains a number of current analyses of economic alternatives to specific factory farming practices. More information: *www.hsus.org*.

See also the resources described in Chapter 1 of this volume.

Notes

[1]While "cruelty-free" labels clearly provide consumers with more information on which to base their purchasing decisions, many consumers do not fully appreciate the key distinctions among these labels and may inadvertently purchase less welfare-friendly cosmetics products. The experience of the cosmetics-labeling efforts suggests standardization of definitions and regulation of terms like "cruelty-free" would result in even more efficient outcomes.

[2]Ethical questions about animal welfare depend on both the quality and duration of animals' lives. Borrowing a measure used in the health sciences, duration can be expressed in terms of "life-years," equal to the number of animal lives affected times the average life span in years. A life-year can also be weighted by a perceived level of welfare. While highly subjective, as some welfare problems are more serious than others, estimating "quality-adjusted life-years" can help to prioritize projects that relieve the most animal suffering.

[3]In economic terms large retailers exercise what is called monopsony power. Their large purchasing share from the wholesale or manufacturing sector makes their preferences or requirements worth responding to. McDonald's Corporation, for example, used its monopsony power as the number one purchaser of beef in the United States to exact animal welfare improvements at cattle slaughterhouses owned or contracted by companies wanting to continue selling beef to the fast food giant (see, for example, McDonald's Corporation 2003).

[4]The price elasticity of demand is defined as the percentage change in the quantity of a good purchased by consumers, in response to a 1 percent change in that good's price. When a good's price elasticity is between 0 and –1, demand is said to be inelastic with respect to price. An increase in price of, for example, 10 percent will decrease demand less than 10 percent. This means that, in principle, the total revenue for the seller of that good will not decrease, as the decrease in demand is more than compensated by the increase in unit price.

Literature Cited

Agra CEAS Consulting Ltd. 2004. Study on the socio-economic implications of the various systems to keep laying hens, for the European Commission. *http://europa.eu.int/comm/food/animal/welfare/farm/socio_economic_study_en.pdf*.

Andreasan, C., A. Spickler, and B.E. Jones. 2005. Swedish animal welfare regulations and their impact on food animal production. *Journal of the American Veterinary Medical Association* 227: 37–40.

Associated Press. 2006. Smithfield Foods to buy Premium Standard. September 18. *http://biz.yahoo.com/ap/060918/smithfield_foods_premium_standard.html?.v=4*.

Bayvel, A.C.D. 2005. The use of animals in agriculture and science: Historical context, international considerations, and future direction. *Scientific and Technical Review of the International Office of Epizootics* (24): 791–797.

Bennett, R.M., and D. Larson. 1996. Contingent valuation of the perceived benefits of farm animal welfare legislation: An explanatory survey. *Journal of Agricultural Economics* 47: 224–235.

Blandford, B., J.C. Bureau, L. Fulponi, and S. Henson. 2000. Potential implications of animal welfare concerns and public policies in industrialized countries for international trade. In *Global trade and consumer demand for quality*, ed. B. Kristoff, M. Bohman, and J. Caswell, 77–100. New York: Kluwer.

Blisard, N. 2001. Food spending in American households: 1997–98, for USDA Economic Research Service. *http://www.ers.usda.gov/publications/sb972/*.

Blum, J. 2004. Statement to U.S. Senate Judiciary Committee concerning animal rights: Activism vs. criminality. May 18. *http://www.animalrights.net/archives/year/2004/000197.html*.

Caspers, J. 2000. Concerning the impact of agribusiness concentration on producers and consumers. Testimony on behalf of the National Pork Producers Council before the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate. April 27. *http://www.nppc.org/public_policy/testimony/testimony000510.html*.

Eurogroup for Animal Welfare. 2005. Into the fold: Creating incentives for improved animal welfare under the Rural Development Regulation. *http://www.eurogroupanimalwelfare.org/pdf/intothefold.pdf*.

European Commission. 2000. European Communities proposal: Animal welfare and trade in agriculture. World Trade Organization, Committee on Agriculture Special Session. June 28. Geneva, Switzerland.

Farming UK. 2006. Free range retail price hits all-time low. April 20. *http://www.farminguk.com/bsp/10130/ews.asp?DBID=103-281-013-096&iPage=1&id=4159*.

Huang, S.K., and B.H. Lin. 2000. Estimation of food demand and nutrient elasticities from household survey data, for USDA Economic Research Service. September. *http://www.ers.usda.gov/Publications/tb1887/*.

Humane Society of the United States, The (HSUS). 2006. The economic consequences of adopting alternative production systems. *http://www.hsus.org/farm/resources/research/*.

