Microeconomics (MEM) Problem Set

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The Problem Set contains two types of question.

- Some are pretty straightforward. They are narrow, numerical exercises with a single correct answer, and the aim is to sharpen thinking about the basic economic tool kit.
- Some are more open ended. They are broader and give you the opportunity to think creatively about using economic theory to understand practical issues.

Session 1

Question 1.1

Imagine that a company has a policy of awarding a bonus equal to 10% of the value of every good idea initiated. An employee thinks that this is such a good idea, he helps his boss to write a book explaining why it will prompt even more good ideas. If the company believes that the value of this book is £120,000, and that it was genuinely the result of this employee's actions (and only this employees actions), how much should he receive as a bonus? What is the corporate marginal tax rate of good ideas in this instance?

Question 1.2

Consider the video "Starbucks flat white // value creation!".[1] What are the 5 needs that I have, which Starbucks satisfy with a flat white?

At the end of the video I say that in the face of new competition Starbucks went from being "in the coffee business serving people" to "in the people business serving coffee". This demonstrates a shift in emphasis away from the product (coffee) towards the source of value creation (satisfying customers' needs). My own combination of needs is idiosyncratic, but this can be true for many products. Choose a product that you like and list some of the non-obvious needs that are being satisfied.

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[1] https://youtu.be/HAuGP5vJbDI

Question 2.1

Consider *Markets for Managers*, Ch. 2.1

Imagine that you are given a choice between three banknotes:

a. £50

b. £20

c. £10

What is the cost of choosing the £20 note?

Question 2.2

Use the table below, and assuming a cost of capital of 12%, which business unit is generating an economic loss?

Business unit	**Annual budget**	**After-tax income (NOPAT)**	**Economic profit/loss**
A	£100,000	£14,000	
B	£200,000	£20,000	
C	£20,000	£4,500	

+ Discussion Question 1b

Provide an interesting and original example of a company that has suffered due to risk compensation (i.e. the "Peltzman effect").

+ Discussion Question 1d

Create a list of 3-6 products or services that you sell and explore the different sources of value creation. Demonstrate a thorough understanding of the customer's needs that are being satisfied.

+ Discussion Question 1e

Provide an example of what you consider to be a managerial error that you have encountered as a student at ESCP Europe. (i) Identify the decision maker; (ii) did they face the right incentives? (iii) did they have sufficient knowledge? Suggest a way of

avoiding a similar error in future by aligning incentives and/or improving knowledge flows.

+ Discussion Question 2a

Provide a real, detailed, and original example of the following:

a. A sunk cost that should have been ignored but wasn't
b. An opportunity cost that shouldn't have been ignored but was

Session 2

Question 2.3

Find the expression for the average fixed cost, average variable cost, and average cost functions where the total cost function is:

a. $TC = 3 + 4q$
b. $TC = 10 + q^2$
c. $TC = 100 - 3q + 10q^2$

Question 2.4

Fill in the table below using the information in *Markets for Managers*, Ch. 2.2

	A	**B**	**Total**
Initial profit			
Corporate overhead			
Profit if both open			
Profit if A is closed			

Question 2.6

Mutual Industries owns three plants at which it produces exactly the same cars. Plant 1 has cost function $TC_1 = 300 - 10q + 50q^2$. Plant 2 has cost function $TC_2 = 50 + 10q^2$, and plant 3 has cost function $TC_3 = 1{,}000 + 20q$. Mutual decided to produce 5 cars in the least costly way. Which plant will be chosen? Find its cost.

Question 2.11

Consider "La Marmotte", January 2012.

Firstly, what is the highest amount of profit that the restaurant could earn? How many meals should they produce? Then, draw a rough graph to show the level of output consistent with profit maximisation.

Output	Costs						Revenue			Profit
daily	VC	FC	TC	AVC	ATC	MC	MR	AR	TR	π
66	164	500					30	30		
67	193	500					30	30		
68	224	500					30	30		

Question 2.12

Consider "La Marmotte", January 2012.

The variable costs for *La Marmotte* are given by the following equation:

$$AVC = q^{1.05} - 140 + (\frac{4000}{q})$$

Calculate the profit maximising level of output.

+ Discussion Question 2b

Consider the case *Dogfight over Europe: Ryanair (A).* What were some of the ways in which economies of scale gave British Airways an advantage over new entrants back in 1986?

