

Exercise 3 (Part 4b)

1. Consider the following structure of costs and benefits of apprenticeship training in your firm, where X denotes the number of apprentices. Assume that your expected post-training benefits are 0.

$$\text{Training benefits: } 35000 * X - 300 * X^2$$

$$\text{Training costs: } 30000 * X + 200 * X^2$$

$$\Rightarrow \text{Net training benefit} = 5000 * X - 500 * X^2$$

- How many apprentices do you hire if your objective is to maximize net benefits of training? What is the average benefit of training an apprentice?
- How many apprentices will you hire if you first need to send one of your employees to an instructor course - which costs CHF 15,000 – to obtain the training permission from the authorities?
- Assume that there has been a recent political initiative with the aim to increase the number of apprenticeship positions offered by firm, such that every school leaver will be able to enroll in an apprenticeship program. The initiative states that every firm that trains apprentices will receive CHF 5,000. How many apprentices will you train under this scheme? Compare your answer to your result in question a) above.
- Assume that the text of the initiative says that training firms receive CHF 5,000 *per apprentice* they take on. How many apprentices do you hire in this case? What is the average benefit to train an apprentice?

Answer:

- Take derivative of the net training benefit function w.r.t. X , so that the first order condition (FOC) is: $5000 - 1000X = 0 \Rightarrow$ hire $X^* = 5$ apprentices, at average benefit of CHF 2500
- Hire 0 apprentices, as training yields average costs of CHF 500 (at $X^* = 5$ apprentices)
- FOC: $5000 - 1000X = 0 \Rightarrow$ still hire $X^* = 5$ apprentices, but now at an average benefit of CHF 3500 due to the subsidy (which is equivalent to a negative fixed cost). Thus, lump-sum subsidies do not change the firm's decision at the margin!
- FOC: $10000 - 1000X = 0 \Rightarrow$ hire $X^* = 10$ apprentices, at average benefit of CHF 5000. Here, subsidies affect the decision at the margin, and as a result, firms train more apprentices!