



If move simultaneously get Cournot solution:

$$q_1^c = q_2^c = \frac{1}{3}, \quad \pi^1 = \pi^2 = \frac{1}{9}$$

This is "accommodated entry."

Suppose there is a fixed cost of entry  $f < \frac{1}{16}$

$$\pi^2 = \begin{cases} q_2 (1 - q_1 - q_2) - f & \text{if } q_2 > 0 \\ 0 & \text{if } q_2 = 0 \end{cases}$$

Firm 1 can deter entry if choose  $q_1 \geq q_1^d$  where

$$f = \max_{q_2} q_2 [1 - q_1^d - q_2] = \frac{1 - q_1^d}{2} \left[ 1 - q_1^d - \frac{1 - q_1^d}{2} \right]$$

$$= \left( \frac{1 - q_1^d}{2} \right)^2 \Rightarrow \frac{1 - q_1^d}{2} = \sqrt{f} \Rightarrow q_1^d = 1 - 2\sqrt{f}$$

If  $f = \frac{1}{16} - \varepsilon$ , it is worth deterring by setting

$$q_1 = \frac{1}{2} + \varepsilon'$$

"Good commitment strategies"

- Old: commit to a low price. This is not a convincing story
- Newer:
  - current price acts as a signal (Spence)
  - capacity constraints act as commitment device (Dixit)

Commitment is important, because it is necessary to justify firm 1 not playing on its reaction function.



Suppose  $\frac{\partial \pi^2}{\partial x_1} \frac{dx_1^*}{dk_1} > 0$  (ie investing more increases firm 2's profit.)

• Then you will underinvest to deter entry.

Entry accommodation: Still want to choose  $K_1$  optimally

$$\frac{d\pi^1}{dk_1} = \underbrace{\frac{\partial \pi^1}{\partial K_1}}_{\text{myopic effect}} + \underbrace{\frac{\partial \pi^1}{\partial x_2} \frac{dx_2^*}{dk_1}}_{\text{strategic effect}}$$

(ie  $\max \pi^1(K_1, x_1^*(K_1), x_2^*(K_1))$ )

By symmetry,  $\text{sgn}\left(\frac{\partial \pi^1}{\partial x_2}\right) = \text{sgn}\left(\frac{\partial \pi^2}{\partial x_1}\right)$

$$\Rightarrow \text{sgn}\left(\frac{\partial \pi^1}{\partial x_2} \frac{dx_2^*}{dk_1}\right) = \text{sgn}\left(\frac{\partial \pi^2}{\partial x_1} \frac{dx_2^*}{dx_1} \frac{dx_1^*}{dk_1}\right)$$

• The sign will be the same here as in previous section if strategic substitutes. ( $\frac{dx_2^*}{dx_1} < 0$ )

Under strategic complements and "tough investment,"  
you have to be careful, because

1] If want to deter entry, you want to overinvest

2] If want to accommodate, you want to underinvest

Contracts as strategic investments

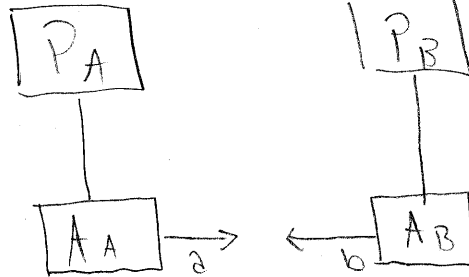
Suppose principal says "If you do not choose  $q_1 = q_1^m = q_1^s$ , then I will kill you."

• This can act as a commitment device

# "Competing Vertical Structures"

• To prevent perfect renegotiation under asymmetric information

Principals



Agents

