[SQUEAKING]

[RUSTLING]

[CLICKING]

JONATHAN GRUBER: So basically, we proved that essentially, if you follow the steps we followed so far in the course and derive the perfectly competitive equilibrium outcome, that's the best you can do. Now, the best way to understand this example is to ask how it gets messed up by government interventions. In this world of perfectly competitive markets, the government can only screw things up.

The market knows best. The government can only screw things up. And so I want to talk about a couple of examples of ways the government could screw this market up before coming back in a few lectures, telling you why the government isn't always the bad guy. But thus far, it is. So for example, let's go back to our market for gas and let's look at figure 10-1.

Imagine you're initially in equilibrium in the market for gas at P1, Q1. Point E1 is equilibrium. Everybody's happy. You're on the demand and supply curve. And as I proved last time, that's the welfare-maximizing outcome. That's the outcome that maximizes the sum of producer and consumer surpluses.

Now imagine there's a war in the Middle East, as we unfortunately are having. And that raises, as it will raise, the price of gas. The price of gas is rising in the US and will rise now because of these terrible events in the Middle East. And that results in a higher cost of getting oil. That shifts up the supply curve. And that leads to a higher price for gasoline.

So we went through these dynamics last time, how that would happen. And you move from E1 to E2. Now, what does that do to welfare? Positively we know what it does. We've derived that. What about normatively? What's it do to welfare? Well, before this supply shift, consumer surplus was A plus B plus D plus E.

So before-- so we're talking about now government interventions. So let's say there's a supply shift. So consumer surplus before the price rise, before the war, the consumer surplus was A plus B plus D plus E. And the producer surplus equaled consumer surplus. And the producer surplus was C plus F plus G.

What has happened now? Well, with the new equilibrium, E2, consumer surplus has fallen to just A. We've lost that entire trapezoid-- B plus D plus E. Producer surplus has-- producers have gained the area B because prices are higher. But producers have lost F plus G. So producer surplus has lost F plus G, but they've gained B.

So overall, society has lost D plus E plus F plus G. That entire, if you will, sideways trapezoid F, D, E, G is gone. It's disappeared because now the price is higher. And that's our welfare analysis. And right now we're talking about good-bad. We're not talking about how we feel about this. We're just saying what happened positively. What happened positively is welfare fell by that trapezoid F, D, E, G.

However, imagine that voters are upset about this. President Biden is up for reelection in a little bit more than a year. He may be worried that higher gas prices will hurt his chances, as they often-- turns out, people's feelings about inflation are heavily shaped by what happens to gas prices. And he says, you know what we ought to do? We ought to limit this price rise in gas.

Why don't we just tell the gas producers that they can't raise their prices? Why don't we set a price ceiling at P1 and just say, look, the price of gas was, I don't know, $3.50 before these latest events, $3,60. You can't raise it. It's got to stay $3.60 a gallon. You can't raise it to $4.00 Or $4.50 or wherever it's going to go to. And then the voters will be happy because they won't have to pay more for gas.

Well, what would that do? We can show that in figure 10-2(ii). So what is the effect of the price ceiling? Let's walk through this slowly. First thing is they set a price ceiling at P1. So this is a price ceiling set at P1. First question is, at a price ceiling of P1, how much gas gets produced and why? Someone tell me.

At a price ceiling of P1, if the government says the price can't go above P1, how much gas gets produced and why? What quantity of gas is produced in the market? And why? Yeah. You got to speak up.

AUDIENCE: A lower quantity.

JONATHAN GRUBER: Specifically, what quantity, lower quantity? Q3 is produced. And why is Q3 produced?

AUDIENCE: [INAUDIBLE]

JONATHAN GRUBER: Yeah, basically because in this situation of disequilibrium, where at that price, supply does not equal demand, firms are in charge. You've basically said, look, we are going to insist the price of P is P1. Consumers are like, super! We want to continue consuming Q1, and firms say, no. We're not interested in producing Q1, we're going to produce Q3. And that's all we're going to produce, that's all you get.

