**W11 V1 Strategic Interaction**

0:10  
In this video, we're going to talk about how to determine whether firms are engaged in price or quantity competition.

0:15  
The reason for doing that is because the strategic interaction depends on which variable they're choosing.

0:20  
We're only going to be looking at examples with two firms.

0:23  
Anything we do here extends on to more than two firms, but the narrow focus allows us to think about the economic intuition more carefully.

0:31  
We follow the same process that we did in game theory.

0:33  
Is there a strategic interaction?

0:35  
Because if there's no strategic interaction, we don't need to worry about game theory.

0:40  
Then we need to figure out what exactly in our word, in oligopoly, what firms are choosing, because that affects the mechanism through which we talk about strategic interaction.

0:50  
We're only going to be focusing on games where people choose prices or quantities at the same time.

0:55  
Again for simplicity, to allow us to focus on the economics.

0:59  
You'll extend this to sequential games in the second year and beyond.

1:04  
We also have to figure out when firms make their choices, what's the outcome in the market.

1:08  
And in order to do that, I need to know how firms value it.

1:12  
The reason for that is all of this information allows us to generate a payoff matrix that you saw in game theory, right?

1:19  
So I have all of the choices that they're making.

1:21  
Then I have the outcome market price and quantity in the demand and supply module.

1:28  
We stopped there because we said we just wanted to talk about what happens in the market perfect competition.

1:33  
We extended that a little bit to talk about markets and firms, and we could then talk about firm quantity and number of firms.

1:40  
But here our number of firms is fixed because there's a few firms and there is strategic interaction.

1:46  
So we're really going to focus on the payoff matrix, the outcome and how firms value that.

1:51  
And in our world, firms are very boring.

1:53  
The only thing they care about is profits.

1:55  
OK, so strategic interaction, once we figure out what it is and why it arises, that's going to result in a market price and quantity, which is then going to affect firm quantity and hence their profits.

2:07  
And we use the profits as a starting point to figure out what the little pieces of information in our payoff matrix are.

2:15  
We have so far considered games where there's no strategy.

2:18  
Perfect competition.

2:19  
I didn't need strategy because I was not in control of anything in the sense of prices.

2:25  
I was a price taker.

2:26  
My only choice was my quantity, and it didn't depend on anybody else.

2:30  
Monopoly didn't matter what they chose.

2:32  
If they chose price, they would get quantity through the demand curve and vice versa.

2:36  
And the reason they didn't care about anybody else because there was number other firm to think about.

2:41  
Now we've got other firms in here, so we want to model it, but we want to keep the simplest possible model.

2:48  
So that allows us to focus on the economic intuition.

2:50  
We're going to keep a lot of the perfect competition assumptions.

2:53  
For example, we have identical goods.

2:56  
There's no transaction costs, there's full information, no externalities.

2:59  
Keeping all of those assumptions, we're not going to talk about them explicitly because they're hidden in the background.

3:04  
What we are going to change is the assumption that firms are small, that their price takes.

3:08  
And the way we're going to do this is kind of we're going to assume that there's some barriers to entry, that there are going to be profits, but firms are not going to enter because they cannot.

3:16  
And this is what's going to lead to a limited number of firms and firms having strategic interaction.

3:21  
What this means also is that we have market power.

3:24  
We've introduced the concept of market power and monopoly and we're going to continue on phrasing it as market power and see how market power adjusts the firm's choices through kind of you know, marginal revenue perspective.

3:39  
So we again are focusing on examples or competition where firms make choices at exactly the same time if they're choosing prices at the same time.

3:49  
The implicit assumption here is I can post a price in the shelf and then it doesn't matter how many people show up at my store, I can provide the good to them.

4:00  
So for example, if an unexpectedly high number of people show up, it's no problem for me.

4:04  
I can give each and everyone a good because that's the implicit assumption we're working under.

4:09  
If you have a price, then you're supposed to be able to provide a good for that price.

