Wednesday, March 29, 2017 4:11 PM

NON COOPERATIVE STRATEGIC BEHAVIOR

ACTIONS / STRATEGIES OF A FIRM, LET'S SAY INCUMBENT, THAT WANTS TO INCREASE ITS PROFIT BY IMPROVING "ITS POSITION" RELATIVE TO ITS RIVALS (COMPETITORS / POTENTIAL ENTRANTS)

TO MAKE IT WORK, THE FIRM NEEDS TO HAVE

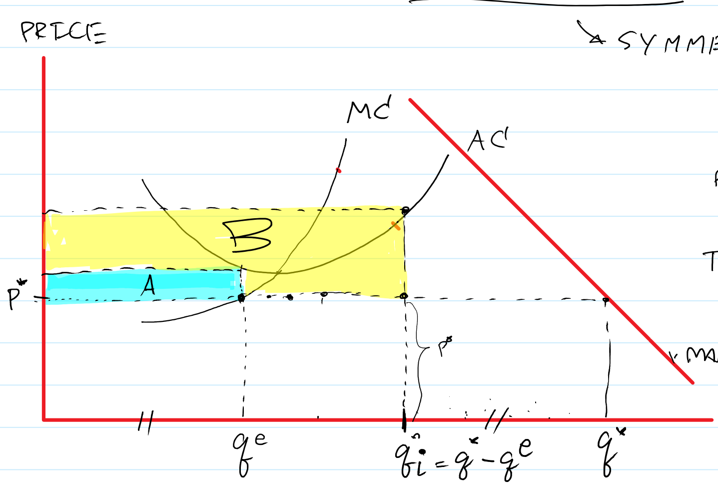
- ADVANTAGES
  - COST ADVANTAGES
  - INNOVATION / R&D / BETTER TECHNOLOGY
  - FIRST - MOVER ADVANTAGE
- COMMITMENTS
  - COMMITMENT TO LOWER THE PRICE IF AN ENTRANT ENTERS.
  - COMMITMENT TO EXPAND OUTPUT IF AN ENTRANT ENTERS.

PREDATORY PRICING :

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

CASE I PREDATION W/ IDENTICAL FIRMS

→ SYMMETRIC COST STRUCTURES



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

PREDATORY PRICE

TO SUSTAIN P^*, 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, PREDATORY PRICING DOES NOT WORK (WHY?)

THE INCUMBENT WOULD NOT HAVE AN INCENTIVE TO CARRY ON

THE THREAT ABOVE. THIS STRATEGIC BEHAVIOR IS NOT RATIONAL.

CASE 2 PREDATORY W/ COST ADVANTAGE.

- ADVANTAGES ⇒ LOWER MC, CAPACITY TO PRODUCE MORE OUTPUT IN RESPONSE TO A SURGE IN DEMAND, BETTER REPUTATION, MORE ROYAL CUSTOMERS

INCUMBENT → LOW-COST FIRM vs. HIGH-COST FIRM

THE ENTRANT DOES NOT KNOW WHICH THE INCUMBENT IS.
THE ENTRANT MUST OBSERVE = PRICE HISTORY OF INCUMBENT " AS A SIGNAL OR AN INDICATOR TO FORM " A PRIOR BELIEF " ABOUT "TYPE OF INCUMBENT"
- H-C FIRM W/ SOME PROBABILITY
- L-C FIRM W/ SOME PROBABILITY

NOTE THAT

1. NATURALLY, L-C FIRM USUALLY DOES PRICE REDUCTION MORE OFTEN THAN H-C FIRM.
2. DOING PREDATORY PRICING IS COSTLY TO THE INCUMBENT: IT MUST ACCEPT "SHORT-TERM LOSS" FOR LONG-TERM GAIN.
3. BOTH L-C FIRM AND H-C FIRM CAN DO PREDATORY PRICING TO "INFLUENCE" ENTRANT'S BELIEF ABOUT ITS TYPE.

EX IF H-C FIRM CAN SUCCESSFULLY CONVINCE THE ENTRANT THAT IT IS A LOW-COST FIRM (MIMIC), THE ENTRANT WILL STAY OUT

PREDATORY PRICING AND LEGAL STANDARD

1. BY EU'S COMPETITION LAW AND US' ANTITRUST LAW PREDATORY PRICING IS ILLEGAL. IN OTHER WORDS, IT IS NOT LEGAL TO SET $P < MC$.

