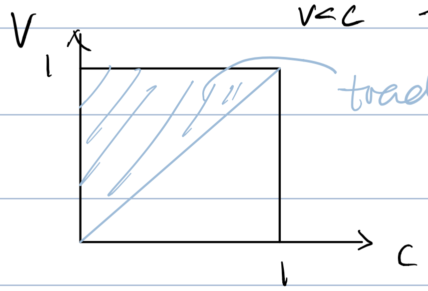
Biolatenal Trade under asymmetric information
(incomplete / private)

real world: only know your value ⇒ ? outcome.
↳ barrier to effienciency.
decision on uncentainy.

model: who knows why / how
→ single buyer
single seller
→ nature draw the valuation of the buyers, seller (independently) no corrilation.
according to distribution given by distribution function
$F(v)$ and $G(c) \Rightarrow \mathbb{P}[\tilde{c} \le c]$ (random)
↳ $= \mathbb{P}[\tilde{v} \le v]$ (possiblity of the buyer to give)
→ nature privately informed both trader about the evaluation. resperant

Bench Mark full info case
outcome.
(c, v) ← know this, then know what happens.

$v > c$ trade occurs, p between c, v.
$v = 0$ radom
$v < c$ trade never occurs.



trade should occur.

Δ Split-the-difference game.

A) $v < c$ go home
$v > c$ ① machinicine desiginers set $p = \frac{v+c}{2}$ ⇒ split equally.
(First best). ② buyer / seller each get to say yes or no

Outcome: if (y, y), trade occurs at p.

otherwise, go home

dominant strategy: say yes. $\Rightarrow$ PO occurs

B) mechanism designer does not know c, v.

↳ split-the-difference mechanism.

buyer / seller independently report valuation v', c'

if $v' > c' \Rightarrow p = \frac{v'+c'}{2}$.

take p from p from buyer, give to the seller

if $v' < c' \Rightarrow$ go home

(Propose) If the seller / buyers always tell the truth.

then, the split the difference mechanism is redo the first best outcomes. ⇐ Happen?

⇓

No!!!

Reality: E.g.: buyer 20 100 $\Rightarrow (\frac{1}{2}, \frac{1}{2})$.

seller 0 80 $\Rightarrow (\frac{1}{2}, \frac{1}{2})$.

(if truth) $\Rightarrow$ buyer reports $\Rightarrow$ 20 100

	20	100
reports 80	0, –	1, 90
0	1, 10	1, 50

⇐ probably / price in trade.

For (buyer 100, seller 0)

A. If the buyer of evaluation 100 expect that the seller to always tell the truth.

and report $v = 100$ surplus: $\frac{1}{2}(100-50) + \frac{1}{2}(100-90) = 30$.

B. If reports $v = 20$.

?? seller surplus ?

surplus $\frac{1}{2}(100-(10)) = 90$ ← trade ~~of~~ ⇒ not trade with S2.

the price to trade ↓ ⇒ ↑ surplus.

Continuous Distribution of Evaluation

F and $G \sim [0,1]$

$F(v) = v \quad G(c) = c$

Expected Surplus of a buyer of valuation v when the report v', and the seller always tell the truth.

suppose c random.

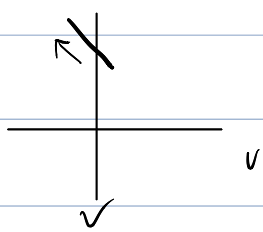
↳ $v < c$ surplus $= 0$

$v > c$

$$\int_0^{v'} \left(v - \frac{v'+c}{2}\right) \cdot g(c)\,dc$$

optimal : $\frac{d}{dv'}\left(\int_0^{v'} \left(v - \frac{v'+c}{2}\right) \cdot g(c)\,dc\right)$

$$= \left(v - \frac{v'+v'}{2}\right) g(v') - \frac{1}{2} \underbrace{\int_0^{v'} g(c)\,dc}_{G(v')}$$



if $v' = v$ $= 0 - \frac{1}{2}G(v) < 0$ for all $v > 0$.

↳ Truth-telling is not optimal to any $v > 0$.

better to lower ⇒ optimal to understate the valuation