2002 MT Q2

$v(1,2,3) = 1$

$v(i,j) = \alpha = 1 \geq 2/3 \quad \forall i,j$

$v(i) = 0$

$v(\emptyset) = 0$

convexification arises from the indivisibility of labor (fractional matching also convexifies)

LP

$$\sum_{T \in I} v(T)\, x(T)$$

st $\displaystyle\sum_{T: i \in T} x(T) \leq 1$

in assign. model:

(P) $\displaystyle \max \sum_{b,s} V(b,s)\, x(b,s)$

$C: \displaystyle\sum_i \sum_z z\, x_i(z) \leq 0$ ← commodity constraint

$I: \displaystyle\sum_z x_i(z) \leq r_i$ ← individual constraint.

(D) $v(b,s) \leq q_b + q_s$

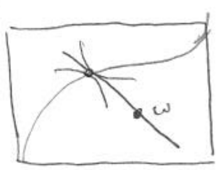
$x(b,s) > 0 \Rightarrow v(b,s) = q_b + q_s$

2004 MT Q4

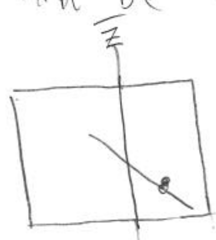
Price-taking can be viewed as a mechanism in a small economy

↳ In a large economy, it is "almost" Nash to play "price-taking"!

non-QL



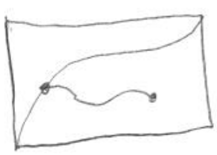
QL



begin with ω at t=0. Do not consume until t=T

suppose I have the following mechanism: Can be creative.

a)



b) The only possible endpoints are when $z = \bar{z}$

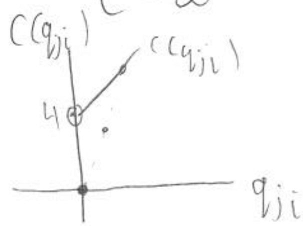
2004 F comp Q5

It is widely thought that perfect competition drives toward Linear pricing.

$j = 1, 2$ $\qquad c(q_{ji}) = \begin{cases} 0 & q_{ji} = 0 \\ q_{ji} + 4 & q_{ji} > 0 \end{cases}$ $\qquad q_{ji} \equiv$ quant j delivers to i.

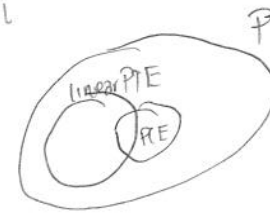
$i = 1, 2.$

$v(q_i) = \begin{cases} 10 q_i & 0 \le q_i \le 1 \\ -\infty & \text{else} \end{cases}$

a) 

Suppose $p = 1 \Rightarrow q_{ji}^{\text{supplied}} = 0$

but $q_{ji}^{\text{demanded}} = 1$



b) $V_I(0) = 10 + 10 - (4+1) - (4+1) = 10$

$V_{I \setminus (i)} = 10 - (4+1) = 5$

$V_{I \setminus (j)} = 10 + 10 - (4+1) - (4+1) = 10$

$MP_j = 0$ $\qquad \sum MP_i + \sum MP_j = 10 \Rightarrow$ full appropriation.

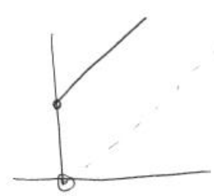
$MP_i = 5$ $\qquad$ Yes, unless $n = 1$.

c) Entry fee and user fee. In this case,

$\text{Entry fee} = 4$, $\text{user fee} = 1$

$\pi_j = 4 + 1 - (4+1) = 0 = MP_j$.

d) $c(q_j) = \begin{cases} 4 & q_j = 0 \\ q_j + 4 & q_j > 0 \end{cases}$

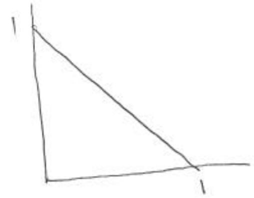


$\left(\frac{4}{N}, 1\right) \xrightarrow{N \to \infty} 0$

convexifying effect

price-taking equilibrium sort of exists in the limit.

2003 Fall Q 6



$c \in [0, 1]$ no fixed costs.
$MC = AC = c$. c unknown.
$D = 1 - p$

Story: monopoly reports c'. Government implements a

a) $1 - c' = q(c')$

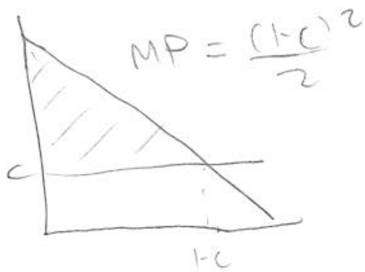
b) $\pi_M(c'; c) = q(c')c' - q(c')c$

True c such that it is incentive compatible?

$\pi_M(c'; c) = [1-c']c' - (1-c')c$

$\frac{\partial \pi}{\partial c'} = 0 \Rightarrow 1 - 2c' + c = 0 \Rightarrow c' = \frac{1+c}{2}$

$c' = c$ iff $c = 1$

c) 

Report c and I will give you $\frac{(1-c)^2}{2} + c(1-c)$

$\pi = \frac{(1-c')^2}{2} + c'(1-c') - (1-c')c = \frac{1-2c'+c'^2}{2} + c' - c'^2 - c + cc'$

$\frac{\partial \pi}{\partial c'} = 0 \Rightarrow -1 + c' + 1 - 2c' + c = 0 \Rightarrow c' = c \;\forall c \in [0, 1]$.