It doesn't matter that consumers want Q1. So we're out of equilibrium. We have excess demand. But unlike the case last time where that excess demand led the equilibrium to adjust, it can't this time. Because the government set a price ceiling. So now the new equilibrium is at E3 with only Q3 being sold. So the key point is, when you're out of equilibrium, you've got to look at who is the constrained party?

Who's going to determine what happens? Well, basically it's going to be whichever party wants to produce or consume less. It doesn't matter how much consumers want to consume. Producers will only produce Q3. So only Q3 gets produced, and we have a new equilibrium at E3.

Well, what does this do? Well, there are two costs and one benefit. The first cost-- so the government intervenes. There's two costs. The first cost is an efficiency reduction. What is the efficiency reduction? Well, let's return-- so if you look at this diagram, in the disequilibrium outcome, only E3 gets produced.

So what is the new-- so only Q3 amounts of gas are produced. Compare equilibrium E3 to equilibrium E2. Now remember, on the previous diagram, the bottom of the previous page, we talked about E2 was worse than E1. But that's done. The war has happened. We're now at E2 if the government doesn't do anything.

So now the relevant comparison is not to E1. E1 doesn't exist anymore. It's E3 to E2. So I want to ask, what happens to total social welfare, we move from E2 to E3? Well, the answer is that consumers only get Q3 amount of gas at a price of P1. So consumer surplus-- without the government intervention-- at this new price would be-- so at E2, consumer surplus would be V plus Y at E2. And producer surplus at E2 would be W plus Z plus X.

Now we move to E3. What is the new consumer surplus? Can anyone tell me what the new consumer surplus is at E3? Yeah?

AUDIENCE: V plus W?

JONATHAN GRUBER: V plus W, excellent. Because it's the area under the demand curve, above the price line, but only for units sold. It doesn't matter that the area Y and the area Z is still under the demand curve above the price line. That's irrelevant because the units aren't sold. You can't derive surplus of something you don't buy.

So consumer surplus is now v plus w. So consumers lose Y and they gain W. But what about producers? Same person, what's the new producer's surplus?

AUDIENCE: X

JONATHAN GRUBER: X Producers have lost W and Z. So what has happened? W has been transferred from producers to consumers. Consumers are gaining W because they're now paying lower prices for gas. But Y plus Z is lost. Y plus Z is what we call deadweight loss. Remember from last time. What's happened to Y plus Z? They are trades that would make both parties better off that are not allowed to happen.

Look, if you stayed at E2, both producers and consumers would be happy to sell all the gallons of gas between Q2 and Q3. But you're not letting them. Therefore, you're reducing welfare. You're reducing the total social welfare by not allowing those trades to happen. So that is the first cost of this government intervention. Trades that don't get made lead to an efficiency loss.

Trades that would make both parties better off, but that don't get made, lead to an efficiency loss. Shouldn't this radical idea-- if you've got your two playing cards you like and your friend has two playing cards they like, and you'd be happy to have your friend's card and they'd be happy to have yours, but your mom's upset with you and won't let you make the trade, you're worse off.

You're worse off if you can't make trades that make both parties happier. That's the simple intuition. Society has lost. And what have they lost? They've lost this deadweight loss amount-- Y plus Z. Questions about that? But that's not the only cost. There's a second cost, which is allocative inefficiency.

And this is a new idea, but it's really following from the intuition we've already developed in this class, which is that in a world of equilibrium, we never have to ask who gets the good and how much they value it, and who doesn't get the good and how much do they value it. We know from the diagram. So if you look at figure 10-2 without the price ceiling, basically we know who gets the gas-- everyone who values it at above P2. We know who doesn't get the gas-- everyone who values it below P2. You're done.

But now look at the new out-of-equilibrium outcome E3. You have Q1 units of gas people want, but only Q3 that's provided. So what determines who gets it? It used to be you didn't have to worry about that. The price determined it. People who wanted it above the price got it. People didn't want the price, didn't get it. But now you've got more people who want it at that price that is actually supplied.

