

EEP100 Lecture 11 (Oct 1, 2009)

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Thursday. Today's Thursday. October 1st. Oh yes it's October 1st! It's the deadline. I've been very pleased to see lots and lots of e-mails come in to my inbox. The vast majority of you have finally converged on what I asked you to do. The deadline is, as I've mentioned a million times, tonight. Midnight. So I have about 50 or 60 blogposts so far. Hopefully, maybe more, I'm not quite sure. But those of you who want those 10 points of credit, make sure you send it in within the next 13 hours. Don't do it during class.

Today, also, office hours are 3 o'clock until 4 o'clock in case you're coming by, you might want to. In case you already have a question on homework 2, which you haven't seen yet, but you'll see it by the end of the class. Homework 1 we'll hand back at the end of class.

I'll take a brief moment to go over the most popular ways to not get points, and then you'll be able to look at the detailed answer key when that gets posted soon. Homework 2 is going to be due one week from today. One week after that is the midterm, so you'll have enough time to get everything done. I'm in the middle of a complete haze and daze. Anyway, I hope I still make sense.

Are there any questions? Anybody? Outstanding stuff?

I think I've learned something about how inefficient AC Transits are. So because there's a bus that goes down College, I normally take the bus to get to Evans, but then today I found out that if I walk on Telegraph and I take the long way, it actually takes less time instead of going there, waiting for the bus, and...

Takes less time to walk?

Yeah, it's so sad.

I'm with you there. So individual efficiency versus systems efficiency, right? And it turns out the biggest thing on mass transit is that people don't necessarily care that the bus shows up on time; they care that it comes ever 10 minutes or so. I go the BART, I get on whenever the next Bart is. If the bus comes every forty minutes, then you're screwed. If you miss it by 3 minutes then you have to wait another 40 minutes. So mass transit has to be frequent to be helpful, to be handy.

Any other Q&A?

Income elasticity. You asked a question; I screwed it up, so this is the clarification. There's three types of effects you're going to have with income elasticity. The again is your change in demand for a product given a change in your income, controlled for income and the quantity you are demanding, and that's going to be less than zero for inferior, between 0 and 1 for normal, and then greater than 1 for luxury. In the last class I said something like the normal good was exactly on one, which is ridiculous. It's this range right?

Normal goods...so normal and luxury goods...are they dependent on income elasticity? For example water, let's say. So water...if income elasticity is more than one, is that a luxury good? Or is your luxury good like a Mercedes Benz car.

No, no, no. This is the economic definition of a luxury good.

So it's not our definition about what is luxury?

Forget all that normal common sense stuff. This is economics. So luxury, how's that? Or E luxury or economic luxury. The idea, essentially, is that a Mercedes Benz is not something the average college student will buy.

So as your income is interesting, you're going to be switching from these goods (ramen) into Mercedes. It's a tendency. It doesn't mean you'll automatically go out and buy one, but it's a tendency. That's what we'll say. Anybody have questions about that?

It's a definition. The word gets thrown around a lot. It's not necessarily. The only thing I could say is...the elasticity is 0.5. What kind of good is this? It's kind of hard to figure out why this matters in real life, but the word is used all the time.

So let's go to the theory of the firm. This is a phrase (theory of the firm) that is connected to a 1937 paper by Coase. It turns out that Ronald Coase, who I'm pretty sure got a Nobel Prize in economics, he basically wrote two papers. And one of them is called Theory of the Firm. He wasn't even the first to do it. He's just a really clear expositor. And the other one he wrote is *The Problem of Social Costs*, I think. I think that's assigned in this class, or is it not? Suggested? Somewhere?

Well, the problem with social cost is essentially trying to figure out externalities, ok? How do we do with somebody that's polluting us?

But theory of the firm, basically, is like...when do you have a firm? When do you not have a firm? So let's take the example of a coffee shop and a donut shop.

And the question really is, in theory of the firm: should we merge these into one entity? Should we merge these into one bigger firm or not? What is to be gained? So if you have a coffee shop, and Mr. Coffee runs the coffee shop, and he's the coffee entrepreneur, and Mr. Donut runs the donut shop. What are the benefits to be gained by merging into one?

Let's look at the status quo. What are the negative aspects of having a separate coffee shop and a separate donut shop, from the perspective of the business people (not necessarily the perspective of the customers?)

You have to run two shops.

You have to run two shops. Two shops; two guys, two shops. So you might want to throw away a guy. So you've got two managers. What else?

Overhead costs?

Overhead costs? Like a fixed cost in a sense?

So let's just call it double overhead or fixed costs.

Isn't it like they're adjusting their price according to the other one. Because coffee and donuts are complements. So if donuts were to lower their price, then coffee might think about increasing their price if people are going to buy more coffee.

Okay, so there's a problem of profit maximization between...how do you get the maximum profit from both of them when they're not coordinated, right? So that's important. Profit max, I'm just going to call that. What else? Someone new?

Production costs?

Production costs? In what sense?

In terms of purchasing the supplies needed to make each product?

Okay, so in a sense you're kind of having an economy of scope, or scale. So the overhead is an economy of scale, and there is another one called the economies of scope.

Let me take a little side trip from that, which I've got on number 7 on here. What does economies of scale mean? I've talked about it before; this is not the first time you've heard it.

Isn't it like the more you produce of something, the harder it gets to produce it?

Right, okay. And the scale. Economies of scale. So increasing returns to scale, as you produce more, the marginal cost is decreasing. Increasing returns to scale. What's the technology look like that's leading to increasing returns to scale? This is decreasing costs, increasing returns to scale is technology. What is that graph going to look like that's going to give you this kind of cost curve?

I'll take a wild guess. What does it look like?

