MONOPOLY – PART 1

INTERPRETATION

Literally, just one firm in an industry
But interpretation depends on how you define industry
General idea – a group of commodities that are close substitutes for one another
but poor substitutes for other goods or services in the economy
In reality there is a chain of substitutes, with no clear break points into industries
So even an industry with a hugely dominant firm will have some substitutes
for its products, including a fringe of smaller firms within the industry
So must interpret theory somewhat flexibly

SOURCES OF MONOPOLY (Related to P-R pp. 357-9)

Historically, monopolies granted by kings, often in exchange for money
Related practices still persist – lobbying etc. to influence legislation and regulation
Copyrights, patents – temporary monopoly, incentive to create new products and ideas
Ownership of scarce resource – natural (diamonds, petroleum, ...) or created (patents)
Large sunk costs or large economies of scale in relation to size of demand –
only one firm can produce at an efficient scale
Collusion by existing firms to act like a single firm (cartel)
Predatory practices – driving out existing competitors, deterring entry of new competitors
Antitrust policies try to counter cartels and predatory practices

MARGINAL REVENUE (p-r PP. 340-341)

A monopolist takes the demand curve Q = D(P) or its inverse P = P(Q) as given, not the price P
Recognizes that to sell more, must lower price (or by selling less, can raise price)
Hence crucial concept – marginal revenue = effect of marginal sale on the revenue received
Total revenue R(Q) = Q P(Q)
Marginal revenue MR = dR/dQ = 1 * P + Q * dP/dQ = AR + Q dP/dQ < AR (because dP/dQ < 0)

Examples : [1] Linear demand curve. P = a - b Q , R = a Q - b Q^2 , MR = a - 2 b Q
[2] Iso-elastic demand curve, e is numerical value of price elasticity of demand (– E_d in P-R)

$$Q = a\ P^{-e}, \quad AR = P = b\ Q^{-1/e}, \quad R = b\ Q^{(1-1/e)}, \quad MR = b\left(1-\frac{1}{e}\right) Q^{-1/e} = \left(1-\frac{1}{e}\right) AR$$

where b = $a^{1/e}$. If e < 1, MR < 0; then revenue can be increased by reducing output
So obviously monopolist will exploit all such opportunities and operate in region e > 1

Conceptual importance of MR concept – It represents a basic tradeoff for the monopolist
To sell an additional marginal unit, must lower price slightly,
and therefore accept lower revenue from all inframarginal units
Or, to sell to the next customer who is not willing to pay so much,
must lower price to all customers who would have been willing to pay this or more
Price discrimination strategies are attempts to escape from this tradeoff –
give a price break to attract new sales without giving it to all existing sales

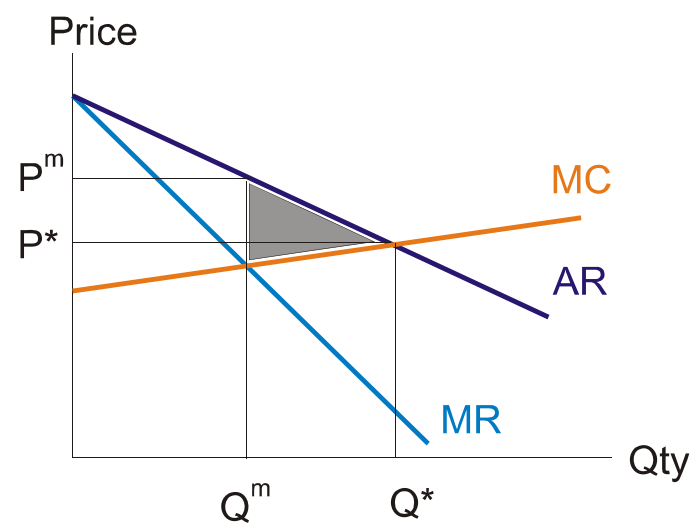
CHOOSING QUANTITY (OR UNIFORM PRICE) FOR PROFIT MAXIMIZATION (P-R 342-6)

Profit $\pi = R - C$. First-order condition $d\pi/dQ = dR/dQ - dC/dQ = MR - MC = 0$
Second-order condition $d^2\pi/dQ^2 = d^2R/dQ^2 - d^2C/dQ^2 = d(MR)/dQ - d(MC)/dQ < 0$,
so MR should cut MC from above. OK if MC itself is declining, so increasing returns OK.
Contrast this with perfect competition.

