Student ID:

Applied Microeconomics Final exam

BSc in International Business and Politics

Copenhagen Business School

Pages: 9

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01. December 2020

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Question 1

Question A

The market for smoked salmon in Denmark is perfectly competitive. The inverse demand and supply are

$��_{��} = 10 - ��$

$��_{��} = ��$

In this market the government imposes on consumers a per unit tax of 2

Finding the optimal quantity produced

$$��_{��} + 2 = 10 - ��$$

$$��_{��} = 8 - ��$$

$$8 - �� = ��$$

$$��^{*} = 4$$

Optimal quantity produced is 4

Finding the price producers' pocket

$$��_{��} = 8 - �� = 8 - 4 = 4$$

The producers pocket the price 4

Adding the tax because consumers pay the tax

$$��_{��} = 4 + 2 = 6$$

The consumer pays the price 6

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Question B

Finding what percentage of the tax is paid by the consumers

First finding the optimal price without the tax

10 − �� = ��

��* = 5

���� = 10 − 5 = 5

Now looking at the difference of what the consumers pay before and after

tax Δ��

Δ��=6 − 5

2=1 2= 50%

The tax revenues for the danish governments are the optimal quantity produced with tax and the price of tax

$$4 \cdot 2 = 8$$

Question C

Now, the market for smoked salmon in Jamaica is also perfectly competitive. The inverse demand and supply in Jamaica are

���� = 10 − 3��

���� = ��

The government also imposes a tax of 2 on consumers

Finding the optimal quantity produced with the tax

���� + 2 = 10 − 3��

���� = 8 − 3��

8 − 3�� = ��

��* = 2

Producers pocket the optimal price

���� = 8 − 3 · 2 = 2

Consumers pay the price which producers charge, plus the tax

$$2 + 2 = 4$$

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Question D

Finding what percentage of the tax is paid by the consumers in Jamaica

First finding the optimal price without the tax

10 − 3�� = ��

��* = 2,5

���� = 10 − 3 · 2,5 = 2,5

Now looking at the difference of what the consumers pay before and after

tax Δ��

Δ��=4 − 2,5

2=1,52= 75%

The tax revenues for the Jamaican governments are the optimal quantity produced with tax multiplied with the price of tax

$$2 \cdot 2 = 4$$

Question E

Which consumers face a higher tax incidence, Jamaican consumers, or Danish consumers, why?

The tax incidence on consumers is the share of the tax which the consumers pay. In Denmark the tax incidence on consumers is 50% and in Jamaica the tax incidence on consumers is 75%. Thus, the Jamaican consumers face the higher tax incidence.

The tax incidence is higher on Jamaican consumers because

����������������� = 1 ·2,5

2,5= 1

����������������� = 1 ·55= 1

����������������� = −13·2,5

2,5= −13

����������������� = −1 ·55= −1

As the supply elasticity is the same for both markets the reason why Jamaican consumers faces a higher incidence of the tax than danish, is that their elasticity of demand is lower than that of the consumers in Denmark

Question 2

Question A

Emma has utility over money characterized by the following function

��(��) = ��^{2}

Calculating the first and second order derivative of the utility function

��(��)$'$ = 2��

��(��)$''$ = 2

Emma is risk loving because her utility function is convex, we can see that

because ��(��)$' > 0$

��(��)$'' > 0$

Question B

Emma finds a lottery ticket on the street. The lottery ticket pays 10dkk with 80% probability and 2000dk with 20% probability

Calculating the expected value

���� $= 0{,}8 \cdot 10 + 0{,}2 \cdot 2000 = 408$

Calculating the expected utility

���� $= 0{,}8 \cdot 10^2 + 0{,}2 \cdot 2000^2 = 800.080$

Calculating the utility for the EV

��(����) $= 408^2 = 166.464$

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Question C

Daniel, a friend of Emma, is thinking of offering Emma some money in exchange for the lottery ticket What amount of money should Daniel off Emma for her to consider the offer?

To find out how much Daniel needs to offer, we calculate Emma's willingness to pay/certainty equivalent for the lottery ticket

$$��^{2} = 800.080$$

$$�� = 894{,}5������$$

Daniel need to offer at least 894,5dkk

What risk profile should Daniel have to wanting to buy the lottery ticket at that price?

The expected value from the lottery ticket is 408dkk, which is significantly less than the price he needs to pay to obtain the lottery ticket, which is 894,5dkk. This can be classified as an unfair bet, and if he is willing to take this bet, he must have an increasing marginal utility of wealth and therefore be risk loving.

