Static and dynamic games, preventing the entry and predation

Industrial organization – lecture 2

Cournot model

2 firms with

- the same marginal cost $c_1 = c_2 = c$
- zero fixed cost $F_1 = F_2 = 0$

Inverse demand function: $p = A - (q_1 + q_2)$

What is the Cournot equilibrium?
What is the profit?
What happens if firms have positive fixed costs?

Stackelberg model

Pepall et al. (2010, p. 193)

2 firms:

- firm 1 is the leader
- firm 2 is the follower

Both firms have

- the same marginal cost $c_1 = c_2 = c$
- zero fixed cost $F_1 = F_2 = 0$

Inverse demand function: $p = A - (q_1 + q_2)$

What is the Stackelberg equilibrium?
What is the profit?
What is the reason for the dominance of the leader?
What happens if firms have positive fixed costs?

Limit output and limit price models

Pepall et al. (2010, pp. 193–195)

We assume that the follower has one-time sunk entry costs F.

What quantity q_L^d would deter entry?

When does the leader choose the quantity q_L^d?

Capacity expansion as a credible entry-deterring commitment

Pepall et al. (2010, pp. 195–202)

Dixit, A. (1980). The role of investment in entry-deterrence. *The economic journal*, 90(357), 95–106.

A dynamic two-stage game between two firms:

1. The incumbent chooses the capacity level $\overline{K_1}$ at a cost $r\overline{K_1}$.
2. Cournot game:

   The incumbent's costs are

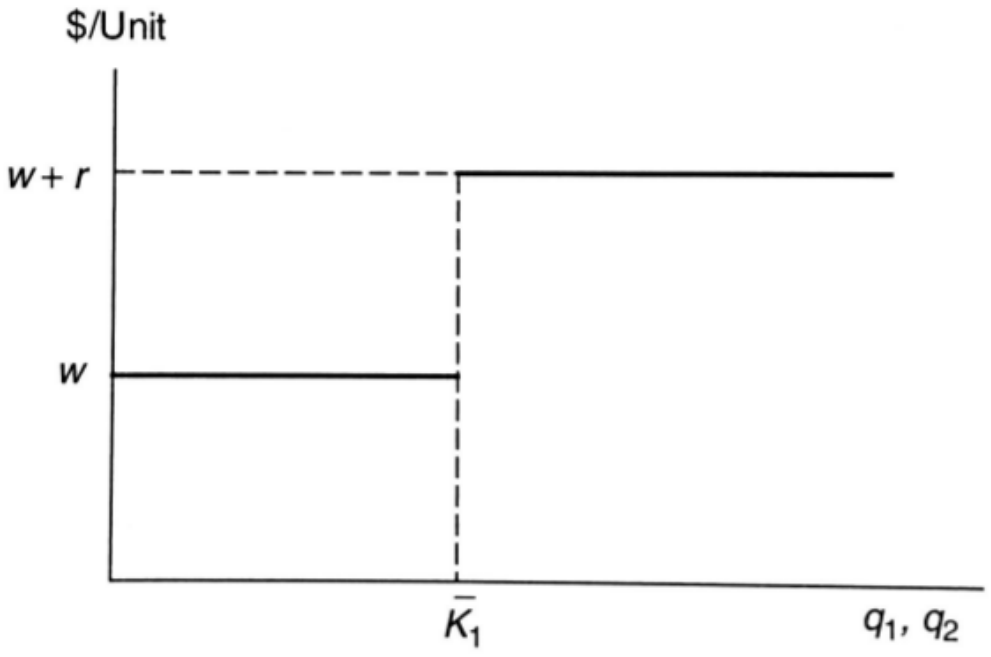
$$c_1(q_1) = \begin{cases} wq_1 + r\overline{K_1} + F_1 & \text{for } q_1 \leq \overline{K_1} \\ (w+r)q_1 + F_1 & \text{for } q_1 > \overline{K_1} \end{cases}$$

