D0C08A/D0N27a/D0C29a
Fall 2010

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Homework # 2

due Dec 13

Problem 1: Consider production functions $f(z) = \sqrt{z_1 + z_2}$ and $f(z) = \sqrt{\min(z_1, z_2)}$, and denote output price and input prices by p, w_1, and w_2.

a) For each production function, derive the conditional factor demand functions and the cost function. (Explicitly specify the arguments each of these functions depends on.)

b) For each production function, use your results from a) to derive the profit maximizing output supply function, the unconditional factor demand functions, and the profit function. (Again, explicitly specify the arguments each function depends on).

c) Only for the first production function, directly find the functions asked for under b) using two different approaches: Lagrange, **and** alternatively plugging the constraint into the objective function.

Problem 2: A company's production technology is given by $f(z_1, z_2) = (z_1^\rho + z_2^\rho)^{1/\rho}$, $\rho < 1$, and it takes factor prices w_1 and w_2 as well as the output price p as given.

a) Derive the firm's conditional factor demand functions and express them in terms of the own factor price and a suitably chosen factor price index. Also determine the firm's cost function.

b) Distinguishing three cases ($p < MC$, $p = MC$, $p > MC$), solve the firm's profit maximization problem, i.e. find its unconditional factor demand functions, its output supply function, and its profit function.

c) Suppose the firm's CEO turns egomaniac and seeks to maximize revenue, now facing a cash-constraint (denote the available cash by C). Solve this problem. Can you always tell apart the egomaniac CEO from his more traditonal profit-maximizing (and not cash-constrained) counterpart?

Problem 3: Do exercise 6.C.15 in MWG.