4:13  
Now I can only do that if I have what we call no capacity constraints.

4:17  
If it is gonna be difficult for me to do that, cuz for example, I have a limited amount of broccoli and when the broccoli runs out, I can't give you more broccoli even though the price is posted, then we are not in price competition.

4:28  
We are in what we call quantity competition.

4:31  
OK, here firms are thinking in advance.

4:34  
I have to think in advance of how many heads of broccoli to order.

4:37  
That comes to me, and now if people show up wanting more broccoli, I cannot give them any more broccoli because I don't have any more right.

4:45  
It's close to impossible.

4:47  
And we want to think about it in our heads as impossible to give you any more quantity because I've made my quantity choice.

4:53  
And if more people show up, they're not going to get the good that is in a world where we have capacity constraints.

4:59  
Now that sounds really big.

5:00  
So let's think about this with an example.

5:03  
OK, you guys think about buying mobile plans.

5:05  
Let's think about this from the perspective of a cell phone company provider, right.

5:11  
What they need in order to give you an additional cell phone plan is wireless spectrum.

5:16  
OK.

5:17  
Now, if right now they have spare capacity and if you show up your friends show up, enough of people show up.

5:24  
The cell phone company says sure, I can still give you a plan because I have spare capacity.

5:30  
In our case, if they are able to provide additional connections to new consumers who show up, we say you're in price competition.

5:39  
Because theoretically for the theoretical possibilities of the number of people who show up, it is possible to give whoever wants a connection at that price.

5:48  
Then we feel comfortable modeling that as price competition.

5:52  
On the other hand, if we're taking a more longer term view of this and cell phone providers have to determine their wireless spectrum in advance cuz they have to bid for it when the government or whatever it is.

6:03  
But that choice is made in advance.

6:05  
At that point, what they're choosing is capacity.

6:08  
And once that capacity is reached, they cannot give you any more cell phone plans.

6:13  
That is a word when we would model it as quantity competition, OK?

6:18  
This is the maximum number of cell phone plans we can provide.

6:20  
And if somebody shows up, I do not have the wireless spectrum bandwidth in order to give you something like that.

6:26  
So if you're thinking about it in a real world perspective, are these firms engaged in price competition or quantity competition you really want to think about?

6:34  
Do they have capacity constraints for the reasonable number of extra consumers who show up at their door, right, based on what the demand is at that market price?

6:44  
OK.

6:46  
Does it matter?

6:47  
OK, because if we're going to make such a big deal about determining price or quantity, competition doesn't matter and where does it show up.

6:52  
So let's talk about that for a second.

6:55  
When we're in price competition, what we're implicitly assuming is that consumers buy from the lowest price firm.

7:02  
Why is that?

7:03  
Because we've already kept the perfect competition assumption that firms are all identical in the eyes of the consumer.

7:10  
There's no transaction cost.

7:12  
So consumers don't care who they buy it from, they just want the cheapest price.

7:15  
And if it's as easy, for example, it's a click of a button, I just go to a different website and order it, then I'm going to respond to even a one cent change, OK.

7:23  
That's going to be a huge, I think for residual demand and we'll talk about that in a second.

7:30  
What that's going to do is it's going to determine the market price.

7:34  
If there's plenty of sellers with different prices and consumers are only going to the lowest price, then the only person selling goods will be the lowest priced firm.

7:44  
And that's what's going to be the market price.

7:46  
Nobody is selling any goods at any other price.

7:49  
Those prices are not real, right?

7:52  
They don't exist.

7:52  
They're not market price.

7:53  
And once we have market price, then we know what the market quantity is via the market demand curve.

8:00  
OK, post any price, I'll tell you how many consumers want to buy the good at that price.

8:04  
So if we're in price competition, we know how the market price is determined and then we can back out the market quantity.

8:12  
Quantity competition starts from a different place.

8:14  
It says I'm choosing quantities first.