Examples:

1. Linear demand and marginal cost
   $P = AR = a - b\,Q$, $MR = a - 2\,b\,Q$; $MC = c + k\,Q$
   $MR = MC$ implies $Q = (a-c)/(2b+k)$
   Second-order condition: $-2b - k < 0$; $2b+k > 0$

2. Iso-elastic demand, constant marginal cost
   $MR = P\,[1 - (1/e)] = P\,(e-1)/e$, $MC = c$
   $MR = MC$ implies $P = MC\,e\,/\,(e-1)$ [need $e > 1$]
   This is the rule-of-thumb of monopoly pricing
   Write it as $(P-MC)/P = 1/e$: price markup
   or "Lerner Index of monopoly power" (P-R 353)



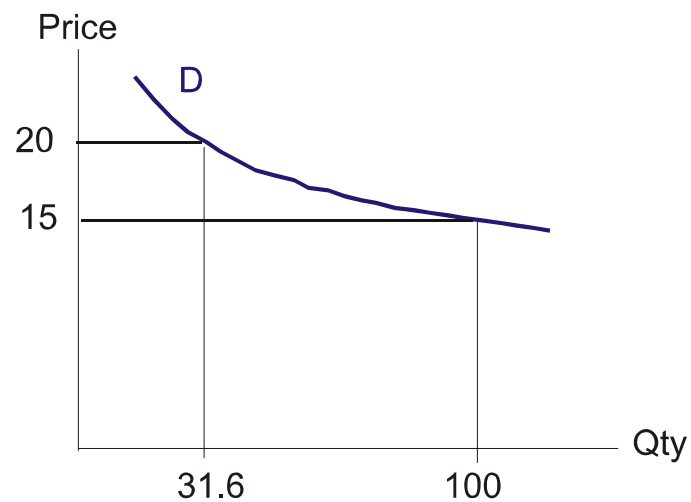
* = optimum
m = monopolist's choice
DWL in gray

Monopolist keeps Q below the quantity that
equates P and MC
This generates dead-weight loss :
loss of consumer surplus > monopolist's profit

EXAMPLE OF DEADWEIGHT LOSS CALCULATION (P-R pp. 359-60)

Designer jeans : MC = 15, e = 4 (using P-R p. 355), so P = 15 * 4/(4-1) = 20
Suppose quantity demanded would be 100 if price were 15 (this is just choosing units)

So demand function is $Q = 100\left(\frac{15}{P}\right)^4$



Try linear approximation:

$$\frac{P}{Q}\frac{dQ}{dP} = -4, \quad \frac{dQ}{dP} = -4\,\frac{100}{15} = -26.67$$

When P = 20, Q = 100 – 26.67 * (20-15) < 0
So linear approximation clearly won't do
(Note: even without such an extreme case,
linear approximation may be inaccurate)
Exact calculation :

When P = 20, Q = 100 * 0.75^4 = 31.6

Profit = (20-15) * 31.6 = 158

CS loss (just note the result and don't worry about the derivation; if in some later work e.g. JP you need such calculation you can always ask a mathematical friend):

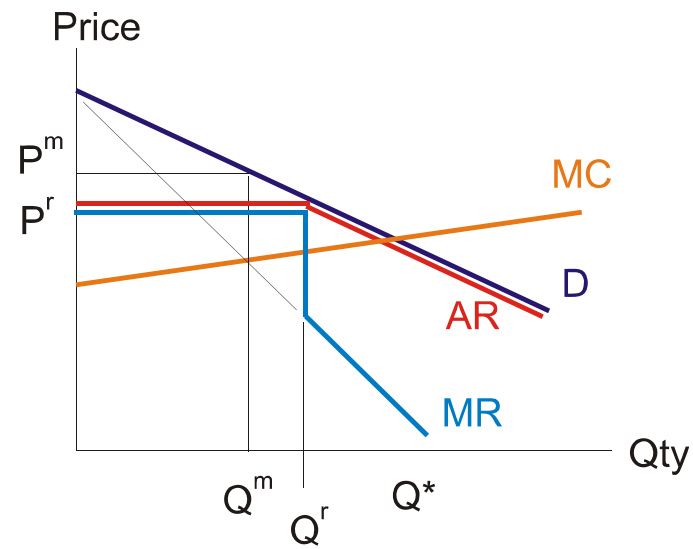
$$\int_{15}^{20} 100*15^4\ P^{-4}\ dP = 100*15^4\ \frac{1}{3}\left(15^{-3} - 20^{-3}\right) = 289.1$$

