Econ 200B
UCSD

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Problem Set 2

It's OK to work together on problem sets.

1. Consider the comparative statics of a single commodity market in competitive equilibrium, subject to exogenous variation in a parameter α. Demand is characterized as $D(p, \alpha)$, supply as $S(p, \alpha)$. Excess demand is $z(p, \alpha)$. The market equilibrium condition is $z(p,\alpha) = D(p,\alpha) - S(p,\alpha) = 0$. Comparative statics of equilibrium is then

$$\frac{dz}{d\alpha} = \frac{\partial z}{\partial p}\frac{dp}{d\alpha} + \frac{\partial z}{\partial \alpha} = 0$$

$$\frac{dp}{d\alpha} = -\left(\frac{1}{\frac{\partial z}{\partial p}}\right)\frac{\partial z}{\partial \alpha} = -\frac{\frac{\partial z}{\partial \alpha}}{\frac{\partial z}{\partial p}} \quad = -\frac{D_\alpha - S_\alpha}{D_p - S_p} \quad .$$

The denominators of the two expressions on the right hand sides are known as the Jacobian of the system.

Then suppose that α represents an upward shift in demand, S is unaffected by the change in α, and that D and S have the usual slopes with respect to p. Find an expression for $\frac{dp}{d\alpha}$. Can you determine the sign of $\frac{dp}{d\alpha}$?

2. Who really pays the Social Security payroll tax ?

Let α = Social Security payroll tax (to keep it simple, we'll treat it as a set value per hour worked), w^o = wage rate received by labor, $w^o + \alpha$ = wage (gross of tax) paid by employer

$D(w, \alpha) = D(w + \alpha, 0)$, $S(w, \alpha) = S(w, 0)$

Find conditions so that the tax α levied on employers is shifted to labor, that is so that $\frac{dw^o}{d\alpha} \approx -1$.

3. Mas Colell, Whinston and Green, problem 10.C.4.

4. MasColell, Whinston and Green, problem 10.C.5, using the implicit function theorem as the problem suggests. As stated it's a bit obscure, but let's do some homework. The equilibrium condition is

$$Z(p,t) = \sum_i \varphi'^{-1}_i(p+t) - \sum_j c'_j(p) = 0$$

Stating the equilibrium condition in this way and applying the implicit function theorem should give the answer. Do <u>not</u> use the technique of MasColell's Example 10.C.1.