[SQUEAKING]

[RUSTLING]

[CLICKING]

JONATHAN GRUBER: OK, why don't we get started? Today, we're going to come full circle back to the first lecture. So in the first lecture, we talked by-- we started by drawing a supply and demand graph. We've now spent the last few weeks explaining where supply and demand curves come from. And now, we're going to talk about the supply and demand curves. What do they know? Do they know things? Let's find out. So, no one? No one on that?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: OK, thank you. All right. So let's start by talking about shocking the supply and demand curves. Shocking the supply and demand curves. That was a *BoJack Horseman* reference for those of you who missed that. OK, let's talk about shocking the supply and demand curves.

So let's start with a review of the supply and demand framework that we introduced in the first lecture. So let's go back to figure 9-1. We've got the market for gasoline, OK? On the x-axis is big Q. Quantity of gas is the market-level diagram. On the y-axis-- the price of gas.

And as we said, the first lecture-- the supply curve that's upward sloping, representing the fact that higher prices call forth more supply. We now know where that comes from. We know that what happens is when there's a higher price, firms can now afford to move up the marginal cost curve, which is the supply curve. So we know where that comes from.

We have demand curve, which is downward sloping. Higher prices lead to less demand. We know where that comes from. We know that as the price of a good rises, through both income and substitution effects for normal goods, consumers will want less of it, so whenever that comes from.

So we now have derived these. And we're back where we started in equilibrium. So let's actually start by asking what happens. Let's start by asking, as we move forward, how do we want to think about these curves? And the way we think about them is we want to think about the demand curve, want to think about these as willingness to pay and willingness to supply curves.

So think about the demand curve as a willingness to pay curve. How much are you willing to pay to get that next unit of the good? Or how much is the market willing to pay to get the next unit of the good? OK? And the supply curve is willing to supply, OK?

An equilibrium is the point where consumers' willingness to pay for the next unit of the good meets the suppliers willing to supply the next unit of the good. When those are equal, we're in equilibrium. So that's where we start. Now, let's ask, what happens as these curves shift?

So, for example, let's take this market and imagine the tastes change. Suddenly, everyone wants to drive big cars. Everyone wants to drive SUVs, OK? What does this do to the market for gas? Well, so what does this do? Well, what it does-- yeah, go ahead.

AUDIENCE: SUVs require a lot more gasoline, so the demand goes up.

JONATHAN GRUBER: Yes. SUVs are what we call a complement as opposed to substitute-- are a complement for gasoline. When demand for SUVs goes up, demand for gas goes up. So the demand curve would shift out. So we would end up in a situation like figure 9-2.

But let's talk through the dynamics. All you would see in the market is quantity of gas sold would go up from Q1 to Q2. And price of gas would go up from P1 to P2. Well, let's talk about underneath, how we get there. What happens is demand shifts up. People want more gas, because they want to drive these gas-guzzling cars. So demand shifts from D1 to D2.

What does that mean? That means at the previous equilibrium price-- if the price didn't change, if the price stayed a P1, what would happen? Well, we'd no longer be in equilibrium. Because people would-- firms would still be happy to supply Q1 units

of gas. But people would want way more than that. We would have excess demand. If the price didn't change, there would be excess demand. People would want more than the Q1 units of gas.

Suppliers will recognize this and say, well, if people want more, we're happy to produce more. But remember, we have to respect the marginal cost curve and marginal cost of rising. If we're going to produce more, we're going to have to charge more. We're going to have to move up the supply curve.

So a shift in the demand curve makes firms move along the supply curve. Want to keep shifts and movement along curves separate. A shift in demand curve, meaning people are saying to gas producers, we want more gas. Gas producers are like, great. We want to give you more gas, but we're going to charge you more to do it. Because our marginal cost curve is upward sloping, which is our supply curve, as we learned.

So the price rises. And we need to reach a new equilibrium at E2. So we don't see these steps in practice. In the end, we just see the price change, but think about it as two steps. Demand shifts out, creating excess demand. Providers, to meet that excess demand, have to produce more. And to produce more, they're going to charge a higher price. And that moves you from E1 to E2, OK?

So we have a shift in demand, which caused a slide up the supply curve, OK? Now, let's think about a different example. Imagine war breaks out in the Middle East. Not too hard to imagine, unfortunately. And as a result, the quantity-- so suppliers need to pay more to get the oil that they use to make gasoline, OK?

What does that do? We see that in figure 9-3. Now, what happens is for every unit of gas, suppliers need to charge more. Their underlying marginal costs have gone up, because they have to pay more to get the oil. That's a variable cost of production of gas.

So their marginal costs have gone up. Their marginal costs going up mean their supply curve has shifted upwards, OK? For every unit of production, their marginal cost is higher, because their variable costs have gone up. Therefore, they're going to need to charge a higher price to break even.