So you've got a new question-- who gets it? And the problem is, answering that question creates a new inefficiency. Because it's inefficient having to figure out how to allocate the good. So for example, in the 1970s, we put in a gas price ceiling. There was a gas price shock due to the formation of the Organization of Petroleum Exporting Countries or OPEC.

The countries in the Arab world got together and formed a cartel. We'll talk about all this in a couple of lectures. Formed a cartel and that cartel reduced the amount of oil being sold, raising the price of gas. The US government was upset. Gas had been cheap forever. So they put in a gas price ceiling.

What happened? Well, what happened was more people wanted gas at that low price than the gas station was willing to sell. So what resulted was giant lines of cars waiting at gas stations, huge snaking lines of cars. You could wait 15, 20 minutes in a line or longer to get your gas. Why? Because it was only Q3 amount of gas and Q1 people wanted it. So the only way to allocate it was to wait in line.

Well, that waiting in line is inefficient. Why is it inefficient that people waiting in line for gas? What's the efficiency cost? Yeah.

The opportunity cost. They could be doing something else. Clearly that is not the use of their time that makes them happiest. I highly doubt there was anyone who said, woo-hoo, I want to go wait in a line for gas. They could have been working. They could have been having fun. Whatever they could have been doing, it would have been better than waiting in line for gas.

There's also a second order inefficiency cost-- second order means small-- which is, they're using up a lot of gas waiting in line for gas. Remember, we had big gas guzzlers then that got like, eight miles to the gallon. So you could use up probably a gallon of gas waiting to get your gas, sitting in line idling. But that's a technical point.

The main point is there was a huge opportunity cost. That opportunity cost is an efficiency that has destroyed social surplus, social welfare. That is happiness that could have been derived working or in leisure that's gone. So that's an additional inefficiency that comes from this kind of government intervention. Not only is there an inefficient amount of gas produced, you're destroying efficiency further through the mechanism that allocates the gas.

Why doesn't that happen in a competitive equilibrium? Because the mechanism is the price. You look at the price. You either get it if you want it or you don't if you don't. It's easy. You drive by the gas station. If you want it, you pull in, you get the gas. If you don't want it, you drive by. Now if you want it, you got to wait in line because there's not enough to satisfy the demand.

So that government intervention has caused a new efficiency loss, the opportunity cost of people waiting in line for gas. OK? Now what's the benefit? The benefit of all this, presumably, is equity. Presumably, the government has decided that they care about consumers more than producers. You can call it equity. You can call it political calculation, whatever you want.

But the idea is the benefit is the government saying, well yeah, you get all the inefficiency. But look, we got to transfer W from those awful oil companies to these wonderful consumers-- who happen to vote. And isn't that a good benefit? And the answer is, well, maybe. In what we've learned so far, it's not. In what have we learned so far, social welfare is just the sum of producer consumer surplus.

So transfers do not affect social welfare. That's the key. In our framework so far, we've defined welfare as simply consumer surplus plus producer surplus, then transferring from one party to the other doesn't help. That's just an inefficiency. But voters and politicians may not feel that way. And maybe we shouldn't either.

This raises the really interesting question that we will come back to about the fact that in reality, we might not be indifferent between these two. In reality, we might be willing to have a little inefficiency to get goods in the hands of people who we think deserve them more.

In other words, in reality, we may be willing to sacrifice some efficiency for equity. And that is the heart of what we call the equity-efficiency trade off that we'll discuss later this semester. So in reality, we might be willing to make this trade. But from what you've learned in this class so far, we're not. With this definition of social welfare, we are not willing to make this trade. And this is a fundamental concept in economics.

Questions about this? Let's go through some real world examples. Let's talk about ticket scalping. A few years ago, Adele went on tour for the first time in four years to back up an incredibly successful album. And folks, there was huge pent-up demand to see her live. She said, look, I want to make sure my fans can see me. So I'm going to price the tickets affordably.