8:17  
OK, which means that effectively I'm determining market quantity first, cuz I take all of the quantities provided by those little firms, I sum them up and I say this is the maximum possible quantity you're going to get in the market.

8:31  
This is what all the firms are bringing to the market.

8:34  
Now, the firms don't want to go home with this extra quantity, right?

8:37  
So what they're going to do is they're going to sell these goods, make sure that they sell whatever quantity they bring, and market price has to adjust in order to make sure that all of these goods get sold.

8:48  
So if you want the consumers to buy, let's say 1000 goods, then market price will adjust via the demand curve in order to make sure all of these 1000 units are sold, right.

8:59  
So it's kind of working backwards from a perspective that we usually work from price to quantity.

9:05  
So here's what we've done, right.

9:07  
We have said firms need to make a choice whether than price competition or quantity competition and that's determined by capacity constraints, something outside of their like a market feature.

9:19  
OK.

9:20  
We're again focusing only on simultaneous games, games where they choose to make their choices.

9:24  
At the same time, we have talked about how the market outcome of these choices depend on the type of competition they're in, because one determines market price and then we back out quantity, 1 determines market quantity and then we back out market price.

9:42  
OK.

9:43  
So given that we figured out what the market outcome is, we now have to go to talk about what the strategic interaction is.

9:50  
Strategic interaction matters because it matters for firms choices.

9:53  
And as we've seen firms make choices, quantity choices based on marginal revenue versus marginal cost.

10:01  
Here, we're focused a lot on costs in the previous module.

10:04  
We're going to keep that as given everything in the cost module plugs in directly here here.

10:09  
What's different compared to perfect competition is we've got market power.

10:12  
So we're going to use the insight from market power from the monopoly module and we're going to plug that inside in here, but we're going to develop that a little bit.

10:24  
Now, where did we get market power coming in?

10:26  
It came in from market marginal revenue.

10:29  
So let's start off with that and think about what marginal revenue is and how it depends on a firm's choices.

10:37  
Now again, price competition, quantity, competition.

10:41  
They are different.

10:42  
We give them fancy words like Bertrand competition and Cornell competition in one O 1.

10:48  
Actually, in any economics course that I teach, I really don't like to focus on jargon because I think jargon becomes like a like a token that students hold on to.

10:56  
This is the one exception when I will use jargon and I will expect you to use jargon because on an exam I need to determine from you that you understand there's a difference between price competition and quantity competition.

11:10  
If I tell you it's price competition, you know what to do.

11:12  
If I tell you it's quantity competition, you know what to do.

11:15  
So I will use terms like Bertrand because then you're unsure whether it's price or quantity competition.

11:22  
And if you're not sure that there's a difference, you may reveal that information to us.

11:27  
So you need to know that piece of jargon.

11:29  
Please don't ask us an example because we cannot tell you for this particular reason.

11:34  
But more importantly, remember this, because if you get confused because you don't know which label corresponds to which type of competition, that's not a good reason to lose points.

11:43  
OK, so Bertrand.

11:45  
Competition, price competition, corner competition, quantity competition.

11:48  
They're making their choices at the same time.

11:51  
Now let's think a little bit about marginal revenue, because that's going to be determined by market power, and that is what affects the firm's choice.

11:59  
Now in Bertrand, competition firms are choosing prices.

12:03  
We have already said that prices for A, prices for B2 firms.

12:10  
OK.

12:10  
Market price is the minimum of both of those.

12:14  
Why is that Market price is the minimum Because consumers just care about the lowest price.

12:21  
They don't care about who they're buying it from.

12:23  
So if I want to figure out how much revenue firms get from selling the extra unit, I really need to think about what the price they're posting is, because that determines how many consumers show up at their door.

12:34  
Can I sell the extra unit or not?

12:37  
OK, so here we're going to work backwards because I'm choosing prices, right?

12:42  
So let's pick a number for Firm B's price.

12:48  
OK.

12:48  
I'm going to do it with variables because it's a more general insight, but if it's easier for you, pick a number.

