MONOPOLY

CAUSES OF MONOPOLY

1. Legal grant – historically sold by kings
   Now – public utilities, "national champions"
2. Exclusive ownership – DeBeers, OPEC?
3. Large sunk costs or scale economies – Microsoft?
4. Predatory action to exclude others – Microsoft?
   Modern governments regulate 3, outlaw 4

MONOPOLIST'S BEHAVIOR

Even a monopolist competes for consumer's $
with firms producing all other goods

But no strategic interaction (game theory)
Profit-maximization given demand curve
Direct $x = D(p)$, inverse $p = P(x)$

Two equivalent solutions

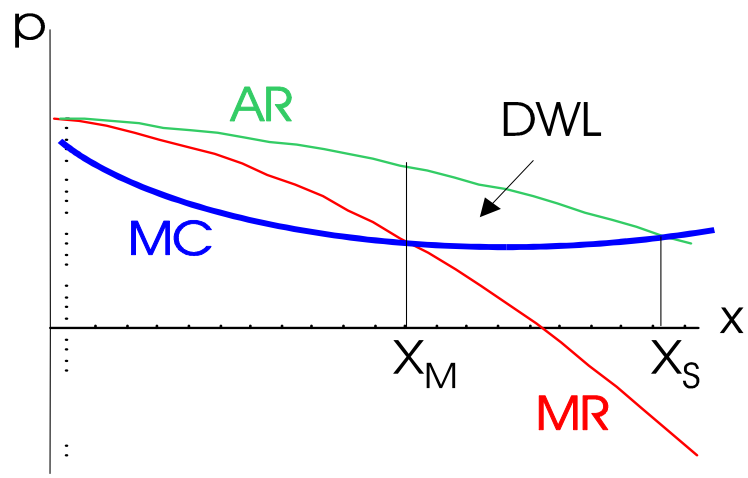
[1] Choose x to max $x\,p - C(x)$
FONC $[p + x\,dp/dx] = C'(x)$ $(MR = MC)$
SOSC $(MR - MC)$ $\downarrow$; MC cuts MR from below
Can have MC itself falling; some incr. rets. OK

[2] Choose p to max $p\,x - C(x)$
FONC $x + p\,dx/dp - C'(x)\,dx/dp = 0$
Same since $dx/dp = 1/(dp/dx)$

Elasticity of direct demand

$$\epsilon = -\frac{p}{x}\frac{dx}{dp}, \quad \text{so mark-up } p = \frac{MC}{1 - 1/\epsilon}$$

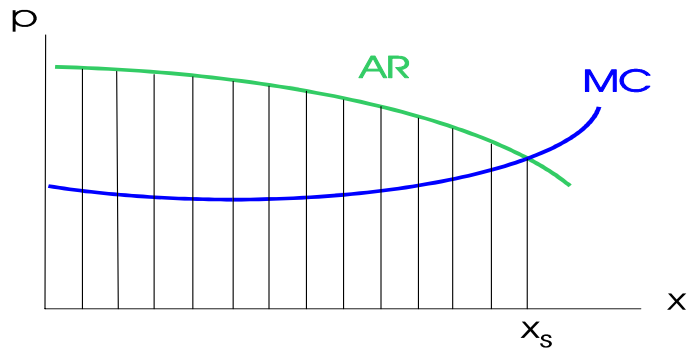
Dead-weight loss because $p > MC$
hence need for antitrust policy



KEY TRADEOFF – Price $\downarrow$ / quantity $\uparrow$ implies
profit $\uparrow$ $(P - MC)\,dx$ from marginal sales,
$\downarrow$ $x\ dp$ on inframarginal sales

PRICE DISCRIMINATION – Attempt to escape tradeoff

[1] Perfect – separate price for each buyer, unit
Efficient, but monopolist extracts all surplus
Needs detailed info; must prevent resales



[2] Grouping – indiv. membership observable
Separate, uniform price for members of each group
Less info needed; must prevent resale

Two-group case:
max $x_1\ P_1(x_1) + x_2\ P_2(x_2) - C(x_1 + x_2)$

FONCs
$p_1 + x_1\ dp_1/dx_1 \equiv MR_1 = MC \equiv C'(x_1 + x_2)$
$p_2 + x_2\ dp_2/dx_2 \equiv MR_2 = MC \equiv C'(x_1 + x_2)$
$p_1 = MC\ /\ [1 - 1/\epsilon_1]$, $p_2 = MC\ /\ [1 - 1/\epsilon_2]$
Group with less elastic demand pays higher price
e.g. airfare discounts for senior citizens

[3] Versioning – individual demands unobservable
But distribution in population known
Offer multiple "packages"
Separate by self-selection (screening)
e.g. Saturday night stay requirement in airfares
May be easier to prevent resales
Details later in information theory

OLIGOPOLY

GENERAL ISSUES

1. How to define "industry"
   Close substitutes (or complements), matter of degree
2. Why is number of firms in industry small?
   Large fixed costs or scale economies
3. Forms of strategic interactions
   a. Choice variables – quantities or prices
      Others – investment, R-and-D, advertising, ...
   b. Simultaneous vs. sequential actions
      leadership and followership advantage
   c. One-time vs. repeated interaction
      tacit collusion possible if repeated
   d. Explicit or implicit collusion or competition,
      depends on information, time-span, law, ...