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

FROM GOVT'S VIEW, IF $P < MC_{\text{SHORT RUN}}$, FIRM FACES LOSSES. IT IS NOT NORMAL TO MAKE LOSS UNLESS IT HAS STRATEGIC

INTENTION

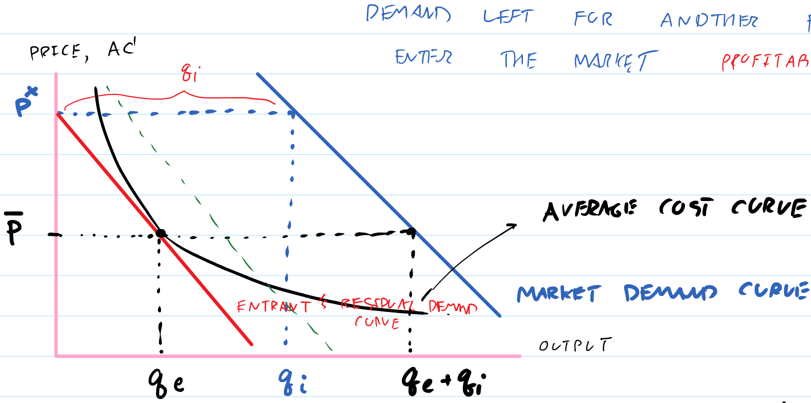
HOWEVER, $P < MC_{SR}$ DOES NOT ALWAYS IMPLY PREDATORY PRICING. EX: GIVING FREE SAMPLES OF NEW PRODUCTS TO SIMPLY PROMOTE YOUR PRODUCTS IS ACCEPTABLE.

Tuesday, April 18, 2017 2:14 PM

STRATEGIC BEHAVIOR
- NONCOOPERATIVE STRATEGIC BEHAVIOR
  - PREDATORY PRICING ✓
  - LIMIT PRICING ✓
  - INVESTMENT TO LOWER PRODUCTION COSTS ✓
  - RAISING RIVALS' COST — TODAY
- COOPERATIVE STRATEGIC BEHAVIOR
  - COLLUSION

KEY TERMS
- MARKET ENVIRONMENTS
  - PRICES
  - QUANTITY
  - TECHNOLOGY
  - R&D
  - COSTS
  - PROFITS
  - WELFARE
  - ETC.
- BELIEFS

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



q_i = quantity demanded by the incumbent.

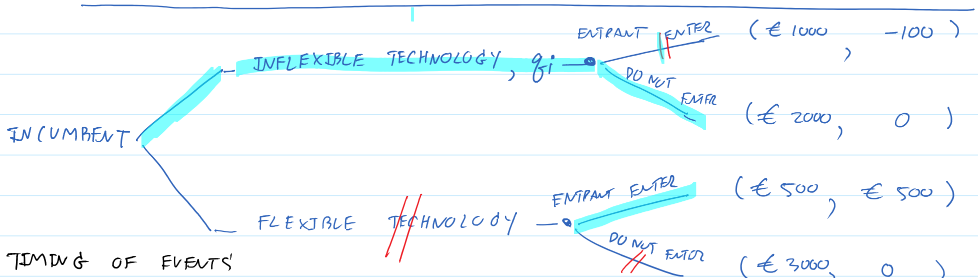
The incumbent wants the entrant to "believe" that if entrant enters, the incumbent will produce q_i.

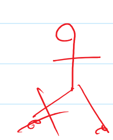
If the entrant believe this annoucement, it will not want to enter as it is not profitable!

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

- THREATENING BY THE ENTRANT TO THE INCUMBENT WORKS IN THE SAME WAY.

LIMIT PRICING WHERE ONE FIRM HAS "AN ADVANTAGE"





TIMING OF EVENTS

① THE INCUMBENT CHOOSES EITHER "INFLEXIBLE TECHNOLOGY" OR "FLEXIBLE TECHNOLOGY" (q_i)

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

③ THE PAYOFFS ARE REVEALED.

