

Industrial Organisation ECON309

Introduction

Industrial Organisation is the study of how firms behave in markets. Industrial organisation takes a strategic view of how firms interact and it deals with a whole range of business issues including:

- Prices of goods and services
- Which products to produce
- Merger decisions
- Methods for attacking or defending markets

HOW? In practice, Industrial Organisation is the practice of:

- Relying on the tools of game theory and focuses on strategy and interaction
- Constructing models: theoretical abstractions
 - well established tradition in all science
 - simplification but gain the power of generalisation
- Empirical Analysis—use theory to form testable hypotheses measure price elasticities
 - experiment with penalty for price-fixing
 - examine the impact of advertising

WHY? With a long-standing concern with market power, Industrial Organisation and the need for anti-trust policy was recognised by Adam Smith.

“The monopolists, by keeping the market constantly under stocked, by never fully supplying the effectual demand, sell their commodities much above the natural price.”

“People of the same trade seldom meet together, even for merriment or diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.”

Contextual Background

History of Anti-Trust

US Sherman Act (1890) – Standard Oil

- Section 1: prohibits contracts, combinations and conspiracies “in restraint of trade”
- Section 2: makes illegal any attempt to monopolize a market

US Clayton Act (1914)

- Intended to prevent monopoly “in its incipiency”
- makes illegal practices that “may substantially lessen competition or tend to create a monopoly”

US Federal Trade Commission (1914)

- Application affected by ‘rule of reason’
- proof of intent
- “the law does not make mere size an offence”

History of Industrial Organisation in Economics

Structure-Conduct-Performance SCP (1930s-1970s)

- Spectrum of markets: pure competition to pure monopoly (towards greater deadweight loss)
- Closer to monopoly means worse welfare loss
- IO mission is to identify link from market structure to firm conduct (pricing, advertising, etc) to market performance outcome (profits, deadweight loss)
- Dates back to Edward Mason (Harvard 1930s) and others; notably his Doctoral student Joseph Bain (1956)

The Chicago School (1970s-1980s)

- Good as well as bad reasons for monopoly including superior skill and technology (Economies of scale)
- Potential entry of new firms can discipline even a monopoly
- Structure is endogenous (interior) and causality difficult to determine

Post-Chicago or ‘New Industrial Organisation’

- Game theoretic emphasis
- Competitive discipline can fail
- Careful econometric testing to determine correct policy
- Theory in advance of policy
- Recognition of connection between market structure and firms’ behaviour

Efficiency and Market Performance

Analysis derived in the contrast of two polar cases:

- Perfect competition
- Monopoly

(Pareto) Efficiency?

No reallocation of the available resources makes one economic agent better off without making some other economic agent worse off.

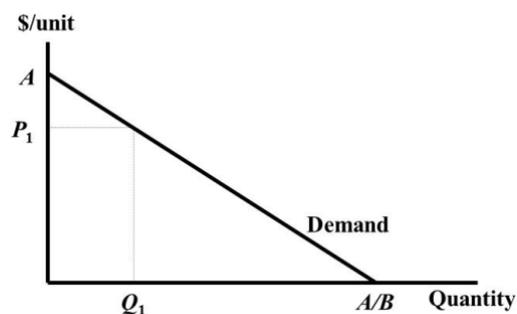
Example: given an initial distribution of food aid will trade between recipients improve efficiency?