OK, we're still in perfectly competitive markets where nobody is making any profit, OK? They're going to charge more to break even. So now, let's once again talk about the dynamics of what's happening. The dynamics are the costs and the input to the suppliers went up-- oil, OK?

Their marginal costs shifts up to S2. So they want to charge a higher price. So if we kept the price the same as it was before, suppliers would say, we don't want to sell Q1 anymore. We're not interested in selling Q1 anymore at that old price. OK? That doesn't interest us.

Therefore, consumers want more than providers are willing to sell. And we once again have excess demand. So in both cases, we get excess demand. In the first case, we got excess demand because consumers wanted more. The lower-- the consumers' tastes shifted, so they wanted more gas at every price.

Now, we have excess demand not because taste shift, but because costs go up. So providers don't want to provide as much gas at every price. So what happens is providers are going to say, fine, we're going to charge a higher price, OK? And we'll slide up the demand curve.

Because as providers charge a higher price, people want less gas. At a higher price, you want less gas through the substitution effect. Because you'll buy other things instead and for the income effect. Because you're effectively poorer, because the price of gas went up.

For those reasons, you're going to shift up the demand curve and reach a new equilibrium at E2. So that's the underlying dynamics of how shifts in supply and demand lead to changes in quantity and price, OK? So that's basically what we're seeing. Questions about that? Yeah?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: Great, great question. So what's the answer? What's the substitution effect with gas?

AUDIENCE: [INAUDIBLE] not driving.

JONATHAN Well, you've answered yourself. It's not driving. It's taking the bus. It's driving less.

GRUBER: It's walking or taking your bike. So once again, when everything about substitute effects, you want to think about the next opportunities you could use instead, OK? Good question. Other questions?

OK, so here's an interesting point. Look at figure 9-2 and 9-3. In both cases, the price went up, OK? In both cases, the price went up. So we can't tell. If a price goes up, you can't tell from that alone whether there was a shift in demand or supply.

So if I, for example, asked you on an exam or your mom came home. Your mom asked you, hey, if the price goes up, does that mean demand shift or supply shifted? You say to your mom, I don't know. I can't tell with just that information. I need to know what happened to quantity, too. OK? And then you say your mom, good question.

OK, so let's go through the reasons why the supply and demand curves shift. So why do curves shift? OK? Well, on the demand side, there's at least six reasons why demand curves would shift. So why do demand curves shift? OK, one reason is tastes change. I just used that reason-- tastes change. OK, people want different things. OK?

A second reason is that income changes. Second reason-- because people are richer or poorer. And so that makes them want different quantities, even with the same tastes. A third reason is the change in the price of a complementary or substitutable good, OK?

Now, that's different. I should separate. The actual example before was this. Taste change is slightly different. So change in price [INAUDIBLE] is what I talked about. Taste change would be literally for everything held being equal, I just wake up one morning psyched to drive. That'd be a taste change, OK?

So really, the example I used was a change in the price of complimentary-- no, no, price didn't change. No, I go back. I go back. The example I used was a taste change. People wanted more SUVs. But at the same time, imagine a different change. Imagine that we're looking at the demand for babysitters. And the price of movies goes up, OK? Well, movies are complementary with babysitters.

You guys don't worry about this. You don't have kids yet, but trust me. Movies are

complement to babysitters, that basically the more you go to the movies, the more you need babysitters. So if the price of movies goes up, that's going to lower my demand for babysitters or vice versa.

Imagine that how a change in the price of movies affects the demand for Netflix, while those are substitutable. As the price of movies goes up, I'm going to want more Netflix and less babysitters. So change in price of complementary substitutable goods will also affect my demand curve.

Another thing that could affect the demand curve is a change in the market size. So we will talk in a couple lectures about international trade. If suddenly you're selling goods to a much larger market, that will affect the demand for your good. So preference haven't changed. Price haven't changed. You just suddenly got a bunch of new customers. That will affect demand for your good, OK?

And the last thing that could change, the most subtle way demand could change is expectations of the future. So for example, imagine you expect the price of gas to go up tomorrow. You might buy more gas today. And that'd be weird. [INAUDIBLE] look, nothing changed today.

Your taste didn't change, prices-- nothing changed, but people buy more gas. What's going on? It's that they expect the price to change in the future. So expectations of the future can actually drive demand today, OK? We've all-- experiences in various aspects of our lives, OK?

So those are the reasons why the demand curve can shift. There's a lot of reasons why the demand curve can shift. For the supply curve, why the supply curve shifts is much simpler. There's really only two reasons, OK? One reason is changes in input costs. And the second is a shift in the technology and production. So the production function changes or input costs change. That's pretty much why supply curves shift, OK?