Session 3

Question 3.2

Consider Question 1 from the Comparative Statics Worksheet. Find the equation for the demand and supply curve and then use algebra to verify the equilibrium price and quantity. Then, calculate the consumer surplus in equilibrium.

Question 3.3

Assume that the market demand curve is $Q_D = 40 - 2p$ and the market supply curve is $Q_S = 4p - 20$

a. Find the equilibrium price and quantity.
b. Calculate the consumer surplus and producer surplus.
c. Suppose the government imposes on each firm a $3 tax on each unit sold. What is the new equation for the supply curve?
d. Calculate the new price and quantity.
e. What is the price received by the producer?
f. Find the tax revenue of the government and calculate how much is paid by the consumer and how much by the producer.
g. How much consumer surplus has been lost?
h. How much producer surplus has been lost?
i. What is missing?

Question 3.5

Use comparative statics to show why house prices have increased so much over the last few years. Also, how will the following events influence the price and quantity of housing over the next 10 years?

a. A new government relaxes planning laws on greenbelt land
b. The UK Border Agency engages in a major clampdown on illegal immigrants
c. The divorce rate spikes upwards
d. The economic downturn becomes a severe depression

Hint: See the video, "Comparative statics and the UK housing market", April 2014.[2]

Question 3.6

Use comparative statics to show what would happen to the quantity and price of hotels in Cancun under the following scenarios:

a. An earthquake causes several hotels to collapse
b. Lots of American universities have Spring Break
c. A large part of land is made available for development
d. The Mexican tourist board tries to encourage tourism by mandating a below market price ceiling

Question 3.7

Consider the following passage (source unknown):

[2] http://youtu.be/sSxGMwMEyWc

> In September, 1939, Germany stopped buying Yugoslav plums. With their plums a glut on the market, the Yugoslavs increased the production of slivovitz, the native plum brandy. As the price fell below 8 dinars a gallon and the supply of brandy outran the supply of bottles and barrels, the entire province of Bosnia seemed to join in the task of drinking up the excess. The result was a wave of mass drunkenness, 20 murders, and the mutiny of some army reservists. (*The New York Times, October 25, 1939*). The hangover that followed had at least one economic consequence: the Bosniaks were able to absorb on a mass scale the aspirin dumped in Yugoslavia by the German through clearance agreements.

Use comparative statics to show the effect on (i) the market for plums (hint: treat the supply curve as highly inelastic) and (ii) brandy.

+ Discussion Question 3a

Provide a real example of a city that has adopted rent control. Use comparative statics to show the theoretical effect rent control on the market for rental accommodation. Make sure you label the market rate of rent that would exist without the price ceiling. List some of the possible unintended consequences of such a policy. Is there evidence that any of these unintended consequences occurred?

Hint: *Markets for Managers*, Ch. 3.2.

+ Discussion Question 3b

Fairtrade products are becoming increasingly popular. Use microeconomic analysis to discuss how effective you think Fairtrade certification is for improving the living standards of farmers in the developing world.

Session 4

Question 3.8

You're participating in a sealed-bid auction for a one-of-a-kind painting, for which you'd be happy to pay $100 but not a penny more. You place your bid in an envelope, all the envelopes are opened, and the high bidder buys the painting for the amount of her own bid. What number should you put in your envelope?

Question 3.9

You're participating in another sealed-bid auction for a one-of-a-kind painting, for which you'd be happy to pay $100 but not a penny more. This time, you place your bid in an envelope, all the envelopes are opened, and the high bidder buys the painting for the amount of the second highest bid. What number should you put in your envelope?

Question

In 2018 all 5 groups of MIM students at the London campus participated in an auction to buy an ESCP hoodie. The winning bids for each class are shown in the table below:

Group	Winning bid
A	€25
B	€32
C	€44
D	€22
E	€27

Assume that the winning bid remains the highest value of each bidder, and bids can be made in €1 increments. Imagine that all students participated in an auction for a single hoodie.

a. How much would the winning bidder pay under an English auction?
b. How much would the winning bidder pay under a Dutch auction?

Question 3.12

Explain how adverse selection and moral hazard apply to an all-you-can-eat buffet.

