Appropriation and Externalities
Real vs. Pecuniary Externalities
<u>Public Goods</u>

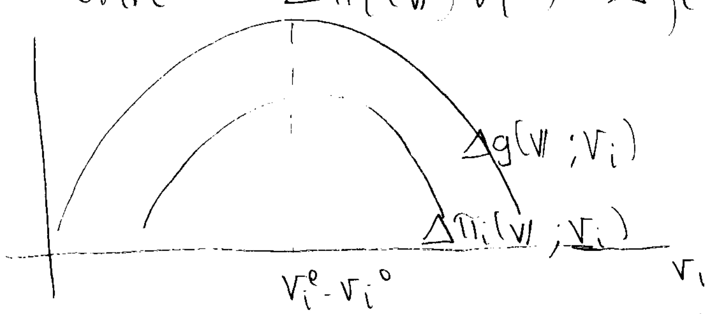
Game Economy

$$\pi_i(V_{-i}, \cdot) == v_i^*(p(V_{-i}, \cdot))$$

From an economic point of view, i does not need to know V_{-i}. He/she only needs to know $\{p(V_{-i}, v_i)\ \forall v_i \in V_i\}$.

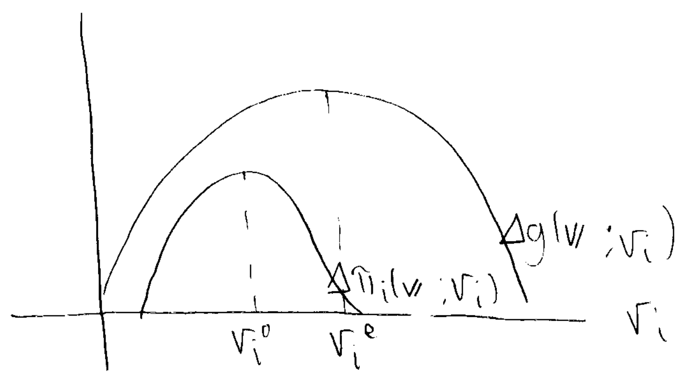
Individual i is a <u>price-maker</u> if $\exists v_i, v_i' \in V_i$, $v_i \neq v_i'$ such that $p(V_{-i}, v_i) \neq p(V_{-i}, v_i')$ for some V_{-i}.

If individual i is a price-maker, we probably have that $\Delta\pi_i(V; v_i') \cdot \Delta g(V; v_i') < 0$.



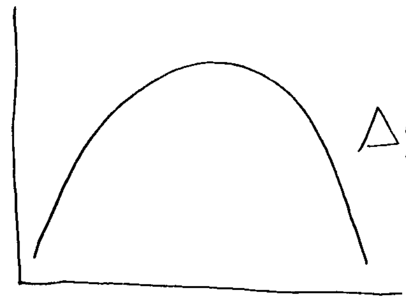
This is not a picture of full appropriation, though we would have efficiency.

If instead we have something that looks like this, we might not have efficiency

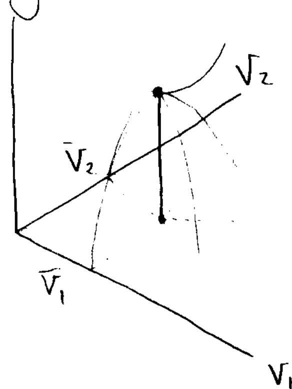


Ostroy claims that the first graph is not likely. People will have some incentive to hold out for their unappropriated surplus.

This is a graph of full-appropriation



Part (g) of Q3:



i.e. $\frac{\partial g}{\partial v_1}(\bar{v}_1, \bar{v}_2) = \frac{\partial g}{\partial v_2}(\bar{v}_1, \bar{v}_2) = 0$, but there is a coordination problem.