So that gives you a catalog of how to think about these curves shifting. I have a fun example in the videos that go with this class, which is that we all know Kim Kardashian is-- you may or may not know she has more Instagram followers than there are people in France. She got 80 million. It's up to about 100-plus million Instagram followers.

Kim Kardashian, a few years ago, tweeted out a picture of herself in an exercise corset, she called it. She basically claimed-- a corset is this thing they used to wear back when we didn't care about women much at all. And we just made them wear these incredibly constrictive things to make them look skinnier, OK?

They're basically like a brace you'd wear to make you look skinnier back in the old days. And Kim Kardashian said, actually, if you wear a corset when you exercise, it helps you lose weight. Well, actually, she's totally fucking wrong, OK? It doesn't, OK? There is no-- it does not help you lose weight, but she tweeted this out.

And there was a massive increase in demand for exercise corsets, OK? And the one company that made them made scads of money. There was a huge demand shift based on this Kim Kardashian tweet, OK? So tell me what happened next. Yeah?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: More companies entered, OK? So what happened was profits were being made on exercise corsets. So more companies started making exercise corsets. And they came in and drove those profits down, OK? So that's a classic example of how demand shift and how the market in the long run will respond to return us to zero profits. Zero profits in the long run-- in the short run, some corset companies made a lot of money. They should-- they owe, Kim, OK? But in the long run, profits go to zero. Yeah?

AUDIENCE: With the expectations where the demand curve shifts, is that when companies-- you're like, oh, there's these coupons for limited kind of sales? Would that be an example of demand?

JONATHAN GRUBER: Yeah. And anything where you basically-- well, no. But once that's on, that's a price change. A limited time sale for good is literally just a standard to price changed, OK? It's you think the sales are going to happen in the future, so you buy less today. That's the expectations, OK? So that shifts in demand supply curves.

Let's now talk about what determines the shapes of supply and demand curve. Now, what determines the shapes of supply and demand curves? OK? So basically, the effect-- not what determines the shapes. We already talked about what determines

the shapes. We want to talk about the role, the shapes the supply and demand curves play. Let me rephrase that. We already know what determines the shapes. We covered that in the last 10 lectures or whatever.

Now, we're talking about the role that shapes play as demand curves shift. So for example, let's think about a [INAUDIBLE]. Figure 9-3 shows what happens with a supply, the figure we're just looking at, OK? Figure we're just looking at, figure 9-3, shows what happens when the supply shift with a standard downward, sloping demand curve, OK? Which is that the price goes up, quantity falls.

However, imagine, instead, we had perfectly inelastic demand. So, for example, for insulin. Then what would happen? Well, figure 9-4 shows if demand is perfectly inelastic, quantity won't change. So if there's a supply-- if there's a shock that shifts up the supply curve like war in the Middle East.

So this is the question here. Why wouldn't gas just be perfectly inelastically demanded? In fact, in the short run, gas is actually pretty inelastically demanded, OK? It's not perfectly inelastic, but is pretty inelastic, OK? So in that case, you would see just prices going up, and quantities wouldn't change. Now, in the long run, do we think the elasticity for gas will be higher or lower in the short run, the demand elasticity for gas?

AUDIENCE: Higher.

JONATHAN GRUBER: Higher. Somebody raise their hand and tell me why. Somebody raise their hand and tell me why. Somebody else besides people who always answer questions. Yeah?

AUDIENCE: People can shift towards electric cars.

JONATHAN GRUBER: Exactly. In the short run, all you can do is drive less. And we got to drive to work and stuff like that. And in the long run, I can buy a different car. So this is an example of long run versus short run, how it can affect these elasticities, OK?

Now, let's think instead about a perfectly elastic demand, the demand for-- I don't know-- chachkies in a market or something like that, OK? Perfectly elastic demand in figure 9. It's always hard to think of markets with perfect elastic demand. It's easier think about firms that have perfectly elastic demand. It's hard to think about markets.

But think about a market for a certain kind of candy with another kind of candy that's just as good, OK? So those are markets, which are fairly elastically demanded, OK? There you see when the supply shifts, price doesn't change, only quantity does.

And why is that? That's because demand is probably elastic. You can change the price. If you try to raise price by one penny, you'll lose the entire market. If you lower the price by one penny, you gain the entire market. And then your profits will go away, because your marginal cost will be through the roof, OK?

So with perfectly elastic demand, you're going to get prices fixed, but only quantity changes, OK? So basically, that's how we think about these extremes. The bottom line is that's how the shapes of supply and demand will affect the response to shocks, OK?