Upward sloping like this? This is output, and these are all inputs. Is it this kind of upward sloping or is it this kind of upward sloping? A or B? B, right? It's increasing at a...well hold on a second. It's actually A, isn't it? B is the one that's intuitive, but increasing returns to scale...we haven't gotten to the one that's decreasing returns to scale. B is decreasing returns to scale. DRS. A is an increasing returns the scale. The more you do, the more you put out. And that has something to do with running something with higher and higher efficiency. And that's the analogy. The idea is that nuclear power plants are increasing returns to scale. You make this huge upfront investment, and the first megawatt hour (or the first unit of energy) is very expensive. And if you produce more and more, it additional unit gets cheaper and cheaper.

So that means that more quantity that produces more input, but the marginal cost is growing also...

Right so for each additional unit of input, you're getting more and more output. Which is weird in terms of what we talked about kind of the...it's not equivalent to law of demand, but we consider it decreasing returns. The fact really is that the shape of this curve is

often increasing and then decreasing. So you have an inflection point (remember that word from math?), and here, what you have here in calculus... what you've got here is you've got the first derivative. Change in Q, change in input. I'm just going to put a generic thing called input.

The first derivative is greater than zero throughout this curve. But then here is the second derivative (remember that?). What's the second derivative, here? Concave down, so it's less than zero. And over here? Greater than zero, right? And at this inflection point, it's literally one. It's constant returns to scale. So there's going to be a 45-degree line going through here. So this is going to be an area of increasing or decreasing returns to scale? Increasing, right? And over here? Decreasing, right?

[inaudible student question]

Well, what I asked was: what leads to this curve to here? And that would be A, to this one here, right? But the fact is, after awhile, marginal cost goes up again. So what's going on over here?

What's going on with the technology over here?

Inefficient?

Not inefficient. Use the letters over there with the calculus. What's going on over here? Decreasing returns to scale, right? Increasing returns to scale over here. Constant returns to scale, right? This one point. Let me neaten that up for you and point out something which is going on. We've got input, we've got output, and over here, we've got costs, marginal costs, and you've got output.

I've drawn this for you guys before, but this is going to be a more complicated one. Increasing, decreasing, okay? And the marginal cost is going to be falling, stop, rising. This is a very popular cost curve in economics because there's lots of curves, lots of calculus, lots of optimal points. So this leads to that.

And "marginal costs" is assuming that your input is static. You're a price taker, right? Let's not make life too complicated.

So this is like calculus and curves and accounting (or whatever), but if you were thinking in terms of the business (and we're going to get back to the business for a second here) what kind of reasons are you going to have this switch. Why are you going to go from increasing returns to scale to decreasing returns to scale? What's a real world reason?

Law of demand?

Demand is not the reason. This is production side. Demand is over there.

You've maxed out your technology?

You've maxed out your technology. You might be running your plant at 110% capacity, right? You're running your workers at more than 8 hours a day, or sometimes more than 14 hours a day.

The cost of inputs increase?

I'm going to hold that constant. What else? This is basically the answer. You're hitting your limit of one of your inputs. Not the cost, but the limit...it's kind of what I said before, you've got the coffee machine and you put 3 spigots, right? 3 people, then you put 4 people, then you put 5 people, then after awhile you've got too many people, right?

In the nuclear power plant example, would using too much water be an example of when you stop because you've used too much water?

Well that would be kind of an input constraint. But the power plant example is...when you're running at low volume for the nuclear power plant, you're running at low volume for a nuclear plant, you're running at a 10% capacity, you still have very high costs. Those costs will fall as you hit 80-90% capacity. As you hit 100%, they might bottom out, and then when you go to 110%, you might have to start babying it along. It's the notorious...put it up to 11. Remember that? So if you put your amp up to 11 (that's spinal tap right?) You're pushing it beyond its limits of something and it will break. And this is what's going on with the firm. You're all happy land here, and then the costs start going up, right? At some point you will exceed optimality and in economics you'll see optimality, right, because your cost is greater than your price. But in a pure engineering sense, you'll see optimality when you go like this. And you'll start breaking things. You're running the engine too fast, or whatever.

So that would be the inflection point?

Yeah, so as soon as you go beyond the inflection point you're getting into decreasing efficiencies. You're willing to go past the inflection point if you're actually going to be making money. So this is the economics, this is the engineering. Technology, markets. Or technology, costs. So this is how these things relate. And it's very similar to utility. In a utility function, this is how happy you feel about something and how much you're willing to pay for it. But this is technology maps on to profit maximizing decisions.

So one of the big limiting factors to any company or any firm is what I mentioned before: management talent. It's the idea of...you know the Brazilian guy that runs the juice shop? I've never actually been there. Who's been to that thing? It's really good, right? It's one dude though, right? He started it with an apple cart or something, right? There's one guy though. There's no chain. So you might see the McDonalds version of that if he can figure out how to duplicate himself. McDonalds is boring, but as a business model, it's pretty good. Because they can figure out how to do a 65 cent hamburger across... whatever...15 thousand international outlets. So if your limiting factor is going to be your manager, or the charm of the person who's selling you something, then you're going to start hitting decreasing returns to scale. It's not the machine anymore; now it's just the human element. Does that make sense? That's the economics of it. That's how businesses are going to work.

Now, what's the difference between scale and...

So scale is just output of a widget. We'll call it a Widget X. What is the difference between scale and scope? What does scope mean?

Does scope mean predictions for the future stuff?

Predictions for future stuff? No, not what I was thinking of. But that might be the right answer later, sorry...

It's like the area.

The area, what kind of area? We're getting definitely into jargon land, because this is like a non-intuitive word.

Things related to the item

Okay like as in what? Give me an example. Coffee and donuts? Yeah.

Like with economies over scale...it would be getting bigger over time.

No, we're doing timelessness still.

Is it specialization? Like what products you're making...

Okay, so what does scope...do you have more scope or less scope if you're specialized?

Less?

Less scope if you're specialized. Okay.

So scope essentially refers to the different products that you're producing, right? And the idea is that...so you could have a shop, and inside the shop you're selling coffee, and if you add donuts, you have an economy of scope...how?

How are you having an economy of scope?

If you're doing better than the other coffee shops...