   The entrant's costs are

$$c_2(q_2) = (w+r)q_2 + F_2$$

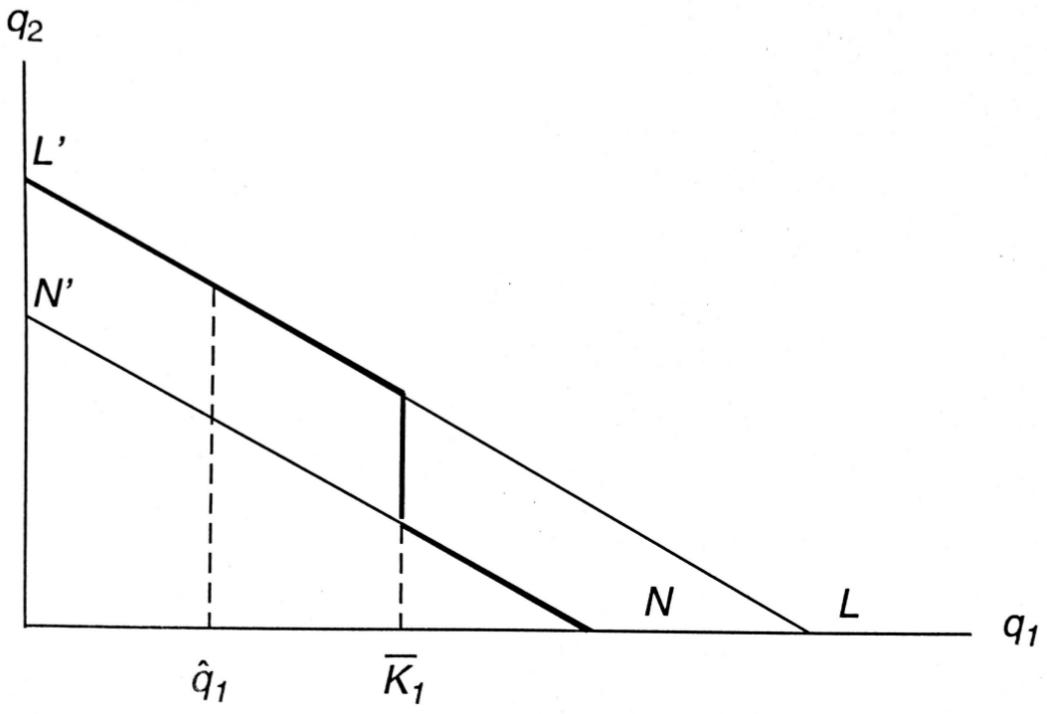
The effect of previously acquired capacity

Pepall et al. (2010, p. 197)



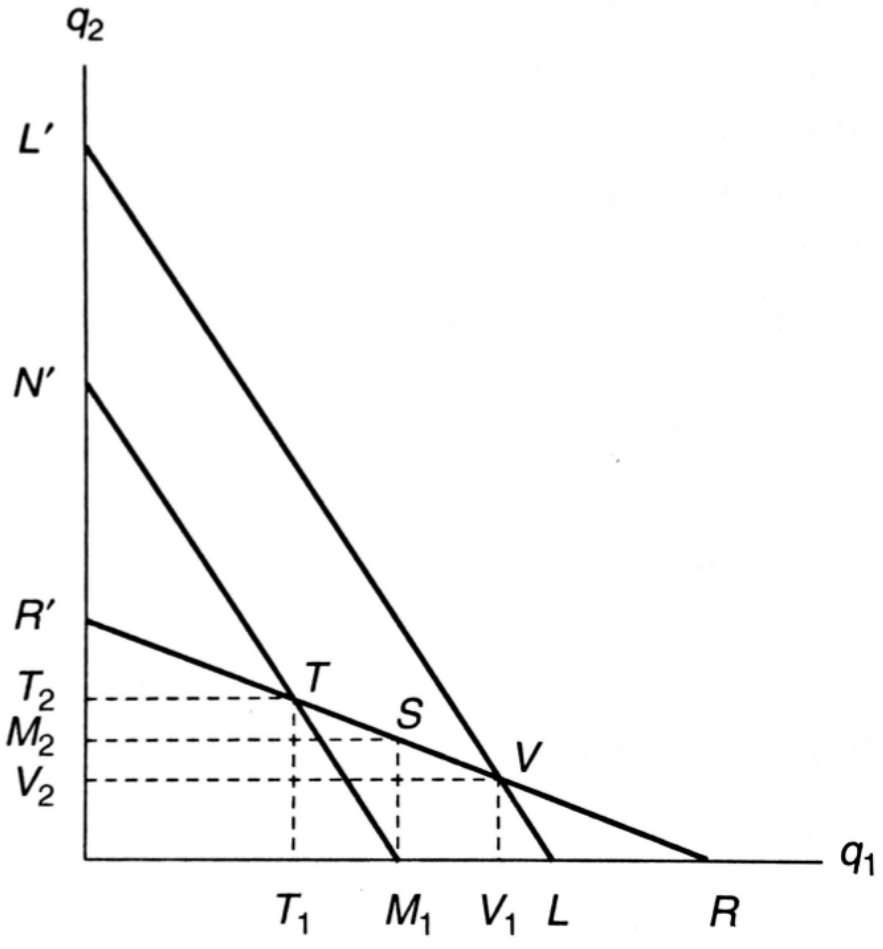
The incumbent's best response in stage 2