12:53  
OK, so let's say that we have been given PB and now I've got to figure out what my price of choice is.

13:01  
So this is what firm A is choosing.

13:06  
And as a result of its price, that's going to determine how many consumers show up at their door.

13:11  
So for example, if this is price of B, then if A posts a higher price, nobody showing up at their door, right?

13:24  
Literally nobody is showing up at their door because too much right Consumers identical goods.

13:31  
Now if you post a price that's below the other firm, everybody's going to show up at their door.

13:36  
So here you get the entire market demand curve.

13:43  
What about if you both post the same price?

13:45  
Well, you could get anything in between, right?

13:47  
You can get no one showing up a door.

13:49  
You can get lots of people.

13:50  
It's kind of random because consumers view you as identical.

13:53  
So each one of those is possibilities.

13:55  
So notice the demand for firm is goods.

13:59  
That's where we started with this discussion of market power.

14:03  
If I raise prices, do I lose consumers?

14:05  
How many consumers?

14:06  
That was market power.

14:08  
It's the same thing here in this region.

14:10  
If you raise prices, sure, you're going to lose some consumers.

14:13  
You're going to lose them because they don't want to buy the good anymore.

14:17  
But here, if you raise prices, you're not going to get any consumers because what matters is what the other firm is doing given what the other firm is doing.

14:25  
And that is going to determine how many consumers show up at your door.

14:29  
That is going to determine how flexible you are in terms of the price raising and what your market power is.

14:36  
This is where we are going to build in the strategic interaction.

14:38  
This is the difference between monopoly and price competition here.

14:43  
OK, let's compare and contrast that with corner competition.

14:47  
Corner competition is quantity competition.

14:49  
So let's take as given what the other firm is doing.

14:53  
Game theory, right?

14:54  
When I'm filling in the matrix, if one side chooses this, what's the other side's best response?

14:59  
For that, I need to know what the outcomes are.

15:01  
So if firm B chooses QB, why does firm A care about that?

15:07  
Firm A cares about that because it determines the market quantity.

15:10  
The market quantity is the sum of both quantities.

15:16  
OK, So what is market price that we back out from the demand curve?

15:21  
So here's a really simple demand curve to help you understand that.

15:25  
Now in here, here's my market price, which is typically a function of the market quantity.

15:31  
But if I've got the other firm in there already providing these goods, this is where my quantity comes in.

15:41  
So notice if for example QB is equal to 60 then market price will be equal to 100 -, 60 minus QA.

15:55  
If QB is 40, the market price will be 100 -, 40 minus QA.

16:06  
Notice for the same choice that A is making the same quantity choice.

16:12  
Take any number here that helps you.

16:13  
You're going to get a different market price depending on what the other firm is doing.

16:19  
That is where the strategic interaction comes in.

16:22  
That is what's going to determine my profits.

16:25  
That's what's going to determine my revenues.

16:26  
That's what's going to determine my marginal revenue.

16:29  
Therefore my choices.

16:33  
OK, so strategic interaction for quantity competition comes in because given my choice, given the choice that A makes, the other firms quantity choice gets added on to that and determines the market price.

16:49  
OK, price competition.

16:53  
I care about what the other firm is choosing in terms of their price because depending on what the other price the firm is choosing, it affects how many people show up at my door, and that affects my revenues and that affects my profits.

17:09  
That affects my choices.

17:11  
That is a strategic interaction.

17:12  
This is why it's different from quantity and price, and that's why we care about this.

17:18  
OK.

17:18  
So capacity constraints help you when given a situation figure out whether firms are engaged in price or quantity competition.

17:26  
OK.

17:27  
And then the strategic interaction that we're going to focus on the primary channel is through how the other firms actions affect your profits, your profits primarily through the revenue side, because the cost side is the same, there's nothing different oligopolies cost versus anybody else's cost.

17:46  
It affects it through the revenue side.

17:50  
It affects your marginal revenue and that's why it's going to affect your choices.