

## EEP100 Lecture 4 (Sep 8, 2009)

So if you are interested in fisheries (which maybe you aren't, maybe you eat fish, I don't know). But if you're interested in one of the best examples of the tragedies of the commons, you'll want to read this paper from 1956.

So I'm putting them under required reading, because they'll fit right in into the other books we're reading. *The Logic of Collective Action* (the Mancur Olson). And that will right in with the Olson, as well as the major concepts here.

Are we recording? We're online, Fei? Okay cool.

So, that's an FYI. November 6.

So how are the books going? Has anybody started the book? Liking the book? You can actually read it? Good? You can read the next page? Okay, that's good. That's a good sign. There are two books...what the hell are they? *The Economic Naturalist* and *Economics in One Lesson*. What's the one lesson? Anybody?

*[Think about the long-run, or there are more repercussions than you think.]*

Right, or we sometimes call it the law of unexpected consequences. It's like, "Uh oh, we're going to have a problem here." So we're going to get into that particular concept we're going to get into when we talk about dynamics. And dynamics simply means interaction. Don't get all jargoned out on this stuff.

Those books are obviously for your learning, and they're also...you should have them done in the next 10 days or so. So hopefully those are going fairly well. Any open questions? I was gone for a week. Is there anything out there somebody needs the answer to? Any urgent thing? My office hours are put off for today (I don't know if anybody cares...but...). I'm not coming till later. And we're having all kinds of amazing technical problems with the video stuff, so at some point we'll get it up there, but obviously you're in lecture, so you know where the payoff is, and we'll take care of the video in the future.

We're getting those posted on the UC Berkeley YouTube account at some point, so that could be quite cool, if you happen to want to go back and look at day one at some point.

So last week on Tuesday, Claire came and gave a talk. What did she talk about?

*[Water]*

Water? Shoot, I can't talk about water anymore. What about water? What part of water?

*[She kept saying that you'd say a lot more about water.]*

What did you learn? Anything good? Anyone? Nothing? Didn't learn anything? What's this university stuff all about? Come on...

*[That you can't really buy water rights right now, in California...but you can buy water options. That's easier...]*

She's such a geek. She talked about options contracts for water? Okay, and what did she say?

*[I think that something happened in 2003...]*

*[The MET]*

The MET, she talked about MET? Did she talk about a particular deal, an option contract? Is that something? Okay. Was that interesting? Was that exciting? Do you want to go into the water options trading business? Don't do it. You'll die. You'll go bankrupt. Anything else she said, besides water options contracts?

*[She talked about market design. So either option markets or...retail...?]*

*[Clearing house]*

Okay, clearing house, retail...different types of market structures. So this is something that's complicated because water (since I'm a water geek also) has traditionally not been a commodity. We're trying to push water into a commodity space.

You're used to buying...you to going to Walmart saying, "I want ketchup." Let's do an easier one. You can say, "I want steak." You can go to the store and buy a fresh steak, you can go to a farmer and buy a steak, you can go to an auction and buy a steak (or beef, as they call it, on the hook?). And they're trying to do the same thing with water.

And there's an economic explanation, which is that we don't have as much water as we used to have. So we're trying to treat water like a commodity. But it's running into a whole bunch of institutional problems, and sociological problems, and psychological problems.

Because people are not used to treating water as a commodity. And almost everything in our society for allocating water is about *not* treating water as a commodity, so there's this massive transition problem, right?

And that's going to matter a lot when we talk about things like climate change, because...

There's a jargon word in statistics called stationarity. Who knows what stationarity is? Anybody? It has something to do with the word stationary. Any idea? No. Alright. Let's just do it like this.

This is the idea of stationarity. The idea that there is a pattern, and it kind of repeats.

This is not stationarity, okay? I mean, in some ways you *can* call it stationarity because it's following an upward trend line, but if you say, "I'm going to study this

part of the past to understand the future.”...if you’re in a stationarity world, you’re okay, right?

In the old days, it used to be...I’ll study the weather patterns, right? In the winter it snows, and in the summer it’s hot. And you say, “I need to have snow plows ready in February, or whatever snow plow season is. And in the summer I’ve got to have swimming pool supplies, right?”

So that would be...the stores would stock up for the Christmas sales, or whatever. That’s stationarity. You could look at the past, and you could predict that cycle would repeat in the future. But if things are moving, and the past is no longer a useful reference point, then it’s nonstationary.

And that’s the big word, now, that’s being debated about climate change. How do we deal with the world where...when the tide comes in and it floods your property (where it didn’t before, because the sea level rising).

We knew that happened 50,000 years ago, but we weren’t around with our tidal charts. So a non-stationary world is a very troublesome, expensive world because you have to make a lot more adaptation. Whereas in the past, we just go back to our closets (you know the whole winter wardrobe/summer wardrobe). But now you’re like...your winter wardrobe has to get furrer and furrer, and your summer wardrobe has to get skimpier and skimpier.

Who has seen that cartoon about the proof of global warming with underwear, on the line? You know what I’m talking about? So it’s going to get smaller and smaller and smaller pairs of underwear, until the summer is like...all naked. Just as a reference point.

So the stationarity is what’s going on, in terms of...we are in a non-stationary world. And moving water into a different kind of psychological, logistical, institutional space is a lot of work because we have to create all these new ideas. We have to create all these new concepts that people are not used to applying to something like water (whereas we are used to applying them to beef, for example).

And ironically, this is the funny part, you can take a lot of stuff just from beef, or from basic economics, and just bolt it right on top of water, and it will basically work. Right? And this is what happened in Canada and Alberta (which is basically the Texas of Canada). And they have all these oil guys and they said, “Why don’t you guys deal with our water problem.”

And the oil guys are like, “Oh, there’s water it’s like oil, oil is valuable, water is valuable, so we will just treated it like oil, which is valuable, so we’ll just have a market and prices...”

And everyone else is like, “Oh you can’t do that, you can’t do that, it’s inhumane!”

But the oil guys knew exactly what to do, and they ran into massive political opposition, so you see this is where that tension is going on back and forth, and this

matters a lot in the environment and resources, and I'm going to get to this when I talk about...power, which is kind of like...next...kind of like now...okay I will talk about it now.

It matters more in environmental resources because those activities, those good are often much more politicized. We don't have a lot of politics around the iPhone, besides the battle about why apple has their contract with..., but that's not a political problem. We have huge political problems about water, or about climate change.

