

BS2243 –Lecture 2

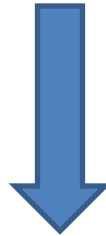
Structure – Conduct – Performance - I

Spring 2010

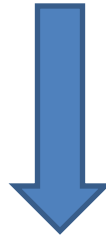
(Dr. Sumon Bhaumik)

The basic proposition

Structure of the market



Conduct of the firm



Performance of the firm

Structure of the market – Measurement - definition

- *n*-firm concentration ratio
 - Combined market share of the *n* largest firms
 - *n* typically equals 4 or 5
- Herfindahl index
 - Sum of the squared market shares of each firm in the industry

Structure of the market – Measurement - example

Firm number	Market share
1	40
2	20
3	10
4	5
5	5
6	5
7	5
8	5
9	5

- 4-firm concentration ratio
= 0.40 + 0.20 + 0.10 +
0.05
= 0.75
- Herfindahl index
= $(0.40)^2 + (0.20)^2 +$
 $(0.10)^2 + \dots + (0.05)^2$
= 0.225

Structure of the market – Measurement – trade off

Firm number	Market share - I	Market share - II
1	40	64
2	20	4.5
3	10	4.5
4	5	4.5
5	5	4.5
6	5	4.5
7	5	4.5
8	5	4.5
9	5	4.5

- 4-firm concentration ratio:

Market I: 0.75

Market II: 0.775

- Herfindahl index

Market I: 0.225

Market II: 0.4258

Structure of the market – Measurement – problems

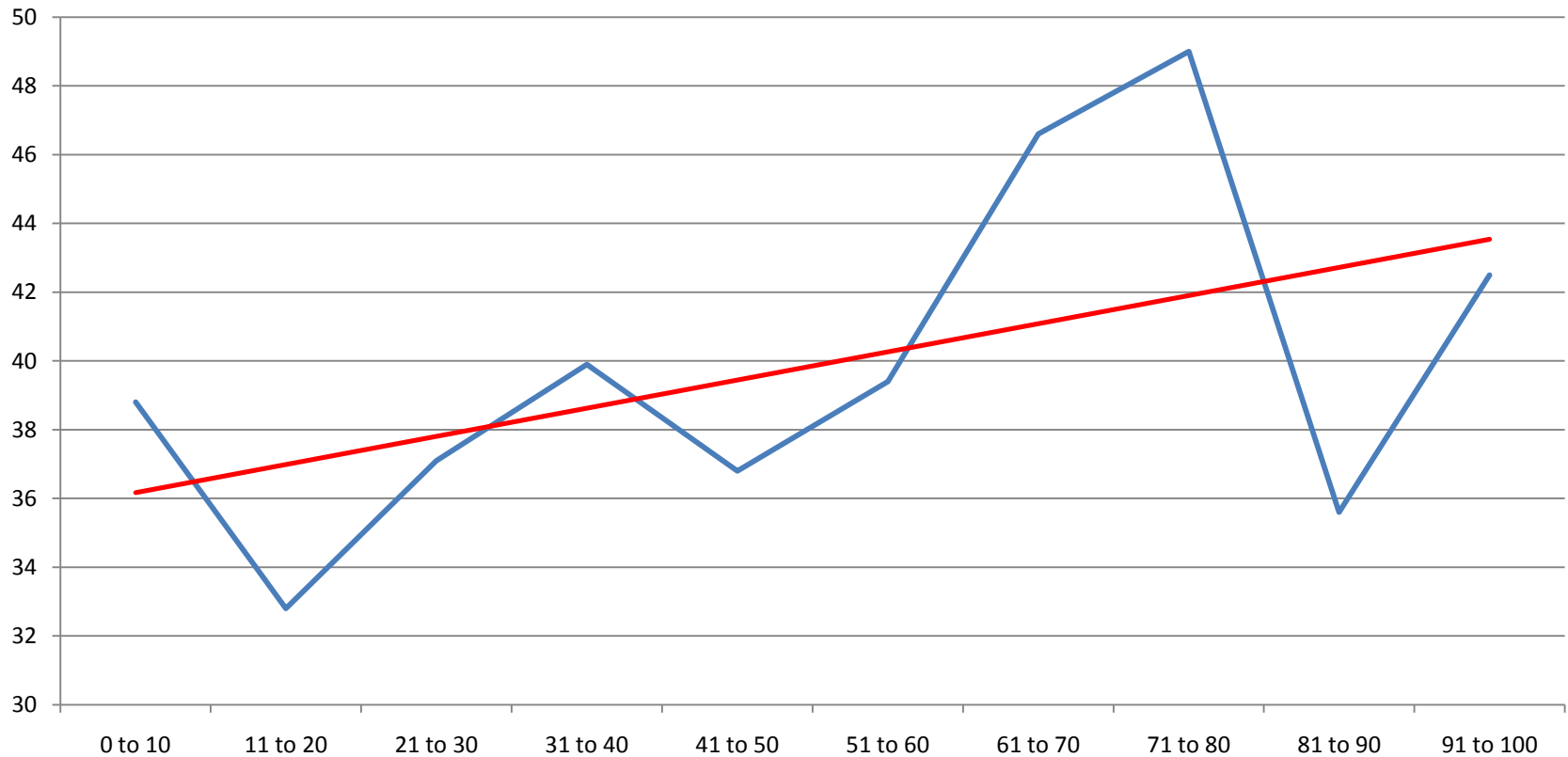
- It may simply reflect the profitability of the industry
- It is difficult to measure the size of the “economic” market
 - Domestic vs. international
 - Related products (tea and coffee)
- Buyer concentration
 - US market for electronic consumer products

