**W6 V2 Quotas**

0:09  
Now in this video, we're going to look at a second type of market intervention, which is a coder.

0:14  
And we're going to do the same thing that we did before, right?

0:17  
Find the equilibrium, find all the surpluses and talk about why we have a deadweight loss.

0:22  
Thinking about potentially additional sources of efficiency loss.

0:27  
Now, what is a coda?

0:28  
At its most basic, a coda is a quantity restriction.

0:31  
For some reason, the government says more than Q bar number of units cannot be sold or traded legally in the market.

0:40  
Illegal stuff we're not thinking about just now.

0:42  
OK, Now again, we always have to worry about whether it's binding or not.

0:46  
If it's not binding, who cares?

0:47  
If it is binding because it's preventing us from reaching the higher competitive market equilibrium, then we have a problem.

0:53  
And there are plenty of examples of this, right?

0:56  
Import export restrictions, taxi medallions and so on.

1:01  
Let's think about this on a graph.

1:03  
OK.

1:03  
So now instead of working on the on the Y axis, which is the price axis, we are thinking about restrictions on the quantity axis, which is on the X axis.

1:12  
So once it's pretty straightforward because you want to be like oh we are here, we want to go here, but we're stopped from getting here because of this quantity restriction.

1:22  
So market quantity is pretty straightforward and not that's what it is.

1:26  
We want to trade more, we can't.

1:28  
But what is tricky now is prices, right, because that quantity, this is what people are willing to pay for, like the lowest minimum willingness to pay is this is kind of what the highest marginal cost is.

1:41  
There's a gap, there's a wedge between those two.

1:44  
So what price should we set here?

1:46  
It was pretty straightforward to set the price because you know, demand equals supply and that was market price for price ceiling or price quota.

1:53  
Price is pretty straightforward 'cause we couldn't go higher or lower than this one binding price.

1:57  
And so that is what the price was.

1:59  
Now we have two options.

2:01  
So which one should we choose is market price.

2:04  
Now you can say I don't care because I don't need market price to figure out market surplus.

2:10  
I can get around that using social costs and social benefit to which I would say fantastic.

2:16  
OK.

2:17  
So let's start off with that and then we'll talk about consumer surplus and producer surplus once we have price.

2:22  
OK.

2:23  
So if I don't have a price, here's another way I can figure out market surplus.

2:28  
I can say what's my social benefit?

2:31  
What's my social cost?

2:33  
What are the units traded?

2:35  
And figure out surplus from that, because I'm assuming perfectly competitive markets still, which hides among in it the assumption that there are no externalities.

2:46  
I have private and social costs the same, which means I can just use supply and demand to figure out total surplus.

2:56  
If Q bar units are being traded.

2:59  
Here's a social benefit, here's the social cost, which means that that is what the total surplus market surplus is going to be.

3:09  
Fantastic.

3:10  
I can just go ahead and do that and not have to worry about consumers and producers.

3:16  
I can immediately identify deadweight loss because I know what the efficient surplus is at the top here it's ABCDE and F compared to the market surplus.

3:26  
I'm losing E&F and that is my deadweight loss.

3:32  
This are you.

3:33  
These are units that should be traded because there's a snap kind of benefit to society from those units.

3:38  
They're not traded.

3:40  
I've identified the deadweight loss and the reason for them.

3:44  
So I'm going to push you a little bit to say, look, we need to have a price, fine, you don't care about from the surplus, but people who are trading need to know a price.

3:50  
So what should we choose for a price here, given that we have this wedge?

3:56  
OK, so let's think about potential prices that we can have a little bit more carefully.

4:01  
OK.

4:02  
So we want people to sell the good, which means that they need to get a higher price, high enough price, in order to bring these goods to the market.

4:10  
What's the lowest price I can offer producers in order to get them to sell at least these many goods?

4:15  
Well, this is the highest marginal cost of those goods, which means that this is the lowest price I can offer producers in order to get them to sell the good.

4:25  
OK, what about consumers?

4:28  
I want them to buy at least these many goods.

4:30  
If the price is too high, they're not going to buy it, which means that this is the highest price can go and still have people buy the good.

4:38  
So I've got this highest price, I've got this lowest price and then I've got this space in between to figure out where the actual price is.

4:47  
So in general, I don't know.

4:49  
I would kind of say, look, it's somewhere in here because otherwise I won't get all the units bought and sold that I need to.

4:55  
But where exactly depends on what exactly you're looking at.

4:58  
So sometimes we'll give you details that will help you figure out where exactly this is.

5:03  
But if there's no details given and you have to think about consumer and produce a surplus, our default assumption is to assume that this is the price, right?

5:12  
There's very few goods available.

5:14  
People want to pay for it.

5:15  
A lot, a lot.

5:16  
So it can kind of make sense to say, let's think about the highest price we can charge and still get all of these people to buy these goods.

5:24  
OK.

5:24  
All of that here is written on the slide so that you remember what I talked about.

5:31  
OK.