So that's where the economics runs into politics, and that's why I'm taking the word policy in the name of this class very seriously, because policy is about making rules and changes and laws, and economics is like how people behave, and when you change those rules you're trying to change the way they behave, as opposed to letting people run and do what they want. So that's kind of a vague statement, and Claire talked about that.

Anything else that Claire talked about that comes to mind? I haven't seen the tape. So, I am just kind of quizzing you guys, so I can learn. Anything? Yes.

*[Trade, and why trade would break down...for reasons like tax...]*

Why trade would break down?

*[Yeah]*

In a market for water? Is that it? Or in general?

*[Yeah...water was the example]*In a sense the tax was too big, and there was no trade, because...it broke.

*[I think she was talking about trade breaking down...it was just general ideas of why trade would break down, but I think it could be applied to water.]*

*[She was saying that if your transaction costs increase the whole thing increases]*

Right, so let's look at that for just a second...the general idea. So transactions costs, turn out to be really important. And so when you guys went through econ 1 (and we talk about supply and demand), we talk often about a frictionless market.

Who has ever tried to sell or buy a car, well sell a car. Sell a car. How easy is it to sell a car?

*[Depends on the car]*

Depends on the car, depends on the price. There's only two people who have sold a car in this class? Wow.

Where you're selling the car, where's the market?

I got my PhD at Davis, and Davis is the best place in the world to buy a bicycle—because there's so many bikes. And I always go there and buy bikes and then sell them up here and make profit. Remember those post doc wages.

So the car market is not nearly as liquid as you would assume. It's like...Oh, there's a market, and you read it in the newspaper. There's a market for cars and there's sales happening. But there's a cost of matching a buyer and a seller.

You post it on Craigslist, and you have to take a photo, and they've got to find you, and then they go over to your place, and then they flake out, and then they don't call back...(I'm selling a bike right now that's why I know this).

And so the so-called frictionless market that we talk about...it's really nice, but there are always transaction costs in market, and the idea is to lower the transaction costs as small as possible, assuming you want the market to function. Some people don't want the market to function, and they will try and sabotage the market.

There was this student, and the government was leasing timber, or something like that. And the student put in a bid for a lot of timber, and he had no money. And they had no idea how to deal with this no-money bid, because they were like you won. And he was like, "Well I have no money."

And they are like, "Well you can't do that"

And he was like, "Well I did." And they didn't know what to do, and he just completely sabotaged that auction because he didn't want that stuff to go on the market. Which is not the best of economics, but it's quite entertaining.

So back to the whole friction idea. Let's look at supply and demand for a second. And the classical example that you guys get is where you have a tax, right? If I want to put a tax (this is our P star) where does the tax show up on this thingy? Anyone, anyone? It's called a tax what? Wedge, tax wedge. Where does the tax wedge go?

*[You draw a line parallel to the supply line]*

Yeah, that will work. Above or below the supply line? Does a tax add cost or take away cost?

Adds cost, good. Because you know the difference between a tax and a subsidy. So let's call that a tax,  $S$  prime. But basically what you are doing is...you're increasing the price by this much—that wedge. And more importantly for market efficiency is you're lowering the volume, right? You're doing fewer transactions.

And if you go back to utility, and I get utility from consuming stuff, and if I'm not consuming it, I'm not happy, then you can see that a tax has a social cost or human cost called: "we're not getting what we want because of a tax".

Now the tax is traditionally this area here, and that's revenue. And we are going to be talking about supply and demand today, so I will be bringing this up more often. But that revenue will usually go to whoever is taxing—it's often the government, right? Whoever has the power to interfere with that transaction.

You could have a tax if you have...sometimes a vendor shows up at an event on campus for a counseling fair or outdoor party, and sometimes they have to pay a percentage of their receipts to the ASUCD or ASUCB or how do you say it? ASUC.

So they have to pay a fee of like 7% of their registered volume to the ASUC. Which is a tax, right? On top of the sales tax. So the ASUC will take this, and then they'll have a party, or drink beer or whatever...the government will drink beer. But that's okay.

But what if it's just a pure transactions cost...where does this go? Where does that rectangle go? In the back?

*[Deadweight?]*

It's not a deadweight loss. That's this little triangle here. Where does it go?

Let's just call that a transaction cost. Let's not call it a tax, but let's just call it a transaction cost. I will just say...Craigslist breaks down, and we have to go back to the newspaper...where does that go? It just goes away. It's just gone, it's like wasted energy. It's like...I just spent all my time trying to do stuff, and it's a bitch to get it done.

*[But it would not be, right? For example, if you had it with the newspaper and that transaction cost that you have to place advertisements in the newspaper now, then that revenue would go to the newspaper]*

Ah, but that's... the newspaper is dealing with this kind of stuff here... the newspaper is this supply curve here. This tax...this difference between this price and this price is the difference between the Craigslist price and the newspaper price. Right?

This might be the price for the...say the newspapers free, but it's less efficient. It just takes time to do it. You have to fill in a piece of paper... It's like sending a text message to a friend versus typing, you can type a lot faster, but with your text message you can walk around, right?

But if you had to use your phone to type your essays, you would die right? Or your essays would be very short. And that's why my briefings are only one page. If you write your briefing on your phone that would be so cool, but I won't give you extra points.

So, this is literally just a transaction cost. And just think of the transaction cost as a tax. And the transaction cost is: I've got to walk down the to market. The transaction cost is: I have to go to the ATM. The transaction cost is: I don't have exact change.

In India, it's really fun; they have 40 Rupees (give or take) to a dollar. So one Rupee is about two or three cents. So that's not much money, but you can buy a samosa, you know...these little Indian pastries for like two or three Rupees. So that's like...ok cool you can have a snack.

And then you go and you say, "Oh I have 5 rupees" and they say, "I don't have change."

And they give you a piece of candy, or something like that.

There is actually a change mafia in Mumbai (in Bombay), and every day the merchants have to go to the bank, and they have to buy their change from the mafia, because the mafia gets there before them, because they pay the beggars to stay in line all night.

And then they go to the bank, and the mafia gets all the Rupee coins out of the bank, and the merchants (who want to give change to their customers) have to buy their coins at what? A markup. It's a 10% cost, and the mafia is just making money. It's just like that. And the Italian mafia is exactly the same. Classical mafia.

