NTNU
Department of Industrial Economics and Technology Management
Spring 2020

TIØ4285 Production and Network Economics
Assignment 7

Out: Thursday 27 February
In: Thursday 5 March, 6pm
Supervision: Monday 2 March, 4:15pm A31

Note that late exercises will not be approved.

Exercise 1

The company Bare Blomster AS has 2 divisions, the market garden that produces tulips and the retail division that sells these to the end customers. The market garden has the following cost function per batch of tulips q:

$$TC_G = 50 \cdot q + 2 \cdot q^2.$$

The retail division observes the following demand for batches of tulips in the market:

$$p = 150 - 0.5 \cdot q.$$

Its total cost function is given as
$$TC_B = 10 \cdot q.$$

a) Find the company's net marginal revenue curve as seen from the market garden. How should this curve be interpreted?

b) Maximize the company's profits. What are the optimal profits? Which transfer price is used between the different divisions and what is the price for the end customer?

Exercise 2

Saftbolaget has a monopoly in the Nordic juice market. It consists of two departments: a production department and a retailing department. The manufacturing cost is given as

$$C_P = 250 + 8 \cdot q + \frac{1}{20} \cdot q^2,$$

whereas the retailing cost can be described by the following function

$$C_R = 225 + 9 \cdot q.$$

Demand in the Nordic juice market is given as

$$p(q) = 62 - \frac{1}{10} \cdot q.$$

a) How much juice should the company sell in the Nordic market to maximize profits? What are the optimal profits?

b) What is the transfer price for juice used between the production department and the retailing department?

To increase profits, Saftbolaget considers the possibility of the production department selling juice to retailers in Southern markets. The demand function of these external retailers is given as

$$p_e(q) = 33 - \frac{1}{30} \cdot q_e.$$

Note that the demand of the external retailers does not influence the demand in the Nordic market. Saftbolaget does not incur retailing costs for juice sold to external retailers.

c) How much juice (if any) should be sold in the different markets? What are the optimal profits and which transfer prices should Saftbolaget use?