5:31  
But I'm gonna follow the default assumption which is that pH which is the high price is the market price.

5:41  
OK.

5:41  
So let me just clean that up a little bit and I'm going to assume that this is the market price in here typically default assumption which I'm going to work with in here.

5:51  
Now that I have this, I can now think about consumer surplus and producer surplus.

5:55  
Consumers are buying these many goods.

5:57  
This is willingness to pay minus price.

6:01  
That's consumer surplus.

6:03  
Producer surplus producers are happy here.

6:05  
They're getting a really nice high price pH, right?

6:09  
And they're producing fewer goods.

6:10  
So now there's this kind of tension for those goods I'm selling.

6:13  
I'm getting a higher price, but I'm producing fewer goods.

6:16  
And so I kind of have to think about the net.

6:17  
But producer surplus B + C + D notice again how much this depends on what the price is.

6:24  
If pH is, then this is what it is If I chosen a different price.

6:28  
For example, if I had chosen PL.

6:31  
as the price.

6:33  
In that case, actually you know what let me choose green, so that is visually different.

6:37  
If I had chosen PL.

6:38  
is the price.

6:39  
In that case, I would have consumer surplus being A + B + C and produce a surplus just being D So here's another way you can kind of see how prices are to allocate surplus and they're not actually determining the market quantity.

6:56  
It's the same quantity being sold.

6:58  
OK, but I'm gonna stick with the default which is pH, and so I'm gonna stick with the A + B + C + D, right?

7:04  
Total surplus does not change based on price, just the allocation now.

7:13  
OK, Deadweight loss, consumer surplus, producer surplus, details matter.

7:18  
What about misallocation?

7:20  
Misallocation.

7:21  
Again, as there's too many people wanting the good, so accidentally, the wrong person gets the good.

7:25  
Well, what about with the prices of pH?

7:27  
How many people want to buy the good?

7:29  
These many people want to buy the good.

7:31  
How many people?

7:31  
Anybody extra wanting the good?

7:33  
No, not a problem, no misallocation here.

7:36  
What about from the producer point of view?

7:39  
Price is really high.

7:40  
All of these guys want to sell the good.

7:44  
Very few goods available to sell, right?

7:46  
So yes, from the producer side, if the price is P, flip the prices around.

7:57  
If PL.

7:58  
is the price and we have the opposite, right, price is very low, Not too many people want to supply the good price is really low.

8:05  
Lots of people want to buy the good, right.

8:07  
So then we're going to have misallocation on the consumer side if the price is PL.

8:21  
OK.

8:21  
So again, deadweight loss is a minimum deadweight loss if I'm thinking about just prices in between pH and PL.

8:29  
because it opens up the potential for misallocation.

8:34  
OK, something else that comes up here is this idea of quota rent.

8:41  
OK, so here's a problem with misallocation.

8:45  
We've got two potential prices and we've got something that's preventing us from reaching equilibrium, which is the quantity restriction.

9:04  
In this case, I've got two prices.

9:11  
There's this gap in between.

9:13  
Now why is there this gap?

9:14  
There's this gap because if we think about pH as the price, producers used to be getting this price here.

9:22  
Now they're getting this high price.

9:25  
Here's some extra surplus that they can get.

9:27  
If I'm thinking about PL.

9:29  
as the price, you're gonna be like, oh, you know what?

9:32  
Consumers used to be paying that high price.

9:34  
Now they're getting a low price.

9:36  
There's some surplus.

9:37  
But if I don't care about who's getting this surplus and I'm just looking at this gap, this wage, this surplus, that's in between really I'm thinking about this whole region.

9:50  
How it's going to be allocated will depend on the prices.

9:55  
So this gap is what we call quota rent.

9:58  
It's surplus.

9:59  
It's going to go to one side or the other depending on what the pricing mechanism is, OK?

10:06  
It's the difference between what's the least we need to give producers to get them to bring something, what's the highest we can charge to consumers to get them to buy this quantity.

10:15  
And that gap is surplus that's available.

10:17  
And then how it's allocated will depend on the prices.

10:20  
So that gap is what we call quota rent, right?

10:24  
So for each unit, now we sum it up to get quota rent.

10:28  
OK, here's another way you can kind of think about why quota rent is important.

10:32  
So suppose we pick pH is the price.

10:35  
That's the default assumption.

10:36  
Let's just start with that as an example.

10:39  
Now we have tons of people wanting to produce the good, very few people able to produce the good because that's all we have.

10:45  
We have a quantity restriction, right?

10:46  
Few goods needed.

10:48  
So who should get this good?

10:50  
So let's think about a simple example.

10:53  
But it's kind of something that sticks in my head.

10:55  
I've got only five goods needed to be produced.

10:58  
Or 500 pick, right?

11:00  
Fixed number of units that need to be produced.

11:01  
Lots of producers.

11:03  
So I'm going to print a bunch of golden tickets.

11:04  
All right, Think Willy Wonka kind of golden tickets.

11:07  
And then I'm going to give them to the producers.

