Formulas

MICROECONOMICS

(SECOND PARTIAL)

EDIZIONE A.A. 2021 – 2022

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This handout has been written by students with no intention to substitute the official materials. Its purpose is to be useful for the exam preparation but it does not give a total knowledge about the program of the course it is related to, as the materials of the university website or professors.

GAME THEORY

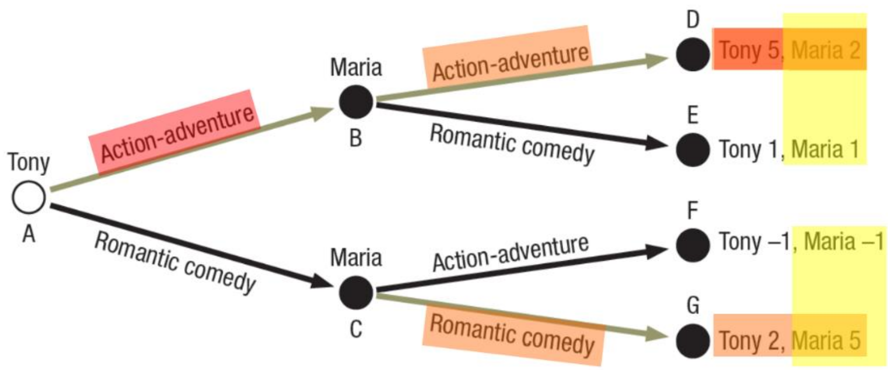
ONE STAGE GAMES

Anna \ Michele	Theater	No theater
Theater	4,5	2,8
No theater	1,1	3,4

Down right is nash equilibrium → pair of best responses

There can be multiple nash equilibria or also none at all

MULTIPLE STAGE GAMES



Solve by backward induction

We have first striker advantage

We get a stronger NE, that is SubPerfect Nash Equilibium

SPNE of this case (AA (Tony); AA if Tony chooses AA, RC if Tony chooses RC (Maria))

We never reach RC if RC, as Tony will always choose AA

MONOPOLIES

MARKET POWER

Market power → when a firm can charge a price above MC (P > MC)

Increasing quantity from Q – ΔQ to Q

→ Output expansion effect = sell ΔQ additional units at P(Q)

→Price reduction effect = reduction in price from P (Q – ΔQ) to P(Q) for all previous units

Marginal revenue = $P(Q) + \left(\frac{\Delta p}{\delta q}\right)\ Q$ → sum of output expansion and price reduction

Markup/ price cost margin/ Lerner index = $\frac{P-MC}{P}$

Markup → $\frac{P-MC}{P} = -\frac{1}{E^d}$

Surplus in monopoly = $\frac{1}{2}((Dy\ intercept - Sy\ intercept) + (P - MC(Q))) - avoidable\ costs$

Deadweightloss (DWL) = surplus in perfect competition – surplus in monopoly

PRICING POLICIES

PERFECT PRICE DISCRIMINATION

P_i = WTP_i → for each customer

Sell other units for which wtp is higher than mc → sell at P= MR = MC

DWL = 0 CS = 0 PS = all

TWO PART TARIFFS

Set P = MC

Charge fixed fee = CS

DWL = 0 CS = 0 PS = everything

OBSERVABLE CHARACTERISTICS

High v low willingness to pay → charge different prices

DWL> 0 (inefficiency) CS > 0 π > π without price discrimination

CHOICES UNDER UNCERTAINTY

EXPECTED VALUE (EV)

$$EV = P_1V_1 + P_2V_2 + \cdots + P_nV_n$$

P_i = probability of outcome i

V_i = value of outcome if state i occurs

EXPECTED UTILITY (EU)

Called von Neumann – Morgenstern utility function

$$EU = P_1 u(V_1) + P_2 u(V_2) + \cdots + P_n u(V_n)$$

Certainty equivalent → U(CE) = E(U(lottery))

Risk premium = (EV – CE)

RISK AVERSION

EV(riskless lottery) = EV(lottery)

U(riskless lottery) > EU(lottery)

CE < EV(lottery)

RP > 0

Utility function is concave

RISK LOVING

EV(riskless lottery) = EV (lottery)

U(riskless lottery) < EU(lottery)

CE > EV(lottery)

RP < 0

Utility function is convex

RISK NEUTRAL

EV(riskless lottery) = EV(lottery)

U(riskless lottery) = EU(lottery)

CE = EV(lottery)

RP = 0

Utility function is linear

INSURANCE

2 outcomes

Benefit – premium

Value of the object (= benefit) – premium

Full insurance is riskless lottery

EXPECTED PROFITS

$$E\pi = P - pB - (1-p)0$$

INSURANCE POLICY (COMPANY SIDE)

Actuarially fair insurance and fair premium

$$P = pB$$

Actuarially unfair premium

$$P > pB$$

AGENTS' SIDE

Compare utilities (W is wealth)

$$EU(no\ insurance) = pu(0) + (1-p)u(W)$$

$$U(insurance) = pu(W-P) + (1-p)u(W-P) = u(W-P)$$

Agent is willing to buy if

$$U(insurance) \geq EU(no\ insurance)$$

EXPECTED VALUES

$$EV(no\ insurance) = p0 + (1-p)W = (1-p)W$$

$$EV(insurance) = p(W-P) + (1-p)(W-P) = W-P$$

DIFFERENT INSURANCES

$$EV(fair\ insurance) = W - pW = (1-p)W$$

$$EV(unfair\ insurance) = W - P < (1-p)W$$

Risk loving → never full coverage

$$EV(fair\ insurance) = EV(no\ insurance)$$

$$U(fair\ insurance) < EU\ (no\ insurance)$$

Risk neutral→ indifferent

$$EV(fair\ insurance) = EV(no\ insurance)$$

$$U(fair\ insurance) = EU(no\ insurance)$$

Risk loving and risk neutral don't buy actuarially unfair

Risk averse →

$$EV(fair\ insurance) = EV(no\ insurance)$$

$$U(fair\ insurance) > EU(no\ insurance)$$

Risk averse buys actuarially unfair if $P \leq W - CE$

$$If\ P = W - CE: EU(no\ insurance) = U(unfair\ insurance)$$

MORAL HAZARD

First best → solution with observable effort (variable wage)

Second best → solution when not observable effort (variable wage based on outcome)

Third „best" → fixed wage and moral hazard

ADVERSE SELECTION

Good products are driven out of the market but

$$IF\ PRICE\ FOR\ GOOD\ CARS\ <\ MAXIMUM\ PRICE$$

Also good cars enter market, but bad cars too expensive = good cars will disappear

Solutions

Warranties → seller guarantees to take back item if consumer not satisfied

Reputations → sell good items to maintain credibility over time and space

Public interventions → licensese, mandatory quality checks

IN COLLABORAZIONE CON

For doubts or suggestions

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