No combination of these universally true
Study some special models for insight, techniques

Key concept – Each firm's price or quantity choice
shifts others' demand curves, affects profits
Like an externality, negative if substitutes
Conflict between joint and individual profit-max
Result – game-theoretic interaction, equilibrium

DEMAND FUNCTIONS

Result of maximizing quasilinear utility $u(x_1, x_2, y) =$

$$y + a_1\, x_1 + a_2\, x_2 - \tfrac{1}{2}\, [\, b_1\, (x_1)^2 + 2\, k\, x_1\, x_2 + b_2\, (x_2)^2\,]$$

subject to budget constraint $y + p_1\, x_1 + p_2\, x_2 = M$

Inverse:

$$p_1 = a_1 - b_1\, x_1 - k\, x_2, \quad p_2 = a_2 - k\, x_1 - b_2\, x_2$$

a_i,$b_i > 0$, $k^2 \leq b_1\, b_2$
Substitutes: $k > 0$, complements: $k < 0$
Perfect 1-for-1 substitutes: $p_1 = p_2 = a - b\, (x_1 + x_2)$

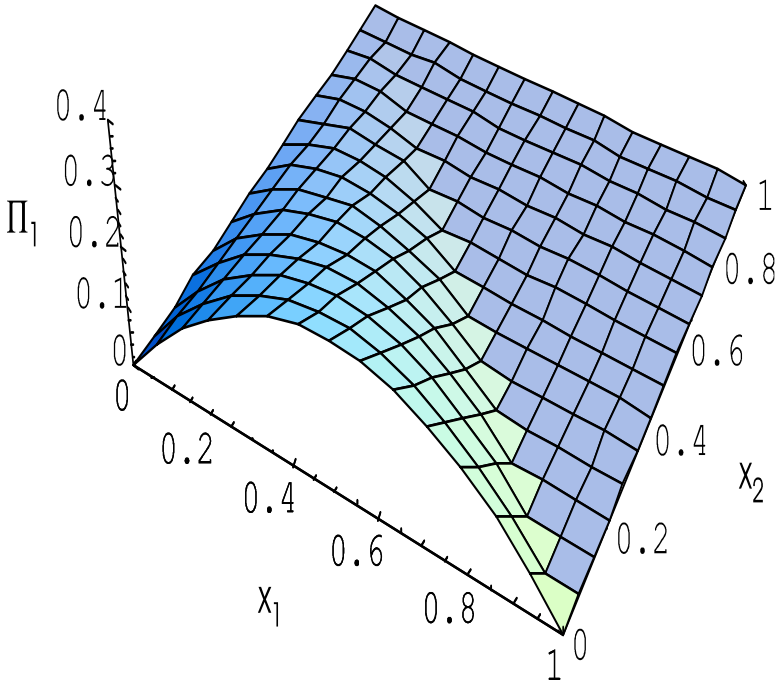
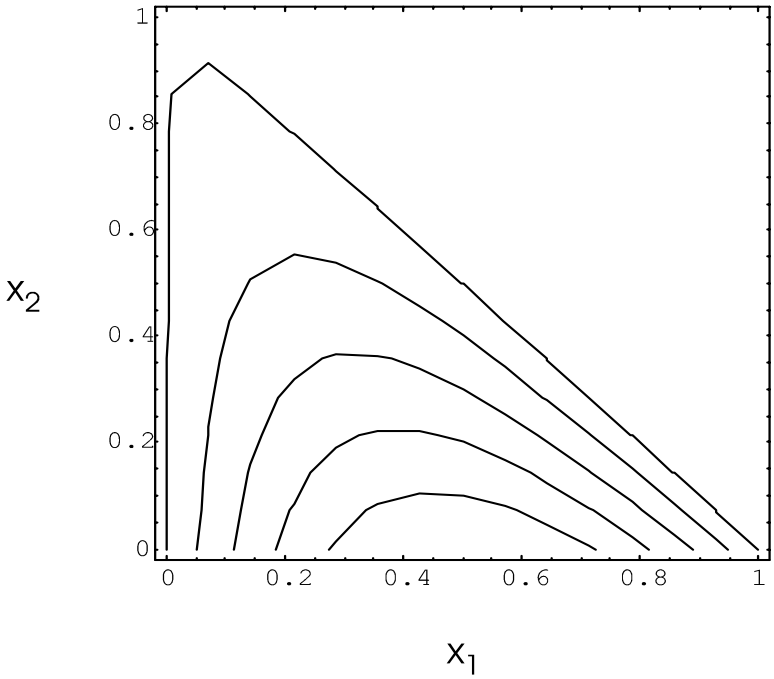
Direct:

$$x_1 = \alpha_1 - \beta_1\, p_1 + \kappa\, p_2, \quad x_2 = \alpha_2 + \kappa\, p_1 - \beta_2\, p_2$$

α_i, $\beta_i > 0$. $\kappa^2 \leq \beta_1\, \beta_2$
Substitutes: $\kappa > 0$, complements $\kappa < 0$
Perfect 1-for-1 complements: $x_1 = x_2 = \alpha - \beta\, (p_1 + p_2)$

QUANTITY-SETTING (COURNOT) DUOPOLY

Constant marginal costs c_1, c_2; fixed costs "in background"
Firm 1's profit

$$\Pi_1(x_1, x_2) = (p_1 - c_1)\, x_1 = [(a_1 - c_1) - b_1\, x_1 - k\, x_2]\, x_1$$

3-D and contour graphs ($a_1 - c_1 = 1$, $b_1 = k = 1$)