So it's just a transaction cost; it keeps things from happening as efficiently as they might. And, believe it or not, a lot of economics ignore transaction costs. A lot of economics...there is an economics branch called transaction cost economics. But if you think about outside there, and when you are doing your blog postings and real life. Think about... "Oh, I just ran into a transaction cost, what a bummer." It's like the post office or like the DMV. When you go down to the DMV and make an appointment...it was like a revelation because usually you would just go down there with a book and you'd wait. And now you can make an appointment, and you wait half the time.

So that's what transaction costs are all about. And markets...we want them to be as efficient as possible. We want to lower the transaction costs. That's what computers are all about...digitization is all about...what standardization is all about. The standard contract...one bushel of wheat, one kilo of tomatoes. That standard scale. In the old days they would have all kinds of different weights and measures around the world. The length of the king's foot was a foot, the thumb was an inch. And when the king died, you've got a new thumb, and you've got to change all of the measurements. And it screwed everything up. So literally this idea behind standardization is a way of reducing transaction costs, and may be everything would work better for us: the size of your shirts, all kinds of stuff.

So anything else from Claire? Anything, nothing. Ok great, that tape will go up eventually.

Damien talked about what?

*[AC Transit]*

AC Transit, my favorite; the empty bus. What did he say?

*[It's not worth it to have another bus, because there's enough people walk.]*

It's not worth it to have another bus on top of the one we have. Because...there's more than one bus right now, right? So it's not worth it to buy more buses or have bigger buses?

*[It's not worth it if the bus is empty]*

Ah because they are empty, ok. What else did he say?

*[Said the reasons they made the bus free for students was to reduce congestion, so to help to with the parking shortages. But it did neither because the people who were driving were really far away. And it doesn't really affect them]*

Right, because the people who are here, they could bike anyway.

*[It affects people who could take a bike and those are the people who could take the bus. Not really people who are driving in and causing congestion.]*

Right. That's a good point.

Ok, other stuff, what else did he say?

*[He talked about how we have to make it more efficient...we need to figure out what there fair should be...whether to make it zero or the average cost at capacity...because right now you have a flat rate cost of \$68 to buy the class pass]*

68 dollars for a bus pass? Right? Oh you have to buy it...Oh I love that, it's a tax. So \$68 from every student and who uses the bus? Oh not bad....but its free right, because you already paid. And the other people, that don't use it, you just got gypped.

*[So since there is no marginal cost for an additional rider, then maybe we should lower the fare?]*

Right, did I say this before also? I said the bus should be basically free if it's empty. This is the tension between, essentially, accountants who think, "Oh we have to get our money back by charging the customers", or like die-hard free market economists (which I used to be). And then the efficiency people who are like, given that we are running these stupid buses already, how do we get as many people as possible on them?

Anything else, did he say? What did he say that was cool? ... Nothing. Damien is a cool guy. He should have said something.

*[He said you were at Burning Man.]*

Yeah... I was doing research. Um ok, that was cool but that's not what he was saying. Anything else he said? Claire, anything else she said? I'll wrap this up and keep going. Alright, any outstanding questions from their talks? No?

Who went so section last week and played the game? Who didn't play the game; I heard some people didn't play the game?

Ok so for everybody—I'm going to roll back and talk about that game for a second, because it's super useful example of what we are talking about in this class. It's about the tragedy of the commons. So somebody describe to me how the game works—the first setup that we did? What's it called?

Go fish...the fishing game. How did the setup work? Give me the rules. Rules.

Ok, take as much as you can as fast as you can. Is that the rule? Did the GSI say, "You should take as much as you can as fast as you can?" No...

*[Follow your self-interest]*

Follow your self-interest.

*[Whatever is left in the first session is doubled in the second session]*

Right, so... P2 equals 2P1.

*[No property rights]*

No property rights---super important.

*[You can't talk. No communication]*

Right, you can't talk, right. Why can't you talk?

*[Collaboration]*

Collaborate, right? Dammit, we don't want you all to collaborate; we want you guys to kill all the fish.

Ok, so if there's no talking...was the first round rule. Wasn't that the whole way through?

Because what's talking going to do? It's going to get you guys to start making rules, and collaborating, and swearing at each other.

So what happened in the first go-around, where this was the basic set-up. Did any candy or fish make it to the next round?

*[No]*

No, perfect example of the tragedy of the commons. So for those of you that didn't play the game, let me just let this out for a second.

Basically, you have an area, and you have people around it (I'm making this up from my own experience, so this may not be yours).

Then you put a bunch of candy, and you call them fish, and you say, "Here's the rules." and you say go ahead right there. And your idea is to pursue your self-interests and maximize your profit. After 30 seconds, all the candy that is left over will be doubled by nature, because that's like the spawning season. I was talking about the salmon fisheries last week.

So, if you are pursuing your self-interest, (you want to have a candy) there is no property rights, so here is the problem. The classic problem is that you're like, "Oh I like that candy. If I leave that there I will get another next period. Except this bastard comes and takes your candy, but it's not *your* candy. That is the "no property rights" thing. That is the key item here. There's no property rights. This follows a very classical set of examples with fishing. The regulators said, "Oh my god, we lost all the fish. What we have to do is we have to make it harder to fish."

So what we're going to do is we're going to say you can't use your hands. You can only use your elbows.

So there's the thing called technological handicapping. And they literally said to these fisherman, "Your boat can be no longer than 45 feet." So the boats that used to look like this...started to look like this.

They are still 45 feet long, but they got fatter and fatter and fatter because they stuck more and more gear, and more and more sophisticated stuff, and bigger and bigger engines on the backs of the boats.

So the regulator is like "Shoot, they got around the 45 foot thing, now we are going to shorten the season, from 365 days down to 4 hours, per year," right? The halibut season in Alaska was literally 4 hours long. You had these boats with 80 crew on them throwing out 5 nets in 4 hours, trying to catch as many fish as they can. And of course they take whatever they can get. Because when they go out of the ports they have massive capital investment, they have massive gasoline and humans.

And let's talk about supply and demand. If everyone has to show up for those 4 hours during the one time of the year then do we have a problem with supply and demand of the fisherman? Of the crew? It's almost like they have to charter jets to get fishermen from Vietnam to work on this one 4-hour thing, and then they go back again. So it's extremely expensive.