The sources of the coordination problem are
1. Failure of differentiability
2. Failure of concavity

Real Externalities

One consumer, one producer, one non-money good

$v(x; y)$ utility function for consumer

$c(y)$ cost function for producer, $\pi(p) = \max\{py - c(y)\}$

an equilibrium is a $[(x^*, y^*), p^*]$ satisfying

1. $v(x^*; y^*) - p^* x^* + \pi(p^*) \geq v(x; y^*) - p^* x + \pi(p^*)$
2. $p^* \cdot y^* - c(y^*) = \pi(p^*)$
3. $x^* = y^*$

We can have: $\frac{\partial v}{\partial y} \begin{cases} <0 & \text{ie pollution} \\ =0 & \text{no externalities} \\ >0 & \text{ie "walking by the garden"} \end{cases}$

FOCs for equilibrium:

$\frac{\partial v}{\partial x} = p$ utility maximization

$\frac{\partial c}{\partial y} = p$ profit maximization

FOCs for efficiency (given we want to $\max_{x,y:x=y} \{v(x;y) - c(y)\}$)

$$(x): \frac{\partial v}{\partial x} + \frac{\partial v}{\partial y} \underbrace{\frac{\partial y}{\partial x}}_{=1} - \frac{\partial c}{\partial y} \underbrace{\frac{\partial y}{\partial x}}_{=1} = 0$$

since $x = y$

$$(y): \frac{\partial v}{\partial x}\frac{\partial x}{\partial y} + \frac{\partial v}{\partial y} - \frac{\partial c}{\partial y} = 0$$

The social marginal cost (benefit) of production is $\frac{\partial v}{\partial y} - \frac{\partial c}{\partial y}$

- If $\frac{\partial v}{\partial y} < 0$, then too much will be produced
- If $\frac{\partial v}{\partial y} > 0$, then too little will be produced

The externalities here were real, because they entered directly into the utility function

The gap between efficient x and equilibrium x is the Pigovian motivation for government intervention.

Economists say that real externalities are a problem, because the price system cannot adequately handle them. If we were to price the externalities as a separate good, the price system could handle them, and efficiency would result.

Relationship between real externalities and income externalities.

Originally, economists believed that pecuniary externalities were not problematic because they go through the price system.

Ostroy: Pecuniary externalities are benign when they are not the result of any single individual's behavior. When a single individual can affect prices (inflicting pecuniary externalities on others), there are problems.

Public Goods		Private Goods
$z_1 = z_2 = z$	Mkt Clearing	$z_1 + z_2 = 0$

With public goods, there is non-rivalrous consumption: your consumption does not interfere with mine. ie national defense.

Of course, we can have $v_1(z) \neq v_2(z)$

There is a connection between public goods and positive externalities. Free-rider problem.

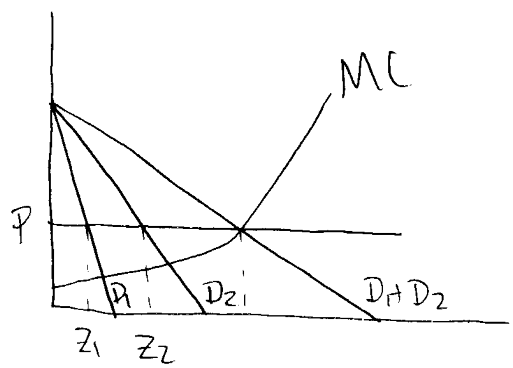
In the public goods situations, large numbers is actually a bad thing: large numbers magnifies the free-rider problem.

Lindahl equilibrium: P_1, P_2 - individualized prices

Standard private-good equilibrium: p - single price for a commodity.

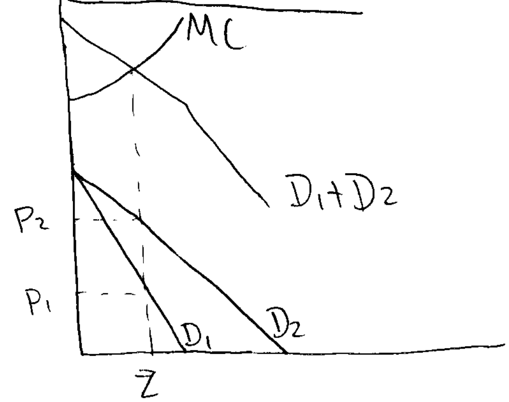
The Lindahl equilibrium concept is related to the idea of idealized prices.

Private Goods



$$\max\{v_1(z_1)+v_2(z_2)-c(z_1+z_2)\}$$

Public Goods



$$\max\{v_1(z)+v_2(z)-c(z)\}$$