Firms' Strategies and Markets Entry

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Introduction

- Entrant's strategy: "Judo economics"

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- Incumbent's strategies vis-à-vis entry
  - Entry deterred
  - Entry Accomodated

Entrant's strategy: Judo Economics

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- *Rule-based* judo strategy

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Value-based judo strategy

1. Softsoap on the liquid soap market
2. Red Bull on the energy drinks market

Softsoap Case

- **1970s** — Minnetonka Corporation was facing slowing sales: $25 million.
- **1977** — US bar soap industry had sales of $1.5 billion. Industry dominated by 4 large firms "Armour Dial, P&G, Lever Brothers, Colgate Palmolive".
- **1980** — Minnetonka created a new product, a liquid soap. Minnetonka launched Softsoap at $1,49. Spent $7 million on advertising. Sales of Softsoap reached $39 million, i.e. a majority of market share.
- **1983** — P&G released a liquid soap product under the name "Rejoice". With aggressive strategies, they achieved 30% market share.
- **1985** — Minnetonka still market leader with Softsoap in a $100 million market.
- **1987** — Minnetonka sold Softsoap to Colgate-Palmolive for $61 million.

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Red Bull Case

1987 — Founded in Austria by Dietrich Mateschitz. Red Bull began with sales to discos where alcohol was prohibited.

1997 — Sold for a decade before entering the US. market. Carbonated soft drinks largest beverage market in the US (>$50 billion)
US energy drinks market were not interesting yet for large players ($75 million)

2001 — Coke launch its energy drink KMX with a marketing strategy based on secrecy and mystery.

2001 — Rumors of being made of bulls' testicules. 3 swedes died (because of mix with alcool). Red Bull now looks dangerous. Red Bull had grown its sales 118% over the past year (about 2/3 of the energy drink market), while overall soft drinks grew by only 0.6% (total US energy drink market size: $275 million)

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2. The incumbent observes (K_E, p_E) and adapts its price denoted p_I.

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- E gets 0 and I is a monopolist.
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- I chooses the price that maximizes its profit i.e.: p_{max} if $p_E \leq \frac{p_{max}(D-K_E)}{D}$ and p_E otherwise.

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- If $c_E = 0$, i.e; the entrant is as efficient as the incumbent, $K_E^* = \frac{D}{2}$, the two firms share the market and the price is $\frac{p_{max}}{2}$.

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A less efficient entrant can enter the market and realize a positive profit when facing an incumbent more efficient and with more capacity. The entrant chooses a relatively low capacity to make it very costly for the incumbent to go into a price war.

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- With personnalized prices, I would sell at $p_E - \epsilon$ at population K_E but at P_{max} to other consumers and entry would be always deterred.

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- Two strategies: Entry deterrence and Accomodation.

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  - Sign of direct effects :advertising informative ($\frac{\partial \pi_2}{\partial K_1} > 0$) or persuasive ($\frac{\partial \pi_2}{\partial K_1} < 0$), investment in capacity ($\frac{\partial \pi_2}{\partial K_1} = 0$)

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  - Strategic effect : given K_1 it is a commitment for the incumbent to be tough or weak in its decision of $\sigma_1(K_1)$
  - If $\frac{d\pi_2}{dK_1} < 0$, investment makes the incumbent tough: "top dog"; If $\frac{d\pi_2}{dK_1} > 0$, investment makes the incumbent soft: "lean and hungry look".

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  - The strategic effect:

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Table: TAXONOMY

Strategic substitutes	(D) Top Dog	(D) Lean & Hungry
$\frac{d\sigma_2^*}{d\sigma_1} < 0$	(A) Top Dog	(A) Lean & Hungry
Strategic complements	(D) Top Dog	(D) Lean & Hungry
$\frac{d\sigma_2^*}{d\sigma_1} > 0$	(A) Puppy Dog	(A) Fat Cat

- Top Dog: Overinvestment;
- Lean & Hungry: Underinvestment;
- Puppy Dog: Overinvestment for (D) and Underinvestment for (A);
- Fat Cat: Underinvestment for (D) and Overinvestment for (A).

