Recall:

- Creditor (C), Debtor (D)
- $\alpha = 1 \Rightarrow Pr[\text{Creditor has all bargaining power}] = \alpha = 1$
- Case II: $T + R_1 < R_2$
  - amount sold: $1 - \frac{T+R_1}{R_2}$
  - left in place: $\frac{T+R_1}{R_2}$
  - creditor gets $T + R_1 + L\left(1 - \frac{T+R_1}{R_2}\right)$
  - debtor gets: $\left(\frac{T+R_1}{R_2}\right) R_2 = T + R_1$

Basic good

- price in contract P_0
- gov't benefits of B_0
- cost to principal C_0

2 players: G(overnment)
M(anager)

actual good

- Benefit: $B_0 - b(e) + \beta(i)$
- Cost: $C_0 - c(e)$

e - cuts cost and quality
i - pure quality innovation

$t=1$ — $t=2$ — $t=3$

- $t=1$: contract; ownership structure determined
- $t=2$: M chooses e, i.
- $t=3$: renegotiation; payoffs realized

- If renegotiation breaks down, then get basic good.

- $c' - b' > 0 \Rightarrow$ ◦ quality reduction from cost innovation does not offset the cost reduction
- $\beta' > 0$
  - ◦ cost increase from quality innovation does not offset the quality increase.

First best:

$$\max_{e,i} \{ B_0 - b(e) + \beta(i) - (C_0 - c(e)) - e - i \}$$

$$= B_0 - C_0 + \max_{e,i} \{ -b(e) + c(e) + \beta(i) - e - i \}$$

FOCs:

(e): $-b'(e^{FB}) + c'(e^{FB}) = 1$

(i): $\beta'(i^{FB}) = 1$

Under private ownership (M owns prison):

(e): cost innovation - implemented w/no renegotiation

(i): quality innovation - not implemented w/no renegotiation

assume 50/50 Nash Bargaining

- $u_G = B_0 - P_0 - b(e) + \frac{1}{2}\beta(i)$
- $u_M = P_0 - C_0 + c(e) + \frac{1}{2}\beta(i) - e - i$

$\Rightarrow c'(e^P) = 1 < 1 + \overbrace{b'(e)}^{>0} = c'(e^{FB}) \Rightarrow$ $e^P < e^{FB}$ if c convex; $e^P > e^{FB}$ if c concave

$\frac{1}{2}\beta'(i^P) = 1 \Rightarrow \beta'(i^P) = 2 > 1 = \beta'(i^{FB}) \Rightarrow i^P < i^{FB}$

Surplus under management is

$$S_P = B_0 - C_0 - b(e^P) + c(e^P) + \beta(i^P) - e^P - i^P$$

Under Government ownership

$$U_G = B_0 - P_0$$

$$U_M = P_0 - C_0 - e - i$$

Here, both are implemented

<u>Renegotiation:</u>

$$U_G = B_0 - P_0 + (1 - \tfrac{\lambda}{2})[c(e) + \beta(i) - b(e)]$$

$$U_M = P_0 - C_0 + \tfrac{\lambda}{2}[c(e) + \beta(i) - b(e)] - e - i$$

<u>FOCs:</u> (Suppose $\lambda = 1$)

(e): $\frac{\lambda}{2}\left(c'(e^G) - b'(e^G)\right) = 1$

$$\Rightarrow c'(e^G) = b'(e^G) + \frac{2}{\lambda} = b'(e^G) + 2 > b'(e) + 1 = c'(e^*)$$

$\Rightarrow e^G > e^{FB}$ if convex

$e^G < e^{FB}$ if concav

(i): $\frac{\lambda}{2}\beta'(i^G) = 1 \Rightarrow \beta'(i^G) = \frac{2}{\lambda} = 2 \Rightarrow i^G = i^P < i^{FB}$

Surplus:

$$S_G = B_0 - C_0 - b(e^G) + c(e^G) + \beta(i^G) - e^G - i^G$$

$S^P > S^G \Rightarrow$ Privatize

- If c convex, $e^G > e^{FB} > e^P$ and $i^G = i^P < i^{FB}$
- c concave, $e^G < e^{FB} < e^G$

- Smoke dope
- Garbage collection: claim: b(e) low
- weapons procurement
- foreign policy
- schools
- entire health care system: b(e) high

Two issues:

- competition amongst the M(anagers)
- role of government (patronage)