Because remember, when we were talking about a supply curve, when you're out here in terms of quantity of fisherman, you are at the highest prices. If you can get by with an average of 10 guys per day over 50 days, you can get quite cheap fisherman. But if you have to get 50 guys or 100 guys for 1 day then you get this high marginal cost. The guy is like, "I don't want to fish,...oh \$150 an hour? Oh alright,." So it's extremely expensive in capital, extremely expensive in labor, and there are all these boats that are all huddled around each other, around the fishing grounds. And they take whatever they can get, including really crappy fish, right? They get the bad size fish, the small fish. They get the wrong fish...they kill the wrong fish. That's where a

lot of shark deaths and dolphin deaths occur (around tuna fishing). So all these kinds of restrictions are a complete disaster.

And what the economists ended up doing (that's what this paper I told you, you would want to read in 1956). 50 years ago an economist was like hey we can fix this. Let's do this. Let's do property rights. But notice the salmon fishery, a year ago, in California is already collapsing. So going from economics into the real world is often very difficult.

But in fisheries they have this thing called ITQ's (individually tradable quotas). That's a type of property right. Basically what they do is they take the entire fishery,  $x$ , divided by  $n$  fishermen, and they say your share for the individual "I" is going to be one share, one fraction of the total. And that's yours. And you can't take more than that. That's the key. You can't take more. It's your property right. So what the fisherman do is they say, "Wow you know I am feeling kind of tired today, I'm going to go see a movie today, I will go get my fish tomorrow, or I am going to get my fish when the weather is nice, or when the crew is cheap, or when I can use my brother's boat, or when the price is high because it's Friday.

So what they did with this ITQ is they completely broke down this huge problem of this...which is what you guys should have actually had in your game. Did you actually play a version of it where there was property rights? Yeah, so you say everybody had their little thing. Now did the fish make it to the second round when there was property rights?

Ah, good. If you learn nothing else in this class, learn that. It's really useful when you're talking about natural resources to talk about property rights. And there's problems with water...it just blows my mind, constantly, that we have problems with things that could be solved like that quickly. And then you have to ask, "Why are we not solving it?"

And that's kind of the politics, or the psychology, or the culture of the institution. But that's okay...we can still deal with those things and try and beat on them and try and persuade people that it's probably in their best interest. In the best interest of the fishermen to allocate these property rights. Fishermen usually resist allocating property rights. And they're like, "No, no!"

And I think it's part of it...it's that...Lake Woebegone effect? Every fisherman above average? I could do better than the other guys...and they all are screwing themselves; usually they're screwing the future. They're screwing their kids. They're destroying the fishing stock that won't be there next year. Same thing with water, same thing with timber, same thing with lots of other resources.

Although the buffalo extinction was intentional. Just so you know.

So that's kind of what that game was all about. We'll be doing a few more games through the rest of the quarter. There will be candy involved, so get excited. One

thing I forgot to ask...who wants to be an economist in this room? PhD in economics, raise your hand?

And by the way, I don't recommend it highly, but the thing is that...what is it to be an economist? That's not my existential question. But the important to think about what is economics. It's a way of looking at the world. Psychology is a way of looking at the world. Sociology...social sciences, right? Economics is one way.

And all of you who are not going to be a PhD in economics? You're going to learn some tools, and hopefully you'll be able to use them all over the place in the rest of your life. And that's what I'm aiming at when I'm doing this class. And this is the big metapoint about higher education at Berkeley, because people have told me that, "Oh, god, there's so much math in this class."

Because that, believe it or not, is for all of those PhDs. None of it is for you guys. Except that they teach it to you, which is why you're like, "Why am I learning this now?"

Don't worry. You're not supposed unless you go and get your PhD. Just learn it so you learn the concepts. That's the key idea. So that's my little editorial of the second. Now let's go to power.

So, finish this sentence for me. Power corrupts, and absolute power...

*[corrupts absolutely]*

Right. Now, what's the opposite of power? What's the way to diffuse power?

*[Democracy?]*

*[Disenfranchisement?]*

You mean to spread the power around. 50 states for example. What else?

*[Fractioning the power]*

Diffusion of power. So in economics, we use the word market power. What does that mean? What does it mean when you have market power?

*[You have the advantage]*

What kind of advantage?

*[You have a supply that's in high demand?]*

A supply that's in high demand, okay. And what do you do with that? So you have a supply, and it's in high demand.

*[You can control the price, you can raise the price?]*

You can raise the price. You're going to affect the price. Give me an example of that? Companies?

*[DeBeers]*

DeBeers. Classic. Diamond Cartel. Another one?

*[Microsoft]*

Microsoft, with their XP and Vista. See, what happened with Vistas? Complete fail, right? They tried to sell it, and the only place they could sell it were like...central government purchasers, because they're like whatever. Remember that tax pledge? That was your money. Another company?

*[OPEC]*

OPEC, that's the oil cartel. Organization of Petroleum Exporting Countries. Right. Awesome. Next?

*[iPhone?]*

iPhone. The Apple. There's a significant amount of market power. And I don't know what the deal is between Apple and AT&T, but AT&T must be giving Apple a huge amount of money. Because the number of...I switched...I'm like... "I'm going to get the iPhone". Example?

*[Walmart]*

Walmart. Does Walmart have market power?

*[They have pricing power.]*

Do they have market power against you, the consumers? The suppliers, right?

Now the Walmart effect...there's like so many economists studying Walmart because they're like...labor stuff...control...they sell 20% of the retail market...it's crazy. But the one thing that Walmart does...it's kind of like the deal of the devil. If you're a Walmart supplier, you will be selling heavy volume. But you will be making this much profit. And I went to Walmart, and I was like, "Wow!"

I came out with this huge shopping cart, and it was like, "Wow, \$80 of crap, this is really great!" And then it all broke. So anyway, other...?

*[Standard Oil?]*

Mhmm, the Standard Oil Trust. Classical case of buying up...so there's a tension between monopoly (and I'm going to call this monopoly, not in the economic sense, but in the illegal sense). Antitrust, right?

There's a tension between monopoly and good business, isn't there? Competitive. Is Apple being unfair, exerting their market power by coming out with this phone...and

poor Samsung can't catch up with them? Is that mean? And they're taking a market away from them and it's not fair? Or are they being competitive? There's a revisionist argument about Standard Oil that they were actually just competitive. They just beat the crap out of all their competition. They took over everything, right?