The more elastic is demand, the more price shock will come through in quantity and less in prices. The more inelastic is demand, the more supply shock will come through in prices and not in quantity, OK? Any questions about that? OK. So now, let's go on to what we can do with these supply and demand curves.

So now, we're the masters of supply and demand curves. We know where they come from. We know why they shape the way they do. We know what happens when they shift. And we know what happens how that shift depends on their shapes. So we own supply and demand curves.

Now let's go, what can we do with them? And what we can do with them is use them to take the next step in this class from positive to normative economics. So far, this class has been completely focused on positive economics. Why do firms behave the way they do? Why do consumers behave the way they do? And we haven't talked at all about whether it's a good thing or a bad thing.

Well, we need a new set of tools if we're going to move from positive economics about why things-- the way things are to normative economics about the way they should be, OK? And those set of tools-- we're going to derive from supply and demand curves.

And this is critically important. Because, for example, let's take where we ended the

last lecture-- or the last lecture, I think, talking about how with perfectly-- or in the middle of last lecture, talking about in a perfectly competitive market under a set of assumptions, all firms-- a zero profit in the long run, OK?

So you buy that. But you have to ask yourself, is that a good thing or a bad thing? Is zero profits in the long run good or bad? Well, on the one hand, firms are cost minimizing. That's good. On the other hand, why would anyone start a business? In the long run, they're going to make no money. That's bad.

So how do we think about trading those things off? How do we think about whether it's good or bad to have long run zero profits? OK? This is the question. This set of questions is what we turn to with the notion of welfare economics. Welfare is going to be used in two senses in this class. Mostly when I say welfare, I'll mean as a measure of well-being. Mostly when I say welfare, I mean welfare is well-being.

Sometimes we say welfare. We mean cash payments to poor people. That's welfare payments. That's not what I mean, usually, when I say welfare. I'll try to distinguish when I mean the other thing. When I say welfare, I don't mean the way it's used in the political debate, meaning cash payments to poor people. I mean welfare is a measure of well-being.

And welfare economics is the tools of normative analysis. The tools of welfare economics are the tools of measuring well-being. And we're going to start by talking about the concept of consumer surplus. It's going to be the first thing we're going to use when we talk about welfare economics is consumer surplus, OK?

Now, if we want to measure well-being, however, we have a problem, which is, how do you measure how happy I am? My utils But utils don't exist. So we've got a fundamental challenge here, which is our indicator of well-being is utility function, which isn't a real thing, OK? We use it to derive decisions, but we don't actually have a measure of well-being that gives real meaningful inputs.

So what do we do? We do a clever thing economists thought of a long time ago, which is to use the concept of compensating variation. The concept of compensating variation. What does that concept-- means? That means instead of asking you how happy you are, I ask you, how much would I have to pay you to become less-- to become sadder?

Or how much would you be willing to pay to be happier? So I can't measure margin utility in dollars. But I can measure how many dollars you would pay to buy the next good or how many dollars you'd pay me not to be punched or whatever, OK?

I can basically measure those things by essentially asking you, how much would you pay to be better off? Or how much would you be willing to pay not to be worse off? And those are what we called a compensating variation. We measure your well-being by the money equivalent that you give to us in expressing your preferences.

And what we can then define consumer surplus-- we'll define consumer surplus, which is our first measure of normative welfare economics, as the benefit that a consumer gets from consuming a good, above and beyond the price of that good. The benefit that a consumer gets from consuming a good, above and beyond what they paid for that good. That's consumer surplus.

Surplus means extra, right? So it's your extra. It's how much more you get than what you actually pay to get the good in the first place, OK? So basically, consider my daughter's demand for songs by Kendrick Lamar, OK? And to make life easy, let's say this is pre-streaming and songs cost $1, OK?

So she wants songs by Kendrick Lamar. So that's actually-- yeah, she wants songs by Kendrick Lamar, and there's no streaming. And the songs cost $1. So if my daughter is willing to pay $1 for a Kendrick Lamar song and it costs $1, then her consumer surplus is zero.

The benefit she gets from the song is $1. It costs $1 to hit zero. But if she was willing to pay $2 for a Kendrick Lamar song and it only cost a $1, then she's got $1 in surplus, OK? So basically, the key thing is to define consumer surplus, we need two things-- the price and the willingness to pay. Well, how the hell do we get willingness to pay? Where does that come from? Someone raise their hand and tell me. Yeah?

AUDIENCE: Demand.

JONATHAN GRUBER: The demand curve. We already defined it. We already defined what willingness to pay is. It's the demand curve. So consumer surplus is simply defined as the area below the demand curve, above the price. Because that tells you.

The demand curve tells you how much you're willing to pay for each unit. The price you face tells you how much you had to pay. So any gap between them is consumer surplus, OK? So let's go to figure 9-6. Let's do my daughter's demand for Kendrick Lamar songs, OK? Let's say that her demand is such that-- now, once again, the trick here is we've drawn a continuous demand curve.