NASH EQUILIBRIUM : (INFLEXIBLE TECHNOLOGY , DO NOT ENTER)

• RESTRICTION MAKES IT BELIEVABLE FOR THE ENTRANT THAT THE INCUMBENT CAN ONLY PRODUCE q_i. GIVEN SO, IT IS IN THE ENTRANT'S BEST INTEREST TO "STAY OUT".

KEY FEATURE THAT DRIVES THIS ABOVE CONCLUSION IS

"ASYMMETRY" : ASYMMETRY HERE IS THE FACT THAT

THE 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
- THE INCUMBENT CAN CHOOSE TO INVEST IN R&D IN PERIOD 1 WHICH WILL HELP TO REDUCE THE PRODUCTION COST IN PERIOD 2
- IN PERIOD 2, THE ENTRANT DECIDES TO ENTER OR NOT ENTER.

ASYMMETRY ? ⟹ INCUMBENT CAN CHOOSE TO INVEST IN R&D, NOT ENTRANT.

(EX: THINK ABOUT A MONOPOLIST WHO STAYS FIRST IN THE INDUSTRY FOR SOME TIME)

INCUMBENT MUST COMPARE PROFITS BETWEEN INVESTING IN R&D AND NOT INVESTING IN R&D, IN EQUILIBRIUM.

PERIOD 1 : MONOPOLIST

PERIOD 2 :
- IF FIRM 2 ENTERS, THEN "COURNOT OUTPUT" WILL BE PLAYED
- IF FIRM 2 DO NOT ENTER, THEN FIRM 1 REMAINS A MONOPOLIST

- MARKET DEMAND FUNCTION : $q = 12 - P$.
- COST FUNCTION FOR MONOPOLIST : $TC = \underbrace{1}_{FC} + \underbrace{6}_{\text{MARGINAL COST}} q_i$

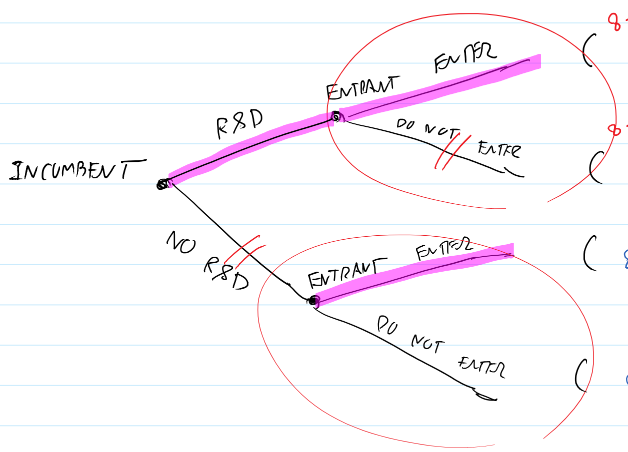
EXTENSIVE FORM GAME OF R&D

$\boxed{\text{R\&D COST} = €\ 7.01}$

$8 - 7.01$ $\pi_{INCUMBENT}$ $\pi_{ENTRANT}$

EXTENSIVE FORM GAME OF R&D

R&D COST = € 7.01



$\pi_{INCUMBENT}$ $\qquad$ $\pi_{ENTRANT}$

($\underbrace{0.99}_{8-7.01}$ + 10.11 = 11.11 €, 0 + 0.63 = 0.63)

($\underbrace{0.99}_{8-7.01}$ + 15 = 15.99 $\qquad$ 0 + 0 = 0)

COURNOT PROFITS

(8 + 3 = 11 , 0 + 3 = 3)

(8 + 8 = 16 , 0 + 0 = 0)

NASH EQUILIBRIUM : (R&D, ENTER)

NICE RESULT : W/ THE THREAT OF ENTRY, THE INCUMBENT CHOOSE TO DO R&D WHICH BENEFIT BOTH " CONSUMERS " AND " INCUMBENT "

	W/O R&D	W/ R&D
$\pi_{INCUMBENT}$	11.00	11.11
CONSUMERS'	P = 7.33	P = 8

(VERIFY THIS, PAGE 392 – 393)