That's going to be the result. But why is there a scope? Why is there an economies of scope there? This is what's going on over here. The question of merging two firms. The donut firm. Why is there an economy of scope? Think of costs or benefits or markets or whatever.

Adding another product to differentiate yourself?

Not exactly, but if you add...but if I say that it costs me \$100 to start my coffee shop, fixed costs, right? How much does it cost me to start my donut shop in the coffee shop? Less than \$100 or more than \$100. Less, right? You've got your rent paid, you've got your manager there, you've got the lights on; that's economy of scope. Essentially, you can add another product without duplicating your fixed costs. So it's kind of like... quantity...sorry not quantity.

The cost of A and B is less than the cost of A plus the cost of B. That's the idea, okay? It's that you're going to have some costs that are going to be in common, right? If you have a coffee shop, and then you start an auto repair shop inside your coffee shop, you're

not going to do very well with scope. You've got the coffee maker, you've got the hydraulic lift, right? It doesn't really help, right? That's not a scope situation, but if you're a retail outlet...if you're a Best Buy selling CDs already, selling DVD's [is not going to be a] big deal. They all sit in the same cases. 24:28

Yeah?

I was just going to ask if scope has a lot to do with complementary items?

It has a lot to do with complementary items. It could have to do with substitutes as well. You're a supermarket? You've got a big house, right? Got Coke, put Pepsi, right? So the idea mostly about scope and scale is about fixed cost because you can also have an impact on productive variable costs or marginal costs, right?

My favorite example of that is...I think it was KFC that was doing this, but I know McDonalds...who's had an apple pie or one of those pies at McDonalds? Who's had one of those things? And they're like... "Mmm, yummy." You'd have to be like completely drunk. But what do they do? They're like, "Well, we have the deep fryer here...it's already making French fries; let's just drop a pie in there." Right? Because that's how they make it.

Really? No....

Yeah! It's deep fried!

Yeah but not in the same oil as French fries...

Yeah, but whatever...it's the same bin, right? They just put another thing next to it. It's not the same oil. It's the same bubbler machine, right? So you just divide the oil in half. It's not a big deal. And you just drop your pies in there too. Right? I thought KFC was trying to fry everything for a while. They're like...fry the chicken, fry the French fries, fry the pie, fry the ice cream...

So once you've got the fryer, you just put as much stuff through the fryer as you can, right? Once you have a kitchen, you cook as much stuff as you can. It's kind of like...if you're in the dorms and then...I'm the guy with the blender. And down the hall is the person with the microwave. And everybody's like setting up this virtual kitchen of like... "Oh I need to blend something! Okay, good!" right?

So on the marginal side, you can also have lower costs because you might have simultaneous production processes. The idea that while a person is making your coffee, they're also getting you a donut from the bin because the coffee machine is warming up.

But isn't also a factor, for example, if you have a kitchen then you cook as much as you can for Chinese, Indian, other stuff. At some point, nothing is good anymore. I mean if you have...

Okay yeah, if you mix it all together.

No, what I mean...or like...

Okay, so what you're getting there is...okay so now you're...if you scope out too much, then it's like when you go to...

I mean, if you go to Small Town, USA, and it says Oriental Cuisine. It's like...we've got Japanese, Indian, Thai...it's just a whole bunch of rice all thrown in the same spice bin. Right? So it's just like...

Well it's like the quality of the individual products...

That's right! So you might be saving on costs, but the quality is falling because essentially, you've expanded out too far. Right?

This is General Motors with 9 brands of cars (or however many brands they have). They couldn't pay attention to any one brand. Right? And that's kind of...

In the business...the MBAs...it's like...stick to your knitting. What's your core competency? But you don't go to core competency when...Apple is only making an eight gigabyte nano and that's it. It's like: "Well we can do a 16...oh okay that's not too hard."

But you have a sixteen, and a thirty-two, and a sixty-four, and a four...and sixteen different colors, and different jacks, and different plugs, and after awhile people are like: "I don't understand."

Your customers can't even understand how to buy something. That's the typical Chinese restaurant menu. It's like 50 pages long, and you're like: "Holy cow. Just tell me what the special is."

So there will be increasing economies, and at some point, decreasing economies will kick in. Customers don't understand what you're doing, your quality will fall. You've got products mixing in with each other, you don't have enough refrigerator space, or whatever. You've got no idea what your inventory is because you've got too many products. This is not an uncommon problem as well. Okay, so that's mostly what I want to say about scale and scope. Let's go back to our firm.

These two firms are trying to decide whether or not they want to merge. Basically, we've talked about a lot of the reasons why they want to merge. And the way that Coase explained it...he basically said: Look. Here's your firm. There's activities that are inside the firm, and there are activities that are outside the firm. You will bring them inside your firm if the change in profits from bringing them in is greater than change in costs, okay? It's obviously if you make money.

It's 1937, we're still talking about nice, simple, basic economics. So the border...his idea was: well, do we want to expand our firm to be bigger or not? Do we want to take more activities in house, or do we want to send them out. Outsourcing. Literally, this is where outsourcing is coming from. Can we...should the University of California outsource our janitorial services? UC does not do that. Many, many companies *do* do that.

Shall we outsource our advertising? Shall we outsource our printing? UC has its own printing plant. The UC is actually more like a Soviet style bureaucracy than a cutting edge entrepreneurial business. They've got their own janitors, they've got their own power plant, they've got their own accountants, they've got their own...the printing press is kind of crazy. They have busses, all kinds of stuff that a firm would tend to outsource out because of what? Why would a firm make a decision to outsource this question? The activity?

Cheaper.

Costs Less.

Cheaper, costs less...

Specialization?

Specialization...that leads to cheaper and costs less...that's the root cause...what else? That's the cost side.

Relations? Hiring a janitor or outsourcing that? You don't have to pay as much?

