

Handout 1

diese Woche: 1. Theorie der Unternehmung

1.1. Technologie

Produktionsfunktionen, Grenzprodukt, MRTS,
Skalenerträge, weitere Eigenschaften

1.2. Kostenminimierung

bedingte Faktornachfrage, Kostenfunktion und ihre Eigenschaften,
Beziehung Skalenerträge - Grenzkosten

1.3. Gewinnmaximierung

Faktornachfrage und Güterangebot, Gewinnfunktion und ihre
Eigenschaften, Verbindung zur Kostenfunktion

zu lesen: Intermediate Varian, Kap. 18, 19 und 20; sowie (technisch anspruchsvoller -
eher zum Nachschlagen) Mas-Colell Kap. 5 A-D und graduate Varian Kap. 1-5.

Übungsaufgaben:

1. Let $f(K, L) = K^{2/3} L^{2/3}$. Depict this production technology by sketching the isoquants for 1, 2, and 3 units of output. Does it exhibit increasing, decreasing, or constant returns to scale - can you see this from your diagram? Calculate the marginal products - are they diminishing? Calculate the MRTS - how does it change along the isoquants? Can a production function have diminishing marginal product in each factor and still exhibit increasing returns to scale? What is the idea behind returns to scale? How does it diverge from the MP(s)? Give examples of companies or sectors which exhibit increasing/decreasing/constant returns to scale.
2. Suppose a firm is producing a single output y using a single input k and takes input and output price as given. Its production technology exhibits increasing returns to scale for low output levels but decreasing returns past some quantity of production.
 - a) Graph its production function.
 - b) Illustrate how one can graphically derive its profit-maximizing output supply curve from this production function.
 - c) Illustrate how one can graphically derive the cost function from the production function.
 - d) Show how one can derive the marginal and average cost functions from your answer to c).
 - e) Graphically derive the supply curve from your answer to d).
 - f) Are the two supply curves derived above identical (or should they be identical :) ? Why or why not?
3. Consider a firm with the Cobb-Douglas production function $Y = F(K, L) = K^\alpha L^\beta$. Let r and w denote the prices of the two input factors and p the price of the firm's output.
 - a) Find the conditions on the two parameters α and β ensuring that
 - i) the marginal products MP_K and MP_L are diminishing;
 - ii) there are constant/increasing/decreasing returns to scale.
 - b) For $\alpha + \beta = 1$ find the firm's cost function $C(r, w, Y)$ and cost-minimizing input demands $K(r, w, Y)$ and $L(r, w, Y)$.
Now assume $\alpha + \beta < 1$.
 - c) Describe in minute detail how you would calculate the profit maximizing output supply and the unconditional input demands as functions of r , w , and p .
 - d) Do you know of another way to calculate these functions - also describe in minute detail.
 - e) Discuss the profit maximizing output supply when $\alpha + \beta \geq 1$.