RAISING RIVALS' COST

- DIRECT METHODS
  - LOBBYING SUPPLIERS OF THE COMPETITORS TO "REDUCE" THE QUANTITY SOLD TO THE RIVALS OR "RAISE" PRICE OF INPUTS.
  - DESTROY THE COMPETITOR'S REPUTATION (UNETHICAL)
- INTERFERENCE THROUGH GOVT REGULATIONS
  - ENVIRONMENT REGULATIONS
  - CARBON TAXES
- RAISE SWITCHING COSTS
- TIE-IN OF OTHER PRODUCTS
- RAISE WAGES OR OTHER / INPUT PRICES

RAISING ALL FIRMS' COSTS

- SOMETIMES, IT MIGHT PAY FOR THE INCUMBENT TO RAISE COST OF ALL FIRMS.

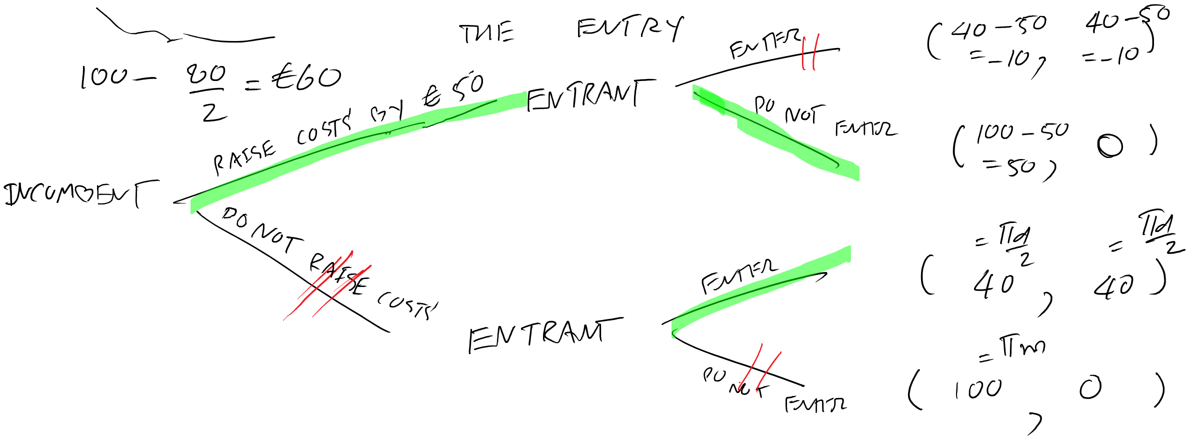
EX: THE INCUMBENT SUPPORTS GOVT'S POLLUTION CONTROL WHICH RAISES ALL FIRMS' COST.

SUPPOSE $\pi_m = €100$ (MONOPOLY PROFITS)

$\pi_d = €80$ → €40 (ME) $= \pi_d/2$; €40 (YOU) $= \pi_d/2$ } DUOPOLY PROFITS OBTAINED BY BOTH IF ENTRY OCCURS.

$\pi_m - \frac{\pi_d}{2}$ = THE MAXIMUM AMOUNT OF MONEY THE INCUMBENT WOULD SPEND TO DETER THE ENTRY

$100 - \frac{80}{2} = €60$



BY RAISING COSTS OF ALL FIRMS, THE INCUMBENT

CAN MAKE THE ENTRANT "STAY OUT".

ADVANTAGE OF ENTRANTS'

- THE ENTRANT MAY CHOOSE TO ENTER ONE OF THE GEOGRAPHICAL / PRODUCT MARKETS' TO AVOID RIGOROUS COMPETITION.
- INCUMBENT MAY DEVELOP "A FIGHTING BRAND TO COMPETE.

WELFARE IMPLICATION

{ PREDATORY PRICING / LIMIT PRICING } MAY / MAY NOT INCREASE WELFARE.

IF IT LEADS TO → PRICE REDUCTION ✓
→ MORE COMPETITION ✓
→ MORE VARIETY OF GOODS AVAILABLE ✓
→ MORE QUALITY OF PRODUCT (VIA R&D) ✓

THEN WELFARE ↑

IF IT LEADS TO → LESS COMPETITION
→ HIGH MARKET POWER
→ SUBOPTIMAL AMOUNT OF GOOD

THEN WELFARE ↓