Tickets are going to start at $40 and no ticket will be more than $150, which is unbelievably cheap for major concerts these days. She said, look, I know my fans are willing to pay thousands of dollars to see me. So I want to give them some surplus. I'm not going make them pay more than $150 or even $40 if they're willing to sit in the cheap seats.

But did the fans get that surplus? No. What happened was, as soon as the tickets went on sale, they were all immediately bought by scalpers. Scalpers are basically secondary ticket sellers who set up bots to instantly buy all tickets available if they feel that they're priced below market value. They then resell them through places like stubhub.com and other places at the actual market value.

So what happened was the price for an Adele ticket was actually not-- sure, if you got on and managed to beat the bots, you got it for $150. But if you didn't and went on StubHub, it was $1,500. Because that's what people are willing to pay to go see Adele. Don't get me started on Taylor Swift.

Taylor's tickets were priced between $50 and $500. The tickets are now sold between $800 and $11,000 to go see Taylor Swift. Because that's what people are willing to pay. So everyone's like oh, Taylor Swift said her tickets $500! That was too cheap. That was cheaper than the market wanted. The market was willing to pay much more.

Now, it didn't have to be this way. When I was a kid, scalping was illegal. And there was no online market. So you had to go to shady guys in raincoats outside the stadium and buy the tickets from them. That's the way it used to work. So really, if you wanted tickets, there's no online market-- what did you do? You waited on line.

So literally, we'd stay up all night. If a big band was touring, we'd camp out the night before and stay up all night waiting on line to be able to get a ticket the next day. That's how they were allocated. There's no more lines because now we do it by price.

Which system is better? Well, in fact, the system when I was a kid was much less efficient. Why? Because basically the people, the time we wasted on line had a high opportunity cost. Now we can just pay. In some sense, essentially what the secondary online market does has reintroduced efficiency to the allocation of tickets. Now people pay what they're worth.

So in some sense, the good news is the market today is much more efficient for allocating tickets than was the market when I was a kid, because we don't waste time sleeping in the cold, waiting on line. However, it's not necessarily as equitable. Because now who gets the money? Well, when we slept on line, who got the surplus?

Well, the consumer got the surplus. Presumably, those of us who are willing to sleep on line could get tickets for less than our surplus. If the value to us of seeing the show plus the disutility of sleeping on line exceeded-- I'm sorry, if the value of seeing the show minus the disutility of sleeping on line exceeded the ticket price, we wouldn't sleep on line. So we got the surplus.

Now the surplus largely goes to secondary ticket sellers. It still goes to consumers because people don't buy unless they get some surplus. But who's not getting the surplus is performers. So even Taylor Swift is making way-- even though she is now setting all-time record for a tour. The previous record was Elton John at $1 billion.

Elton John, to be clear, has been making music for 50 years. Taylor Swift is only 33 years old, is now going to break the record at $1.5 billion. And that is way under what her tour should make. Way under what her tour should make because she is not selling the tickets at the price people are willing to pay for them.

So which system is better? Well, it's hard to say. On the one hand, tickets today get allocated to those who value them the most, according to price. On the other hand, all that extra money goes to scalpers. What could Adele or Taylor Swift do to address this point? What could they do to at least make sure that they got the money, rather than scalpers getting the money? Yeah?

AUDIENCE: Sell them [INAUDIBLE].

JONATHAN GRUBER: I'm sorry?

AUDIENCE: Sell them at equilibrium price.

JONATHAN GRUBER: Well, basically, it's hard to know what the equilibrium price is. But they could, for example, set up an auction. Why couldn't Taylor Swift say, I'm playing Boston, I'm going to put my tickets up for auction. People can bid and it'll be like eBay. I'll just sell my tickets to the highest bidder.

You would end up with exactly the same outcomes you get from the secondary market, but all the money would go to Taylor Swift instead of going to these shady StubHub guys. Why don't performers do this? The answer is, I'm pretty sure, public relations. There's no reason why they couldn't. There's no reason Taylor Swift couldn't hire an infinite number of programmers to set up an online auction to make this work.

