NON COOPERATIVE STRATEGIC BEHAVIOR

(INCUMBENT'S, LET'S SAY)

ACTIONS / STRATEGIES OF A FIRM THAT WANTS TO INCREASE ITS PROFITS BY IMPROVING "ITS POSITION" RELATIVE TO ITS RIVALS (COMPETITORS / POTENTIAL ENTRANTS)

- TO HARM ITS RIVALS
- TO BENEFIT ITSELF

TO MAKE IT WORK, A FIRM NEEDS TO HAVE:

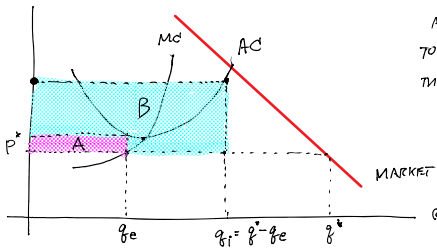
- ADVANTAGES: COST ADVANTAGE; R&D, INNOVATION AND TECHNOLOGICAL ADVANTAGE; FIRST-MOVER ADVANTAGE
- COMMITTMENT → COMMITMENT TO EXPAND OUTPUT IF ENTRANT ENTERS.
  → COMMITMENT TO LOWER THE PRICE IF ENTRANT GETS IN.

↓ HIGH-COST FIRM Vs LOW-COST FIRM

STRATEGIC BEHAVIOR

① PREDATORY PRICING: THE INCUMBENT LOWERS ITS PRICE IN ORDER TO DRIVE RIVALS OUT OF BUSINESS AND DISCOURAGE ANY POTENTIAL ENTRANTS AND LATER ON RAISE THE PRICE WHEN NOBODY COMPETES W/ IT.

CASE 1 PREDATION W/ IDENTICAL FIRMS → SYMMETRIC COST STRUCTURES



AT P^*, TOTAL QUANTITY DEMANDED = q^*

TO SUSTAIN P^*: PREDATORY PRICE, THE INCUMBENT MUST PRODUCE $q^* - q_e$ TO FULFILL q^*

AREA A = THE RIVAL'S LOSS
AREA A + B = THE INCUMBENT'S LOSS!

→ OUTCOME: W/ IDENTICAL COST STRUCTURE, PREDATION DOES NOT WORK.

CASE 2 PREDATION W/ COST ADVANTAGE

(EXCESS CAPACITY)

- ADVANTAGE ⇒ LOWER MC, CAPITY TO PRODUCE MORE OUTPUT, BETTER REPUTATION, MORE LOYAL CONSUMERS'

⇒ HIGHER CAPACITY CONSTRAINT: WHEN P ↓, Q^D ↑
THE INCUMBENT MUST BE ABLE TO DEAL W/ THE HIGHER DEMAND. OTHERWISE, PREDATORY PRICING WILL NOT SUCCEED.

INCUMBENT: LOW-COST FIRM Vs. HIGH-COST FIRM

THE ENTRANT WILL OBSERVE "PRICE HISTORY" OF THE INCUMBENT AS "INDICATOR" OR SIGNAL TO FORM "A BELIEF" ABOUT "TYPE OF INCUMBENT" / H-C FIRM OR L-C FIRM

NOTE THAT ① LOW-COST FIRM USUALLY DOES PRICE REDUCTION MORE OFTEN THAN HIGH-COST FIRM.

② DOING PREDATORY PRICE IS COSTLY TO THE INCUMBENT. IT MUST ACCEPT THE SHORT-TERM LOSS FOR LONG-TERM GAIN

③ BOTH LOW-COST FIRM AND HIGH COST FIRM CAN DO PREDATORY PRICING TO INFLUENCE RIVALS' BELIEF ABOUT ITS TYPE.
EX IF A HIGH-COST FIRM SUCCESSFULLY CONVINCES THE ENTRANT THAT IT IS A LOW COST FIRM,

THE ENTRANT WILL STAY OUT.

PREDATORY PRICING & LEGAL STANDARD.

- BY EU's COMPETITION LAW AND US'S ANTITRUST LAW, PREDATORY PRICING IS ILLEGAL. IN OTHER WORDS, IT IS ILLEGAL TO SET $P < MC$.

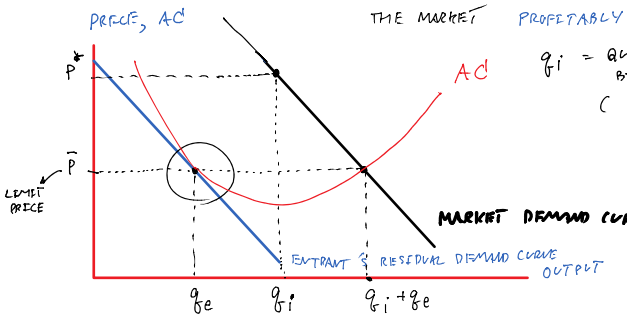
" DRIVE OTHER FIRMS' OUT OF THE MKT AND RESULT IN LESSEN COMPETITION AND HARM CONSUMERS' WELFARE " IS NOT LEGALLY ACCEPTABLE.