DWL = 289.1 - 158 = 131.1

GOVERNMENT POLICIES TO IMPROVE OUTCOMES (P-R pp. 359-64)

Social costs of monopoly: [1] Dead-weight loss, [2] Adverse redistribution? (Profit up, CS down)
[3] Firms may compete to acquire / preserve their monopoly and get its profits;
this uses up resources (“Rent-seeking”)

Regulation Example : Price ceiling
D = demand curve
P^r = price ceiling imposed by regulatory agency
Resulting in
AR = kinked average revenue curve
MR = double-kinked marginal revenue curve
Q^r = monopolist’s profit-maximizing choice
Other similar policies – rate-of-return ceilings etc.

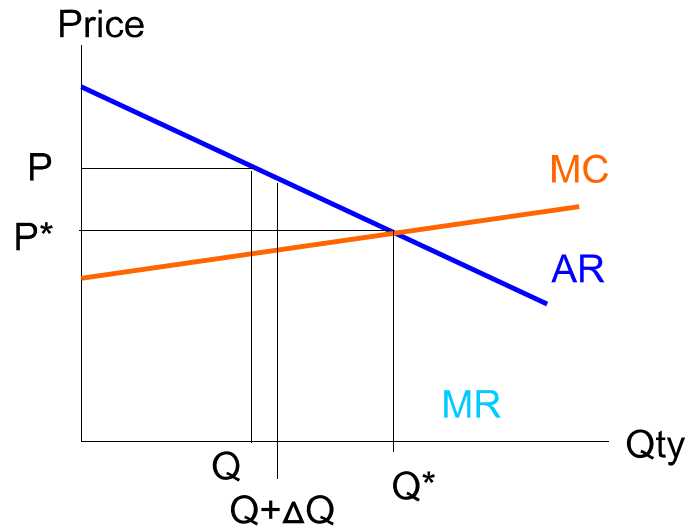


Other anti-trust policies –
[1] Preventing explicit or implicit collusion among firms in an industry to form a cartel
[2] Preventing predatory practices aiming to drive out old / deter new competitors
[3] More rarely, breaking up an existing large firm into two or more smaller competing firms
Implemented by Justice Dept, Fed. Trade Comm., state agencies, private suits ... (P-R 372-7)

Problems – [1] Regulatory agency may lack information to make good decisions
[2] “Rent-seeking” costs of trying to get favorable regulatory legislation and implementation
But these create lucrative career opportunities for economists and lawyers :-)

FIRM'S STRATEGIES TO INCREASE PROFIT:
FIRST-DEGREE OR PERFECT PRICE DISCRIMINATION (P-R pp. 383-5)

Charge every consumer the max willingness to pay for every little marginal unit
Consider a consumer who is buying quantity Q
Price along demand curve at this point is P
To buy the marginal quantity ΔQ,
consumer must pay extra P ΔQ
So under this scheme, MR = P
and TR = area under demand curve



Then to maximize profit, monopolist will
produce Q* such that P* = MC
Result – output level is efficient, (same
as under perfect competition)
But consumer gets no surplus
It all becomes monopolist's profit

Sometimes practical method of achieving this :
Two part tariff – If you want to sell Q, find point on the demand curve, height P
Set an entry fee = triangle CS area above P*
(minus a tiny amount to create positive incentive for the consumer to enter)
and then charge a price P* per unit purchased
Classic example: theme parks

When there are several different consumers with different preferences,
truly perfect price discrimination becomes difficult or even infeasible
Optimal to produce at a point where every consumer's marginal willingness to pay
equals a common marginal cost
1. Make every consumer an offer of individual-specific Q* for individual-specific TR*
2. Charge a common per unit price P* (= MC) to all, but different entry fees for each customer

Both require knowledge each consumer's demand curve to calculate
the correct individual-specific total revenue or entry fee
Each consumers has no incentive to reveal this information about his/her preferences
knowing that the monopolist will then extract all of his/her consumer surplus
Sometimes there exists such information, not always perfect –
Personal and professional service providers know a lot about customers (see P-R p. 385)
Then imperfect but first-degree (individual-specific) price-discrimination attempted

Other limits on price discrimination: may be illegal, or against social norms