Pepall et al. (2010, p. 197)



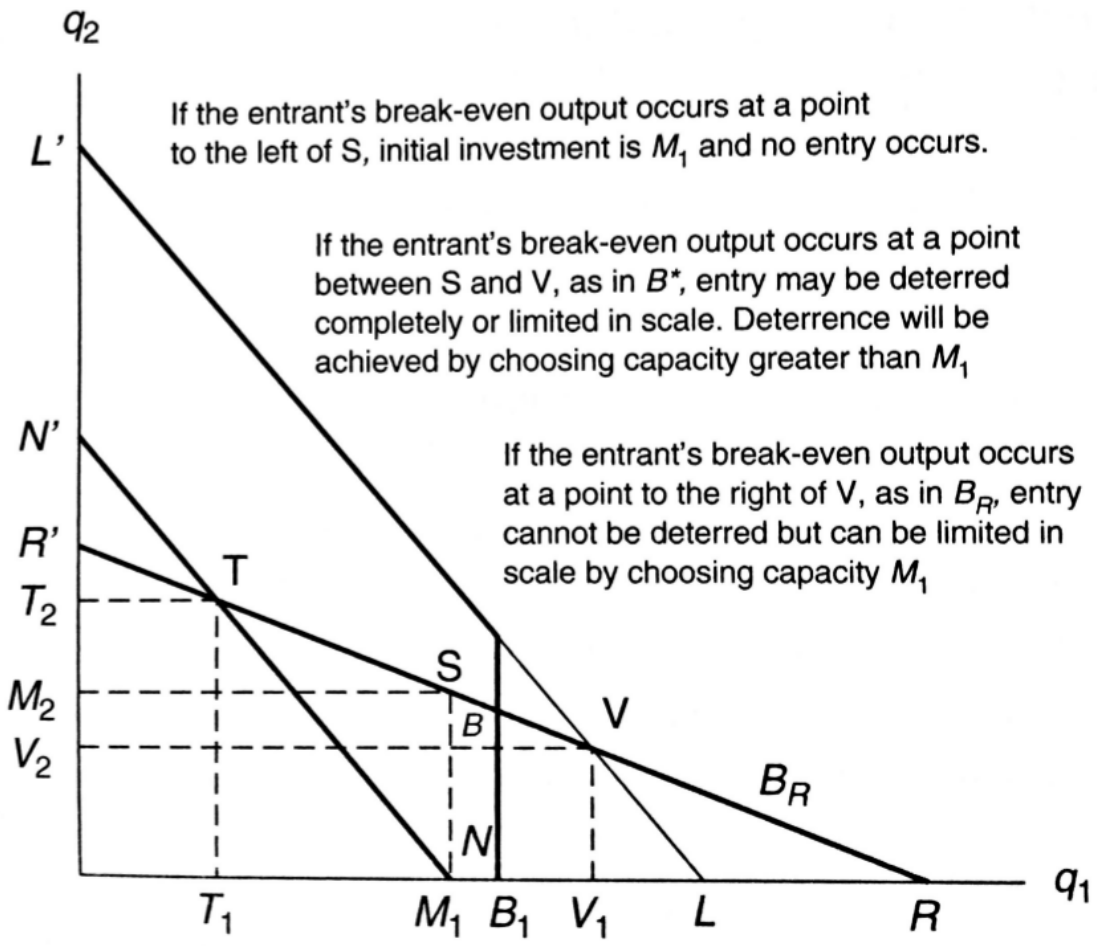
The rational bounds on the incumbent's choice of $\overline{K_1}$

Pepall et al. (2010, p. 199)



Possible locations of the entrant's break-even point

Pepall et al. (2010, p. 200)



Evidence on Predatory Capacity Expansion

Pepall et al. (2010, pp. 203–204)

- Alcoa case – increased capacity 8x between 1912 and 1934
- Weiman and Levin (1994) – preemptive investment in SBT
- Safeway in Edmonton in 1960s and 1970s
- DuPontand production of titanium dioxide
- Take-or-pay contract – a way to commit to a quantity

Asymmetric information and limit pricing

Pepall et al. (2010, pp. 206–211)

Milgrom, P., Roberts, J. (1982). Predation, reputation, and entry deterrence. *Journal of economic theory*, 27(2), 280-312.

Microhard may be high-cost or low-cost – two period game:

1. Microhard M chooses high or low price
2. Newvel N may enter or stay out