11:09  
So if you want to produce one unit, the good, you need 1 golden ticket.

11:13  
Now I have all of these golden tickets.

11:15  
Who should I give them to right?

11:18  
While government printing the golden ticket?

11:20  
I'm in the government.

11:21  
Maybe I give them to my friend, right?

11:23  
But that's a problem because if I give them to my friend, what am I opening up the potential for?

11:28  
I'm opening up the potential for misallocation, right?

11:31  
I give it to my friend and that friend turns out to be a really high cost producer instead of a low cost producer who should be producing it.

11:37  
Now we introduce misallocation.

11:40  
So you're like, fine, OK, don't just give out the tickets.

11:44  
Randomly sell the tickets or pedestal, allocate them, but allow people to trade.

11:52  
OK, tickets are out there.

11:53  
I don't care how you distribute them.

11:54  
Pick a lottery.

11:55  
Whatever it is, do the Willy Wonka way, hide them in candy bars.

11:58  
But once people get those golden tickets, allow them to trade.

12:03  
If they're allowed to trade, well, what would the price of a ticket be?

12:09  
So think about it.

12:10  
If you're a producer, OK, you have this ticket.

12:20  
And now for this ticket that you have, you know that you are going to get this really high price.

12:29  
So there's a lot of people who want this golden ticket, right?

12:33  
But there's very few of them.

12:35  
So let me give you an example.

12:36  
We're just cruising with 1 ticket, there's two tickets, there's three tickets, four, and there's five tickets randomly.

12:42  
OK, high price.

12:44  
I have 5 tickets.

12:45  
I don't know who.

12:45  
I'm just gonna allocate them randomly.

12:47  
OK, good.

12:48  
So now these people get it.

12:49  
But I don't want these five people to to get the the good.

12:53  
I want only these five guys here, 123 Put it here 12345.

13:14  
OK, I just want some of these guys to get it in here.

13:30  
OK.

13:30  
These are all the producers.

13:32  
Tickets are randomly allocated.

13:34  
So 12345 guys.

13:39  
These five guys get the ticket.

13:40  
I don't want these guys to get the ticket.

13:42  
I want this person to get the ticket.

13:45  
This person, this person, this person, 123-451-2345.

13:53  
Now those guys who have the ticket, Fantastic.

13:56  
Keep it right.

13:58  
But what the problem is these guys here, they don't have the ticket.

14:02  
They should get the ticket.

14:03  
In fact, taking the ticket away from these guys and giving it to those guys will increase efficiency.

14:08  
But these guys at the top have the ticket.

14:10  
How are they going to sell it?

14:13  
Well, they're only going to sell it if they're going to make some money from it.

14:16  
OK, how are they going to make some money from it if selling the ticket gives them more surplus than just keeping the ticket themselves?

14:25  
So let's pick an example.

14:27  
OK, this is the purple guy up here.

14:30  
He has a ticket, OK?

14:33  
If he sells this, uses this ticket to produce the good and sells it on the market, what is he going to get?

14:38  
He's going to get that price.

14:41  
If he gets that price, what is his cost of production?

14:43  
Well, this is his marginal cost of production.

14:45  
It's along the supply curve, right?

14:47  
He's not making any money in here because his cost of production is exactly equal to the price that he's getting.

14:53  
He sells the ticket.

14:54  
On the other hand, he can make some money, right?

14:57  
So how much is he going to get for this?

14:59  
Well, he goes to this guy sitting here who doesn't have the ticket, yellow guy and says how much are you willing to pay me for the ticket?

15:07  
The yellow guy says if I have the ticket I would get that much surplus.

15:13  
So the maximum I'm willing to pay you is that yellow region.

15:17  
What about the other guy here?

15:19  
He's willing to pay you even more, right?

15:23  
Running out of colours?

15:24  
Let me pick.

15:26  
I don't know.

15:26  
Here he's willing to pay you even more up there.

15:31  
OK.

15:32  
So when people buy and sell, there is an incentive for these guys to trade.

15:37  
And when they trade, it's going to turn out that the price of a golden ticket is going to be exactly this wedge, as we call it.

15:53  
This distance, this gap between PHNPL is going to be the price of the golden ticket.

16:05  
So this is going to be a lesson that's going to seem a little bit vague and come out of nowhere in this example.

16:11  
But it's actually going to be something we're going to use a lot when we talk about cap and trade later on when we get to externalities, OK, But with the coder, again, here's the thing.

16:22  
Coders have to be binding in order to be problematic.

16:26  
That's why we lose surplus, because our units should be produced or not.

16:30  
But the difference between quarters and price controls is now we have a range of possible prices.

16:35  
We have a wedge between for that last most expensive and lowest willingness to pay units.

16:39  
We have this wedge between willingness to pay and marginal cost, OK.

16:43  
And then depending on the price and how that quota is allocated, who gets to produce what, we can have potential for misallocation, OK.

16:54  
And there is such a thing called quarter rent, which depends on prices and whether we have those pricing mechanisms for the golden ticket or not.