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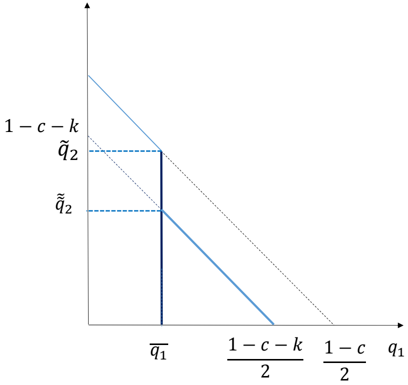

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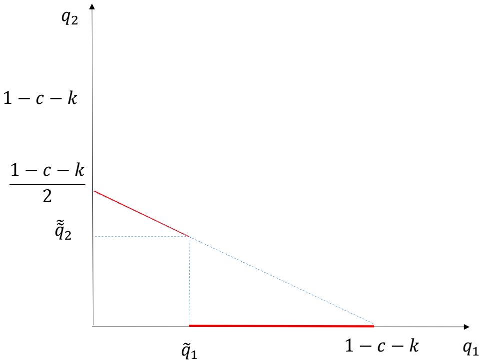
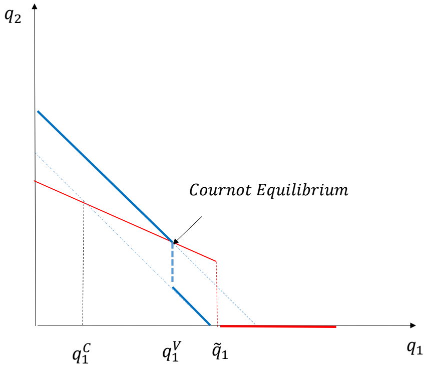


4 cases to consider

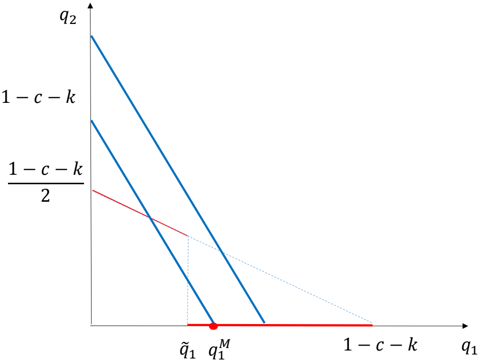
1. Inevitable entry: $\tilde{q}_1 > q_1^V \Rightarrow e < e^- = \frac{1}{9}(1-c-2k)^2$. q_1^V corresponds to a Nash equilibrium between the entrant 2 and an unconstrained firm 1.

- if $\bar{q}_1 = q_1^V \Rightarrow \pi_1 = \frac{1}{9}(1-c+k)(1-c-2k)$
- if $\bar{q}_1 = q_1^C \Rightarrow \pi_1^C = \frac{1}{9}(1-c-k)^2$.



4 cases to consider

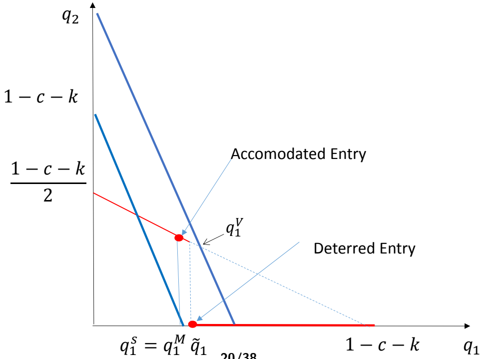
2. Blockaded entry
   $q_1^M = \frac{1}{2}(1-c-k)$ and $q_1^M > \tilde{q}_1 \Rightarrow e > e^+ = \frac{1}{16}(1-c-k)^2$
   - Then $\bar{q}_1 = q_1^M \Rightarrow \pi_1^M = \frac{1}{4}(1-c-k)^2$



