**W10 V4 Strategic Situations and Payoffs**

0:10  
So with price discrimination, we've introduced this idea of people behaving strategically, people trying to escape high prices and starting to think about how firms will react to that.

0:20  
OK, now that's an example of what we call strategic situations.

0:24  
So we're gonna have to 1st define what strategic situations are and then think about what we call a payoff matrix.

0:32  
OK, this is a jargony term, but this is going to help us introduce a tool that we are going to use in order to identify strategic situations.

0:45  
OK.

0:45  
So far close to 0 strategy.

0:48  
We've introduced a tiny bit of strategy with price discrimination, but with price taking consumers in perfect competition, 0 strategy, I didn't care about what anybody else was doing because whatever I did or they did had no impact on the price that I got as consumers or producers.

1:02  
Monopolist, on the other hand, had some ability to change prices, but there was nobody else to worry about.

1:08  
So there was no strategic interaction, OK.

1:11  
Now in reality, typically what you do depends on what other people are doing, right, as an individual consumer, also as a firm.

1:19  
And in fact strategic situations can be even in things that are not necessarily price transactions or market transactions.

1:27  
Let's look about think about some examples from your daily life, right.

1:30  
So let's suppose you are driving to class and you're going to have to come to class and make sure that you're downtown at a certain time.

1:39  
OK?

1:39  
And let's say you live in the suburbs and you have two options.

1:42  
You can take the gardener or you can take the side streets and get downtown in time for a class.

1:47  
Well, if you just think about it, should I get to class or not?

1:51  
If your only option was a gardener, fine, then there was no other option.

1:54  
But if you have another option, does your choice whether to take the gardener or to take the side streets depend on what other people are doing?

2:03  
So, for example, if everyone else in the suburbs gets up in the morning and decides to take the gardener, you know you're going to be stuck in traffic, right?

2:10  
That's not moving and you're going to be late.

2:12  
What do you do then?

2:13  
You decide to take the side streets.

2:16  
But if everyone else wakes up in the morning and decides to take the side streets, the gardener is clear and you're downtown in record time.

2:22  
So your choice of whether to take the gardener or not depends on what everybody else is doing, because it affects your commuting time.

2:34  
And how does it affect your commuting time?

2:39  
Through traffic.

2:42  
OK, group projects, and we love group projects, right?

2:45  
Why you hate group projects so much?

2:47  
Because you can put in an effort, right?

2:50  
You put in the same effort, but the grade depends on what everybody else is doing, right?

2:59  
If you put in the same effort on your group mates effort, you can put in the same high effort and work really hard, do your best for this project.

3:12  
But if everyone else has done nothing, your grade is going to be pretty low, right?

3:17  
So your same choice to put in high effort has a very different outcome for you depending on what everybody else does.

3:24  
This is what we call a strategic situation.

3:25  
This is why in Group work, you care about what the other people are doing and you kind of have to worry about that as well.

3:30  
OK, let's compare this to a one-on-one assignment now, one-on-one assignment.

3:34  
The grade just depends on an individual assignment, just depends on your effort.

3:38  
In that case, you don't care about what anybody else is doing because if you put in high effort, you're going to get a high grade, You put in low effort, you're going to get a low grade.

3:45  
It doesn't impact or your grade is not impacted.

3:48  
Your outcome is not impacted by what anybody else is doing.

3:51  
So we would say these two situations are strategic situations and this one because it's an individual thing that's not affected by anybody else, the last one is not strategic.

4:03  
OK.

4:04  
So what you are looking for to think about whether it's a strategic situation or not is what we call interdependence.

4:10  
Does the outcome depend on what other people are doing?

4:15  
So my same choice of taking the gardener of putting in high effort, does my outcome reaching class in time or not, getting high grade or not depend on what other people are doing?

4:28  
If it does, we have interdependence and we would call this a strategic situation.

4:32  
OK, this is a classic question on the exam and if you just give me a memorized answer here or a definition, you're going to get close to 0 points.

4:40  
In fact, you may just get zero.

4:41  
Why?

4:42  
Because we want to know that you can apply this concept and check for this particular thing.

4:47  
Is there interdependence?

4:48  
So tell me why there is interdependence and how one people's one person's choice, the outcome depends on what other people do.

4:57  
OK, so you need to be able to say for a group assignment, my choice of high effort depends on what the other person is doing compared to what would happen on an individual assignment.

5:10  
And the tool that we use to analyse this once you have determined that there is a strategic interaction is game theory.