Question 3.13

Suppose that a person wants to buy a used car. She knows that half of the available used cars are good cars and the other half are "lemons". She is willing to pay $10,000 for a good car and $2,000 for a lemon.

a. Assume that this buyer cannot distinguish the good cars from the bad cars. How much would she be willing to pay for any car?
b. What types of car will be offered for sale in the market at the price calculated in part a?
c. Based on your answer in Part b, calculate the ultimate equilibrium price of a car in the used-car market.

Question 3.14

Imagine a market where there are 8 buyers (who can buy a maximum of one unit each) and 6 sellers (who can sell a maximum of two units each). There is a Grade 4 (i.e. high quality) product available. Assume that the buyers place a value of £24 on the product. It costs £14 to produce the 1st unit, and £1 more to produce the 2nd unit. Draw the demand and supply diagram and clearly mark the equilibrium price.

+ Discussion Question 3d

To what extent is there an asymmetric information problem between your company and your customers? Use an example of a product you sell that consumers will not be able to detect the quality of before they buy it. What are some of the methods you may use to resolve this problem? Do warranties always signal quality?

+ Discussion Question 3e

See the video, "Auctions: Key Concepts", February 2018[3]

How do the concepts of the Coase Theorem and the Transitional Gains Trap apply to the 3G telecoms license auction?

Session 5

Question 5.10

Consider the following game in which player 1 chooses a row and player 2 choose a column.

	L	**C**	**R**
T	3, 1	0, 5	1, 2
M	4, 2	8, 7	6, 4
B	5, 7	5, 8	2, 5

a. Does player 1 have a dominant strategy?
b. Does player 2 have a dominant strategy?
c. What is the Nash equilibrium for this game? Is it *ever* possible for either player to use a strategy other than his dominant strategy? Explain

Hint: See the video, "An Introduction to Game Theory", February 2015.[4]

[3] https://youtu.be/WdsVzzvJoqs

[4] https://youtu.be/YndXmFGaRmU

Question 5.11

Consider the following matrix, which shows the payoffs for a game between two firms in a duopolistic industry.

		Firm II	
		Low price	**High price**
Firm I	**Low price**	0, 0	20, -8
	High price	-8, 20	5, 5

a. What is the only Nash equilibrium in pure strategies for this game?
b. Are there dominant strategies for each firm?
c. Now suppose that the cost structure in the industry has changed so that the new payoffs for the game are as shown below. Is the Nash equilibrium determined in Part a of this problem still an equilibrium?

		Firm II	
		Low price	**High price**
Firm I	**Low price**	0, 0	0, -10
	High price	-10, 0	5, 5

d. Are there now any other equilibria?
e. If there are now several equilibria for the game, which one do you think is likely to be chosen? Why?

Hint: See the video, "An Introduction to Game Theory", February 2015.[5]

Question 5.12

a. Is the bar scene from "A Beautiful Mind" a Nash equilibrium? [6]
b. Is the boat scene from "The Dark Knight" a Prisoner's Dilemma? [7]

Question 5.9

The table below shows profits of two companies in the same market producing perfect substitutes.

[5] https://youtu.be/YndXmFGaRmU
[6] A Beautiful Mind, February 2008 https://www.youtube.com/watch?v=uAJDD1_Oexo
[7] Joker's Social Experiment, December 2010 https://www.youtube.com/watch?v=K4GAQtGtd_0

My output \ My partner's output	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	11	10	9	8	7	6	5	4	3	2	1
2	20	18	16	14	12	10	8	6	4	2	0
3	27	24	21	18	15	12	9	6	3	0	-3
4	32	28	24	20	16	12	8	4	0	-4	-8
5	35	30	25	20	15	10	5	0	-5	-10	-15
6	36	30	24	18	12	6	0	-6	-12	-18	-24
7	35	28	21	14	7	0	-7	-14	-21	-28	-35
8	32	24	16	8	0	-8	-16	-24	-32	-40	-48
9	27	18	9	0	-9	-18	-27	-36	-45	-54	-63
10	20	10	0	-10	-20	-30	-40	-50	-60	-70	-80

Identify:

a) The price and profit in a situation of a shared monopoly
b) The equilibrium under Cournot competition

+ Discussion Question 5a

Imagine your company is locked into a Prisoner's Dilemma and collusion isn't an option. Outline some strategies you may take and how effective they are.

Provide a real-world example of the Prisoner's Dilemma (PD). Mention three possible strategies to escape from the PD, and discuss how you think it can be solved.