It's a discrete decision, so bear with me-- the numbers. Bear with me, just think about this. But roughly speaking, she's willing to pay for the first Kendrick Lamar song between $4 and $5, OK? For the next Kendrick Lamar song, she's willing to pay between $3 and $4 and so on.

So this gives you-- so to make life easy, let's imagine she's willing to pay $4 for the first Kendrick Lamar song, $3 for the second Kendrick Lamar song, $2 for the third Kendrick Lamar song, and $4 for the first Kendrick, and-- I'm sorry-- $1 bucket for the fourth Kendrick Lamar song, OK?

So imagine that's basically her demand curve. It's not quite that discrete, but we can make it stepwise if you want-- just be ugly looking, OK? So that's her demand curve. So what does that mean? That means when she buys the fourth Kendrick Lamar song, when she buys King Kunta or whatever, that is zero surplus, OK? Zero surplus.

She was willing to pay $1 for "King Kunta," and it cost $1, so she's done, OK? However, what does that mean? That means when she bought "Humble," which was her first choice song, she gained a surplus. Because she paid $1 for that.

But she was willing to pay $4 for it. So she gained a surplus. And the surplus is the difference between what she paid, which is represented by the horizontal line and a dollar, and what she was willing to pay which is the main curve, which is $4. So she gained that surplus. Yeah?

AUDIENCE: Let's say as her father, you want to get her a gift-- all these Kendrick Lamar songs. And let's say it's special. I don't know-- $2, something like that. Would the consumer surplus be what you think she would want out of it or what she--

JONATHAN GRUBER: Let me come back to that. It's a great question. There's a famous article about that. And I'll come back to that in one minute. Let me finish this. The bottom line is the

surplus there is between what she was willing to pay and what she had to pay, which in a continuous example is this entire triangle.

Think of being able to buy fractions of songs-- little bits, ringtones or whatever, OK? Fractures of songs, OK? Then this entire area under the curve, above the price is her surplus. She was willing to pay the points on the curve. She only had to pay the flat line at $1. So the entire difference is her surplus, OK?

The key point is this is all driven by diminishing margin utility. That is the reason her surplus goes to zero eventually-- is eventually gets tired of Kendrick Lamar songs, so it goes down. We have diminishing margin utility for the songs. And that's why we get consumer surplus as a triangle. It's the difference between the downward sloping demand curve and the flat price line that the consumer faces, OK?

So the individual consumer surplus-- individual consumer surplus, OK? It's her demands-- that individual graph, OK? Individual graph. Her demand is downward sloping. And therefore, her surplus difference between is the area under the demand curve, above the price line. Yeah?

AUDIENCE: If demand is perfectly inelastic, is it infinite consumer circle?

JONATHAN GRUBER: Let's talk about that. Let's talk about-- actually, I don't have it here. If demand was perfectly inelastic, you're absolutely right. The consumer surplus would be infinite. Because the area under the demand curve above the price line would be infinity. It'd be a rectangle going up to infinity. Why is that? Why is the consumer surplus infinite if demand is inelastic?

AUDIENCE: Because they'd pay anything for it.

JONATHAN GRUBER: Because they'd pay anything for it. So at any price, it's a bargain. In theory, if you're an incredibly rich diabetic, you would pay an infinite amount to have insulin. So at any price, you're getting huge surplus. You're getting infinite surplus. Infinitely minus anything is infinity. Likewise, what's the consumer surplus if demand is perfectly elastic? Same person.

AUDIENCE: Zero.

JONATHAN What? Zero. Why?

GRUBER:

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: That's graphically why. But intuitively, why? Why do you get no surplus from a good where demand is fairly elastic?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: What makes a perfectly elastic demand curve?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: Because-- why? Because there's substitutes that you're indifferent towards. That's what gets the perfectly elastic demand. So if I'm indifferent between Jujyfruits-- god, you guys probably don't know Jujyfruits. If I'm indifferent between-- God, I don't even know what candy is anymore. Whatever. If I'm ever eating candy A and candy B, and then I get no surplus for consuming candy A, why? Because I'm equally happy with candy B. So candy A gives me no surplus. What does the candy people eat? What do people eat?

AUDIENCE: Jolly Rancher.

JONATHAN GRUBER: What?

AUDIENCE: Jolly Rancher.

JONATHAN GRUBER: Jolly Rancher. I love Jolly Ranchers.

AUDIENCE: M&M's and Skittles.

JONATHAN GRUBER: OK. Well, no. But that's irrelevant, 'cause Skittles are just disappointing M&M's. Let's be honest. When you get Skittles, you're just pissed off they're not M&M's. Am I right? I mean, Skittles are just disappointing M&M's, so we can't do that one.