IF $P < MC_{SHORT-RUN}$, FIRM FACES LOSS. FROM COURT'S VIEW, IT IS NOT NORMAL TO CHOOSE TO MAKE LOSS UNLESS IT HAS STRATEGIC INTENTION.

HOWEVER $P < MC_{SR}$ DOES NOT ALWAYS IMPLY PREDATORY PRICING

EX: GIVING FREE SAMPLES ($P=0$) OF NEW PRODUCTS TO SIMPLY PROMOTE YR PRODUCTS' IS' ACCEPTABLE.

② LIMIT PRICING : THE INCUMBENT SETS ITS PRICE AND OUTPUT SO THAT THERE IS NOT ENOUGH DEMAND LEFT FOR ANOTHER FIRM TO ENTER THE MARKET PROFITABLY.



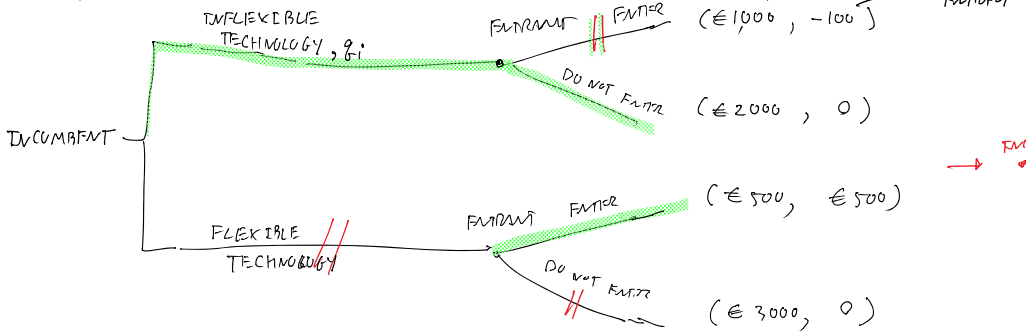
q_i = QUANTITY DEMANDED BY THE INCUMBENT (THE INCUMBENT WANTS THE ENTRANT TO "BELIEVE THAT IF ENTRANT ENTER, THE INCUMBENT WILL PRODUCE q_i

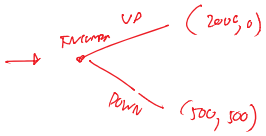
IF ENTRANT "BELIEVES" THIS ANNOUCEMENT, OR THREAT, IT WILL NOT WANT TO ENTER AS IT IS NOT PROFITABLE!

LIMIT PRICING WHEN COST STRUCTURE OF FIRMS IS' IDENTICAL DOES NOT WORK. (WHY?)

— THREATMONING BY THE ENTRANT TO THE INCUMBENT WORKS IN THE SAME WAY!

LIMIT PRICING WHERE ONE FIRM HAS' AN ADVANTAGE $\pi_{incumbent}$ $\pi_{ENTRANT}$





TIMING OF THE EVENTS

① THE INCUMBENT CHOOSES EITHER INFLEXIBLE TECHNOLOGY, q_i OR FLEXIBLE TECHNOLOGY

② ENTRANT OBSERVES THE INCUMBENT'S CHOICE AND THEN CHOOSE TO ENTER OR STAY OUT.

③ PAYOFFS ARE REALIZED.

NASH EQUILIBRIUM = (INFLEXIBLE TECHNOLOGY, DO NOT ENTER)

THE RESTRICTION MAKES IT BELIEVABLE FOR ENTRANT THAT THE INCUMBENT CAN ONLY PRODUCE q_1. GIVEN SO, IT IS IN ENTRANT'S BEST INTEREST NOT TO ENTER.

ASYMMETRY HERE IS THE FACT THAT INCUMBENT CAN CHOOSE TO COMMIT/RESTRICT ITS CHOICES OF PRODUCTION WHEREAS ENTRANT CANNOT.

INVESTING IN R&D

- 2-PERIOD GAME
- 2 PLAYERS: INCUMBENT Vs. POTENTIAL ENTRANT
- INCUMBENT CAN CHOOSE TO INVEST IN R&D IN PERIOD 1 WHICH WILL HELP TO REDUCE COST OF PRODUCTION IN PERIOD 2
- IN PERIOD 2, AN ENTRANT DECIDES TO ENTER OR NOT ENTER.

ASYMMETRY ? ⇒ INCUMBENT CAN CHOOSE TO INVEST IN R&D, NOT ENTRANT.
(EX: A MONOLOIST WHO STAYS FIRST IN THE INDUSTRY FOR SOME TIME)

THE INCUMBENT MUST DECIDE IF HE SHOULD INVEST IN R&D OR NOT.
TO DO THIS, HE MUST COMPARE PROFITS BETWEEN INVESTING IN R&D AND NOT INVESTING IN R&D, IN EQUILIBRIA.

