**Externalities**

**Professor John Min**

I am going to introduce to you a new TV series. It is called the -- instead of the TV show that was on FOX, the -- what was it -- 90210. Yeah, yeah. I am going to introduce you to a TV series called Zip Code 22015. Zip code 22015, and that is where I live. That is my neighborhood and…

**Male Speaker**

Econ Professor John Min lives in a neighborhood haunted by what economist call a "spillover effect" or an "externality", a situation in which an unintended cost or benefit of an activity that falls on people besides those pursuing the activity.

**Professor John Min**

When I first moved in, I could tell right away that the most important thing in that neighborhood is, what?

**Female Student**

A car.

**Professor John Min**

No! That is what I thought, but we are beyond cars. What is it?

**Female Student**

Lawn.

**Professor John Min**

Condition of the lawn. You know that is? It is a sentiment. I live in a neighborhood where -- how can I say it - they judge the content of your character by the condition of the lawn.

**Male Speaker**

And John's neighbors expect the world to judge them by the condition of all the lawns in the neighborhood.

**Professor John Min**

Here is my neighbor's lawn. Is it not nice?

**Male Speaker**

Now, both John and his next door neighbor, Dennis, have lovely lawns. There is, however, what John calls a lawn failure.

**Professor John Min**

The problem is this. We have a beautiful lawn, beautiful lawn, but we have a lawn failure. There is a property line that goes right down the middle on this patch of the lawn. This side belongs to me and that side belongs to Dennis.

**Male Speaker**

And the two neighbors have never been able to cooperate on watering this patch. So it goes brown in the summer, which not only makes John and Dennis feel bad. In economic terms, that is an emotional cost to them, but lowers the entire neighborhood's self-respect, a much broader social cost. To stick with the language of lawn watering, a spillover cost from John and Dennis's action also known in economics as a "negative externality".

**Professor John Min**

When you come to my house, when you drive into that cul-de-sac, when you park right here and you will look up, you are going to see a patch of dirt, because no one takes care of that lawn. Now, here is the more important question though: How can we fix this?

**Male Speaker**

At this point, Professor Min began suggesting possible solutions to the problem.

**Professor John Min**

And they can subsidize…

**Male Speaker**

When suddenly, another externality rang in.

**Professor John Min**

What is that? Is that a phone?

**Male Student**

Yeah.

**Professor John Min**

Did you just get a phone call?

**Male Student**

Yes.

**Professor John Min**

In the classroom?

**Male Student**

Yeah.

**Professor John Min**

Well, well, well, well. All right, do me a big favor. Could you look at -- count the seconds. Okay. Who is calling you right now?

**Male Student**

I do not know. Hello!

**Professor John Min**

Is anyone there?

**Male Student**

I do not think I know this person.

**Professor John Min**

Wrong number? That even makes it worse.

**Male Speaker**

A wrong number. No big, it seemed, to the guy who got the call, but should it not be?

**Professor John Min**

Time out, time out, time out. We just experienced what type of externality? Action of one individual had a spillover -- cost. Who felt it?

**Female Student**

All of us.

**Professor John Min**

You felt it. What happened? We were lecturing about the externality and suddenly we have to stop, because of action of one person that it -- it affected?

**Female Student**

All of us.

**Professor John Min**

All of us. So now, how should -- how should we solve this problem?

**Male Speaker**

Mahmood's cellphone call has a clear external cost, which we as good economist are about to graph. But first, let us put price as usual on the Y-axis, and the on the X-axis quantity. Here, the total number of cellphone calls, assuming, to keep the numbers simple that each call lasts one minute. Here is a very rough sketch of Mahmood's individual cost curve for the cellphone calls he takes in class, including the cost of the phone service and the value of Mahmood's own scarce time.

MMC, Mahmood's marginal cost. That first phone call would not cost him much, but once he uses up his monthly quota, calls start costing more and more and with each marginal call, he is using more and more of his own time, which becomes precious, the lesser that he has. That is why the marginal cost curve slopes up.

MMB, Mahmood's margin benefit curve. If he checks caller ID and takes only the most important calls, say from a perspective date. Those first ones provide a high benefit. But if he loosens rule and takes more and more, each marginal call will be less valuable. And Mahmood gets a lot of calls.

Mahmood's marginal cost curve intersects with his marginal benefit curve about here, which reveals the number of calls Mahmood would be willing to take during class where the marginal benefit is exactly equal the marginal cost. But, and here is the big but. The calls he chooses to take cost his fellow students and their cost is not on the graph.

A modest cost as it happens being in a community college, still Professor John Min and the class setout to estimate the damage.

**Professor John Min**

But you know what. The harm has been done. We need to be compensated somehow. So how should I do it?

**Male Student**

You can take a look at how much money -- I mean, the tuition in one of them pay to be in the class.

**Male Speaker**

Say in-state students pay a $108 for a two-credit course like this one.