Let's do Jolly Ranchers versus Skittles, maybe. Those are more comparable. Because M&M's are better than everything. So basically, Jolly Ranchers and Skittles--

since I'm indifferent to Jolly Ranchers and Skittles, I get no surplus eating the Skittles. Because I would equally happy having a Jolly Rancher. So surplus is zero for a perfectly elastic demand and good. It's infinite for a perfectly inelastically demanded good, OK?

Now, let's go back to the question. There's a famous article in economics called the "Deadweight Loss of Christmas--" we're such an awful profession-- based about how terrible gift-giving is. And why is gift-giving terrible? Because if you gave people cash, they could get what they want the most. But if you give them a gift, it's by definition, lower surplus than the cash. Because they could always go out and buy that good with the cash.

So by definition, giving someone a gift makes them worse off than giving them that same amount of cash. So this guy-- is he interviewed all the students. I think was at Penn State. And he asked them how much their parents' presents really worth to them.

And he found the deadweight loss of Christmas is hundreds of billions of dollars. People would way rather have cash than the parents-- but what did he get wrong? What did he get wrong? Why is that not necessarily a bad thing? Yeah, you asked the first question, so go ahead.

AUDIENCE: You like the surprise of opening a present.

JONATHAN GRUBER: Maybe. But even ignoring that, what else did he get wrong? Yeah?

AUDIENCE: It's an emotional connect if something my grandma bought me a--

JONATHAN GRUBER: That's like the surprise. There's emotional connections. That's all well and good, but that's not very big, OK? What's really big that he missed?

AUDIENCE: Because the person who buys it-- they saw what they get from it.

JONATHAN GRUBER: Yeah, he missed the fact the person who gave it gets utility from giving it. So in fact, the package may be efficient, because you like the surprise and the person gets utility. But if compare it to dollars, it's inefficient. So it's a clever, clever little exercise he did.

OK, so basically, that's individual consumer surplus. But in this course, we don't care about individual consumer surplus. We care about market consumer surplus. So let's turn to figures 9-7 and think about a market. Let's see about the market for gas. Now, the mechanics is the same here. But we're actually now thinking not about the individual buying 1 gallon versus 2 gallons, but the market for gas. How many gallons in aggregate will be bought?

But the analysis is the same, that basically the willingness to pay for gas is the demand curve for gas, the market demand curve for gas. The price is the price. So the difference is the area under the demand curve above the price. The idea here is for consumers all the way to the left, they have to drive to work. They have to drive. They have to drive a lot. They're truck drivers or whatever. They have to drive a lot.

So for them, they have a huge willingness to pay for gas. So they make a huge surplus. The more you want something at a given price, the more surplus you get. Whereas you move to the right, that's people who need to drive less and less. Once you pass point A, why does surplus go away? To the right of point A, why is there no more consumer surplus? Yeah?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: Didn't happen, because?

AUDIENCE: Because [INAUDIBLE]. It's beyond.

JONATHAN GRUBER: Your willingness to pay is below the price, right? So a transaction-- so consumer surplus can't go negative, but when negatives just wouldn't buy it, especially with negative consumer surplus, OK? When negative, you just wouldn't buy it, OK?

But as you get closer and closer to A, then you actually do end up with consumer surplus going to zero, OK? So that's the market consumer surplus. So let's ask. Let's talk about a couple of aspects of market consumer surplus. First question-- what happens to consumer surplus when the price changes?

Let's show that in figure 9-8. Let's say the price of gas goes up from $3 to $3.50 a gallon. Consumer surplus shrinks by a trapezoid. Consumer surplus used to be the

entire area below the demand curve. It used to be the entire area is below the demand curve and above $3.

It used to be that whole triangle. Now, it's just the empty triangle above the new price curve and below the demand curve. So the new consumer surplus is just the area above $3.50 on the main curve, so it's the area not shaded in. What you've lost is the trapezoid, that on the y-axis goes between $3 and $3.50 and then along the line, goes from A to B.

You've lost that trapezoid. Why is it a trapezoid? Why is the loss-- consumer surplus a trapezoid? Because two things have happened. What are the two things that have happened that have reduced your consumer surplus? Get some more folks involved. Folks, go ahead.

AUDIENCE: The quantity supplied goes down as well.

JONATHAN GRUBER: Well, not just quantity supplied. Quantity sold goes down. Because you want less supply, because you are-- so the first thing is because the price gone up, you want less. That's the triangle you lost. You have given up units that you used to get surplus on, used to derive surplus in all the units from 900 to 1,000.

