

Recall:

- Creditor (C), Debtor (D)
- $\alpha = 1 \Rightarrow Pr$  [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

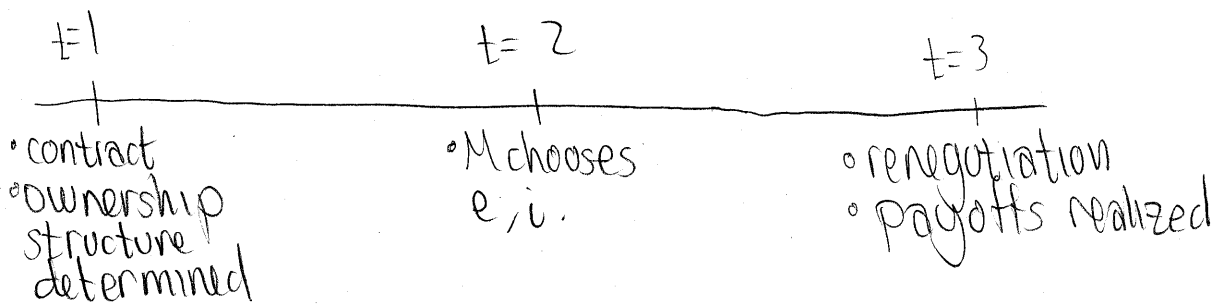
- price in contract  $P_0$
- gov't benefits of  $B_0$
- cost to principal  $C_0$

2 players: G (Government)  
M (manager)

Actual good

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

$e$  - cuts cost and quality  
 $i$  - pure quality innovation



- 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:

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

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

$$\circ U_G = B_0 - P_0 - b(e) + \frac{1}{2} \beta(i)$$

$$\circ U_M = P_0 - C_0 + c(e) + \frac{1}{2} \beta(i) - e - i$$

$$\Rightarrow c'(e^P) = 1 < 1 + \overbrace{b'(e)}^{\geq 0} = c'(e^{FB}) \Rightarrow \begin{aligned} e^P < e^{FB} & \text{ if } c \text{ convex} \\ e^P > e^{FB} & \text{ if } c \text{ concave} \end{aligned}$$

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

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

Bargaining:

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

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

FOCs: (Suppose  $\lambda=1$ )

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

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

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

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

Surplus:

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

$$S^P > S^G \Rightarrow \text{Privatize}$$

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

- 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(angers)
- role of government (patronage)