NTNU
Department of Industrial Economics and Technology Management
Spring 2020

TIØ4285 Production and Network Economics
Assignment 3

Out: Thursday 30 January
In: Thursday 6 February, 6pm
Supervision: Monday 3 February, 16:15pm A31

Note that late exercises will not be approved.

Exercise

Chelski FC wants to build a new football stadium and intends to sell season tickets to help finance the build. The city subsidizes the stadium, but limits the number of season tickets to only 30,000.

Assume that the marginal cost of selling season tickets is 0 and that you only consider the club's income. You have just been hired as the Chelski FC's new CFO and your first job is to determine the right price and sales method for the season tickets. You have been in touch with 10 commercial wholesalers, who want to buy (and distribute) all of the 30,000 season tickets for Chelski FC's new stadium. The club assumes that the valuation of the tickets is uniformly distributed between 0 and 100 million and that the reservation price of all 10 commercial wholesalers is drawn from this distribution.

a) You have been asked to calculate the club's expected income from auctioning off the tickets. Justify your choice of auction design and provide all necessary assumptions for your calculations.

b) The club considers advertising the auction to attract additional bidders. How much should the club be willing to spend in order to attract n new bidders to the auction?

c) Assume that it costs 500,000 to attract each new bidder. How many bidders should the club attract beyond the 10 already participating wholesalers? What is the club's new expected income?

The city is not happy for your suggestion and insists that the Chelski FC sells the tickets itself, without using commercial wholesalers. You decide to try a completely new approach to solve the problem. The demand for season tickets is uncertain and price dependent. Market research reveals that demand can be described by 3 scenarios: S1, S2, and S3 corresponding to low, medium and high demand. Each scenario provides demand for 3 different prices. You know that one of the scenarios is the correct one, but – unfortunately – not which one. The result from market research is given in Table 1. The probability for a scenario to be correct is given as $p = 0.3$, $p = 0.5$, and $p = 0.2$, respectively.

d) Which ticket price should you choose given that you do not have any other information than the one in Table 1?

You now decide to sells the tickets by means of a modified Dutch auction (which is often used to buy back stocks from shareholders).

Table 1: Demand scenarios

	scenario		
price	S1 (p=0.3)	S2 (p=0.5)	S3 (p=0.2)
2500	20,000	35,000	45,000
3000	15,000	30,000	35,000
5000	5,000	15,000	30,000

e) Which property of the modified Dutch auction makes it particularly attractive in this situation?

f) Determine optimal ticket sales and expected income from a modified Dutch auction given the demand scenarios in Table 1.