So what happened here is the price goes up. And a hundred fewer people buy gas. That's the way I've labeled this. That could be people buy less gas. Let's make it easy. A hundred people buy gas. So a hundred people used to buy gas, no longer buy gas. They're out of the gas market. They bike instead, OK?

Now, they clearly were not that sad to bike, or they would've had a huge surplus from gas. But they're a little sad to bike. It's a crappy day out. They rather be driving. And so they lost surplus from the fact that now at the higher price, they have to bike instead, but it's a little bit of surplus.

It's just a little triangle, OK? So there's a little bit of surplus lost. Because some people who were close to indifferent now have to bike instead of driving. But why the big-- what's the big rectangle? Same person. What caused the big rectangle?

AUDIENCE: The increase in price.

JONATHAN Increase in price for who? For the people who were already buying it anyway. So the

GRUBER: big losers are the people who are going to drive anyway and now just have to pay more for it. Because here's the key point. The people between A and B-- the last hundred people-- they were pretty close to indifferent. They didn't lose that much surplus from not driving.

All the people to the left of person 900-- they get big surplus from driving. So their surplus simply went down by this rectangle. They used to get the difference between the demand curve and $3. Now, that's the difference the demand curve and $3.50. It's just a pure loss.

So when you raise a price, the existing-- the people whose behavior doesn't change are worse off. Some of those behavior change. They're a little worse off, but not that much. So the triangle is small. The rectangle is big. The big loss is the people who like gas a lot, but now have to pay more for it, OK? Point one.

Point two-- what determines whether consumer surplus is large or small? Well, we cover this. It's elasticity of demand, determines whether consumer surplus is large or small. So, for example, figure 9-9 takes the gas market with a price of $3.00 and a thousand people buying gas and uses two-- shows two different demand curves, both of which go through point A.

So both demand curves yield the equilibrium price of $3.00 and the equilibrium quantity of a thousand, OK? So these two different demand curves are just two different sets of preferences, both of which yield the same equilibrium outcome. And yet, under the steeper demand curve, the consumer surplus is larger than under the flatter demand curve.

And that's for the reason we talked about. That's for the reason. That's because with a steeper demand curve, the more inelastic demand, people want the good more. They basically-- they're less willing to give it up as the price goes up. Therefore, at any price, they're making more surplus off it.

With a flatter demand curve, people are basically closer to indifferent with some other good. So they're not so sad if the price goes up. Their surplus is smaller from getting this good. They're seeing what they were willing to pay and what they have to pay is smaller, OK?

So that's how we think about consumer surplus. It's basically the excess of your willingness to pay above what you have to pay. So if the price goes up, your surplus goes down. And surplus is larger, the more inelastic is the demand curve. Yeah?

AUDIENCE: [INAUDIBLE] producers would want it, but consumers are having a zero surplus, if that makes sense? Because they're at the point where not only paying more, but they're selling as much as they can?

JONATHAN GRUBER: Great question we'll talk about when we talk about monopolies. Right now, why can't producers do that? Why can't producers exploit that? Because perfectly-- yeah?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: Exactly. That's a perfect answer to a perfectly competitive question. Because they're price takers, OK? So they can't do an exploiting of consumers. They don't have that choice. Starting next lecture or one lecture after, we'll talk about monopoly. Then they're price setters. Then they'll start thinking about that. But right now, they can't, because their price takers.

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: I mean, ultimately, that's what-- yeah, ultimately, they'd like to-- the surplus is just extra money somebody has got. If you're a business owner, why should consumers have it? You want it, OK? So that's consumer surplus. Any other question about consumer surplus?

OK. Now, let's move on. And let's talk about producer surplus. Let's talk about producer surplus, OK? Now, the idea here is the same. Consumer surplus was the difference between the willingness to pay for a good and its price. Producer surplus is the difference between the willingness to supply a good and its price. And how do we measure willingness to supply? The supply curve.

So as figure 9-10 shows, the producer surplus for any given firm-- firms have an upward sloping supply curve. And the market is delivering them some price. So let's think about this firm. When they produce the first unit-- this is a gas production firm, OK? A gas refiner, say.

When they refine that first gallon of gas, that costs them almost nothing. Because margin cost is upward sloping. They've already paid the fixed cost. They don't care in the short run. So all I care about is variable costs, OK? So at the end of the day, this is not expensive.

They are willing to produce that first gallon really cheaply. They've already invested in this giant refinery plant. Marginal costs are tiny. So they get a huge-- but at the same time you pay them, you don't differentiate what you pay per gallons. You plug the thing into your car and you get the gas, OK?

So they're getting $3 a gallon, but they're not paying much to make that gallon. However, as they make more gallons, their marginal cost increases. So the surplus they earn on each gallon produced shrinks. The surplus they earn at each gallon produced shrinks.

