

17. The Citizen & the State

The Efficiency of the Marketplace

What is the efficiency of the marketplace?

We can see the efficiency from supply and demand analysis. Whenever two people trade, they both benefit. The buyer is happier with the good than the money. The seller is happier with the money than the good. The extent of this happiness created on both sides of the market is shown by the amount of consumer and producer surplus. We also recognize an element of the efficiency of the marketplace in the marginal characteristic of the market equilibrium. At the equilibrium, the marginal valuation of the buyer is exactly equal to the marginal cost to the seller.

What do property rights have to do with market efficiency?

Consider examples of the destruction of property. If we break our own stuff, it's ok. If someone else breaks our stuff we are outraged. Why? Because our stuff embodies the value we get from consumption. The consumer or producer surplus that existed when we acquired the stuff is stored in the stuff. If we decide that value is maximized by using up our property (by, for instance, breaking a tennis racket in a fit of uncontrolled and spiritual relaxation), then the property is put to its highest use. If someone else does that, how can we know?

Property embodies value. Efficiency requires that value be maximized by using property according to the marginal criterion of the marketplace: The marginal value of the property's use should equal its marginal cost.

What is the inefficiency created when property rights do not exist?

Consider the case of the passenger pigeon. Passenger pigeons once ranged across the eastern part of North America. They numbered possibly in the billions. Flights of birds would blacken the sky for hours. This animal became extinct around 1930. There is ample evidence to suggest that it became extinct because people hunted them excessively in the late 1800s and early 1900s.¹ But, what does "excessive" hunting mean? In the passenger pigeon case this is obvious. Excessive means that the population of the bird was destroyed. In other types of resources where total destruction of the population does not occur, excessive means that too many resources are used to capture the value in the property. This is called the tragedy of the commons.

Tragedy of the Commons

The tragedy of the commons is aptly depicted in two similar but different cases: ground water and oil fields. In the case of both of these natural resources, there is a pool of liquid

¹ A number of questions are raised:

1. Since the birds had been around since No. Amer. was settled, why did they not become extinct until 1930? Ans: Eating them became popular. Guns and shooting targets became popular. Most likely reason is that hunters could descend in mass on the roosting areas as a result of the expansion of the train system.
2. Why did "excessive" hunting cause them to become extinct? Ans: While many types of plants and animals are hard to eradicate (for instance, roaches and mosquitoes), other species are more delicately balanced in nature. Passenger pigeons apparently had a very high threshold flock size. When hunting caused the flocks to be broken up and dwindle in size, reproduction rates plummeted, and the bird population went into a fatal decline.
3. How do we know that hunting caused this effect? Ans: There is very good evidence kept about the shipments of birds to market and the prices that the birds fetched from railroads and meat brokers. There is a clear pattern of the decline in the population based on the number of birds that were sent to market.

contained in a rock formation below the ground. The rock formation holding the liquid is porous and is surrounded by harder and denser rock. The examples are different because ground water is replenished by the natural effect of surface water seeping down into the “aquifer” which is the name for the water deposit. In the oil field, the working assumption is that the deposit is fixed in volume. That is, after a given amount of oil is pumped out of the ground, the field is used up and no more can be extracted.

The natural recharge rate in the groundwater aquifer means that there is a constant amount of water that can be taken from the ground. If more than this constant amount is taken, the level of the aquifer falls. This means that wells have to be drilled deeper and pumps have to pump harder to get the water to the surface.

Assume that the rate of recharge in the aquifer is 600,000 gallons of water per day and that the aquifer begins 100 feet below the surface. A well drilled to 100 feet can take water at the rate of 600,000 gallons forever. However, if two wells are drilled to 100 feet and each pumped at the rate of 600,000 gallons per day, the water level falls to 150 feet after six months. The two wells must be extended to reach the water. Moreover it costs more to pump the water up from 150 feet. If three wells are drilled at 150 feet and each pumped at 300,000 gallons, the water table falls to 200 after another six months. Again all wells must be extended will increased cost in pumping the water out. Eventually, the cost of pumping stops the wells from extracting more than the equilibrium rate of 600,000 gallons per day. Let’s say that this occurs at 250 feet with three wells. Each pumps 200,000 gallons per day.