Profit Maximisation

Focus on profit maximising behaviour of firms. Profit Maximisation is shown as the market demand curve with equation $P = A - BQ$

Note the importance of:

- Time
- Short-run vs. long-run
- Willingness to pay



Perfect Competition

- Firms and consumers are price-takers
- Firm can sell as much as it likes at the ruling market price
 - do not actually need many firms (as suggested in first year)
 - do need the idea that firms believe that their actions will not affect the market price
- Therefore, marginal revenue equals price (**MR = P**)
- To maximise profit a firm of any type must equate marginal revenue with marginal cost (**MR = MC**)
- So in perfect competition price equals marginal cost (**P = MC**)

The First Order Condition: $MR = MC$

Profit is $\pi(q) = R(q) - C(q)$

Profit maximisation: $\frac{d\pi}{dq} = 0$

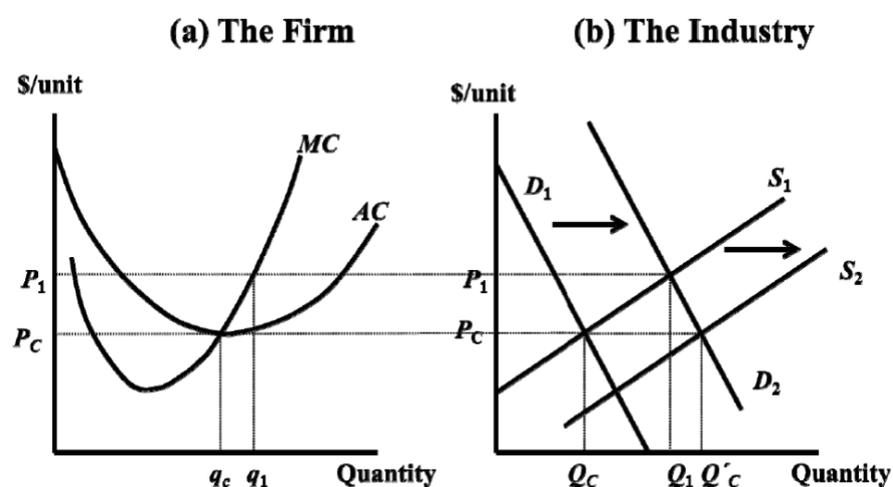
This implies $\frac{dR(q)}{dq} - \frac{dC(q)}{dq} = 0$

But $\frac{dR(q)}{dq} = (MR)$ marginal revenue

And $\frac{dC(q)}{dq} = (MC)$ marginal cost

So profit maximisation implies $MR = MC$

Illustration of Perfect Competition:



Definition of Normal Profit:

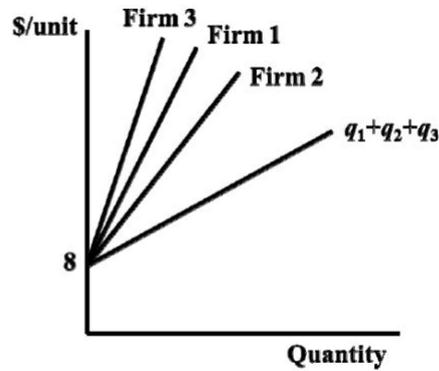
Not the same as zero profit and implies that a firm is making the market return on the assets employed in the business

Derivation of The Short-Run Supply Curve:

This is the horizontal summation of the individual firms' marginal cost curves. Profit maximisation implies $P = MC$ in perfect competition.

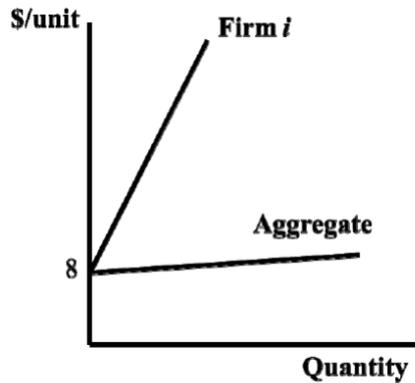
Example 1: Three firms

- Firm 1: $MC = 8 + 4q_1$
or $q_1 = P/4 - 2$
 - Firm 2: $MC = 8 + 2q_2$
or $q_2 = P/2 - 4$
 - Firm 3: $MC = 8 + 6q_3$
or $q_3 = P/6 - 4/3$
- $$Q = q_1 + q_2 + q_3$$
- $$= 11P/12 - 22/3$$
- $$P = 8 + 12Q/11$$