4 cases to consider

If $q_1^M < \tilde{q}_1 < q_1^V \Leftrightarrow e^- < e < e^+$

3. Deterred entry $\bar{q}_1 = \tilde{q}_1$ — Commitment from 1 to be on its highest reaction function $\Rightarrow$ credible that $q_1 = \tilde{q}_1$ and no entry.
4. Accomodated entry
   - $\bar{q}_1 = q_1^S = \frac{1}{2}(1 - c - k) = q_1^M < \tilde{q}_1$. In the competition stage, 1 is on the high reaction function only if $q_1 < q_1^M < q_1^V$.



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- To deter entry, the incumbent must install a larger capacity $\tilde{q}_1$ and its profit is:

$$\pi_1^D = (1 - c - k - \tilde{q}_1)\tilde{q}_1 = 2\sqrt{e}(1 - c - k - 2\sqrt{e})$$

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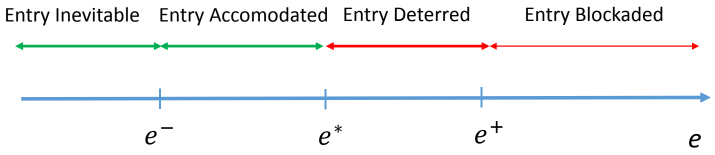
It is possible to show that $\pi_1^D > \pi_1^A$ if $e > e^* = \frac{(2-\sqrt{2})^2(1-c-k)^2}{64}$.



Remember

This investment capacity model illustrates the TOP DOG strategy for Deterrence:

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- Deterrence $\rightarrow q_1 = \tilde{q}_1$ which corresponds to a capacity expansion above the monopoly level.
- Accomodation $\rightarrow q_1^S = q_1^M$ which corresponds to a capacity expansion above the competition level ($q_1^C = \frac{1-c-k}{3}$).

Lean and Hungry look: An innovation model

Assumptions

- **Period 1**: Firm 1 can make an investment K_1 to reduce its marginal cost $c(K_1)$ and obtain the corresponding gross profit $\pi^M(c(K_1))$ which strictly increases in K_1 in period 1.

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  - To innovate with probability ρ_i costs $\rho_i^2/2$.

Innovation is drastic and leads to a marginal cost c.

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Table: Gains in period2

Innovation probabilities	ρ_2	$(1-\rho_2)$
ρ_1	$(0,0)$	$(\pi^M(c),0)$
$(1-\rho_1)$	$(0,\pi^M(c))$	$(\pi^M(c(K_1)),0)$

Period 2: Firms 1 and 2 choose their $R\&D$ levels ρ_1 and ρ_2 to maximize their expected profit:

$$\begin{aligned}
\pi_1 &= \rho_1(1-\rho_2)\pi^M(c) + (1-\rho_1)(1-\rho_2)\pi^M(c(K_1)) - \rho_1^2/2, \\
\pi_2 &= \rho_2(1-\rho_1)\pi^M(c) - \rho_2^2/2
\end{aligned}$$

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FOCS are:

$$\begin{cases} (1-\rho_2^*)(\pi^M(c) - \pi^M(c(K_1)) = \rho_1^*, \\ (1-\rho_1^*)\pi^M(c) = \rho_2^* \end{cases}$$

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The equilibrium investments ρ_1^* and ρ_2^* that solve the above system are such that $\frac{\partial \rho_1^*}{\partial K_1} < 0$ and $\frac{\partial \rho_2^*}{\partial K_1} > 0$. FOC

Deterrence

$$\frac{d\pi_2(K_1, \rho_1^*, \rho_2^*)}{dK_1} = -\rho_2^* \pi^M(c) \frac{\partial \rho_1^*}{\partial K_1} > 0$$

The deterrence strategy consists in reducing K_1.