The equilibrium occurs because the water has a commercial value. The demand for water is its marginal value in agricultural production. The demand curve is the value of the marginal product of water. That is, it is the price of agricultural production times the marginal productivity of water in increases crop yield. Assume that farmers buy water from well operators. The well owners pump the water out and sell it to the farmers. The market equilibrium must occur at 600,000 gallons per day, because that is most water that can be extracted on an equilibrium basis. Over some shorter periods, the amount of water can increase. But this is a market disequilibrium. Rates higher than 600K gal require that the wells be drilled deeper and more energy expended in pumping. Eventually, the market returns to 600K gal.

This is clearly shown in the accompanying graph. The natural recharge rate of 600Kgal is shown as R . When there is only one well operator selling water, the cost of extraction is m at 100 feet. The equilibrium price is p^* . The difference between m and p^* times R is the rent value of the natural resource. When a second well is drilled, output expands temporarily to E and price falls to p_E . But this cannot be sustained because the water table falls. Yet another well is drilled. Ultimately, the equilibrium is reached with three wells at a depth of 250 feet. The cost of the wells completely consumes the rent value of the water.

The tragedy of the commons is the wasted resources in drilling an excessive number of wells, drilling the wells too deep, and incurring the extra cost of pumping the water from that depth. Common access to the resource creates a *free-rider* problem in that no one well operator feels the full cost of his actions. The increased depth caused by each well is shared among all wells.

The example of ground water is similar to many other so-called renewable resources such as fisheries where there is a natural recharge rate.

The case of oil fields is different because the oil field is not naturally recharged. However, the same common pool problem can affect the extraction of the resource. Because multiple wells all draw from the same pool of oil, the only way that one well owner can capture the oil is by pumping it out of the ground before another oilwell gets it. This creates a race to pump the oil out of the ground. Once out of the ground the oil must be stored on the surface until it can be processed. The demand for oil products determines in large part the number of refineries, pipelines, etc., that are available. If excess oil is taken out of the ground it must be stored until it can be refined. Of course, if excess oil is taken out the ground and if its cost of storage is high, its price will be cut. If excessive oil is extracted from all oil fields and if price of crude falls as a consequence, then more refinery capacity will be built. However, one oil field will not affect the number of refineries. Hence, if there is a common pool problem at one field, oil from that field will be marginally discounted and used first at the refinery. Oil from other fields will be left in the ground, because oil is most cheaply stored in its natural reserve.

This race to capture can be contrasted to the efficient extraction of the oil. If the entire pool is owned by one economic agent, then the oil is taken out of the ground at an efficient rate based on the demand for crude oil by refineries. The race to capture causes there to be an excessive number of well drilled. It causes there to be too much above ground storage to be built. Since above ground storage is expensive, it causes the price of crude to be too low and over consumption of oil in the near term. In addition, the race to capture causes the oil field to be pumped to fast with a consequent loss in the total extraction potential of the field.

Property Rights

Property rights are restrictions on the use of assets. These restrictions are valuable because they prevent the tragedy of the commons. Property rights reduce waste and cause assets to be employed in their highest valued use.

Property right restrictions may take many forms. Some of the most obvious are: Ownership of personal property; Ownership of land and other large items of physical property (these claims are usually recorded at the court house); Ownership rights to literary material; Patent rights; Business secrets.

Most of these rights represent claims that can be enforced through tort actions against offending parties. Torts are civil court cases in which one party alleges that it has been damaged by another. The court hears the evidence and decides.

Personal property and land are said to be owned in *fee simple*. Fee simple property rights mean that the owner can do anything he wants to with the property including sell it. Fee simple property rights are *alienable*, which means they can be sold.