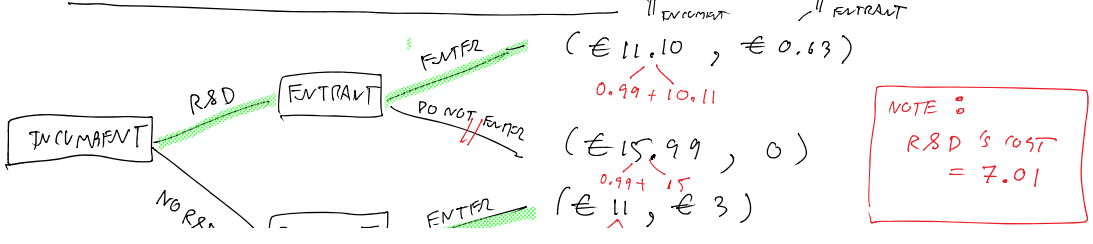
NOTE IN THE FIRST PERIOD: MONOPOLY
" " SECOND PERIOD: IF FIRM 2 ENTERS → COURNOT OUTPUT (COURNOT COMPETITION)
IF FIRM 2 DOES NOT ENTER → FIRM 1 REMAINS A MONOPOLIST.

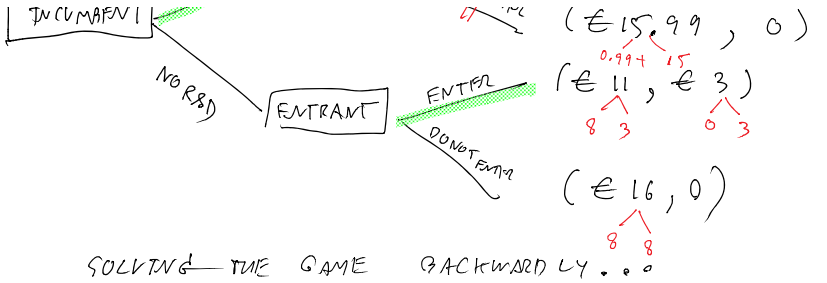
- COST FUNCTION FOR MONOPOLIST: $TC = 1 + 6q_1$ (MARGINAL COST; 1 = FIXED COST)

THE COST FUNCTION ABOVE WILL APPLY TO PERIOD 2 IF THE INCUMBENT DOES NOT INVEST IN R&D.

- MARKET DEMAND FUNCTION: $q = 12 - p$.

EXTENSIVE FORM GAME OF R&D





R&D 's cost = 7.01

SOLVING THE GAME BACKWARDLY...

MAIN EQUILIBRIUM : (R&D , ENTER)

OBSERVE THAT W/ THE THREAT OF ENTRY, THE INCUMBENT CHOOSES TO DO R&D WHICH BENEFITS BOTH CONSUMERS AND THE INCUMBENT. (11 → 11.10)

(w/o R&D) (w R&D)

RAISING ALL FIRMS' COSTS.

IT MAY PAY FOR THE INCUMBENT TO RAISE THE COST OF ALL FIRMS.

EX: INCUMBENT SUPPORTS GOVERNMENT'S POLLUTION CONTROL WHICH RAISES ALL FIRMS' COST.

SUPPOSE Π_m = €100 (MONOPOLY PROFIT B/F ENTRY)

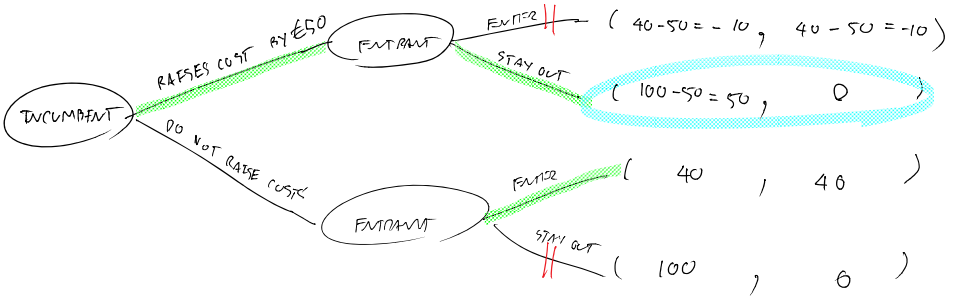
Π_d = €80 (DUOPOLY PROFITS RECEIVED BY BOTH IF ENTRY OCCURS.

SO, EACH WOULD RECEIVE = $\frac{\Pi_d}{2} = \frac{80}{2} = €40$.

THE INCUMBENT WOULD PAY AT MAXIMUM = $\Pi_m - \frac{\Pi_d}{2}$ (MARKET SHARE IS ALLOCATED EQUALLY)

$= 100 - \frac{80}{2} = €60$

TO KEEP THE ENTRANT OUT.



BY RAISING COSTS OF ALL FIRMS, THE INCUMBENT CAN MAKE THE ENTRANT STAY OUT.

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