Accomodation

$$\begin{aligned}\frac{d\pi_1(K_1,\rho_1^*,\rho_2^*)}{dK_1} &= \frac{\pi_1(K_1,\rho_1^*,\rho_2^*)}{\partial K_1} - (\rho_1^*\pi^M(c) + (1-\rho_1^*)\pi^M(c(K_1))\frac{\partial \rho_2^*}{\partial K_1} \\ &< \frac{\pi_1(K_1,\rho_1^*,\rho_2^*)}{\partial K_1}\end{aligned}$$

where $\frac{\pi_1(K_1,\rho_1^*,\rho_2^*)}{\partial K_1} = (1-\rho_1^*)(1-\rho_2^*)\frac{\partial \pi^M(c(K_1))}{\partial K_1}$

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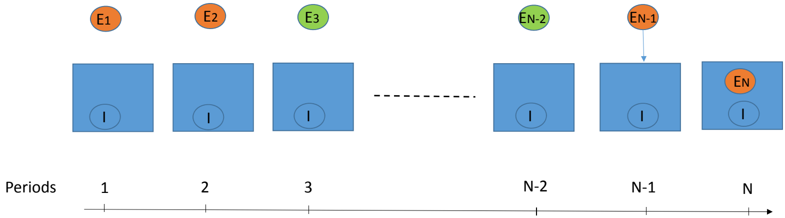
Why? $R\&D$ investments are strategic substitutes and the larger K_1 the higher $\pi^M(c(K_1))$ and therefore the lower the incumbent's incentive to invest in period 2 (Arrow replacement effect).

The chain store paradox (Selten, 1978)



- An incumbent firm I which owns stores in N markets.

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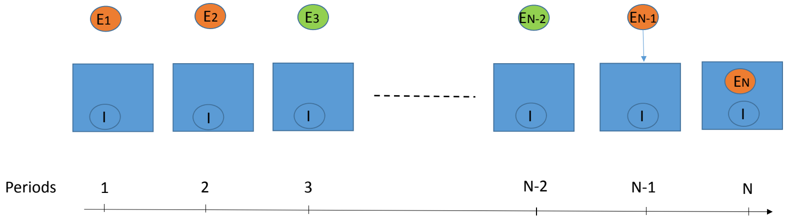

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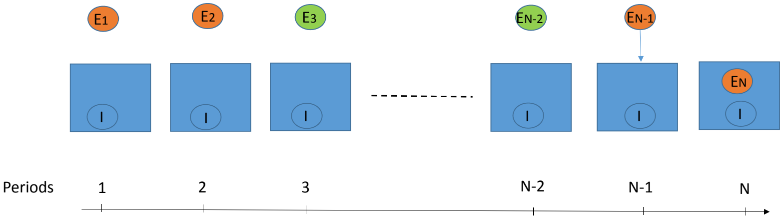

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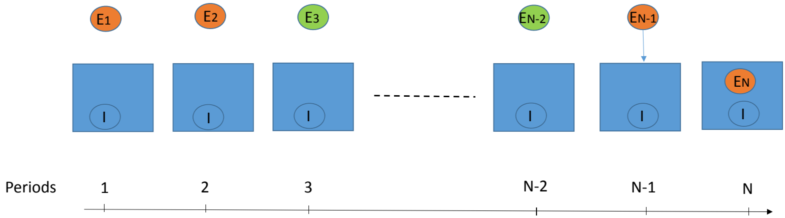

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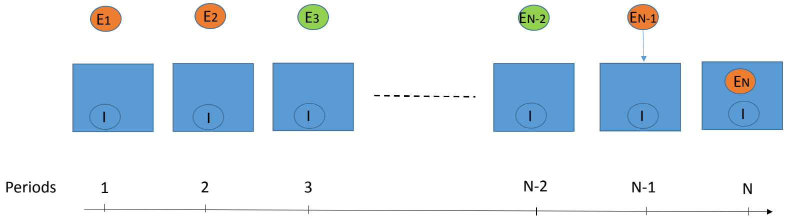

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  3. ...
  4. The last E_N enters or not on market N in period N.