To say that the ownership of land is fee simple is simplistic. We know that there are all kinds of extra restrictions placed on the use of land. Some of these restrictions come from private contracting, such as covenants on deeds.² Some restrictions come from public actions such as

² It is said that the property on College Avenue occupied by Papa John's Pizza has a deed covenant that prohibits the sale of liquor. This restriction was put on the deed by a lady that once owned the property because of her moral convictions concerning the use of alcohol. Such covenants are legal and binding forever until someone convinces the court that the circumstances have become so changed that the covenant is no longer meaningful.

zoning. Some restrictions come from the common law, which is really court precedent. Common Law restrictions can be grouped under the heading of the Prohibition of Nuisances. Zoning and nuisance restrictions include things like noise limitations and limitations on the amount of pollution that can be emitted into the air or discharged onto the ground or into water. Pollution restrictions are also imposed by larger government bodies such as the states and the fed's.

Additional government restrictions encompass most everything we do:

- The speed that one can drive on the public highways;
- Smoking of tobacco in buildings;
- Restrictions on fishing, hunting, water use, etc;
- Restrictions on the use of public property;
- Restrictions on the hours of business;
- Restrictions on the way business can be conducted (health and safety, employment of children and animals).

*The Coase Theorem*³

Does it matter how these property rights are assigned? Consider the case of noise restrictions which come from Common Law. If I own a piece of property, I cannot make noise to the extent that it is discomforting to a normal neighbor. This is a property right restriction that is a limitation to the fee simple right of ownership. (Additional limitations are often imposed by government, such as the noise ordinance imposed by City of Clemson). Are nuisance restrictions such as noise limitations good, bad, or indifferent.

In the simplest cases, the answer is "Indifferent". This principle is called the Coase Theorem. The theorem is based on the fact that property right restrictions such as nuisance limitations are rules that can be undone by the marketplace. Hence, they don't really influence economic use of assets.

For instance, if I operate a business that makes noise and someone moves in next door, such as a doctor, who cannot tolerate noise, the court may rule that I must be quieter. However, the court will be overturned by the landlord. The use of the property will be dictated by the highest rent value. If a doctor and a quiet leasee maximize rent, then silence will prevail. On the other hand, if clanking machines and a noise tolerant tenant pay more, then its rock-and-roll time.

The Coase Theorem is appropriately applied when cases are "simple." Some examples that work are: hedges and the height of buildings; water diversion; noise restrictions. The bigger the area covered by the problem, the less simple the problem becomes and the more likely the problem is not solved by the Coase Theorem. In general, transactions costs are the issue.

The Coase Theorem looks at the question of externalities. Externalities are property right conflicts. Slightly different from common access resources, but of the same family. Externalities involve actions by one economic agent that impose costs on another.

Coase made two main points: Externalities are reciprocal and the resolution to an externality problem depends on transactions costs.

The reciprocal nature of externality problems is seen when we think about the nuisance issues that we have been discussing. Consider skateboarding on the Clemson campus. Skateboarders annoy students trying to study and they leave marks on the sidewalks, etc.

³ Ronald Coase, "The Problem of Social Costs," *JLE*, Oct 60.

Skateboarders are happy and students trying to study are sad. Now that skateboarding is prohibited, students are happier and skateboarders are sad. The problem only exists because two different groups are using the same resource or space.

What is the “perfect” solution? The welfare maximizing solution is to limit skateboarding to the point that the marginal benefit that skateboarders enjoy is exactly equal to the marginal cost that they impose on students trying to study plus the marginal cost of cleaning up their tracks. It may be that the “corner” solution of prohibiting them altogether is perfect, but it is hard to tell.

In some other cases of externalities we get a clearer picture of the marginal rule. Take the case of deed covenants that specify what a homeowner can and cannot do on his property. The deed covenants are intended to reduce negative spillovers caused by one homeowner on another. By restricting the color that a homeowner can paint a house and specifying how the yard must be kept, the developer of the land attempts to maximize the profit that the developer will make in selling the lots.

What determines the number and type of covenants? In attempting to maximize the value of the land, the developer puts on covenants until the marginal cost imposed on the homeowner due to the restriction on his choices is exactly equal to the marginal benefit enjoyed by his neighbors because they are not exposed to garish behavior. The value of the land is maximized when this marginal criterion is reached. While we cannot be sure that each developer achieves the perfect solution in each real estate development, we can be sure there is a powerful motivation working.