Yeah, that's actually really interesting. This is like California agriculture. Or, sorry, agriculture in general. You've got your farmer on a field, and he's got his farm workers, and the law says that you've got to have documented, legal farm workers. And legal farm workers turn out to cost \$12 an hour. The illegal farm workers (of which there are many, and who I love because they're workers)...let's say they cost \$8 an hour. So how does this guy, the farmer, get away from that problem? What he does is he says: Oh, I'm going to contract to this guy, the coyote, who brought some buddies up, or not-buddies up, and he will guarantee that those workers are legal. He'll sign the paper. No problem, amigo. And I pay him \$8 an hour. And essentially what I'm doing is paying less, and I'm shifting the risk.

Let's just do it in a real economics sense. I'm paying \$10 an hour. Why would I pay 10 and not 8?

Cheaper than 12...

Okay, yes, cheaper than 12, I'm not an idiot. Anything else?

You have no risk.

It covers the risk, right? So ten equals, actually, \$8 plus risk.

I don't understand...if you pay \$12, you have no risk. Because at \$12 you can get a legal worker.

But now I'm paying \$10 and I have no risk. I just shifted the risk to mi amigo who's willing to take the chance because he's one dude in a truck. I have a farm. This is why illegal drug cultivation does not occur on someone's property. They do it on national parks. You can seize that land; it belongs to the Feds, right? That's shifting the risk.

And we're going to get into risk more later on, but this is literally risk. The thing that you guys understand in terms of car insurance and accidents...stuff like that. So this is an outsourcing decision that is getting at the legal system, and essentially how efficient, or inefficient, the system is. So the decision whether or not to outsource or in-source (let's just use that word) is going to depend on the decision, essentially, it's going to be one of these things. Change in profit, change in activity. Right? If it's greater than zero, are we going to outsource or in-source?

In-source?

In-source, right? If I put my activities of my firm up, and my profits are going up, then I'm going to in-source it, right? And if it's the other way around, I'm going to outsource it.

By activity you mean the costs of something?

I essentially mean almost anything the firm can do. It can either be on the cost side (cost or maintenance) or it could be on the activities side in terms of what you're producing. Are you going to produce donuts or coffee?

So we have this thing of two managers; that's a cost. There's overhead. The profit maximization...

I was wondering...between the 8 and 10 dollars...it gives you the same amount, right, in terms of value? Whether you pay 8 or you pay 10?

No, what I'm claiming is that if you pay the immigrant \$8, you take the risk.

Oh, right, yeah.

If you pay the coyote \$10, he takes the risk. Right? It's two dollars of risk.

So the question really is specialization versus generalization. This is not jargon. Specialization means that you're going to narrow your scope of activities. Not your scale, but your scope. And generalization is that you'll expand them. So that's essentially your boutique, a specialist firm, versus your conglomerate. General Electric has finance, and nuclear power plants, and electricity generated here, and submarines, and a whole bunch of stuff.

And then Peet's Coffee does coffee, right? Peet's Coffee does not own coffee plantation. They probably roast their own stuff. They might outsource their janitorial. They're trying to compensate what's called "sticking with their knitting". So this is the constant tension within firms. That's why you see firms that are adding a division, throwing out a division, getting into a business, getting out of a business, because of they're always sitting there...that's why this paper is so important, this Coase paper. It describes the fundamental dynamic of companies within businesses. Including the guy at the juice stand. Including McDonalds.

It's applicable to all business, everywhere. So our coffee guy, and our donut guy, they might discuss a merger. They will merge if the profit is positive from the merger. So the

big thing is...yeah we can save on costs; we're actually going to benefit in terms of customers because we sell a donut at the same time as we sell a coffee; we don't have to decide to walk next door or walk two blocks away. That's significant. But what happens if the coffee person is really good at making coffee, and they screw up donuts because they leave it in the fryer for too long? That's a problem of generalization as opposed to specialization, right? So this is what's going to go on. And the customer's like...it's like AMPM minimart. Yeah you've made a coffee. Yeah you've made a donut. But they suck. Or then you go to a French pastry bakery and they're like, "Oh, we make the croissant!" and that's all they do (croissant).

When I was in high school, my mom went past this place at closing time and they were literally throwing out boxes of pastries. It's like "Oh, these are old." They're from this morning, right? They're French. They don't do "day old". Americans are like...we take home food from a restaurant. Doggy bags don't exist in most of the world. And it's like...day old? 50 percent. And people are like, "Yeah, yeah I'll eat it." But the French are like, "No, no, we throw our croissant out."

So my job ended up being collecting the donuts from the end of the day. So I'd drive home with this huge box of pastries, and it's just really nice to have a couple on the way because we took it to the church and all that stuff. So if you do your donut thing as a donut store, you better be a good donut store, right? Because if you don't do donuts well, you're out of business. And same with coffee. You can merge and potentially do better, because you're saving some costs...if your quality is relatively good. But if someone comes and starts a store next door, and they start to really out-producing you in terms of quality and quality value (which is price per quality) then you will really go out of business. You will really have to find a way of competing.

I just had a general idea about the labor dynamic of it because I feel like if you're merging, obviously you're going to have like the higher end people...like you're going to reduce the number of managers. However, for the lower end...for the people that are actually...like the baristas...they can only do the barista part. So I feel like the unskilled workers will remain the...

Right, so say you've got two people in here and two people in here. Now is the firm going to be able to get along with four? Yes, you're not saving anything, but you're not losing money. If you can do three, then you're saving money. If you need five, then what the hell is going on here? Right? That's wrong. So this is the notion. It may not work, and then you may have to go to this. But that's not necessarily a problem. At this scale, it could be okay. Right? The guy at the juice stand...he has like 60 products. And he's like, "Yeah, 60 products. I've got bananas, I've got mangoes, and I've got oranges, and I can have a banana shake, a mango shake, a banana-mango shake, a banana-orange shake..." And so the menu gets really long very quickly, but it's actually a few small ingredients. If he starts doing tacos, and he starts doing whatever...massages...then he's going to be out of luck.

You said that [inaudible] have to be relatively decent but if they merged, couldn't one compensate for the other and increase the quality and cost of the other one...

