Ramsey Pricing

- Very similar to Ramsey taxes
- Social welfare maximizing set of prices allowing a natural monopoly to recover its fixed costs.

- Natural monopoly
- n products, independent
- $q_k = D_k(p)$
- $S(q)$ gross surplus (sum of area under dmd curves)
- $R(q)$ is the revenue
  - $R(q) = \sum_{k=1}^{n} q_k p_k$
- $C(q)$ is costs
- $\Pi(q) = R(q) - \overbrace{C(q)}^{\text{could include fixed costs}}$

Social planner wants to:

$$\max \; S(q) - C(q)$$
$$\text{s.t.} \; R(q) - C(q) \geq 0 \quad \text{(Breakeven for the monopolist)}$$

Taking FOCs:

$$(q_i): \quad p_i - c_i + \lambda\left(p_i + q_i \frac{\partial p_i(q)}{\partial q_i} - c_i\right) = 0$$

$$\Rightarrow \frac{p_i - c_i}{p_i} = \overbrace{\frac{\lambda}{1+\lambda}}^{\text{constant across goods}} \frac{1}{\varepsilon_i} \qquad i=1,\dots,n$$

- some sort of weighted average of the competitive and monopoly solutions
- λ is determined by the size of the fixed costs.
- With interdependent demands, the ε_i term changes.

How can we implement this? Global price cap.

Monopolist's problem:

$$\max \; R(q) - C(q)$$
$$\text{s.t.} \quad \sum_{k=1}^{n} w_k p_k \leq \underbrace{\text{const}}_{\text{the cap}}$$

Dual of social planner's problem

$$\max \; R(q) - C(q)$$
$$\text{s.t.} \quad \underbrace{S(q) - \sum_{k=1}^{n} p_k q_k}_{\text{take derivative wrt } p_i \;\Rightarrow\; -q_i} \geq \text{const}$$

- use these as the weights
- this is a pretty big leap of faith in terms of informational requirements