A flip case to the negative spillovers of residential development is the case of positive spillovers found in commercial projects. The most ubiquitous is that of shopping malls. Shopping malls are externality cases where some stores generate business for others. The big stores bring customers to the location and these customers tend to also shop at the smaller stores. The big stores in shopping malls are called anchor stores. Importantly, they get a rent discount because of the positive spillover effect they create for the specialty stores around them. In the perfect world, the marginal reduction in rent that they receive is exactly equal to the marginal value of the business they create for the small stores. Again, we have some encouragement that commercial developments get close to the optimal solution because the profit of the mall owner and manager depends on properly pricing the externality.

Coase’s second point was that the extent to which externality problems are resolved optimally depends on transactions costs. In the cases of new subdivisions and shopping malls, we can expect that the externalities are resolved in an efficient manner, but what about other cases?

The example of Disney World in Orlando is instructive. Disney went to Orlando in the ‘60s (?) to buy land for a new amusement park. Disney did not go to the beach because of the relative population density and the inability (cost) of buying a lot of land. The amount of land that Disney bought for Disney World is the key. The company bought a *lot* of land. We think that the company bought much more land than it has used on its own projects. It essentially bought land surrounding its own theme parks. It did this so that it could capture the value of the positive externalities that it creates. Of course, in hindsight it may have bought too little land or too much. To the extent that Disney World has been a bigger success than expected, then too little land was purchased. However, the point is that there was a way for the development to internalize all of the spillover costs.

Sometimes we imagine that spillover benefits net out. When a factory outlet builds a store in the middle of nowhere and a McD’s comes along too, there is a natural, offsetting relation

between the enterprises. People come to the mall because they know they can get junk pots and junk food.

Sometimes we do not think that it is likely that the private market can be so efficient. Consider the case of sports franchises in metropolitan areas. Promoters of sports franchises claim that they provide large positive spillovers for the community. Somehow that existence of a sports team makes the city more visible and enhances its economic welfare. If true, then it is hard to imagine how a private real estate developer could put together a deal that is all encompassing over the land values that the sports franchise is presumably affecting. (I say “presumably” because it is still speculative as to whether they really do create such benefits.) But what does happen is that the city government steps in and gives the franchise a break on its taxes, or it subsidizes the construction of the arena. This is an attempt to account for the alleged positive spillovers produced by the franchise. Moreover, it is completely consistent with the relations that exist in shopping malls where a similar phenomenon occurs.

In the case of the city, everyone pays taxes to provide for the municipal infrastructure, just like every tenant in a shopping mall pays rent to provide for the building and upkeep. In the case of the city, the sports franchise creates spillover benefits that all city dweller enjoy (even when they do not go to the games or watch them on TV). Hence, the sports team optimally should pay less tax than everyone else, just like the anchor store in a shopping mall.

How do we know that the city government is not just giving away money to some fat cat sports team owner? We don't. That's the problem. However, we do know that there is a lot of competition to get and keep sports teams, so we have some confidence that competition among cities makes their actions efficient.

Some Coase Theorem Queries

The Coase Theorem says that well defined private property assignments ensure the welfare maximizing use of society's resources. This is a proposition that many people hold to like a religion. When peppered with a zillion questions like, “What about noise nuisances?” and “Why do we have zoning laws and OSHA and EPA?”, they respond with a thoughtful expression, and pose the counter questions: “Why should noise problems not be solved by the negotiations of the conflicting property owners?” “Why do we need zoning laws or OSHA or EPA?”⁴

⁴ Without being quite so dogmatic, this is my view.

Many people view economics as a constant turmoil. Everything is open to debate. Nothing is cut or dried. The old joke tells the tale: “What would happen if you laid out all the economists in the world?” Answer: “Nothing. They would never reach a conclusion.” While some people speak of economics derisively in this way, others find it refreshing. Refreshing or not, there is a method to the madness.

Economics is an empirical science (risking redundancy). It is empirical precisely in that it looks at everything under the sun. It questions anything. Puzzles over everything. “Why are doors rectangular and corn silos round?” “What was the cause of the French Revolution?” “What will be the effect of increasing the drinking age?”