Potentially. But say that there's this awesome coffee shop and crappy donut shop. Does awesome coffee shop want to merge?

It could start as a coffee and donut shop...

And then it goes downhill because your business partner sucks. So potentially your business partners could put up with something because they're willing to pay for some convenience. This is the idea of the triple play or quadruple play with your cable phone, mobile phone, all these other things. So it's like okay...I'll...but what happens when you do a triple play and an average cable bundle (which is forty or fifty bucks a month...we'll get into bundling or price discrimination soon...) but if you're willing to have your phone or your cable from the same company, even though the company may not be the best at either, it...what?

Costs less?

Costs less, right? Or one bill, even. But it costs less...

So the company is willing to put up with the degradation of quality if they get some cheaper price or convenience...or same thing. Cheaper hand.

Another hand? Yeah?

Alright so generalization means...or which one means...one guy, but a lot of different types of products, or where you own the multiple stages of the production for your products?

Okay, so...that's...multiple stages of production is called vertical integration, and this is more about horizontal integration. And Walmart is kind of hard to figure out what a retailer is a [inaudible] is...because it's not like back in the day...well in fact there was...back in the day Walmart only did clothes and stuff that didn't go bad. And then they started going into groceries. So that was a horizontal move outward. Walmart did not care about vertical integration.

The opposite of Walmart was Ford. The Rouge River plant. Very, very famous. They used to take in raw...they used to take in coal and iron and rubber in one end of the plant, and out of the other end of the plant would come a car. They did everything. They owned the rubber plantations, they owned the coal mines, they owned the iron mines, so they were doing everything from...almost a cradle to the grave situation. Cradle to out the door.

Walmart is sitting there going: "We don't care about supply. We just want to see (we have our roof) what we put under our roof. So they've gone to food, because that's not too far away from what they're used to.

Then would Walmart be specializing in each of the final product? Or would the other one be specializing in just that one product?

Right, in a sense. Walmart is specializing in retail. And then there's other people that do the wholesale or production. They usually cut out the wholesale; they go straight to producers. Other questions? No? Okay.

The other aspect that's interesting is that...

Let's get out of theory of the firm and get over to profits, profits, profits. So who can tell me the difference between an economic profit and an accounting profit?

What's an accounting profit?

You have a positive number at the end...

You have a positive number at the end of the numbers...what number does it...it actually depends on what numbers you put in here, right? So I've got sales minus costs, profit. Right? So the question really is...what are these? What costs are you including?

It includes opportunity costs?

Opportunity costs, right? So say that you say you have your coffee shop, and you sell \$100 worth of coffee, and the cost of goods sold is \$5. And your rent, let's say, is \$10. You have \$85. You're the coffee entrepreneur. You have an \$85 accounting profit. What's your economic profit. Is it greater or less than \$85?

Less?

It's less in terms of opportunity costs. I'm going to put in...I think this is valid...no. Opportunity costs essentially are what?

What you give up?

What you give up to do that, right? So say that you could make \$100 sweeping the floors. Right? Is that firm economically profitable?

No.

No, right? No. Say that you get \$20 of utility because you like being your own boss. Is that firm economically profitable?

Yes.

Right. Yes. So there's a whole bunch of...people hate economists sometimes, because all they do, sometimes, is just redefine everything to fit our theory, right? So if you want to, you could basically define a way. You could literally define away all profit. You could say, oh let's make sure we take this into consideration, and that into consideration. This is the way that utility function includes everything. My utility that exists from the whales in Alaska is positive, therefore I'm a happy person. It's like "Woah, hold on."

So with opportunity costs you include many, many factors in there. Many of them are hard to quantify.

So when you do accounting profit, that's when you do opportunity costs, and when you do economic profit, that's when you don't?

Accounting profit is only...let's just call that cash.

Okay, so economic profit basically includes the opportunity cost.

It can be foregone costs, but there's no actual cash flow. Right? So opportunity cost...at the start of the semester, I said I'm teaching this class for free because my salary is going up because I'm a lecturer, and it's going down because my post-doc is taking it out of my salary. So what's the opportunity cost of me being here? Make up something...don't have to...

Time. Time is the biggest opportunity cost. The idea that time equals money, maybe?

Or, more importantly, it equals utility. There's a notion that people have a disutility from labor. That when you work, you have to be paid, because you prefer to just hang out. Leisure, right? But my time...I'm obviously making a rational decision...I think I'm making a rational decision...my time is that I prefer to lecture than to use this time elsewhere. Or potentially...that I'm learning something, so that this contributes to my human capital. Another expression being thrown around. Or because essentially I'm contributing to my career because this lecturing is helping me with respect to the way other people see me, or this whole idea that I'm learning...that's the kind of thing too.

So let's go to use guys for a second. You're going to school. The cost is...where's our union laborer? She's out? She's protesting somewhere? She usually sits over there. So the cost of school is like 10K for fees plus 10K for rent, let's say. Plus what? What's the opportunity cost of school?

That you could be working?

Foregone earnings. Let's say 30K. Not hard to say. You could do that at Peet's or whatever. So your decision to go to school...is this 50K?

Isn't it minus 30K?

These are all costs.

Is it 50K? Is 50K the right number?

What about the benefits?

Just costs. We're looking at costs.

Can you put the 10,000 in fees in the bank?

I think we should be doing that. Let's put it like that, okay? That's good.

Wouldn't you be paying rent anyways?

Yeah. You would be paying rent anyways. So here's the thing that's kind of obvious. It's kind of like...you go get your 30,000 dollar job, and you pay 10,000 in rent? Or do your parents pay 10,000 in rent?

There's all these other things...cost shifting...because my parents are paying for school so it's free, right? But I find, and almost everybody will, is that rent, or the cost of housing, is that a normal good or an inferior good, or a luxury good?

Normal?

Normal good, right? So if you're paying for making 30,000 dollars, are you going to live with...share a bedroom with somebody?