Example 2: Eighty firms $i = 1, \dots, 80$

- Each firm identical: $MC = 8 + 4q_i$
 - We know $P = MC$ so $q_i = P/4 - 2$
- $$Q = q_1 + q_2 + \dots + q_{80} = 80q_i$$
- $$= 20P - 160$$
- $$P = 8 + Q/20$$



Example 2 Maths:

$MC_i = a + bq_i$
 $i = 1, \dots, n$

$P = MC \Rightarrow P = a + bq_i$

* trick: $P = a + \frac{b}{n}Q$

P-roof

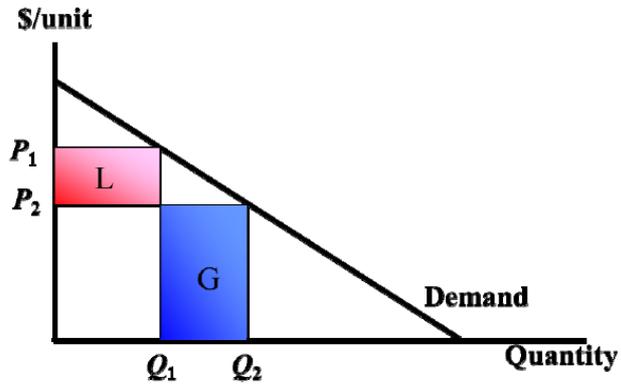
$$P = a + Lq_i$$
$$q_i = -\frac{a}{b} + \frac{P}{b}$$
$$Q = nq_i = -\frac{a}{b}n + \frac{P}{b}n$$
$$\frac{P}{b}n = \frac{a}{b}n + Q$$

$$P = a + \frac{b}{n}Q$$

Monopoly

The only firm in the market

- Market demand is the firm's demand
- Output decisions affect market clearing price



Derivation of The Monopolist's Marginal Revenue:

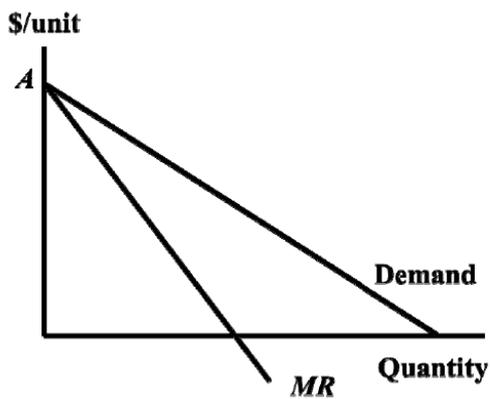
$$P = A - BQ$$

$$TR = PQ = AQ - BQ^2$$

$$MR = dTR/dQ$$

$$MR = A - 2BQ$$

With linear demand the marginal revenue curve is also linear with the same price intercept but twice the slope of the demand curve.



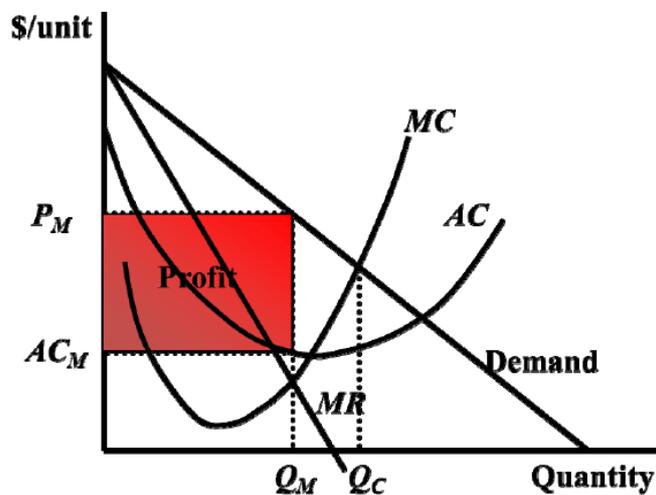
Monopoly and Profit Maximisation

The monopolist maximises profit by equating marginal revenue with marginal cost. This is a two-stage process:

- 1: Choose output Q_M where $MR = MC$
- 2: Identify the market clearing price P_M

Note that this equilibrium implies:

- $MR < P$
- $P > MC$ (loss of efficiency)
- $P > AC$
- Positive economic profit
- Long-run equilibrium: no entry



$$\begin{aligned}\pi &= TR - TC \\ \pi &= (P \times Q) - (ATC \times Q) \\ \pi &= (P - ATC) \cdot Q\end{aligned}$$

Present Value and Profit Maximisation

- Present value is directly relevant to profit maximisation
- For a project to go ahead the rule is
 - The present value of future income must at least cover the present value of the expenses in establishing the project
- The appropriate concept of profit is profit over the lifetime of the project
- The application of present value techniques selects the appropriate investment projects that a firm should undertake to maximise its value

Efficiency and Surplus

Can we reallocate resources to make some individuals better off without making others worse off? We Need a measure of well-being

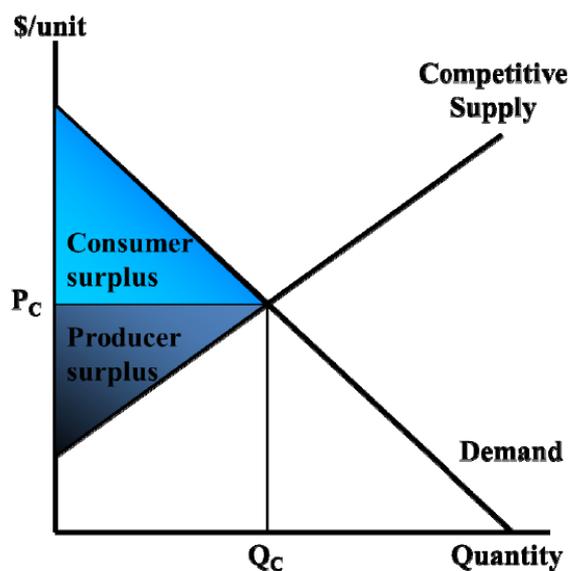
Consumer Surplus: difference between the maximum amount a consumer is willing to pay for a unit of a good and the amount actually paid for that unit.

Aggregate consumer surplus is the sum over all units consumed and all consumers

Producer Surplus: difference between the amount a producer receives from the sale of a unit and the amount that unit costs to produce

Aggregate producer surplus is the sum over all units produced and all producers

Total surplus = consumer surplus + producer surplus

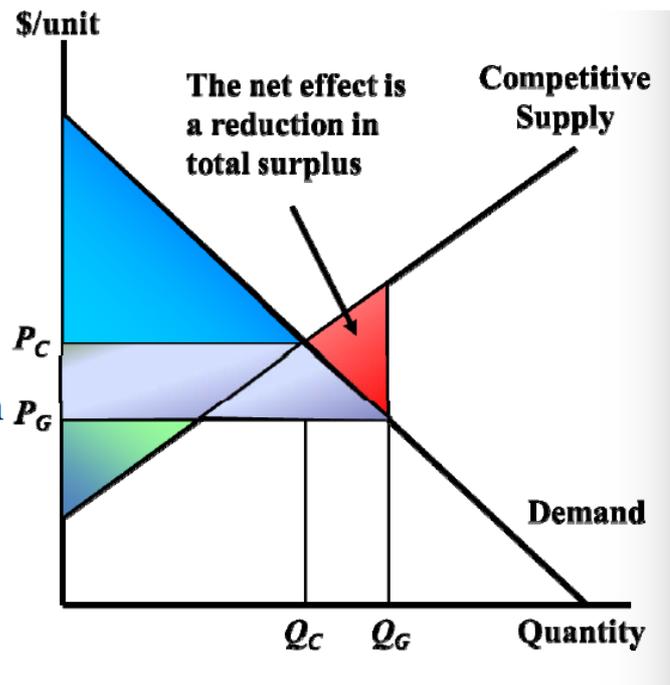


The demand curve measures the willingness to pay for each unit. Consumer surplus is the area between the demand curve and the equilibrium price

