Econ 4545: First Midterm (Second half). Fall 2015

Answer two of the three questions asked in the spaces provided.

A few general comments:

Some people do not understand the word "because"

If you say A is true because of B.

A might be true and B might be true but that does not mean that B is the reason that A is true. Often what follows the "because" is either an incorrect statement, or, if correct, not the reason that A is true.

One reason this happening is because of misstatements/misconceptions about efficiency and inefficiency. The problem is you think you understand what they mean but don't and don't understand that you don't, and don't believe me when I tell you that you don't. Have I told you in a quiz that you do not understand, and have you then come to see me to make sure you do understand?

1. So, Murti (a member of our class and a member of society) likes to drink pumpkin beer. Given her income, the price of beer etc., she would be better off drinking another one (even though she has already had four), but has yet to order it. From society's perspective is the initial situation efficient?

The answer to this question is "It depends." Explain, in part, by describing one or more cases where we know the situation is inefficient before she drinks the 5^{th} beer. And a case or cases where we know the situation is efficient before she drinks the 5^{th} beer.

(Note that "case" refers to a set of assumptions, not to 24 bottles of beer.)

Answer: it depends. If her consumption of beer affects no one else, then the current situation is inefficient. (In explanation: by ordering it she would make one member of society better off (herself) without making another other members worse off).

If her consumption of beer affects other members of society but only positively (makes them better off) then the current situation is inefficient. (Drinking another beer would make some members better off and no members worse off.)

What if Murti's consumption of the 5^{th} beer affected no other members positively but affected some members negatively? In that case we know the situation is inefficient **if** the maximum she would pay to have the 5^{th} beer is greater than what those negatively affected would have to be compensated to accept her having that 5^{th} beer. That, is there is the potential for a Pareto Improvement.

If Murti's WTP to drink her 5th beer is less than what is required to compensate those who would be worse off we know that her drinking her 5th beer is not a PPI. The question is whether other things could happen that are PPI? If the answer is no (that is there are no PPI available to society) the initial situation is efficient.

Think of this case another way. If we have a case where if a member of society is to be made better off, that member must be Murti, and it must be by her drinking a 5th beer, and that must make some other worse off, then the current situation must be efficient.

It is much easier to identify cases of inefficiency than cases of efficiency

Some comments on the answers:

Some of you are still saying incorrect things. For example, saying that things are currently efficient if a change away from the current situation makes some members worse off. I see that statement often and it is not correct. If the current situation is efficient, then any change from that situation that makes some better off **must** make some worse off. If the current situation is inefficient many changes from it will make some better off and some worse off. Whether a change is efficiency increasing depends on whether the gainers have enough gain (in $) to compensate the losers for their loss (make them whole). If this is true at the current situation, the current situation is not efficient.

The current situation is not necessarily efficient if drinking the 5th beer makes Murti puke on all of her friends, even though a number of you said that if the 5th made her puke on her friends the initial situation is efficient.

If the gain to the gainers is less than the loss to the losers (those who gain from the policy do not have enough gain to compensate the losers) then the change in question is not efficiency increasing. However, this does not mean the current situation is efficient: they could be other changes that would be efficiency increasing.

One or two of you in your answers made a very subtle mistake. It is correct to say that if Murti's marginal costs and benefits and society's marginal costs and benefits, Murti will choose to consume the efficient number of beers from society's perspective (and her's as well)

But is in not correct to say that if this in the case Murti will consume an inefficient number from society's perspective. This statement would be correct if we add that she gets to choose how many to consume.

Remember that one way to get Murti to drink the efficient number is to pass a law that says she has to drink the efficient number of beers. If efficiency is achieved that way, the outcome is efficient even though the MB to Murti from the last beer she drinks does not equal the MB society gets from that beer.

Royce's answer of an efficient case (edited a bit):

Murti is at the bar alone except for the bartender Bob. Murti and Bob are the only members of society. Bob will close the bar as soon as Murti finishes drinking. If the **only** way to make Murti better off is ordering and drinking a 5^{th} beer, which makes Bob worse off (he wants to go home), and if Murti's wtp for the beer (above the price) is less than what Bob would have to compensated to voluntarily stay, the initial situation is efficient.

Royce made the efficiency case easier to describe by assuming society has only one other member.

2. Assume that people smoke cigarettes only to increase the concentration of nicotine in their blood. Assume that the smoking of cigarettes produces second-hand smoke (particulate matter) that makes other members of society worse off. The smoker also inhales some of that particulate matter and he would prefer that was not the case.

The amount cigarettes smoked and the amount of second-hand smoke are neither regulated nor taxed. (It is an unregulated free market where smokers (and non-smokers) rights are not well specified.)

Assume a new product then comes to market, electronic cigarettes, and deliver nicotine to the user at the same dollar cost as do cigarettes, but electronic cigarettes produce no particulate matter, so neither the smoker nor others experience particulate matter when someone smokes an electronic cigarette. (Everyone is fully informed about the effects of nicotine and particulates and everyone could care less about the effects cigarette smoking has on others). Before and after electronic cigarettes come to market, everyone smokes their utility-maximizing number of regular cigarettes. From society's perspective, are the efficient number of regular cigarettes smoked? Yes or no, and explain why.

Answer: Yes after the introduction; no before their introduction.

Before the introduction everyone smokes their utility-maximizing number of cigarettes (the efficient number from their perspective). However, there are negative external effects (second-hand smoke/particulate matter) that the smoker does not take into account when they decide how many cigarettes to smoke. So, they smoke an inefficient number (too many) from society's perspective. Marginal social cost of their smoking a cigarette is greater than the marginal private cost.