No, I did that when I was in school. So maybe 10,000, but if I said, "Look." If I was outside, maybe it would be 15,000. So really my cost of going to school...I'm actually saving 5K. So maybe it's more like 35,000. That could be a way of just looking at your basic opportunity costs type of calculation, right?

But if you were not going to school, you could be living at home with your parents, right? Because you don't have to pay anything for rent.

But then you have to live with your parents. And that costs more too, right?

So that's the idea. It's like...oh yeah I want to pay rent, but I don't want to live at home. But you're right, you could save money in terms of cash, but then you have a disutility of living with your parents. This goes into the whole debate about how much rent you would pay.

But then there's the benefit. When I talked to you guys about the little walkout thing. And then I said maybe you're going to school you're going to learn something, and then you graduate (or maybe you don't learn something), and then you get a piece of paper. And then someone says, "Oh good, instead of paying you \$30,000 a year as a high school graduate, I'll pay you 50." So that's something you would take into consideration. You take the sum across time, across four or five years, and you get \$175K of costs versus 20K per year for 4 years. 800 thousand versus 175 thousand. 175 thousand right now, 800 thousand over my life time, is 800 the right number to use?

Come on Mr. Discounter.

No.

Right. Why no? Because as Wendy would say, I would gladly give you two hamburgers tomorrow if you give my one hamburger today. Right? If you have a dollar today, it's worth more than a dollar tomorrow. So 800 thousand dollars over your lifetime is not worth 800 thousand dollars today. It's worth less than that. This is where we do discount rates and stuff like that.

Okay so more things. We did opportunity costs, we did costs accounting (costs accounting is just finding your nickels and dimes). Now cost accounting, I find, is

actually very much in vogue because of the people that are doing carbon footprints. Has anybody been following that?

The idea that those steel metal bottles...the New York Times did a story on them and said that if you use that bottle...the cost benefit in terms of carbon footprint of steel bottles versus the equivalent number plastic bottles...you've got to use that bottle (something like) 500 times before you save the earth, officially. So when you go to these corporate events, and they start handing out bottles like they're candy, and you take them home and put them on the shelf, you did just kill a tree, or whatever.

So you really have to be careful about...well it's called life-cycle analysis. What goes into steel, manufacturing, shipment, the plant that made the steel...it's just crazy accounting that just goes on forever. Compared to plastic, which is merely barrels of oil or petroleum.

So cost accounting is another type of cost. I'm doing this because I'm talking about profits. But it's just usually about money. But it can be something about carbon or something like that. And the cost benefit...how does that work? That's a very important tool in economic analysis. Why is cost benefit important recently? Or since a little bit before you guys were born—the Reagan years? Why is cost benefit...where is it being used most obviously?

Where have you heard that expression used?

Future investments?

Future investments? I don't know, help me.

Well, you try to think of things that benefit more...

So when you're doing a cost benefit calculation you have to think of the stream of benefits over the future. But do firms make cost benefit calculations?

Did you see my shirt today by the way? Do you know what the answer is? Did you read the answer? It says (in very small type) "Why did the economist cross the road?" Why? "The marginal benefits are greater than the marginal costs!" Duh.

It's so bad. The thing with this shirt is...oh it's got an even better story than that. Because I bought it and I got it, and I'm like "man this type is so small and I can't even read it" and then I called the company (Café Press) and I said, "I hate this shirt; I want to send it back." And they said, "Just keep it." Cost benefit right?

So they credited me back. My cost was zero. Except for my phone call.

So do companies do cost benefit? What does it mean? What are they doing when they're doing cost benefit? What's their version of cost benefit?

Marginal cost is less than marginal benefit.

Right, that's not hard to understand. That's been going on since the beginning of time. The hunter wakes up in his cave. "Should I go out? I'm hungry. I better go kill something to eat." Cost benefit. We know about that. But the revolution in cost benefit occurred in the environmental sphere, in the economic sphere, in the resource/environmental sphere, when they started looking at regulations. You could also look at this as the Full Employment Act for economists.

The government now, since the Reagan years, has been doing cost benefit analysis for things like dams or freeways. Or safety regulations, right?

What's the cost of a regulation?

Enforcing it.

Enforcing it, you've got some bureaucrats.

Deadweight loss?

Deadweight loss in a sense of additional...increase in price, reduction in quantity. What else?

Making up the regulation?

Negotiating the regulation. Extremely interesting area. We'll get into lawn mowers if we can, and the B&B. What else? That's the political economy of regulations.

Groups who are against the regulation, or what not?

Okay so negotiations...fighting over the regulations, right? Well the biggest cost of the regulation is that, for example, you say...DDT. Who's heard of DDT?

It was a pesticide, in fact...an insecticide. It was very popular in the United States in the 40s and the 50s to do what?

To get rid of the mosquitoes.

To kill mosquitoes, right? Cheap, effective, but what? That's the benefit, what's the cost.

It kills the eagles...

It has an impact on birds—the eggs get too thin. I actually don't...I'm not up to speed on this because there's a controversy on whether or not DDT actually does that. But let's just say that it's true.

So this is effective, this is the benefit. The cost is equal to cheap plus dead birds. Not popular.

So DDT was banned. Now luckily, DDT was banned after we got the benefit. Essentially, we don't have malaria in the United States. The problem came when countries in the developing world tried to use DDT to kill their mosquitoes, and activists in the developing world were like, "No, no, no, you'll kill your birds." Meanwhile people

are dying of malaria. A little bit of a problem there...the weight these activists are putting on local people compared to birds. If your people die, it's okay. We just have to make sure your birds are alive.

So this is an example of a controversial cost benefit. The cost benefit is often...you look at the benefit costs, you take the benefits over the cost because the way that you want it is a good idea. That's the ratio. This is the benefit. You can do it any way you want. The problem is when you get into...who is calculating the costs, and who is calculating the benefits? In the case of dams, which know I more about because of water...you get the US Army Corp of Engineers, and do they like building dams, or do they not like building dams? They love building dams. And guess who does calculation for cost benefit for a dam? The Army Corp of Engineers. So they say, "Oh, yeah, this dam is going to cost a million dollars." And they'll finance it with 0.05% bonds over a 50 year period (which a financier will tell you means nothing...for free). And the benefits include flood avoidance, recreational benefit, irrigation benefits, and we're going to get those numbers just by making it up, which is what they did, okay?