**Male Student**

And how much time I have been talking on the phone.

**Male Speaker**

As it turned out, about one minute. So 24 one-hour classes per semester equals how many total minutes in class?

**Professor John Min**

Where is your pencil and paper? Where is the paper? You can use the phone, the phone calculator. And if you are not really good with math, this is a good time to call your buddy. Lifeline, right?

**Male Speaker**

Twenty-four classes times 60 minutes. Fourteen hundred and forty minutes per semester and $108 in tuition divided by those 1440 minutes gets what cost per minute?

**Male Student**

Seven and a half cents times 20 people in the class, and it would be a $1.50.

**Male Speaker**

The class has estimated the spillover or a external cost of $1.50 per minute for cellphone used during class time, and adding the spillover cost to Mahmood's individual margin cost gives us a new curve. A social marginal cost curve that represents one way to reckon the cost to everyone of Mahmood's indiscretion -- not counting the Virginia taxpayers who are subsidizing much of this class.

Moreover, if this had taken place at a private school like Dartmouth, Depaul, or Duke, you would be talking tuition of more than $25,000 a year, which works out to something over $2 a minute per person. In an Econ lecture of 700 then, a measly one minute interruption could have a spillover cost of more than $1400, but it is not a factor in the call taker's decision, because she or he does not have to pay.

So a social marginal cost curve better reflects all the cost associated with the transaction and so an economist, all the costs are key. Any truly efficient outcome would include it. And how do we determine an efficient outcome? It is here at the intersection of the social marginal cost curve and the marginal benefit curve, because here, everyone's cost are considered and for fewer calls, only those worth all the costs are taken.

(*Phone Rings*)

Excuse me for a second.

(*Phone Conversation Starts*)

Look, I cannot listen to that right now. It cost society a fortune.

(*Phone Conversation Ends*)

See, if I took that call for even a minute, even at a low opportunity cost of your time, say 10 bucks an hour, I would have used about 17 cents of your time, multiplied by say half a million of you who used McGraw-Hill Econ textbooks $80,000 or more of your collective time wasted by this one negative externality. Unless of course in this, it was worth something to you in instructional or amusement value, in which case, you will have to do the math. But the point is negative externalities are everywhere from two-person transactions like Professor John Min and his neighbor.

**Professor John Min**

And I said, "Hi, Dennis!" And he says, "Hi, John!"…

**Male Speaker**

That are in theory, at least, easy to resolve to one's with wider impact as with our cellphone call examples to externalities that affect indeterminate numbers of people such as airplanes that transport their passengers in relative quiet, but deafen the rest of us, porn that can offend us, pollution that can poison us -- all our market failures in that the usual concepts of marginal cost and marginal benefit do not result in an efficient outcome, because the decision maker's marginal cost curve does not include everyone else's cost.

And if society does not account for the negative externalities of something, it gets more of that something than it would want. The market has failed to send the right signals, failed to come up with the most efficient outcome.

**Professor John Min**

I am going to ask you to get up or leave…

**Male Speaker**

The class is trying to dialup a workable solution.

**Professor John Min**

So what can we do?

**Male Student**

We take it off, sir.

**Male Speaker**

Now, government intervention is one obvious way to correct the market failure of externalities and in fact, most grade in high schools and some colleges simply ban cellphones in class and confiscate them when they ring. But as an economist, Professor John Min has taken on the role of government to apply a more economical solution -- a tax.

**Professor John Min**

All right. So you owe us $1.50 and I do not kick you out. Is that a deal?

**Male Student**

Sure.

**Professor John Min**

All right, give me a $1.50.

**Male Student**

I have only a dollar.

**Professor John Min**

Where is the 50 cents?

**Male**

I do not have it.

**Male Speaker**

Professor Min took a pen for the 50 cents.

**Professor John Min**

What do you think, 50 cents? All right, so -- anyway. Is that okay? I take the $1.50, you get to stay? So here we go. Here is the rule in this classroom. It is okay for you to receive phone call in my classroom as long as long as we know that the cost, the tax that you are going to incur. How much is that? It is a $1.50 per minute.

**Male Speaker**

And that the tax money at the end of the semester will be shared by all in the form, in this case, of a class pizza party.

**Professor John Min**

Is that a good deal? You can answer that now.

**Male Speaker**

But free pizza is not really the point, which we can see with one last look at our graph. The $1.50 per minute tax shifts Mahmood's marginal cost curve resulting in a new greatly reduced equilibrium quantity. Mahmood will now choose to take way fewer calls, not this many, but this many and that benefits everyone in the class. We invite pointing out that in a classroom like this, figuring out the total social cost is not that tough, nor is the problem that tough to resolve. But when it gets to negative externalities like airplane, page porn or a pollution involving billions of dollars and the health of the millions of people, it is a whole lot tougher.

<http://www.mhhe.com/economics/solman_video_mov/external.mov>