Economics is empirical and also scientific. It is scientific in that it looks for answers using a theory. In the scientific method, you formulate a theory, which is made up of a lot of assumptions that simplify the world around us. The theory makes predictions about many aspects of a problem and related phenomena. Next, we see if the predictions are consistent with reality.

In the course of formulating a theory it often seems that economist reach no conclusion. Or that they can reach any conclusion. This is exactly as it should be. A theory is just a logical construct that changes according to the assumptions that are used to form it. A theory will one assumption says something and with another assumption, it

Consider the following questions. What do you think the Coase Theorem tells us about these:

1. Parking: What is the best way to handle the parking “problem” at Clemson? What is the most efficient? What is the rent maximizing? Are these the same? Why or why not?
2. Public roads: What are the problems with common access to the public roads? Where do we have private roads? What happens on the private roads that are different from the public ones?
3. Right to life: Is having babies a common access problem? Are there any common access resources that are exploited by a new child? Will the number of abortions change if the property rights changed? Why?
4. Smoking in restaurants? Does the distribution of property rights matter?

More Coase Theorem

Coase’s paper on social costs was directed at the issue of pollution.⁵ He had a simple point to make: Pollution is a bilateral problem. When one person emits pollution it is a *good* to him while a *bad* to the people around him. To the extent that pollution is a bilateral problem, there is an economically efficient amount of it. That efficiency margin is defined by the equality of the margins from both sides—the level of pollution is efficient when the marginal benefit to the polluter is equal to the marginal cost to the polluted. Moreover, Coase claimed, the efficient solution was independent of the legal definition of the “right to pollute.”

Several examples had become the standard: one farmer’s cows graze in another farmer’s corn; a coal fired locomotive throws a spark that burns up a wheat field; a confectioner’s mixing machines make noise that prevents a neighboring doctor from performing auscultation (i.e., examining his patients with a stethoscope). The last example is my favorite. The confectioner was in business for many years (over 25). The doctor builds an examination room adjacent to the wall by which the mixing machines were located. The doctor sues and wins the right to make the confectioner turn off the machines. Coase says, “So what.” The example attacks our prejudices. However, Coase is right. Think of the problem in the same way that we analyzed the shopping mall. The shopping mall problem is to put together the most synergistic mix of stores. The doctor-confectioner problem is to determine land use patterns that are most valuable. It does not matter who the law says has the right to make noise or enjoy solitude. The landlord (a single owner of the adjacent properties) will decide the issue. If doctoring plus some quiet activity generates the most rent, then that is the efficient solution and that is what will happen. If candymaking and other noisy pursuits generate the most rent, then the mixer will continue to grind. (The law may make rulings that require that the property ownership be consolidated.)

can say exactly the opposite. This is the way it should be. The problem is to try to make the theory fit the facts as well as it can and then see what it says about the focal point of the debate.

As a casual practitioner of economics or as a hardened veteran it is important to make sure that you have a solid theoretical base. The Coase Theorem is a very good theoretical mooring: My recommendation is to tie up tight. It is ok to swing around this mooring some, but do not cut loose and drift off in the fog.

⁵ Coase, Ronald. "The Problem of Social Costs," *Journal of Law & Economics*, October 1960, p.1-44. See also Maloney, Michael T. and Gordon Brady, "Capital Turnover and Marketable Pollution Rights," *Journal of Law and Economics*, April 1988.

Consider the case of Duke Power building a lake to use to cool water as necessary in the process of nuclear power generation. Does the Coase Theorem apply. The answer is yes—and no. Duke bought the land to build Lake Keowee. Lake Keowee is used to cool water used at the Keowee Nuclear Power Station just north of Seneca. As a consequence Lake Keowee is several degrees warmer than it would otherwise be. Is this bad? To the extent that it is bad for the land owners and users of the lake, it is efficiently bad. The Coase Theorem applies. Duke bought the land, sold it for home sites, and allows boaters to use the lake. If the heat reduces their enjoyment, then Duke is the worse for it. Duke will tradeoff this *bad* against the *good* of making electricity.