And that's why you have, essentially, white elephant dams, and they would say, "Oh look...our cost benefit ratio..."

And they did actually do this the other day. It's 1.05. So for every dollar we spend we get 1.05 back. But they forgot to include a million things. The real one might be 0.65. should you make that project? No. But guess who makes the report and the decision? These guys. This is the most interesting area...abuse of numbers...that I can think of besides Enron accounting. This is Enron accounting, government style, right?

Another idea of regulations and cost benefit is...you might have another regulation that comes out and says...children have to have fire proof pajamas. In order to figure that out you have to talk about the value of the statistical life. A very controversial number. Some people say a life is worth what? Priceless. Infinity. Not like Mastercard, right? But if you're going to do a regulation, and they say, "I'm going to regulate the ink in a pen because if you put it in your mouth, and it might poison you, and you might die. And if you die, then that's infinitely bad, so I'm going to ban pens."

That kind of logic will run you into trouble very quickly. Because if a life is worth infinity, then essentially you shouldn't do anything. You should actually stop, right? Because you can't do anything. So this doesn't work. It turns out to be...that the government uses about 6 million dollars. Look this up on the EPA. Oh my god, life is worth more than 6 million dollars.

My favorite example of cost benefit, or value statistic of life, is that...in the old days, when we had coupons for airline tickets, they would say, "In the event this plane crashes, we, the airline company, would pay you \$15,000 your life" or something like that. If it crashes in the United States, then we'll pay you fifty. So dead Americans are worth more than dead everybody else. Or a German who came to America and died in America on a plane. So this idea of 6 million dollars...that's an American life. What if it's somebody from Zimbabwe or somebody from China?

Well basically, they should be the same, but in many cases they are not the same. Right? Either it's a political economy question, or it's the national culture, that kind of thing. There was a war...and the army...oh...it was the Iraq Iran war in the 80s. I think...I don't remember which side did it...but they actually sent out soldiers to clear minefields by walking through them. So if you stepped on a mine, you would find it and die, right?

And that was their cost benefit for military activity. They clearly did not value their soldiers at 6 million dollars. So cost benefit turns into this amazing, huge thing that gives you all kinds of stuff to think about. Let's stop talking about that for a second and keep going on profits.

Do you have a question?

Oh, no. I was just going to when auto manufacturers put out a defective car rather than have a recall. It's because the cost is greater than the...

That's right. So that's where economists are both evil together, right? So it's like...look. It'll cost us \$50 a car. And we have a 100,000 cars, that's 5 million dollars. Maybe somebody's going to sue us, we'll settle out of court for 2 million dollars. The cost is greater than the benefit. We'll let some people die, right? That has happened.

So back to the safety pajamas. It turns out the cost of a life saved is \$70,000. So is this regulation a good idea or bad idea? Good, right? Cost, benefit.

If your value of a statistical life is 6 million, and the cost of averted death is \$70,000, that's pretty good. The same kind of calculus has gone into medical innovation, where they talk about...they actually figure out that fixing AIDs is more important than fixing cancer, just relatively speaking, more important than it used to be. It wasn't the number of dead people from AIDs, it was the number of years they would have lived had they lived. People that are dying of AIDs are in their 20s or 30s. Cancer, you're dying in your 60s or 70s.

So one dead cancer person is worth less. You need 3 dead cancer people to equal 1 dead AIDs person. Literally. In this calculation in terms of years of lost life. So this is the kind of stuff that shows up in cost benefit.

Let me finish up with profits here and get to the homework. So economic profit...now in the long run, what happens with economic profits? They go to zero. Because of what? How do they go to zero?

Entry. Entry matter, right? A monopolist literally does not face entry. The monopolist controls the market, right? But if a monopolist is making more than zero, and somebody comes in and says I can exploit this market too, then you start dividing the market between the monopolists. Now it's a duopoly. They might form a cartel. They might just say hey, let's be nice to each other. We'll have dignified competition. Every year they go to a nice hotel in Switzerland and decide what the prices of their products are going to be, and next year the price stays that way. Those cartels have been found... they've been caught, of course, and fined millions, even billions, of dollars.

There was a Vitamin C cartel or something like that. They were fixing the price of Vitamin C. It happens all the time, everywhere. But in the long run, economic profits are going to zero because of entry. If there is not entry, you're not going to have... profits will not be falling. Now entry can be prevented in two different ways. It can be prevented because the government does not allow competitors to come in, this will happen if the government decides to license oil expirations to one company, or the president of the country decides to give the license to his kids, that's the Indonesia situation.

Or there could be technological barrier to entry. Profits will be positive. Is that bad? Is there something to do about it? Let's just say it that way. Is the fact that iPhone's are popular, is that a bad thing? Should we prevent apple from selling those for... whatever it is? I think the whole price is like 700 or 800 dollars. The unbundled price for the iPhone is 800 bucks. Should we make them make less profit? Is this bad because we're making profits? No, right?

Isn't it motivation...

Right, this is called the honey pot. You want to get into the honey pot if it's got positive profits.

So this is what motivates innovation. The aspect of positive profits. Now when we say in the long run, long run profits is usually where they run it. Profit long-run equals zero. The question is how long is the long run, right? If the long run takes 3 or 4 years, or 30 or 40 years, that's a long time. And if it is long enough, you'll have innovation. And in fact, the fact is that we see a lot of innovation. There's some notion that patents and trademarks are ways of defending profits to promote innovation. There's also a notion that there's been some capture, in a sense that the companies making the profits will lobby those politicians to extend their monopoly even further.