The example typically is: Oh, what you're going to do is...you're going to lower the price, you're going to drive out all the competition, and then you're going to raise the price. That's the classical analysis (if you want to call it that) of people who don't like market power. So that was the idea...that Standard Oil would just go in there and take over the world. And the key to this (what's actually happening) is what's called "key to entry". If somebody can come in, they can enter the market, and they can start competing with you, then this strategy won't work. You lower the price, and everybody goes out of business. You raise the price, it's profitable, you go back in business.

So you have to have entry. And that's where we get into these terms like "Lock-In" or they would call it "Two-year phone contract" or standards (which is that...everybody knows how to use windows, so it's hard to switch).

So there's always this tension going back and forth: between trying to hold on to this market power, and at the same time be competitive, right? And that's why the case against Microsoft ultimately fell apart, (besides some other politics) was that they couldn't show that they were abusing monopoly position. Europeans said yes, they were abusing it by bundling (I think) internet explorer, or media player, or whatever. But the Americans took a more laissez faire approach. They said, "We're not quite sure if they're doing it, and it seems like it's competition, or whatever."

So to get back to my main point: the opposite of market power is competition. And ironically, that applies to both economics and politics, right? If you got the king, he's got market power. And if you don't like it, he kills you, right?

That's a lot of market power. The USSR...the Chinese government is trying to wrestle and stay in power, and yet, give their people freedom (or at least freedom to make money). So there's a tension between market power (I'm just going to call it power now) or the way to destroy power is through competition. And that works in both economics and politics. And this is what I said before. Political economy. These things go back and forth. Let me give you a good example of the historical evolution of this idea (at least put forth by some economists).

And what they said is: in the past, humans were in, what they call, a natural state. And this is where politics and economics were the same thing. That's where you've got the king and his castle, and he owns everything. He owns the economy, he owns the cows, he owns the forest. And everybody else is a serf, and he's the king. He's in charge of politics. If he wants to have an election, he can elect himself. So you can actually see this. Is anyone from (what you can classify as) a developing country? Anyone? Where?

*[Mexico City]*

Mexico City. A country of it's own.

*[India]*

*[Jamaica]*

*[Pakistan]*

*[Armenia]*

From developed countries? European countries?

*[Germany]*

America? Everybody else is from America? So, you're from all of these countries, and think back to these countries and think about the headlines in the newspapers, and you say politicians...Germany...Gerdhardt Schroeder, right? He made this sweetheart deal with this North Stream...was this...

*[After he was...]*

After...like three days after the chancellor of Germany steps down, he becomes like... the Board of Directors member of this pipeline deal for Russia. Russia is like the most corrupt place on the planet. And it's like... "Oh, it was in the interest of my country" and "I'm doing it for patriotism!"

They're paying him shovel buckets of money, so he can call up people on his little magic rolodex. Politics. Because he wants to use his political power to get economic power. Right? And that might be happening in many, many places. You've got the business people. You've got the (or at least he was awhile ago) head of Madagascar... was the Dairy King. He was the yogurt king. He had so much money, he got elected, right?

So much money, got elected. Where have I heard that before? Mayor Bloomberg, right? "I don't need campaign contributions, I just bought...(I don't buy my election) ...I spend my own money". So there's back and forth between politics and economics. And you have to wonder...here's where the problem happens...when this starts to feed.

When you use political power to get money power, and you use money power to get political power. Because money and power...they're exchangeable. It's like the dollar and the euro, right? There's an exchange rate between money and power.

So that kind of makes it hard (in terms of what we were worried about before, which was competition). Because...think of it this way...

Carlos Slim? Is that his name? He's the guy that owns Mobil? I think he's like the richest guy in Mexico. Maybe in like the world. He's really, really rich, right? He's

really rich, and he's just like a dealmaker. All he wants to do is make deals. And he hasn't used his [economic power]...as far as I know...he's like a multi, multi billionaire.

Bill Gates. Has Bill Gates used his power to try and get political power? Not really. He's kind of like putting his foundation, or whatever.

*[That is sort of a soft power...you get your name out there...]*

It's a soft power. He's trying to redeem his reputation...because of Windows and stuff. But the thing is that...if you go to other countries where people have economic power, they will often go into politics, and then they use the political power to get more economic power.

And Indonesia was famous for this. Jakarta was in Indonesia. He put all of his kids in charge of...like...this kid's in charge of this, this kid's in charge of the bank, this kid's in charge of the forest, this kid's in charge of the oil field. And the family's like, "Wow, I'm doing so well! Because I'm in charge of the oil fields!"

It's like...because you just got put there, by your dad, right? You're like...lucky sperm club, right? Okay, so...they're not smart. They didn't go compete in some beauty contest to be the best administrator around. So that is that cycle.

And this is what's called the natural state. Just go back to caveman times. Whoever's got the muscles beats up everybody else, takes all the assets, and then becomes the king. And then it goes in that cycle.

Now what's the opposite of that? Open access society. This is just somebody's word for it, and definitely, by open access, I do not mean open access fishery. Although it's the same idea. We're not talking about tragedy of the commons here, we're talking about the idea that anybody can do it.

And this was back in the day when the constitution was written the idea was like...

Does anybody know...did there have to be a landholding requirement? It did? Landholding, literate. And they expanded the franchise since then. Oh, and male. And the expanded the franchise since then to give access to more people. To the point where we have Obama, who's a black president. And went through all kinds of other stuff.

He's an example of open access society, and there's many other examples. But what you want is you want to have open access in terms of politics and you want to have open access in terms of economics. So you want to have access to the market. You don't want to have to go through 15 licenses to open up your own coffee shop.

The world bank has done studies on the transaction costs of opening a business is called doing business. And in the United States, and in most developed countries, they'll take, say, five days and \$500 to start a business. Let's just say. You've got to fill out four forms, you've got to pay a fee, you've got to put your name down. If you

want to go to Angola and start the same business (for example) it'll take you 150 days and forget the \$500. Let's just say 3 days of wages, okay? Because we want to use the same denominator. The average wage might be \$150. So three days' wages and 200 days' wages. So how easy is it to start a business in Angola? Not easy. So there's two ways of responding to this. Three ways: don't start a business, go into politics, or bribe whoever is out there who does approve these things. That's one of the reasons that corruption is continuing is that you have massive transaction costs.