McDonald's Corporation. 2003. McDonald's reaches animal welfare milestone: 500 global on-site audits. Press release, May 15. *http://www.mcdonalds.com/corp/news/corppr/2003/cpr05152003.html*.

McInerney, J.P. 1991. Assessing the benefits of farm animal welfare. In *Farm animals: It pays to be humane*, ed. S.P. Caruthers. CAS Paper 22, Reading, England: Centre for Agricultural Strategy.

———. 2004. *Animal welfare, economics, and policy*. Report on a study undertaken for the Farm and Animal Health Economics Division of DEFRA. February. *http://statistics.defra.gov.uk/esg/reports/animalwelfare.pdf*.

Meat News. 2005. Quality mark support. January 19. *http://www.meatnews.com/index.cfm?fuseaction=Article&arNum=8882*.

Mench, J. 1992. The welfare of poultry in modern production systems. *Poultry Science Review* 4: 112.

National Institute for Animal Agriculture. 2005. Vet schools to reshape curricula to meet 21st century challenges. April ll. *http://animalagriculture.org/headline/2005NR/NR_2005Osburn.htm*.

Ollinger, M., S.V. Nguyen, D. Blayney, B. Chambers, and K. Nelson. 2005. USDA Economic Research Service: Structural change in the meat, poultry, dairy, and grain processing industries. March. *http://www.ers.usda.gov/publications/err3/err3.pdf*.

Pickett, H. 2006. The way forward for Europe's egg industry: Keeping the ban on battery cages in 2012. Compassion in World Farming Trust. *http://ciwf.org.uk/publications/reports/Battery_Cages2006.pdf*.

Poultry World. 2006. Shoppers want better welfare. *Poultry World* 3 (March), 3.

Rollin, B.E. 1995. *Farm animal welfare*. Ames, Iowa: Iowa State University Press.

Russell, W.H.S., and R.L. Burch. 1959. *The principles of humane experimental technique*. London: Methuen and Co., Ltd.

Studer, H. 2001. *How Switzerland got rid of battery cages*. Zurich: Pro Tier International.

Swanson, J.C., and J.A. Mench. 2000. Animal welfare: Consumer viewpoints. In *U.C. poultry symposium and egg processing workshops*. *http://animalscience.ucdavis.edu/avian/swanson.pdf*.

Tabler, G.T., and A.M. Mendenhall. 2003. Broiler nutrition, feed intake, and grower economics. *Avian Advice* 5: 9.

Theuvsen, L., S. Essmann, and H. Brand-Sassen. 2005. *Livestock husbandry between ethics and economics: Finding a feasible way out by target costing?* Goettingen, Germany: Institute for Agricultural Economics, University of Goettingen.

Thiermann, A.B., and S. Babcock. 2005. Animal welfare and international trade. *Scientific and Technical Review of the International Office of Epizootics* (24): 747–755.

U.S. Congressional Research Service. 2006. Livestock Marketing and Competition Issues. March 20. *http://www.nationalaglawcenter.org/assets/crs/RL33325.pdf*.

U.S. Department of Agriculture Economic Research Service. 2002. Food marketing and price spreads: Farm-to-retail price spreads for individual food items. *http://www.ers.usda.gov/Briefing/FoodPriceSpreads/spreads/table1.htm*.

U.S. Department of Agriculture, National Agricultural Statistics Service (USDA/NASS). 2005. U.S. hog operations, number by size group, 2004–2005. *http://www.nass.usda.gov/Charts_and_Maps/Hogs_and_Pigs/hopsze_e.asp*.

———. 2006. Packers and stockyards statistical report, 2004 reporting year. February. Table 31. *http://archive.gipsa.usda.gov/pubs/stat2004.pdf*.

U.S. Fish and Wildlife Service. 2002. 2001 National survey of fishing, hunting, and wildlife-associated recreation. October. *http://www.census.gov/prod/2002pubs/FHW01.pdf*.

Webster, J. 1994. *Animal welfare: A cool eye towards Eden*. Malden, Mass.: Blackwell Science Ltd.

Yahoo News. 2000. Close quarters for chickens is unacceptable. September 25. *http://dailynews.yahoo.com/h/nm/20000925/zo/chicken_2.html*.

Zogby International. 2003. Nationwide views on the treatment of farm animals. October 22. *http://animalwelfareadvocacy.org/externals/AWT%20final%20%20poll%20report%2010-22.pdf*.

———. 2004. Poll shows that fast-food consumers care about chickens' welfare. June 2. *http://www.zogby.com/search/ReadClips.dbm?ID=8379*.