5:16  
And that's what the rest of this week's topic is, OK, so here's what we're going to do with the strategic situation.

5:23  
First, we're going to do is we're going to identify who's playing this game, who's involved in the strategic situation and what are their possible choices.

5:32  
Now we're going to simplify really complicated things down to what we call two people, two player, two actions, sometimes 5-6, sometimes more than one action.

5:41  
We're going to make it simple in the sense that we're always really going to be looking at two player games.

5:46  
The intuition, the insights will be more general.

5:50  
We'll start off with two possible actions, but if you look at the problem set and we'll talk about the same class, you can extend this to more than one action.

5:56  
OK, we're gonna let's just start here.

5:59  
And for this video, we'll just focus on identifying and setting out the setting, and then we'll solve it in a later video.

6:07  
OK.

6:07  
So let's think about this example in here.

6:09  
I've got a game where there's you on one side and me on the other side.

6:14  
OK.

6:14  
My actions are putting taxes on the midterm or not putting taxes on the midterm.

6:20  
OK.

6:21  
Your actions are to study the tax module or to not study the tax module.

6:25  
Just an example.

6:26  
You have to study the tax module.

6:28  
OK.

6:28  
Now the question for you is this seems like a situation.

6:32  
Two people, two actions.

6:33  
They don't have to be the same, right?

6:35  
Here they're different.

6:36  
Is this strategic?

6:37  
So you want to ask, does your choice of studying the tax module or not affect your outcome?

6:47  
So here you have to define what your outcome is.

6:49  
For example, let's say your test grade, right?

6:52  
Does your test grade depend on what my choice of putting taxes on the midterm or not?

7:00  
Well, you're going to say, well, if I studied the tax module, my same choice of studying the tax module is going to have a bigger impact on my grade.

7:07  
If taxes do actually show up on the midterm.

7:09  
If they don't show up on the midterm, then I've lost that time that I could have spent studying something else.

7:13  
OK, so that is a strategic situation.

7:16  
Now, what about from my perspective, right?

7:19  
Do I put taxes on the midterm or not?

7:21  
If I put taxes on the midterm and students have not studied for it, then they're gonna do it really badly.

7:27  
And that's going to affect me cuz I'm gonna be upset, right?

7:29  
I'm gonna feel bad and I'm not gonna want.

7:33  
Yeah, I'm going to be upset.

7:34  
Let's put it that way.

7:35  
OK.

7:36  
And if I if everyone studies and they're going to do really well in the tax module, then I'm going to feel really good, right?

7:41  
And I feel like you guys have understood economics and you can go forth in the world and know about taxes.

7:47  
OK, So we can care about different things.

7:50  
We can have different actions.

7:52  
But what you're looking for is the outcome changing for the same choice and what somebody else does and for that to be to make it a strategic situation.

8:03  
OK, I'm going to do this with a very simple example, mostly because it allows me to use two different colors, which is what's going to be important for you when you're reading a matrix.

8:11  
And Coke and Pepsi are kind of the the classic colors that we can use, red and blue.

8:16  
OK, now I'm going to make it really simple.

8:18  
Two choices advertised, not advertised.

8:22  
And we first have to think about whether this is strategic or not.

8:25  
So let's think about a word where if Pepsi chooses to advertise, its payoff in terms of profits will be different depending if Coke chooses to advertise at the same time or not.

8:39  
OK, now I need to put in, in terms of the payouts, the value that you care from a given outcome.

8:46  
So for example, if you study the tax module, you are going to be reflected in the grade.

8:52  
Let's say everybody can get the same grade 72, but you can value a 72 very differently from another student.

9:00  
I need to take that into account.

9:02  
And the way I'm going to take that into account is to take the value from that grade value of the outcome.

9:07  
You've done this already, starting in module one.

9:10  
This is what the outcome is.

9:11  
Tell me how you care about it, Right.

9:12  
So convert the outcome into a dollar value.

9:15  
That's the number I'm going to put in the payoff.

9:17  
So if anything matters, anything is going to affect this interpretation or affect your behavior, It has to be reflected in the payouts.

9:24  
And then I'm going to take this and put it in a payoff matrix.

9:28  
Since the example we're doing with Coke and Pepsi, it's pretty straightforward because they're just films.

9:32  
They just care about profits.

9:33  
I'm going to put profits in here.

9:36  
OK.

9:37  
So the way we're going to do it is we're going to take Pepsi's two choices, advertise, not advertise, two options.

9:44  
Each column is going to correspond to one choice that Pepsi makes.