One of the things that fit into that corruption is that they have...

They have two types of corruption. They call it grand corruption, which is kind of where the government decides to award a defense contract to Boeing, because Boeing paid them a \$400 million dollar bribe. That's corruption using other peoples' money. And there's little petty corruption, where the guy pulls you over and says, "You were speeding." And you're like, "No I'm not." And they're like, "I have a gun." And you're like, "Oh, I was speeding." But you get out of it for \$20. Has anybody been asked for a bribe from a cop? Two? In this country?

*[No, India]*

In India? Mexico City...Nigeria...

I was asked for a bribe...this guy, he thought he got me nailed with...he found this bar of paste in my bag. And it's kind of like... "Ooh, it's paste. It could be hash!" And it's like, "Ooh, yeah, I'm going to get you, stupid American."

And I'm like...it was banana paste. So here's the thing that's interesting. The petty corruption...there's a thing called speed money. I pay a bribe...it's like, just let me get my business done. Cool, right? But go back to the *Economics in One Lesson*. What does he say? Think of the implications, right?

*[It all adds up]*

Not that it just all adds up, which is the massive problem because of the tax of the whole economy. Like...there's a whole underground economy, aboveground economy. But more importantly, think about this idea of dynamics.

If you are a cop, and you're making your money from bribes, or people breaking the laws, do you want more laws or fewer laws? More laws, right? To the point where... in the Soviet Union, you couldn't do anything without breaking the law. Because there is a law against that, and there's a law for it. And the tax inspectors in Russia are all about that. So that's what's called endogenous, okay?

Or, there's an important word in economics. In political economy, laws are endogenous. Does anybody know what endogenous means? Or the root word of endogenous? Can anybody define it?

*[Endo, like within?]*

Yeah. That's right. And the opposite of endogenous is...

*[Exogenous]*

Exogenous means all that stuff is fixed. Endogenous means it's inside a system. It's changing inside a system. Exogenous means that it's fixed from the outside and it will not change. Now, if laws are endogenous, then you really have to think what's going on. When you did the fishing game, the rules were set down. Don't talk. Exogenous rules, right? If you were able to talk, what would you have said?

*[Don't touch the fish]*

Don't touch the fish, because?

*[They'll double]*

They'll double, right? And more. Give me another thing you might say. What if somebody touched the fish? What are you going to do?

Hit them right? If you were able to talk, you would've created an endogenous institution. Don't touch the fish! Very simple. You don't have to go through a whole bunch of math. You don't have to write a contract, just say, "just don't touch the fish", right?

Then the part is...we're figuring out how to divide the fish, or it's going to be a free for all, right? But that's okay. So those will be logged or evolving in midplace, in endogenous. And the reason I'm using the word endogenous here is because the reason that it takes 150 days to start a business is because everybody's got their hand out, and they made the laws to make more and more hands out. It's almost like the civil bureaucracy has expanded to get as many hands as possible in there. And what you're getting is this problem here. It's not open access. And those transaction costs that happened in all of these people trying to make their money off of you trying to start a business, is that everything slows down and everybody is worse off. That, in a sense, is development economics in a nutshell.

But it matters for things like resource economics, development economics, as in, how do countries develop into prosperity. But it matters in resource economics because of the very political nature of resources like oil and timber. Because usually, there is a license. The government owns it. The land is owned by the people. We're not talking about water bottles that you could just walk away with. We're talking about things that can be captured and controlled and held by political powers. That's why almost every government in the planet has a licensing regime for oil or minerals or, often for fish, or not for fish, for water, same thing. They're all political. So when you get into this type of politics, you're going to have to keep these ideas in your head. These are the types of dynamics going on in these societies. And they're affecting the resource, and they're affecting the environment.

So that's, essentially, my point. My point in 50 thousand words.

So let's go talk about the theory versus reality. This is a short little point, but it's something that I'm going to keep pounding on. Not to make fun of economics, but to point out where you have to be cautious, okay? Because the worst thing you can do is you can get really cocky about your tool, and your tool breaks. And then you end up in the hospital.

I count on two laws. And maybe in the semester, I'll come up with more than one. Give me one law in economics. Really famous.

*[Supply and Demand]*

The shorter version of that.

*[Comparative Advantage]*

No...that's not a law...

*[Law of Diminishing Returns]*

Law of Diminishing Returns is one of them, right. Law of Diminishing Returns is essentially...

This is a good thing to write down actually...we've got three laws already!

Law of Diminishing Returns. Now that applies to two areas. Which one? Somebody give me one of them. Think of yourself. What are you? Consumers.

What is the law of diminishing returns for consumers? What does that mean?

*[Marginal benefit]*

Marginal benefit is doing what? Decreasing, right? So basically, it's marginal utility (that's our prime for calculus) is falling. Or we can do it this way. Change in utility in good X is less than zero. That's the calculus idea, right? That's not right. It's the second prime. Utility is going up, but it's going up at a diminishing pace. Less than zero.

So your utility is going up, but it's going up at a diminishing pace, right? I have one ice cream cone, I'm very happy. I have a second ice cream cone, I'm happier, but I'm not twice as happy. I have a third ice cream cone, I'm still happier, but I'm not quite doing so well. Does that make sense? That's essentially diminishing marginal utility. What are the other diminishing returns, not with respect to consumers?

*[Manufacturing]*

Manufacturing, basically. It's the same idea. So basically, what are these two things?

If you want to go back to what you said before, the whole law of supply and demand...the reason that demand slopes down is this. The reason that supply slopes up is what? What does that supply curve represent?

If this is a curve based on diminishing marginal utility, what is this one? Increasing marginal what? Costs, right. And diminishing returns essentially comes from diminishing returns to your technology or production, which means that your costs are going up, right?

It's just the flip side of that. The inverse of that. So my favorite is the law of demand, which is based on the exact same concept, which is...as price goes up, quantity demanded goes down, right?

And then there's the law of unintended consequences, which kind of shows up everywhere in life.

This happens to be theory. Especially in these laws. And I'm using these laws in a sense that they're so robust, that no one is going to disagree. It's like the law of gravity, or whatever. So no one's disagreeing with this stuff. There's another theory which is completely disagreeable. This theory tends to match the reality. We tend to see these trends in aggregate, in macro. We tend to see that when the price of gasoline goes up, less gasoline is used. Or when the cost of internet communication falls, more internet is used. Or when the cost of manufacturing goes up, we tend to see these things in reality. Here's the problem. The problem is trying to measure it.