The answer is essentially public relations, that basically, artists feel they're making plenty of money and therefore, they look pretty bad if they were charging these incredible prices, which is what they get from these auctions. Which is too bad because people are paying those prices anyway. But in some sense, because they're hidden, through paying with StubHub, Taylor Swift doesn't get as hard a time as if she set up an auction and sold tickets for $2,000 or $11,000 each.

But that's unfortunate because it's really the same outcome. It's just who gets the money. Taylor Swift should get the money. It's her show. She's the one adding value to society by doing a three and a half hour show, not the scalpers. She should get the money. So the bottom line is, there are ways.

The bottom line lesson from this ticket scalping example is A, we can see an example of shifting from an inefficient allocation mechanism-- which is waiting on line-- to an efficient allocation mechanism-- which is using price. But that shift did not necessarily deliver the surplus to the folks we'd want to deliver it to. It delivered it to a third set of actors who set up this online marketplace. Questions about that?

Let's go to a much more complicated example, but one which really lays out clearly how to think about these trade offs, which is the case of taxicab medallions. Cast your mind back 20 years ago, notably before Uber and Lyft and all these things. In that world, if you want to get from point A to point B and didn't have a car, you took a taxi.

Taxis should be a textbook example of a perfectly competitive market. To be a taxi driver, you just need a car and that's it. Pretty low fixed cost. Most people have cars anyway. It should be a very, very perfectly competitive market. But in fact, it was not. It was a market that was not perfectly competitive because it was heavily regulated by cities.

And in particular, what cities did is they limited the amount of taxis to those who held, essentially, certificates that made them legal taxi drivers. They were called medallions because they were originally medallions, but now they're pieces of paper. Essentially, cities issued pieces of paper that said, you're an official taxi driver. And only if you had one of these could you drive a taxi.

What we want to do is analyze what are the welfare implications of these limited number of taxicab medallions. So let's go to figure 10-3, which is one of the more complicated figures you'll see in this class. It's one of these back and forth figures. Bear with me, but please interrupt me if there's questions.

So imagine that initially we had no taxicab medallions and a free taxicab market. Let's turn the diagram on the left of figure 10-3. In such a market, price would equal marginal cost would equal minimum average cost. We'd be at equilibrium point little e1. Price would be P1. Why? We'd have identical taxicabs producing identical market. It'd be easy shopping. It'd be perfect competition. And we'd end up with price P1.

At price P1, each of the identical caps would produce little q1 rides. Because each cab-- and once again, to make life easy, I'm going to assume identical cabs. This is an assumption, but not too bad in this case. Much better assumption than, say, assuming identical factories. The idea that cabs are kind of identical is not implausible. So assume identical cabs.

They all have minimum average cost at the point little q1 on the left-hand side diagram. So the series of identical cabs, all of whom have minimum average cost at amount little q1 and therefore, set price equal to P1. Now go over to the right-hand diagram. We have a demand curve there. With a price of P1, that means that a total of big Q1 rides will be demanded.

Well, if big Q1 rides are demanded and each firm is going to produce little q1 rides, that pins down the number of firms-- n1. Once again, let me go through the logic. And stop me if it isn't clear. We know each firm will produce little q1. We know at that price big Q1 rides are demanded. Therefore, we can define the number of firms as big Q1 over little q1, which is n1.

So there's n1 firms providing little q1 rides, each at a price of P1 in the free market. Questions about that? Once again, as we learned a couple of lectures ago, we know we end up there. Because if there was less than little n1 firms, the price would be higher, there'd be profits being made, and new firms would enter.

And you could just be able to show yourself that. There are less than little n1 firms. You could see the quantity be lower. At a lower quantity, price would be higher. You'd move up the demand curve and therefore, profits would be being made. And therefore, firms would enter. And there's not a lot of barriers to entry here. So this is not a bad example for a competitive market.

Now let's say the government comes in and says you know what? we are only going to be allowed there to be little n2 numbers of cabs. So the government comes in. The government restriction here is in the form not of price, but of number of firms. The government says, only n2 cabs will be allowed. This is a new kind of restriction. We haven't done this before.