9:48  
Similarly, each row is going to correspond to Pepsi advertising or not advertising.

9:54  
If sorry to Coke, I could have potentially made this different.

9:58  
I could have said Coke advertises 1,000,000 and advertising 2 million $0.00, right?

10:04  
I could have made this more complicated, but I've chosen to make it very simple in that there's just two actions advertised, not advertised.

10:12  
So that's how we create this matrix to to begin with.

10:15  
And then I start filling in this matrix with numbers that correspond to values.

10:21  
So, for example, Coke is red if Coke chooses to advertise and Pepsi chooses to advertise at the same time, they both benefit from each other's advertising, and Coke in particular gets 2 dollars $2,000,000 worth of profits.

10:38  
OK.

10:39  
On the other hand, if Coke advertises and spends all of this money advertising and Pepsi does not, right, it's gonna get zero extra profits because all of this extra advertising, it didn't result in enough extra consumers in order to increase profits.

10:56  
Similarly, if it does not advertise and Pepsi advertises, it benefits from Pepsi advertising soft drinks, right?

11:03  
Because like, you know, cola, cola, cola.

11:04  
And turns out that you happen to prefer Coke to Pepsi, you're going to buy more Coke when you see Pepsi ads, and that's going to give Coke effectively profits for free, right?

11:15  
And if they both don't advertise, they get what they're currently getting, which is, let's say $1 million in profits.

11:22  
The same thing is going to happen for Pepsi, except the numbers are going to be in different boxes because now we're looking at Pepsi's payoff from what Coke does.

11:29  
So for example, if Pepsi does not advertise and Coke advertises, Pepsi is going to benefit from that and get 3,000,000, whereas if Coke does not advertise, they're going to get 1,000,000.

11:42  
This is the most common source of mistakes on the exam because students not sure how to read these payoff matrices and then they ask us on the exam and we cannot help you read it.

11:52  
Now the reason you get confused looks really straightforward when I've separated them.

11:56  
The reason you get confused is because we combine both people's payouts into one matrix and you are expected to know which number corresponds to Boom's payoff.

12:06  
So I would strongly recommend, if this is new to you, to start color coding it in the sense that the column player in this case is Pepsi.

12:15  
Their payoff goes second, so the second number in every little cell here corresponds to the column player, and the first number in every cell corresponds to the row player, which in this case is coke.

12:29  
If you're confused at the beginning, color code them so that you don't go wrong, because later on it'll become easier for you to have it on the exam.

12:36  
It's not color-coded.

12:38  
Get pens of different colors and help you figure that out.

12:42  
But that's how we're going to interpret this.

12:47  
OK Now I want you to take some time to fill out this, OK.

12:51  
Because what are you going to do in here is use this taxes versus not taxes example to think about converting an outcome into a dollar value and put your payoff.

13:01  
OK, so this is you here.

13:03  
This is your choice and this is my choice.

13:06  
Me and you're going to have to think about quantifying the dollar, the outcome into dollar values, fill in numbers here so you'll get a feel as to what to put when and getting comfortable with converting outcomes into payoff.

13:20  
This is something that we're going to ask you to do given information on an exam, look at past exams.

13:25  
So you need to be comfortable working with this, not just with numbers that we give you, because the goal that we want you to take away from here is that you understand what is important is the value and not the outcome, right?

13:40  
So for example, if I'm thinking about you and this is a grade of 72, I don't put the 72 in here, I put your value from getting a 72 grade converted into dollars, which could be specific to you and may be different from somebody else.

14:00  
So here's how we read a payoff matrix.

14:02  
Given a cell, the 1st thing is the row player.

14:06  
So for example if there was coke, the first player is the row players pay off and the second column is the the second number in the cell is the column players pay off.

14:17  
We cannot tell you this if you ask us on an exam.

14:21  
OK, so your job when faced with a strategic situation is to identify what makes it strategic, what is the interdependence in that particular scenario and explain it.

14:33  
Don't just give us definitions #2.

14:36  
Once you've identified the outcome that differs based on the other person's actions, tell me how you can convert that outcome into a dollar value, because that dollar value is the payoff for that each individual person.

14:55  
Then create a matrix where you're putting all of these people's payouts into the cells in that particular order so that we can then use our game theory strategies or our game theory tools in order to find the outcome.

15:10  
This is an important learning objective, so please make sure you understand this And don't just take shortcuts to what we're going to do in the next video, because on the exam, if you look at the past ones, you will be asked to create these and identify strategic interactions.