1.a) $x_i^* \in \xi_i(p, w_i(p))$ $\qquad$ $y_j^* \in \eta_j(p)$

$px_i^* = w_i(p)$ $\qquad$ $py_j^* = \sup\ pY_j$

$x_i > x_i^* \Rightarrow px_i > px_i^*$ $\qquad$ $py_j^* \geqq py_j$

$$\Sigma p x_i - \Sigma p y_j = p[\Sigma x_i - \Sigma y_j] > p[\Sigma x_i^* - \Sigma y_j^*] = p \cdot \omega$$

$\Rightarrow [(x_i), (y_j)]$ is not feasible since $x - y > \omega$.

$$\Sigma w_i(p) = w(p) = p \cdot \omega + \Sigma_j \pi_j(p)$$

$$\begin{tikzcd} \xi & E \arrow[l] \arrow[r] \arrow[dl] & \varepsilon'' \\ \varepsilon' & & \end{tikzcd}$$

PTE }
Coase Theorem } alternative arguments for efficiency of competitive markets.

Without competition there will be waste.
└ Rubinstein's bargaining model is a possible counterexample.

t	1	2	3	...	T	...
$S = ($	I ,	II ,	I ,	II	...	)
size of pie:	1	δ	δ^2	δ^3	...	

["Nash program" - Can we take cooperative equilibria (efficient) and support them as NE in a non-cooperative game?]

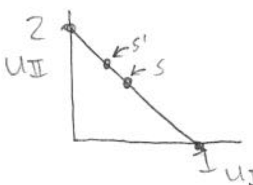
$(u_I(S), u_{II}(S))$ - SGPNE payoffs

$u_I(S) + u_{II}(S) = 1$

$\approx 1/2 + 1/2 = 1$

$s' = (I, II, II, I, II, II, I, II, II, \ldots)$

$u_I(s') + u_{II}(s') = 1$



can trace out entire horizon by varying the S vectors. This is an analog of the 2nd theorem of welfare economics.

Want to criticize this as "game-taking behavior."

$MP_i^t(S)$ $\qquad$ $i \in \{I, II\}$

$$= \begin{cases} u_i(S) - u_i(S_{-t}, S_t \neq i) & \text{if } S_t = i \\ 0 & \text{otherwise} \end{cases}$$

Claim: $u_i(S) = \sum_{t=1}^{\infty} MP_i^t(S)$.

Games of length T:

$S = (\mathrm{I}, \mathrm{II}, \ldots, \mathrm{I} \vee \mathrm{II})$

$t = 1, 2, \ldots, t$

Externality $v_i(z_i, z_j), j \neq i$

Public good $v_i(z)$ (will have the free-rider problem)

Pecuniary vs real externalities

[the kind that individuals create is a problem

With respect to individual behavior, pecuniary and real externalities are "the same."

There is a beautiful pricing duality with respect to public goods.

Both externalities and public goods have notions of "local" and "global".