We talked about gas price ceiling. That was a price restriction. This is now a number of firms restriction. Government says, only n2 cabs will be allowed. Now what happens there? Well, up to n2-- if you look at the right-hand side diagram-- up to the first dashed line, which is little n2, little q1, nothing has changed. If the demand curve was such that big Q was less than little n2, little q1, nothing would have changed.

But what happens once we get past that first point, Little n2, little q1? What happens is that now each cab has to produce more rides. Because you can't add new cab companies. Each cab can no longer produce at the efficient point. Each cab company can no longer provide Q1 rides. Why? Because it won't meet demand and new firms can't enter.

So to meet demand, cabs need to drive more. Well, if they're going to drive more, they're no longer going to be efficient. Q1 is the efficient amount. In other words, think of it this way. Q1 is the point at which drivers are maximally efficient driving. Once you have to drive more, maybe they're more tired. Maybe they have to drive at hours that aren't as convenient for them. They're less efficient at producing rides.

Think of cab drivers like a firm. They have a perfectly efficient amount of rides to give. Once you have them give more, they're less efficient. Maybe because they're more tired. Well, if they're less efficient, that means they are providing them at a higher cost. So the new supply curve is flat until n2, q1.

But the new supply curve S2 is no longer S1, which is a horizontal line. The new supply curve S2 is horizontal to that first intersection and then becomes upward sloping. The new supply curve S2 has that horizontal segment that becomes upward sloping. And once again, these kind of kinked curves are hard. So let's explain why.

The reason why it's flat is because as long as there's less than Q1 rides per firm, they produce at maximum efficiency. But once you ask any taxi driver to work more than little q1 rides, it's inefficient. You can see this by now turning to the left-hand side diagram. You see that to produce q2 rides, they do so at a much higher point than the marginal cost curve.

So if they're going to set marginal costs equal to price, they are going to say-- so now go back to the right-hand side. So with this new supply curve-- question about why the supply curve looks like it does? Once again, this is hard. So please let me know if there's questions about that. OK, so with this new supply curve, that hits demand at a new higher price P2. Yeah?

AUDIENCE: Sorry. Can I ask a question?

JONATHAN GRUBER: Yeah.

AUDIENCE: Why is the new supply curve flat and then curved?

JONATHAN GRUBER: It's flat to the left of that flat part because as long if-- imagine demand was shifted way inwards and demand was less than little n2, little q1. Even if you restricted the number of firms, each firm would only provide Q1 rides. The point is, you're only allowing up to n2 firms. Let's say the demand intersected that line. So I'm doing the risky thing of drawing a diagram here.

You've got this demand curve here, right? And you've got this supply curve that looks like this and then looks like this. Imagine the demand curve came here. And let's call this intersection little n3, q1. Well then each firm will continue to produce at their efficient level. You just have a smaller number of firms. There'd be no reason to produce inefficiently.

But the problem is, once you get past this point, more firms can't enter. What keeps this original supply curve S1 flat is entry of firms. But firms can't enter past this point. The existing firms have to produce more, and they do so inefficiently. So this is the efficient part of production for N1 firms-- sorry, the efficient production for N2 firms. But for N2 firms, once you get past there, they have to be more tired and produce less efficiently. OK? Other questions?

OK. So the new price is P2. Well now let's go back to the left. At a price P2 set equal to marginal cost-- ignore the EC2 curve for a minute. We'll come back to that. Stay with AC1. If we set that new price P2 equal to marginal cost, we get equilibrium E2 and a huge amount of profits. The profits at that new price, P2 marginal cost, is well above average cost. Once again, ignore EC2. Stay with AC1.

At that new price P2, marginal cost is well above average cost. And you get a huge profit of the amount pi. So now they're making profit. Now what's happened is by limiting the number of cabs, they are now making profit. What has this done to social welfare? Well, let's go back to the right-hand side. What was the old consumer surplus?

What was the old consumer surplus? Somebody tell me. Before we put in this restriction, what was the consumer surplus? Raise your hand and tell me. You guys got this. You need a little more confidence out of this class. Come on. You guys got into MIT? You're wicked smart. Go ahead.

