

Principle of Economics

Externalities & Inefficiency

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So in previous chapters we studied the perfect situation when free trade and free markets achieved the maximum amount of welfare, the optimal total surplus.

And when we discussed the government intervention, we...the implied idea was that the government intervention carried inefficiency and the government would do best to leave the free market alone.

But we remember from chapter 1, there are situations when the government can improve on the free market solution, that's when some market failures happen and chapter 10 studies the first kind of market failure that we could encounter that of externalities.

So we say that externalities are the uncompensated effects of market participants on other people in the economy.

And these externalities affect, in the presence of these externalities market participants make choices that are different from what social planner or what society would prefer.

We can distinguish positive and negative externalities.

Negative externalities are some ca... imply some costs of production that the producer doesn't take into account.

Examples of negative externalities are, for example, second-hand smoking.

When market participants decided to light up a cigarette, they consider their own benefits and costs, so they consider the taste of the cigarette and the chances of catching diseases or getting cancer from own smoking.

But smokers ignore the secondary effect that their smoking has on other members of the society, the effects on second hands smoking by people and the risk of other members of the society getting cancer.

And another example of negative externalities is that congestion, when drivers choose whether to take subway or to take a car to work, they're only considering the

speed at which they will get to work so that's the benefit of taking a car on the road would be the speed of traveling drivers also take into account their own costs of driving on the road.

If there's congestion, drivers are considering how much extra time, how much extra nerves they will lose in the traffic, but usually drivers ignore the effect of their driving on the congestion phase to buy other drivers.

So individual drivers ignore the dis-convenient, inconvenience cost to other drivers on the road.

In the presence of negative externalities, we can say that the supply curve, the private supply curve that market participants face doesn't include all of the effective cost of production.

In addition to the cost of production faced by private individuals, there is some cost to the society of providing this service.

So if we have the amount of driving or the amount of drivers on the road we would say that costs face some ...the drivers face some costs of driving on the road and ignore the extra costs of driving imposed on other drivers.

We would say that in the presence of negative externalities, the private market solution is... includes too much production at too low of the price because if we included all of the costs, all of the social costs of production from the society's point of view, we would want to produce less and charge higher equilibrium price to cover all of the social costs of production.

Positive externalities are on the demand side of the market.

We say that positive externality exists if consumer of the product doesn't receive all of the benefits of the provision of the product.

So for example, if consumers receive immunization against certain diseases, consumers are only considering their own benefits and costs of immunization.

So they consider their own benefits of staying healthy, their own costs out of pocket costs of getting health shots, but consumers ignore the beneficial effects on other members of the society.

For example, if you yourself stay healthy, you are implicitly also making other members of the society healthy because you will not spread diseases to other people.

Another example is a network externality.

When consumers are deciding to get a cell phone, they're only considering their own benefits and costs such as the benefits of being able to call friends, the costs of that consumer has to pay to the telephone service provider.

But consumers are ignoring the benefits imposed on other members of network of the phone provider.

So because when a new consumer gets a cell phone that means that other cell phone users have one more person to call and other users of cell phones benefit from having another person that they can call with their phones and so... Because users individual users ignore this positive externality of their action, we may think that in the equilibrium, too few people will buy cell phones and they will be willing to pay too little for the service compare to what would be socially optimal.

So we would say that in the presence of positive externality, the willingness and ability to pay by private consumers is less than the social benefit of providing these services.

So on top of the private benefit received by the consumer, there is some extra benefit that the society receives that the private consumer ignores.

And in the unregulated free market equilibrium, we would say that too little, too few consumers will buy the product so the market quantity will be too low, market price will also be too low because the private market ignores the external effects of providing and consuming the service.

So we have a problem.

There are some external effects of consumers' or producers' actions that are unaccounted for.

And let's discuss some of the options to avoid these issues.

One possibility would be if the market could fix these problems itself.

We would say that in some situations it is possible.

There are some institutions and there are some ways that free market can introduce to fix these problems.

But if the free market cannot fox the problem itself, government has to intervene and try to change people's incentives to internalize the effects of external effects.

So we would say that the government can fix the problem of externalities by choosing correct taxes or subsidies or setting quotas on the minimum or maximum amount of production and consumption in the marketplace.

So here you should think intuitively that graphically when we drew the effects of positive or negative externalities, we shifted the market curves upward or downward.

And so if the government introduce a policy which shifted the market curves in the opposite direction by the same amount.

This policy could internalize the externality because the private supply or demand curve could be shifted to the level where the social supply or demand curves.

Alternatively, the government could simply dictate how much has to be, how many cell phones have to be sold in the marketplace or what's the maximum amount of drivers on the road.

And as a side note, I said that in some situations the market itself can take into account externalities.

In the real world, we know that people have their moral codes and social sanctions for behaving inappropriately.

So drivers who drive too much or smokers who smoke too much are sanctioned by the rest of the society.

Even though these market participants don't receive explicit taxes or penalties for their behavior, there are implicit punishments or rewards for behavior which is socially beneficial.

In the private market, we see charitable organizations that give money to activities that create positive externalities.

If two businesses use the same resource and have a problem allocating the resource between themselves, in the real world, we observe that sometimes these businesses merge with each other so that they wouldn't haggle over the resource so that the entire resource would be allocated efficiently within one company.