The supply curve measures the marginal cost of each unit. Producer surplus is the area between the supply curve and the equilibrium price

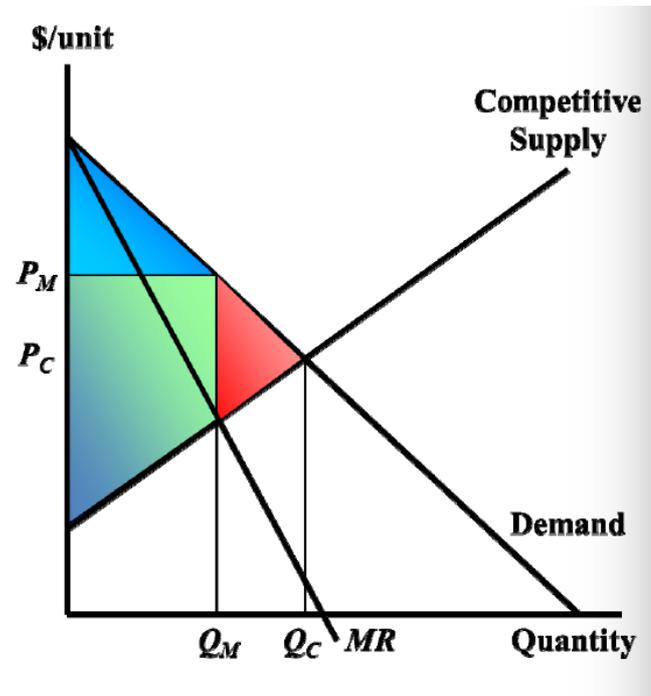
Aggregate surplus is the sum of consumer surplus and producer surplus. The competitive equilibrium is efficient.

- Assume that a greater quantity Q_G is traded
- Price falls to P_G
- Producer surplus is now a positive part and a negative part
- Consumer surplus increases
- Part of this is a transfer from producers
- Part offsets the negative producer surplus



Deadweight Loss of Monopoly

- The monopolist sets $MR = MC$ to give output Q_M
- Market clearing price is P_M
- The monopolist produces less surplus than the competitive industry
- There are mutually beneficial trades that do not take place: between Q_M and Q_C



Why can the monopolist not appropriate the deadweight loss?

- Increasing output requires a reduction in price
- This assumes that the same price is charged to everyone.

The monopolist creates surplus, some goes to consumers, some appears as profit

- The monopolist bases her decisions purely on the surplus she gets, not on consumer surplus
- The monopolist undersupplies relative to the competitive outcome
- The primary problem: the monopolist is large relative to the market

A Non-Surplus Approach

Example 1

- Take a simple example
- Monopolist owns two units of a valuable good
- There are 50,000 potential buyers
- Reservation prices:

<u>Number of Buyers</u>	<u>Reservation Price</u>
First 200	\$50,000
Next 40,000	\$30,000
Last 9,800	\$10,000

- Both units will be sold at \$50,000; no DWL
- Why not? Monopolist is *small* relative to the market

Example 2

- Monopolist has 200 units
- Still 50,000 potential buyers
- Reservation prices:

<u>Number of Buyers</u>	<u>Reservation Price</u>
First 100	\$50,000
Next 40,000	\$15,000
Last 9,900	\$10,000

- Seller would rather sell 100 cars at \$50,000 (profit = revenue = \$5m) than 200 at \$15,000 (profit = revenue = \$3m)
- Now there is a loss of efficiency and so a deadweight loss no matter what the monopolist does