AUDIENCE: A plus B plus C?

JONATHAN GRUBER: A Plus B plus C. C has two parts, it's weird. But A plus B plus C. A plus B plus C. Same person, what's the old producer surplus?

AUDIENCE: None?

JONATHAN GRUBER: There's none. Why?

AUDIENCE: Because they're selling at perfect minimum.

JONATHAN GRUBER: In a perfectly competitive long run equilibrium, there's zero profits. So because of free entry and a perfectly competitive long run equilibrium, there's no profits. So producer surplus is zero. Same person, what's the new consumer surplus if we sell at price P2?

AUDIENCE: A.

JONATHAN GRUBER: A. What is the new producer surplus?

AUDIENCE: B.

JONATHAN GRUBER: B. So what has happened? We have transferred B from consumers to producers. That's their new profits. So B in aggregate would be the sum of the little pi triangles on the left over all firms. So if you took the profits made on the left multiplied by n2 firms, that would give you B. B is the total aggregate profits.

So we've taken money for consumers, give it to profits. But we've created a deadweight loss. The deadweight loss is C. So it's an inefficient restriction It's an inefficient restriction. So we have the efficiency loss. We also have the allocation. Now here we don't have an allocation loss, I'm sorry, because we're in equilibrium. So the people who are willing to pay for the rides still get the rides.

We don't have the allocation issue here because we have a new equilibrium. We're not out of equilibrium, we're in a new equilibrium, which is an equilibrium with fewer rides. What about equity? Well, that depends on how you feel about cab riders versus drivers. If you think in New York City all the cab riders are rich investment bankers and the cab drivers are poor immigrants, then maybe this is a good thing.

Maybe it's good we've taken area B away from the rich investment bankers and given it to the cab drivers. If, on the other hand, you think a lot of the cab riders are also poor people who need to get to work, it might not be such a good idea. But guess what? All that is irrelevant.

Why? Because actually, there's a market for taxi cab medallions. They sell in the market. You can sell your taxi cab medallion. Can anyone tell me in this diagram what the market price of a taxicab medallion should be? If there is a perfectly competitive taxicab medallion market, what should the total cost of a taxicab medallion be? Can anyone take a guess at that?

The answer is a letter, Greek or Roman, on this diagram, which tells you. Yeah?

AUDIENCE: [INAUDIBLE] pi?

JONATHAN GRUBER: Pi! Why?

AUDIENCE: That's the profit you would get if you had a medallion.

JONATHAN GRUBER: Yeah. Because if I want to buy a medallion, I'll be willing to pay up to pi minus epsilon to get it. Why? Because as long as I pay pi minus epsilon, I still make profit. So perfect competition has not driven profits to zero through firm entry. Perfect competition has driven profits to zero by selling the barrier to entry.

There's a barrier to entry here, which is a government restriction that covers the number of firms, n2. We're now putting a market on that. We're letting firms buy their way in. How much will they pay? They'll pay up to the profits they'd make by buying their way in. So, in fact, who is better off here? It's not the taxi cab drivers. They still make zero profit.

Who's better off? It's the medallion owners. And who are they? A bunch of randos who happen to get issued the medallions in 1930-whatever when the government set up this system. Taxicab medallions are incredibly valuable. So for example, in San Francisco, you had to pay $12,000 a year to rent a taxi cab medallion. In Boston, it was $400,000 to buy a taxicab medallion.

So those taxi cab drivers who are not rich guys who are driving you from place to place-- well, you were kids-- driving your parents from place to place, they're paying $400,000 just for the right to drive you around. And the estimated lost consumer surplus was about $2 billion. There was about $2 billion in lost consumer surplus. Partly it was inefficiency and partly it was just going to these medallion owners.

Why do we have restrictions like this? Well, at one level, it makes sense. You don't want any schmo driving around, giving people rides. It could be dangerous. They could be a bad driver. They could be a criminal. So it makes sense to have some regulations on this. Indeed, this is an example of something we call occupational licensing, which is a set of restrictions that governments put in place to make sure that people who say they're doing x can legitimately do x.