And so eventually, they get to a point where they are essentially indifferent about producing the next unit of gasoline. That's at a price of $3 and a quantity of-- should be little q, OK? That's the point at which they are indifferent between producing gas and not producing gas. Therefore, their surplus is zero.

So producer surplus is the difference between the price line. And the upward sloping supply curve is produced surplus. Now, in the long run, we have a name for that. It's called profits, OK? So our consumer surplus is this abstract, weird, theoretical concept.

Produced surplus-- you can get your hands around. It's profits. Basically, remember, in the long run, marginal cost equals average cost, right? Because in the long run, you produce until marginal cost equals average cost. Therefore, the supply curve is the average cost curve.

Price minus average cost is profits. Therefore, producer surplus is profits. Let me say it again, a little three-line proof for you. OK, in the long run, marginal cost equals average cost. Second, the supply curve is the marginal cost curve. Therefore, it's the average cost curve. Third, profits is defined as price minus average cost. Fourth, profits is the shaded area.

Now, in the short run, that's not quite right. Because there's the whole shutdown

decision, which makes things awkward. But roughly speaking, it's not terrible to think about producer surplus as being profits. That's a shorthand that largely works. If it ever doesn't work, we'll let you know. But that's the shorthand. It should largely work, OK?

Now, of course, once again, we don't care about individual firm's producer surplus. We care about the market producer surplus, so let's go to figure 9-11. Figure 9-11 is basically the market surplus curve. And the idea here is that essentially to the left, you have a market supply curve where basically, remember, the individual firm's supply curve is always flat.

But the market supply curve doesn't have to be. It doesn't have to be flat, OK? The market supply curve-- well, no, let me back up. A market supply curve is flat under a certain set of conditions. But now, let's imagine that those conditions aren't true.

For example, let's go back to-- I talked at the end of last lecture about heterogeneous firms. Remember, we talked about the cotton example. Some firms are more efficient producers than others. If all firms are identical and it's very competitive, of course, the market supply curve is flat. So this graph would be uninteresting.

But in fact, imagine that firms aren't identical. Some firms are more efficient producers than others, OK? For example, in that case, what you'll see is the most efficient producer will earn the most surplus, i.e., the most profit. They're all the way to the left.

As you move to the right, you're getting to less and less efficient producers, OK? So profit is shrinking. So under the conditions we started with last time, then price would always equal supply. It'd be a flat supply curve at the price and therefore, profits are zero. That is producer surplus is zero.

So we derived-- towards the end of the last lecture, we said, in the long run, a perfectly competitive market-- profit is zero. That's the same as saying producer surplus is zero. And why is that? That's because in that case, the price line is on top of the supply curve. Therefore, there's no gap between them.

So in the long run, a perfectly competitive market-- there's zero produced of

surplus, means zero profit. In reality, we talked about conditions why there would be an upward sloping, long-run supply curve, like firms different, how efficient they are. Or there's barriers to entry, which means some firms can't come in and drive profits to zero. Or there's an upward sloping input price curve, meaning that basically the more you want to produce, the more you have to pay workers.

For all those reasons, the supply curve slopes up. And therefore, you can get a producer surplus. You can get some profits, even the long run, OK? So basically, what we have here is a situation where as long as the supply curve slopes up, you get a long-run producer surplus, which is the difference between the price and the supply curve, OK?

And that is the same as profits. Questions about that? OK, let me cover one last point. Going back to last lecture-- going to have time to get to your last lecture. Remember, we talked about three reasons why, in the long run, even in a competitive market, supply can slope up.

We talked about heterogeneous firms. That is firms with different levels of efficiency of production. We talked about barriers to entry. That is reasons why firms can't enter and drive profits to zero. Because it's not costless to enter. And we talked about upward sloping, input supply curves.

We talked about the fact that as you produce more, you might have to pay more for your inputs. And therefore, you can't just charge when-- you have to charge higher prices as you produce more. I want to highlight something I said quickly last time, the difference between these two and this one. In these two, there are profits. In these two, there are profits, OK?

Because in each of these, there are reasons why the market will not drive every firm to zero profit. Some firms remain in-- much like Pakistan made profits on their cotton sales. Some firms remain in. Likewise, with the barriers to entry, the firms that are in the market that have gotten over those barriers will make money, OK?

In this case, the firm doesn't necessarily make money, OK? What it does here is it just pays. It takes that extra money and pays it out to workers, OK? So whether or not an upward sloping supply curve, doesn't necessarily mean the firm makes profit.

It could just be upward sloping, because their input costs are rising, OK? So that's an important distinction to keep in mind. So let's stop there with that mind-blowing insight. Let's stop there. And we'll come back. And we'll talk more about welfare economics.