After electronic cigarettes are introduced, no one will smoke regular cigarettes because anyone who wants nicotine will smoke an electronic cigarette. In explanation: the money cost of nicotine delivery is the same but there is no inhaled particulate matter, so every smoker prefers electronic to real. (Remember that we assumed nicotine delivery was the only reason people smoke.) Interesting even though the smokers ignore the negative effects regular-cigarette smoking would have on others, they smoke the efficient number of regular cigarettes—zero

Some comments on some answers:

Some confuse the distinction between "efficient" and "efficiency increasing". If the switching from regular cigarettes makes some better off and no one worse off it is efficiency increasing (it is also a Pareto Improvement). But saying that does not imply the number of regular cigarettes smoked is the efficient number. It could simply be a number closer to the efficient number. In this case it is the efficient number but one does not demonstrate that by demonstrating the new number is closer to the efficient number than was the old number.

Again, some got things wrong because they do not understand efficiency and inefficiency.

One of you said that in the initial situation the inefficient number of cigarettes were smoked because the social cost was higher than the social benefit. This statement is not necessarily true

but most likely untrue. Total is being confused with marginal. This same person later said that electronic cigarettes eliminate the social cost of smoking. This statement is incorrect. Private costs are part of social costs—the electronic cigarettes are not free.

Smokers are members of society.

Some of you said, initially the number of cigarettes smoked is efficient **because** there are negative external effects. This statement is incorrect. External effects are necessary but not sufficient. Assuming the existence of external effects implies inefficiency is a big misconception so saying this costs points. If you said this you do not understand externality-type market failures nor the distinction between external effects and externalities. Another word like because is "if".

Did you say that zero regular cigarettes would be smoked after the introduction of e-cigarettes?

One of you said that in the initial situation smokers would smoke the efficient number from society's perspective because they would prefer to not inhale particulates. This is incorrect logic. The inefficient number results because they don't take account of the negative effects on others. The writer is confusing an internal cost of doing something with the external costs of them doing it.

3. Recently in class we have been discussing a world of abatement technology (the ability, for example, to reduce the pollution from widget production, without decreasing the number of widgets produced). This makes it sound like abatement is making the bad stuff disappear.

Earlier in the course we talked about materials balance. It implied that (given the current state of technology) the only way to reduce the total weight of waste emitted into the environment is to first take less stuff from the environment. This sound like "If we want to emit less into the environment we need to produce and consume less stuff." This view of materials balance suggests there is no such thing as abatement.

How would you resolve this seeming contradiction between our discussion of materials balance and our discussion of pollution abatement to a student in Econ 4545?

Answer: If you smoke on the other side of the street from me, I breathe in less-second smoke but that does not reduce the amount of particulates going into the environment; crossing the street simply lessens their concentration near me.

There seems to be a contradiction, when there is no contradiction because we use the word "abatement" forgetting that we are not using a standard definition of the term. Wiki defines it as "referring to a lessening, diminution, reduction, or moderation."

Dictionary.com has (1) The act of abating, or the state of being abated; reduction, decrease, alleviation; mitigation. (2) Suppression or termination (3) An amount deducted or subtracted.

This makes it sound like pollution abatement is a reduction in the amount of pollution, which is ok if we mean a reduction in the **damages** from the waste emitted, but is not ok if we mean a reduction in waste.

We cannot violate the fact that production and consumption neither create nor destroy matter, they only rearrange it. So, this is true of abatement efforts. Abatement does not make the matter in pollution go away, abatement simply changes it into another form. So when we abate we are simply using energy and resources to transform our waste from one form to another.

Consider, for example, the pollution from our widget factory. In that example the waste was being piped into the river. And piping it into the river must of have been the firm's least-cost option for getting rid of that waste, holding widget production and the regulatory environment constant. Labor and capital allocated to abating that water pollution means getting rid of the waste materials somewhere else. For example, burning it (so the waste ends of in the air) or burying it in the yard, maybe converting the waste into some other kind of waste before disposing of it.

Another example is scrubbers on factory smoke stakes.

A problem with the way I presented pollution abatement in class is that when I modeled abatement as a production process (e.g. amount second-hand some received by Fred and a

function of the number of cigars Penny smokes and resources allocated to reducing the amount of second-hand smoke Fred experiences), I failed in mentioning and specifying that the material in the smoke abated from Fred goes somewhere else, effecting other things and other people. I kind of got around that (not really) by assuming there were no other people. The same is true in terms of reducing the water pollution from widget production holding widget production constant.

So, what I should have probably done is specified the abatement function as a multi-product production function.

For example, imagine that initially total waste M is in the form P_1 where P_1=M and P_1 is pollution type 1. (more generally the waste would not be of all one type)

So the production function I wrote in the notes to represent abatement is, strictly speaking, either misleading or wrong.

When one allocates labor and capital to abatement, for example, the second-hand smoke Fred experiences for Penny's cigar smoking, what is produced is a vector: some amount of second-hand smoke experienced by Fred, some amount of second hand smoke experienced by others, and other sorts of wastes (some of the smoke gets converted into other forms of wastes).

Of course when we consider regulating or taxing pollution we should take account of the fact that "abatement" simply converts the stuff to other types of waste, and those types can also effect people.

Maybe we should define abatement as the ability to change the mix of the waste stream holding constant the amount of the good produced.

What I was looking for to get your grade to go from 9/10 to 10/10 was a mention of that production function and how it really did not capture the totality of what is going on.

One of the things that mislead, was the production function I presented:

$P_{1A} = P_{1A}(P_1, L_A, K_A)$

Should have been a vectored-valued function (the dependent variable is a vector rather than a scalar) such as

$(P_{1A}, P_{2A}, M_1, M_2)$ such that the weight of the material in this stream of outputs is equal to the weight of the material in P_1)

The math is a bit beyond our skill set, so I was only looking for you to mention that the production function I presented was misleading.