It turns out that Lake Keowee was the last of the cooling lakes approved by the nuclear power regulators. This resulted from the fact that a cooling lake built in northern Georgia trapped what was thought to be the sole population of a species of fish (the Snail Darter). Raising the temperature of the lake would have killed the fish and possibly caused their extinction. The regulators mandated that henceforth nuclear plants must use cooling towers.

What does the Coase Theorem tell us about this situation. I say, “Nothing.” The Coase Theorem does not give insight to big picture items. It does not speak on ozone holes, global warming, and the extinction of species. The problem with these issues is that there is no way for an independent economic agent to arbitrage the bilateral values at play in these cases. The social good of harvesting the rain forests cannot be balanced by an entrepreneur against the social bad of the loss of species. (Note that soil run off probably can.)

In a recent, but famous U.S. Supreme Court case many of these issues come into play.⁶ South Carolina some years ago created a regulatory agency called the Coastal Carolina Commission to oversee development of coastal areas. The commission has been fairly aggressive in limiting building on beach areas, ostensibly to protect against beach erosion. The Coase Theorem tells us this is a charade. Beach erosion is a local phenomenon. Developers and homeowners can protect against beach erosion to the extent that it is valuable by their own devices. Indeed, South Carolina beaches have long been developed by management companies that do exactly that. (Fripp Island, Edisto Island, Hilton Head are all excellent examples.) Whatever the true objectives of the commission, they came to loggerheads with the U.S. Constitution. The constitution provides that government cannot “take” property from citizens without providing fair compensation. On the other hand, government can impose regulations that are “in the public interest.” The distinction is a point of some contention in the court. In the S.C. case, the commission ruled that a developer who had purchased two beach lots for nearly \$1 million could not build on them because of the problems of beach erosion that building would cause. He sued. The Sup. Ct. ruled in his favor. Chalk one up for Coase.

Coase gets another win in the most unlikely and most epic of all struggles. In 1970 the United States set course on the most dramatic change in public policy that had ever occurred in the regulatory setting. The initiating event was the passage of the Clean Air Act. The 1970 CAA was the first time that the federal government choose to impose pollution control standards. Congress created the Environmental Protection Agency in that same year to be the authority to define machine level pollution control standard and to impose and enforce these on a source-by-source basis. Pollution control standards of one sort or another had been imposed by states and municipalities since the first town ordinance banning livestock. But the 1970 CAA was the first for the feds and the first time that source standards were ever defined in a comprehensive fashion.

⁶ *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992)

Environmentalists hailed the act as the greatest achievement since the child factory acts. Pollution was to be controlled by mandate by a central regulatory authority. The era of social planning was finally on us.

No doubt it was. Even so there was a twist that no one anticipated except a few with prescience for market powers beyond their years. The source-by-source standards defined and enforced by the EPA were not only a regulation of pollution, but also a catalog of pollution. They restricted pollution and, at the same time, permitted pollution. They were actually a form of *pollution permits*. After a while and by fits and starts, these pollution permits came to be traded. Firms with high cost of clean-up bought permits from firms with low cleanup costs. The overall level of pollution (a big picture, non Coase Theorem decision) was made by the regulators. The decision about who would be allowed to pollute is increasingly being made by the market.

Social Regulation

The 70's were years of other social regulation. Congress passed the Occupational Safety and Health Act, which limited the way that firms could employ their workers. The Coase Theorem suggests that this act was unnecessary and inefficient.

Other regulation included authority for the Federal Trade Commission to impose "truth in advertising" standards. This raises the question of whether truth in advertising is an important social requirement or whether market forces can solve the problem. The case of cigarette companies is a poignant example. Are cig co's defrauding their customers? The issues involved include:

- Individual Freedom
- Addiction
- Social Cost of Medical Services

The answers are scarce. You have your opinions. I have mine. 1) Remember that the Coase Theorem applies. Smoking is not a good or a bad. It is both. 2) I wonder how much more of an addiction smoking is compared to bacon, liquor, or even Coca-Cola. 3) There are no perfect solutions to the medical care problem because it always efficiently involves insurance. Insurance means pooling of risks and always carries with it the adverse selection and moral hazard problems. Even so, one thing is for sure. The less government the better.