Question D

Emma decided to donate her ticket to her daughter Lily. Lily has utility over money characterized by the following function

$��_{��}(��) = 4 \cdot ��$

Is Lily risk neutral, risk averse or risk loving?

$$��_{��}(��)' = 4$$

$$��_{��}(��)'' = 0$$

Lily is risk neutral because her utility function is increasing and linear, we can see that

because $��(��)' > 0$

$$��(��)'' = 0$$

The expected utility for Lily of this lottery is

$$��_{��������} = 0{,}8 \cdot (4 \cdot 10) + 0{,}2 \cdot (4 \cdot 2000) = 1632$$

Calculating the utility for EV

$$��(��)_{��������} = 4 \cdot 408 = 1632$$

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Question E

What amount of money should Daniel offer this time to Lily for her to consider the offer?

To find out how much Daniel needs to offer, we calculate Lily's willingness to pay/certainty equivalent for the lottery ticket

$$4 \cdot �� = 1632$$

$$�� = 408$$

Daniel need to offer at least 408dkk

Question 3

Question A

Rebecca and Camilla are going to a party and must choose how to dress without knowing how the other will be dressed. Rebecca has two dresses to choose from, and Camilla has three dresses to choose from. The simultaneous game can be described by the following matrix

How many Nash Equilibria in pure strategies exist in this game, and what are

they? (different choices are marked with a blue line)

		Camilla		
		Lilac	Mango	Red
Rebecca	Ultramarine	0,2	2,4	2,0
	Dark Orange	4,0	0,2	0,6

There is one Nash Equilibrium in this pure strategi game, and it is for Rebecca to choose Ultramarine and for Camilla to choose Mango. (Ultramarine, Mango)

Question B

When some actions are dominated, we can solve the same problem by iterative elimination of dominated strategies (IEDS). Do Rebecca or Camilla have any actions that are initially dominated? If so, find the N.E by using IEDS, showing all logical steps.

Step 1: Camilla has action Lilac dominated because, if Rebecca chooses Ultramarine, Camilla will choose Mango. And if Rebecca chooses Dark Orange, Camilla chooses Red. Therefore, Lilac will never be chosen.

Step 2: Rebecca is rational and knows Camilla is rational as well. Hence, she knows Lilac will never be choses and now looks at her possibilities. She has action Dark orange dominated, because if Camilla chooses Mango, she will receive 0 and if Camilla chooses Red, she will also receive 0. While if she chooses Ultramarine, she will get 2 if Camilla chooses Mango and 2 if Camilla chooses Red.

Step 3: Camilla is rational and knows that Rebecca will never choose Dark orange, and now looks at her possibilities. She can choose Mango and get 4 or Red and get 0. Therefore, she chooses Mango.

The Nash Equilibrium solved by IEDS is (Ultramarine, Mango)

Question C

Robert and Camilla have lost their phones and must simultaneously decide whether to meet at the Soccer game or at the Operate. The following matrix describes their payoffs.

How many Nash Equilibria in pure strategies exist in this game, and what are

they? (different choices are marked with a blue line)

		Camilla	
		Soccer	Opera
Robert	Soccer	3,1	0,0
	Opera	0,0	1,3

There are two N. Es in this pure strategy game, and they are (soccer, Soccer) and (Opera, Opera)

Question D

Calculating the Mixed Strategies Nash Equilibrium

$$����_{��������������}(������������) = �� \cdot 3 + (1 - ��) \cdot 0 = 3��$$

$$����_{��������������}(����������) = �� \cdot 0 + (1 - ��) \cdot 1 = 1 - ��$$

$$����_{��������������}(������������) = ����_{���������������}(����������)$$

$$3�� = 1 - ��$$

$$�� = 0{,}25 = \frac{1}{4}$$

$$����_{����������������}(������������) = �� \cdot 1 + (1 - ��) \cdot 0 = ��$$

$$����_{����������������}(����������) = �� \cdot 0 + (1 - ��) \cdot 3 = 3 - 3��$$

$$����_{����������������}(������������) = ����_{���������������}(����������)$$

$$�� = 3 - 3��$$

$$�� = 0{,}75 = \frac{3}{4}$$

The N.E. in mixed strategy is $(\frac{1}{4},\frac{3}{4})$; $(\frac{3}{4},\frac{1}{4})$

Question E

Consider a prisoner's dilemma that is repeatedly played by the same two players 7 times. Can cooperation be sustained in this repeated game?

The two players are unlikely to sustain cooperation in this game. This is due, to the fact that the players are aware of exact amount of times, T=7 which the game is being played. When players are aware of the number of games, the last game �� can be considered a single-period game, where both players rat on each other. Now looking at the second last game $�� - 1$ both players know that the other will rat in the last game, which means they can't be punished by not cooperating in $�� - 1$, therefore they choose to rat in this game as well, this logic can then be applied to $�� - 2$ and so on.