Has anybody ever run a business? Who's run a business? How did you set prices?

*[It was pretty unsophisticated business a while back]*

But you had to set a price, right?

*[Based on the amount of business we got, we would raise prices to where we could handle the business]*

Right. It's like...we're running to capacity, we're running below capacity, let's raise the price, for example. So we're running below, so no one's coming in, so we have to lower the price. So there's this groping. We're groping. We're trying to figure our way out. What's going on? What's going on? You're in the dark, you have no idea what's going on, you're trying to grope your way towards, essentially, equilibrium. And I said this before, and I'm going to say it again.

Equilibrium: we'll never get there. There's no equilibrium. In economics, we talk about  $P^*$ ,  $Q^*$ , but we never get there. We trend towards equilibrium. But then, something changes, and then equilibrium's over here, and we move towards over here. So it's theoretically convenient to talk about equilibrium, but reality is that we never get there. And to know where you are is almost impossible. I mean, it's much harder.

*[How was burning man?]*

It was awesome.

Yeah, Burning Man's an interesting experiment in terms of supply and demand. If you haven't heard of Burning Man, it's this thing off in the desert, and it's crazy. It's like dust storms and it's like 100 degrees and there's no water. And I have to go do research, as I mentioned. And it's a gift economy, right? And so we know about...I have money. So in an exchange economy, I have money, you have goods, let's trade. But in a gift economy, things are interesting, because no one has to keep track of anything. It's not like, "Oh, what did you give me, oh wait, what did you give me?" It's like...you just start giving shit away. And it's really fun. Of course, completely unsustainable because everybody shows up with a bunch of gifts. It's like Christmas. You can't have Christmas every week, right? It would break down after awhile.

We're back to theory/empirics/reality. So the empirics stuff. Why does empirics matter? Why do we care about measuring elasticity (which we might get to today). What does elasticity mean?

*[How much demand changes in response to price?]*

Right, so price-elasticity is how much the demand changes in response to a change in price.

Literally, there have been dozens of economists who make their entire career measuring the elasticity of demand for pork, right? That's their job. "I'm the pork economist..."

They spend a lot of time, a lot of data and come up with the result, which is like a 20-page report, and there's like a...

Minus elasticity of pork equals -0.3. Or whatever. Now that's the problem what if it's minus 0.5 or minus 0.2? If I told you that the elasticity of pork was one of these three numbers, would you have any idea of which was right? I don't.

So this is the empirics. The theory is that the elasticity of pork is less than zero. As the price goes up, you demand less. That's the theory. We know that's true. The reality is that it's also less than zero. But the empirical stuff... how do you measure it? And is this just an academic...who cares, type of question? No, it's not, because it comes to policy questions. Because policy makers, they go to an economist, and they say, I want to know what the elasticity of pork is so I can make a law about the relationship between pork, price, and chicken prices (or whatever the hell they're doing).

There's a big elasticity question with respect to this cash for clunkers thing. Right? Did anybody pay attention to that? Anybody buy a new car? Cash for clunkers? Anybody know somebody who did?

So the cash for clunkers was some idea that you would trade in your old car that gets poor gas mileage to a new car that gets good gas mileage. And I don't know if it was a win-win, or a win-win-win. It was...save the environment, save the US car companies (but of course everybody bought Japanese cars...duh). It's like...I know

why GM is bankrupt, because they suck! And some other win; I can't remember. But it was predicated on some person who said if you offer this, then the people will go into the market and they'll buy these cars, and it'll change the life cycle dynamic of gasoline demand, so that the earth is greener. And it's worth paying 2 or 10 billion dollars of government money to subsidize these car purchases. But the whole thing was based on some person's number, called... "if we do this program, we're going to save the earth". It was based on an estimate. The theory—we know the theory is out there. But then what ended up happening is that cash for clunkers is really, just a way of shifting a lot of cars off dealer lots. It had almost nothing to do with the environment or the green economy. It was great for the people who took advantage of it. I need a car anyway, hell, I'll take 3000, 4000 dollars. I'll do that. But when you're talking about the politics and economics and you're trying to pull those pieces apart, this is where you've got to pay attention. It's somebody using numbers here to justify a political win because they actually want to make a profit, and they say, "Oh, I'm saving the environment." When really, the environment doesn't matter, though. This is the kind of thing I'm trying to describe to you. Why we have to pay attention to empirics. And numbers get thrown around...I mean... numbers...forget 0.3. You'll have a number that'll be 0.263, and that's going to be some number that someone's going to use; some economist will come up with it—and it's going to be literally used by political staffers. The staffers are going to say, "Oh, I've got a number, I'm going to write the law up, and we'll put 0.263 because it doesn't even matter. You can use a random number generator sometimes.

So the problem is, a lot of stuff gets done based on that, and I want you guys to be skeptical to say, "Why are you doing that?"

Step back and see what's going on here. The theory or the reality. More importantly, where did the political contributions go? That's the reality, right? That's how the laws get made.

And here we go to statics versus dynamics. So if anybody looked at the syllabus, you would have saw that almost every lecture of the first half of the semester has "statics" next to it, and there's these letters...and this is an attempt of my own to categorize stuff in classes.

What statics essentially has to do with...I'm going to describe it in many different ways over the course of the semester. But statics has to do with a lot of "holding all else equal". So you might have the supply and the demand for beef. And we'll say... okay, if we move supply like this (because of whatever reason), we're going to see that the quantity and prices are going to shift...the price is going up and the quantity is going in, and that's the marketplace, and we're going to go (literally) from one equilibrium to another. This is a very static world. A little bit boring. But in some ways, easier to understand. This is why we use it. We use it as a stepping stone.

You can actually do math. You can have equations. You can have an answer. You can have a proof. Now, if you want to get into the dynamics of this (forget this stuff), ask yourself: what caused this shift from  $S$  to  $S'$ ? What *caused* the shift? Something out

there...something happened, right? And it could be that...there was Mad Cow's Disease, and we had to call off 20% of the herd. The supply curve shifted up. There's less beef at every price. So, why did that happen? So that's kind of an explanation of what's behind the supply curve. Why did that happen, or what's the response? See, now we're getting to response. Oh and then we start importing beef from another country (from Paraguay or Uruguay). Then things start moving around. They start moving around a lot. And after awhile, you're confused. Where are things going to end up? That's when you start thinking about dynamics, okay?