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- Selten Paradox (1978): Incomplete information framework, i.e. I can be of type tough or weak with a probability => a reputation issue!!

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- If $p < \underline{p} = \frac{b}{b+1}$, a weak I gains 0. If $p \geq \underline{p} = \frac{b}{b+1}$, I gains a.

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In $t = 1$, a weak E_1 enters if $p < \underline{p} = \frac{b}{b+1}$ and stays out otherwise.

- If I is weak, he accomodates in $t = 1$, a weak or tough E_2 enters.
- If I is tough, he fights in $t = 1$, a weak E_2 stays out.

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  - Because fighting in $t=1$ always deters entry in $t=2$, a weak I always fights ($\beta=1$) in $t=1$ and earns the expected profit : $-1+\delta(1-q)a>0$

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  - In $t = 2$, still E_2 knows that a weak I accomodates and a tough I fights (last period) but he takes into account the revised probability that I is tough $p(tough/fight)$. A weak E_2 is indifferent between entering or not if: $-\frac{p}{p+\beta(1-p)} + (1 - \frac{p}{p+\beta(1-p)})b = 0$, i.e. if $\beta^* = \frac{p}{(1-p)b}$.

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  - A weak E_1 prefers to stay out if $-p\frac{(1+b)}{b}+(1-p\frac{(1+b)}{b})b<0$, i.e. if $p>(\frac{b}{1+b})^2$ and I gains a. Otherwise if $p<(\frac{b}{1+b})^2$, a weak E_1 enters and I thus gains $\beta^*(-1+\delta(1-q)a)>0$.
    A lower β would reduce I's gains and a higher β cannot block entry of E_2.

Conclusion

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The generalization to any N is possible

- Assuming that $N = 3$, we now find that E_1 enters if and only if $p < (\frac{b}{1+b})^3$ and so on for $N = T$ for $p < (\frac{b}{1+b})^T$.

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  - The European Court of Justice confirms the EC's prohibition of free freezers in 2003.

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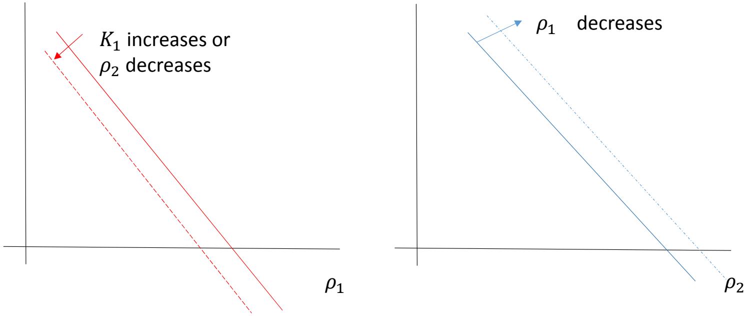
FOC $f(\rho_1, \rho_2, K_1) = 0$
$f_{\rho_1} < 0$

FOC $g(\rho_1, \rho_2, K_1) = 0$
$f_{\rho_2} < 0$



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Two events A and B respectively occur with probability $p(A)$ and $p(B)$. Bayes's rule is as follows:

$$p(A/B) = \frac{p(B/A)P(A)}{p(B)}$$

where conditional probabilities:

- $p(A/B)$ is the likelihood of event A occurring given that B is true;
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Red Bull Case

back

1980s	3 types of companies hold retail gasoline stations in UK: Vertically integrated oil companies (Shell, ESSO, British Petroleum,...), supermarkets, independent retailers.
1990	Supermarkets' market share rose from 1% in 1980 to 6% in 1990. ESSO the largest player with 21% market share hesitate to launch a price war...
1995	Supermarkets have reached 20% market share while the market share of Esso dropped to 16%. ESSO launch "Price Watch" in north east of England and Scotland: ESSO will match the lowest supermarket price in 3 miles around the station.
1996	Extension of Price Watch to all its gas station and immediate price war in response by BP and Shell.