This is the famous Mickey Mouse copyright, because they were going to lose the rights to Mickey Mouse, and Disney said it's not the lifetime of the creator, but it's the lifetime of the creator plus seventy years, which is like forever, right? So Mickey Mouse still belongs to Disney, and Disney still makes all the money off of the Mickey Mouse caps. So we have to worry about barriers to entry, but this idea is what drives innovation. And this, actually... there's an argument that we never get here. If this is equilibrium, then we're always out of equilibrium.

Can economists deal with out of equilibrium situations? Can we do this? Can we? No. there's no equilibrium. We're like here, or we're like here. We're kind of autistic in dealing with out of equilibrium situations. I mean autistic like I said it long ago.

But this out of equilibrium situation is associated with what's called creative destruction. Joseph Schueter is a very famous economist among economists. He's the guy that said creative destruction. That's what we want. We want firms coming in and blowing each other up to try and get those profits. And there's a lot of tension inside companies deciding whether or not they should innovate. If we innovate, do we cannibalize our own

sales, or if we don't innovate then someone will take our market away from us. They'll eat our lunch.

But this is the dynamic that is important, but it's particularly important in capitalism, which is where you have competition and you have companies.

If you have a state controlled economy, where it's efficient to have one coffee shop and one milk producer, and one car maker, then you don't get this creative destruction because we're missing entry.

If you don't have entry, you don't have innovation. And who does innovation help? Does it help the companies? Yes or no?

No.

It does not help the incumbent, it makes them work harder. It will help the company that enters the market and makes those profits. Does innovation help the consumer? Yes, because you have more choices. This is...

There was this commercial when I was a kid, and it said, "One choice is no choice."

It's like such a catchy phrase but it means nothing. Once choice really is no choice. But choices are what makes us consumers happy. And the only other thing I want to say is... what is the expression for economic profits greater than zero are called what?

What's that thing you guys pay every month on your apartment?

Rent.

This is the jargon. Economic rent. They are returns to innovation. They can be returned to corruption (you go bribe a politician, they go to monopoly, they make a monopoly profit, you're getting rents). If you bribe a politician, you're willing to share those rents with the politician. That's why the bribery occurs, because you are making some money. And that's political economy.

Let's stop now, and don't go anywhere. I'm going to take a brief moment to go over the homework one.

So we'll hand this back at the end. And we have homework two that will be distributed at the end.

So I'm quickly going to go over the biggest problem. And if you'll recall the first question was: The government tries to expand the ad campaign against making soda. The number one thing people got wrong on this was identifying the winners and losers. The winners from a campaign against soda are who? On the supply side, sorry.

Substitutes for soda. The losers on the supply side: soda manufacturers. Who's going to be contributing to the campaign to oppose that ban? The soda companies. Coca-Cola.

Alright, on the second one, FDA puts standards on fertilizer. Same problem. The losers from the regulators on fertilizers are fertilizer companies. Supply side, right? The winners are (on the supply side) substitutes for not organic fertilizers.

Fertilizers...there's organic and nonorganic fertilizers. That's what we're talking about there. The winners on the demand side for soda taxes?

Soda drinkers.

Losers on the demand side are soda drinkers. The price of soda goes up—is that what happened? It shifted the demand curve in.

So the price goes down so people who want to drink soda anyways will benefit anyways.

It's not the soda tax that's been done in New York. Obviously, you know how much I know.

Okay number three. The representative function of the Cobb-Douglas...people did not understand...that was the most common thing...they did not know how to get demand function. You get your utility function, you set up your Lagrangian, you solve for X star. And your demand must be a function of exogenous things.

Your demand for good one. Is your demand for good two exogenous or endogenous?

Endogenous. Your demand for good 1 is not dependent on your demand for good 2. You do not...demand for good 1 is a function of your income and price of good 1. You write a demand function; that's what you should do. You should not have demand for X_1 is a function of X_2 .

On the cross price elasticity—that was the worst problem as far as you guys were concerned. What's the cross price elasticity for complements? Is it positive or negative?

When the price...complements...

Change in the demand of good one based on the price of good two, P_2 , X_1 . If it's a complement...beer and chips are complement, right?

The price of beer goes up, does your demand for chips go up or down?

Down

Down. Substitutes...cross price elasticity. Coca Cola and Pepsi. Price of Pepsi goes up, demand for coke goes up.

That's what you need to know. Of course you need to be able to do the math. Two consumers...okay this was just written out. You had an aggregation problem. One consumer had a utility function, the other consumer had a different utility function.

The way you aggregate your demand is you get your individual demand functions and put them together, and that's aggregate demand. It might be tricky, in terms of doing the

addition, but that's essentially the idea. The economy...with the Leontief utility function...what does Leontief utility function mean?

Minimum of one good and the other good. What kind of utility is that? What are those goods to each other? They're perfect complements. So do you use calculus to solve those?

No.

No, okay? The problem was that some people were...you have these indifference curves and they're trying to find a tangency when you can't get a tangency on a point, right? So what you need to do is you have to just write out two equations.

You just write out the demand for good one is a function of price one. No. What you do is you say...because of the ratio that was provided in this product, you knew that you would need to do these in bundles. So you know that $3X_1$ and $2X_1$ will be linked with $2X_2$ in a fixed ratio because they're perfect complements. It's like left shoes and right shoes. One and one.

In order to solve that, you need to figure out how much they're going to consume. You just do P_1, X_1, P_2, X_2 equals m . And you call one of these things...you solve for X_1 and you plug it in here and then you can find X_2 as a function of only prices and income. And the same thing happened with...

Not the same thing, but the other thing that happened with the last question is about perfect substitutes. People, you can't do calculus. You've got these indifference curves, the budget constraint. The slope was the question, right? You're going to find a corner solution. You need a corner solution (that's wrong) down here.

You're going to get the highest indifference curve you can. It'll be either all of one or all of the other. That's how you would solve that problem. It's not a calculus problem to do the observation.

Alright, great, so see you on Tuesday. Homeworks will be handed out by Diana.

Transcribed and checked for accuracy by Brynna Bunnag