And we start with the statics because it's easier to understand. I'm going to give you a classic example of dynamics, and that's coming from game theory. Who's heard of the prisoner's dilemma? Yay! Okay.

So we're going to say...this is going to be quiet and not quiet. So the prisoner's dilemma is based on (it's a little bit contrived...but it's like the fishing game, okay?) two guys get caught in a theft. They're put in separate interrogation cells. And the cops go up to them and say, "If you confess, and your friend doesn't..."

So they're put into two different interrogation rooms. They're told...your brother next door is confessing against you. You better confess. So basically, if both of them confess, they're not quiet. Oh yeah, we did the crime. I did the crime, and he did the crime. Then they both will get negative 3 points, right? They go to jail. For three years, \$3 or whatever. So they're upset. If they both stay quiet and say, no, no, we didn't do anything, then they both go away, and they're happy and they have a funny story. So they can get their 2 points. But if one of them is not quiet and he basically says, yeah, he did it, and the other guy is quiet and says, "I didn't do anything." He rats on his friend (so-called friend). If this guy rats on his friend, then he gets five points. He gets like...a massage and a cup of coffee. And this guy goes to jail for much longer, because he takes the whole wrap. That's why it's called the...so the prisoner's dilemma is "what do you do", right? You can't talk, right? And unfortunately, there's no reputation. If anybody knows prisoners, you know there's a huge reputation, right? If this guys talks, and this guy goes to jail, then he's dead. But this is a one round game.

So the problem is: how to solve this game. We know how to solve the game, but what to do? I'll get to what you do in a second, but how do you solve it? So if I'm this guy, and I'm looking at these payoffs, and I say, well if I am quiet, and he is quiet, I get two. But if he talks, I lose five.

If I'm quiet, he gets two choices. He either gets two or he gets five. So he's going to do this. If I'm not quiet, he either minus five or minus three, so he's going to do this. If I do this, then what is he going to do? Does that make sense to everybody?

You will have to know this, because this game theory is really useful to think about things as contrived as it is. If you don't get it immediately, I'll go slowly or go over it later. If I rat, and I'm not quiet, then he's either going to lose five or lose three. If

he's quiet, then I'll either get two or five. And if he's not quiet, I'm either going to get minus five or minus three, so I'm going to do that.

So basically you end up with this as an answer. Because it's individually rational to make those decisions. Remember? It's one round. If it were a two round game and there was reputation, they would immediately go to here because...if they go here they'd be dead in the second round.

This is the one to go to. What you end up getting is actually the worse outcome. Minus six, social welfare, versus plus four welfare (or two criminals' welfare). It's called a social dilemma. It's a social dilemma because they both want to be there. They really want to be there. But they have no way of insuring that they end up there.

So they end up actually in the worst world. Because these sum up to zero. Now this is what I'm going to call a dynamic situation. You're trying to sit there and say, "If I do this, and he does that (*etc, etc*)", it's a brainbuster figuring out what to do. But this is a dynamic thing.

Now the interesting thing is that when economists look at this and (I don't know who started this...it might have been economists who started this example, or political scientists...I don't know the origin of it). But when economists go through this explanation of game theory, and they say...what are the payoffs...what are the rational actions they take, they say, "Oh, we're going to end up right here."

Now here is the interesting part. When you go and do actual experiments with actual people like you guys (like what I'm going to do in an hour), experimental economics...and you say, "What are you guys going to do?" You end up getting something like...60% of people show up here, right? Most of the economics students end up here, because they know what to do. That's the problem. They learned exactly the right thing to do, except that everybody else on the planet doesn't do that.

And then you have some [*inaudible*] problems here. Some mixed couples. So the fact is that people out in the real world (this is economic theory, but this is reality. This is an important point. We actually are able to solve some of these social dilemmas—these cooperation games, right? And this is obviously just a game, but when you look outside, and you see that...oh wow, people do pay their taxes even the chance of getting audited is like half of a percent, right? Oh wow, people do...has anybody ever had a hit-and-run and they leave a note on your car, and they say, "I'm sorry, I hit your car, here's my number." Has anybody ever had that?

[*I hit someone*]

You hit someone. Did you leave a note?

[*Yeah*]

See, this is like...spectacular, right? Because when someone hit my car, there was like no fucking note, they just left. They drove away!

So you're like up here, in the cool people, and I'm like, "Man, that guy hit my car. It sucks."

Despite the fact that there's no economic incentive (or no rational incentive or no rational reason), people are cooperating in this way. And this is a significant point, because mostly it's the reason we don't have civil war constantly. Because there's a lot of flex. We don't obey the laws because they're laws. We obey the laws because of a long cultural, sociological, religious (everything you want to call it) tradition of doing the right thing. And doing the right thing often means taking care of each other.

And I'm one of those people who thinks it's like an evolutionary psychology explanation because if you didn't do it, your tribe died. Because the other tribe that cooperated...they killed you. Because they were all cooperating.

Let me say...(don't put those chairs down, I've got one more point on this thing). So I'm just going to say one thing about equilibrium again just to emphasize this thing. PhD level, general equilibrium. Remember when I said last week...stochastic dynamic computable generating equilibrium (that jargon thing)? And you have this whole class in advanced PhDs about general equilibrium. And after like 20 classes, I asked the professor. I was like, "So this is equilibrium, when do we end up there?"

And the professor's like "Oh, we never end up there."

And I was like, "What are we doing? This whole class?"

But we end up...we kind of circle around it. And then, as I mentioned to you, it moves over here, right? And we go over there. So I want you to know that equilibrium is a convenient fiction. Same way that Newtonian physics is a convenient fiction for most of the time, right? We know that Einsteinians think that it's the real world, but we can get along with it. Actually that's a bad example, because Newtonian physics is really useful. And equilibrium almost never works. And that gets into the idea of a steady state. Do we ever get to a steady state? Right? And that's something out of ecology. Interesting questions. I'll just end it there. So I'll see you guys on Thursday. Office hours today at 3 o'clock.

**Transcribed and checked for accuracy by Brynna Bunnag**