We would say that if the property rights are in place or if the government allocates property rights correctly, private individuals can contract among themselves to take care of the external effects.

So the Coase theorem is a nice theorem that says that if property rights are assigned to resources in the real world, private individuals can bargain with each other and allocate the resource to its most beneficial use.

So this theorem says that it doesn't matter how the property rights are signed.

Supposed that I have a big dog in my apartment which barks at night, and supposed that my neighbor likes to sleep and doesn't like big dogs.

It doesn't matter if the law says that I can have a big noisy dog or if the law says that everybody has to be quiet at night, we can still bargain with my neighbor and either I can compensate my neighbor, I can pay my neighbor money to allow me to have the dog, or my neighbor compensate me for giving the dog away.

We can solve the conflict between me and my neighbor through bargaining.

So the assignment of property rights is not important.

It is important that property rights exist that it is clear who owns the resource.

When the government intervenes in the market to solve externality, the government can use market-based policies or command-and-control policies we studied, we learned the distinction between these two policies and previous chapter, command-and-control policies are policies when the government sets fixed price level or fixed output level in the market.

Market-based policies are taxes, subsidies or trading permits which allow market participants to adjust to them and which allow the market to find equilibrium price and quantity.

Command-and-control policies require certain behavior or forbid certain behavior, for example, a requirement to provide certain amount of the product could be a requirement for students to get immunized.

This kind of regulation imposes a minimum amount of quantity of immunization in the marketplace and you can think that in the presence of positive externalities, this policy could fix the problem.

An example of a command-and-control policy forbidding certain behavior would be an environmental policy dictating maximum amount of pollution.

Instead of command-and-control policies, the government could impose market-based regulation, for example, such as corrective taxes, corrective taxes or sometimes called Pigovian taxes after welfare economists Alfred Pigou.

And as I said a couple of minutes ago, the goal of these taxes would be to exactly offset the amount of the external effect.

So if there is a difference between private supply curve and social supply curve, corrective tax would raise the private supply curve exactly to the level of the social supply curve.

And finally another market based policy would be to introduce tradable permits for certain kind of behavior in dealing with the environmental externalities.

Environmental authorities sometimes allow sometimes give polluters certain number of permits and then allow individual polluters to trade these permits with each other.

So that if one company can reduce pollution at a low cost and another company would reduce pollution at a higher cost, these two companies can trade each other, so that this firm would reduce more pollution than the other company at a lower social cost.

Let's look briefly at the effects of these three competing policies so with the corrective tax which is a market-based policy, in this graph, I am showing the amount

of pollution and on the vertical axis, I am showing monetary value of this pollution.

So in this graph, this graph shows us that companies have certain demand for pollution.

Okay? If companies create a lot of pollution this graph shows us that the companies can reduce pollution by one unit at a relatively low cost, because the value of the additional unit of pollution is pretty low in this part of the graph.

If the firm kept reducing its pollution the cost of reducing pollution would become higher and we may think that this is a realistic picture because it is harder to, it is easier to reduce pollution when a company has very high pollution level then reducing pollution when the companies already operating very cleanly.

And if the government imposes a tax on pollution then each firm would set its pollution level where the cost of reducing pollution would be the same as the benefit of reducing pollution.

Here we should think that the implicit benefit of reducing pollution is the savings from not having to pay corrective taxes.

Okay? So with this corrective tax of pollution, in the market equilibrium we would have this amount of pollution and companies would be paying this amount per unit of pollution and we may think that the government would collect this rectangle is in tax revenues.

Alternatively the government could impose a quota on pollution so with the same demand for pollution in the marketplace instead of fixing instead of imposing a tax, the government could set the maximum allowed of pollution at each company.

And if the government set this quota exactly at the equilibrium level of pollution under the corrective tax, we could get the same solution between these two scenarios.

The only difference is that in the scenario with a quota, there would be no tax revenue, producers would keep, producers would not have to pay anything for pollution they cause.

So the distribution of resources would be different.

Distribution of the welfare would be different.

But in terms of efficiency the results are identical.

We get the same level of pollution and the same equilibrium price at the same equilibrium price of reducing emissions.

Finally, the second market based policy would be too introduced tradable permits.

So suppose we have two companies.

One company with a relatively high demand curve for pollution rights and one company with a relatively low demand curve.

So between these two companies, we could say that this and for this company, it's relatively cheap to reduce its pollution.

And for this company, it's relatively expensive.

So instead of dictating how much each of these companies should reduce their pollution, the environmental authority could let these two companies contract between themselves.

And in the equilibrium, these two companies would decide that it's cheaper if this company reduces its emission and allows this company to increase or keep its emissions unchanged.

Because if this company reduces its emissions, this company could pay some amount to the other company, and both, and with this trade of pollution permits, both companies could gain.

This transfer of money between the two companies could more than compensate this firm for reducing its pollution.

And this payment could be less than the savings that this company achieves.

So we have a look at three different forms of regulation of externalities, two different kinds of market-based policies and one command and control policy.

And if they are structured appropriately, all these three policies can achieve the same market outcome.

In Chapter eleven, we will continue with this discussion to different kind of commodities so that exist in the real world.