This makes a lot of sense, for example, for doctors. We don't want a world of Dr. Nicks. OK, question. How many of you are well versed in *The Simpsons?* OK, this is utterly depressing. That is the single most important cultural accomplishment of America in the last 50 years is *The Simpsons.* You guys should absolutely be watching and absorbing that for all the lessons you need to know about life.

Dr. Nick is the terrible doctor on *The Simpsons.* He's unqualified. He went to Hollywood upstairs medical school. He's totally unqualified. And that's what happens when we didn't have some licensing, saying doctors have to meet certain conditions. They have to get recertified. We have to get a license to drive a car. That's not an occupation, et cetera.

So the idea is, occupational licensing makes sense to some extent. But having a random limit on the number of cab drivers is not the way to do it. You should have some licensing process. So it makes sense to have some licensing. On the other hand, what you're doing is you're essentially taking $2 billion and giving it to rich medallion owners.

However, we have good news-- bad news for the medallion king, good news for consumers-- which is Uber. Uber essentially turned the drive market into a perfectly competitive market. They said fine, if you limit the number of cabs to n2, we're going to have a whole set of drivers who are going to do the same things cabs can do with free entry.

What happened? Well, what happened was taxi drivers and Uber drivers earned a little bit less. But medallion owners got smacked. The value of taxicab medallions fell by 90%. Why? Because profits went down. Essentially, with free entry, we moved from P2 back towards P1. Profits fell, and therefore they couldn't sell medallions for as much.

So yes, cab drivers lost a little bit and they bitch about Uber. But the truth is, the big losers were medallion owners, who were not a sympathetic crowd. The big winners were consumers. You have no idea how much life-- you guys are just spoiled by life with Uber. And we complain about it. It's got problems, but you have no idea how much better it is-- how much cheaper it is to get from place to place, how much easier it is to get from place to place-- than when we had these limited numbers of taxis.

So this is a classic example of a market innovation increasing both total surplus and consumer surplus. Total surplus is increased because we move back towards price P1. Consumer surplus is increased because price is falling. Producer surplus actually isn't down that much because the producers, the cab drivers, weren't actually making that much money anyway. The real losers are medallion owners.

Questions about that? So this is an example of how we use the normative tools of economics to analyze these kinds of interventions. Let me end with one more example, which is a really fun one about how we can actually use markets to help the poor. And the example comes from food banks. Food banks are organizations that give away food to needy people.

Feeding America is one of the largest food banks in the country. It has food banks all over the country. And they were trying to decide how to send the right food to the right places. Well, the market does this naturally. Places where they want hamburgers, the price is high, they see hamburgers there, the price falls. Places where there's a lot of vegetarians, price of hamburger isn't as high. The market does that naturally.

But Feeding America, it wasn't a market-based organization. The whole idea was to give this food away for free. So they ended up doing things like sending potatoes to Idaho, which is the home of potato growing, which was pretty inefficient. And they were trying to think, how can we more efficiently allocate the food to the needy?

So what they did is they made up a virtual market. They said to each food bank, we're giving you a budget. And we're going to let there be a market across all the foodstuffs, and you guys can bid for what you want. And there will be prices, but none of it's real. It's not real money. It's all going to be free.

If you're someone who really wants potatoes, you will bid the most for potatoes and use up more of your fake points to get potatoes. And that will allocate the potatoes to the folks who really need them the most. So essentially, they created a scarcity where there was none. Before, there was no scarcity. You just said, I want potatoes. You got potatoes until they ran out of potatoes. And it didn't necessarily go to the place that need potatoes the most.

Now the place that needs potatoes the most will bid the most for potatoes and the potatoes will be allocated there. So that's an example of how you can use the price mechanism while still helping the poor. You can use the price mechanism to make sure the right goods get allocated to the right places, but still have things end up being free. So let me stop with that. And we will come back next week and we'll turn to the case of monopoly.