Structure of the market – Determinants

- Scale (and scope) economies
- Cost advantages
- Product differentiation
- Capital requirements
- Unionization
- Institutions
 - Incumbency: can incumbents influence regulation?
 - Democracy: is it necessarily good for market entry?

Structure of the market – Determinants - example

Average capital-output ratio (1997)



Performance - measurement

- Returns to asset (or equity)
 - Profit per dollar of investment
- Price-cost margin
- Tobin's q
 - Ratio of market value of company to replacement cost of company
 - Problem: how efficient are capital markets?

Performance – measurement

Rates of return and economic profit - I

- Economic profit = Revenue – (Labour cost +
Material cost + Capital cost)
- Capital cost \equiv annual rental fees
 - Capital cost is a *flow* and not the cost of the *stock* of capital
- Capital assets should be valued at *replacement cost* for the rate of return to be an accurate indicator of whether new capital should be invested or whether the firm should be shut down

Performance – measurement

Rates of return and economic profit - II

- To be noted:
 - A rental rate must provide an owner of capital with a particular rate of return after accounting for depreciation

- Algebra:

$$\pi = R - \text{labour cost} - \text{material cost} - (r + \delta)p_K K$$

Setting $\pi = 0$ in a competitive market,

$$r = (R - \text{labour cost} - \text{material cost} - \delta p_K K) / p_K K \quad (1)$$

Performance – measurement

Rates of return and price

- Suppose that actual rate of return is 5% higher than the “normal” rate of return
- In order for rate of return to be “normal”, revenue must decline by 5% of value of capital
- Given the labour cost and the materials cost, the implication of this for the required change in price depends on the industry’s capital intensity
 - A high rate of return on capital does not necessarily imply that a firm is overcharging its customers significantly

Performance – measurement

Rates of return – problems

- Economic vs. accounting definitions of capital
 - Rental fee of all assets vs. book value of assets
 - Replacement cost vs. historical cost
- Measurement of depreciation
 - Straight line formula
- Valuing advertisement and R&D
 - Impact of future profitability
- Adjustment for inflation

Performance – measurement

Rates of return – problems (contd.)

- Separating profits from monopoly rent
- Impact of taxes
 - Differences in tax rates for different types of assets
- Adjustment for risk
 - Positive relationship between risks and returns
- Accounting for debt
 - Greater leverage associated with higher risk

Performance – measurement

Discussion – adjusting for risk

- Capital asset pricing model (CAPM)

- Expected return

$$E(R_i) = R_f + \beta[E(R_m) - R_f]$$

where

- $E(R_i)$ \equiv expected rate of return on asset i
- R_f \equiv risk-free rate of return
- $E(R_m)$ \equiv expected rate of return on the “market” portfolio
- β \equiv “beta” of the asset, a measure of risk

Performance – measurement

Price-cost margin

- Lerner index = $(P - MC)/P$

- It can be demonstrated that

$$(P - MC)/P = - 1/\varepsilon$$

(2)

- Check

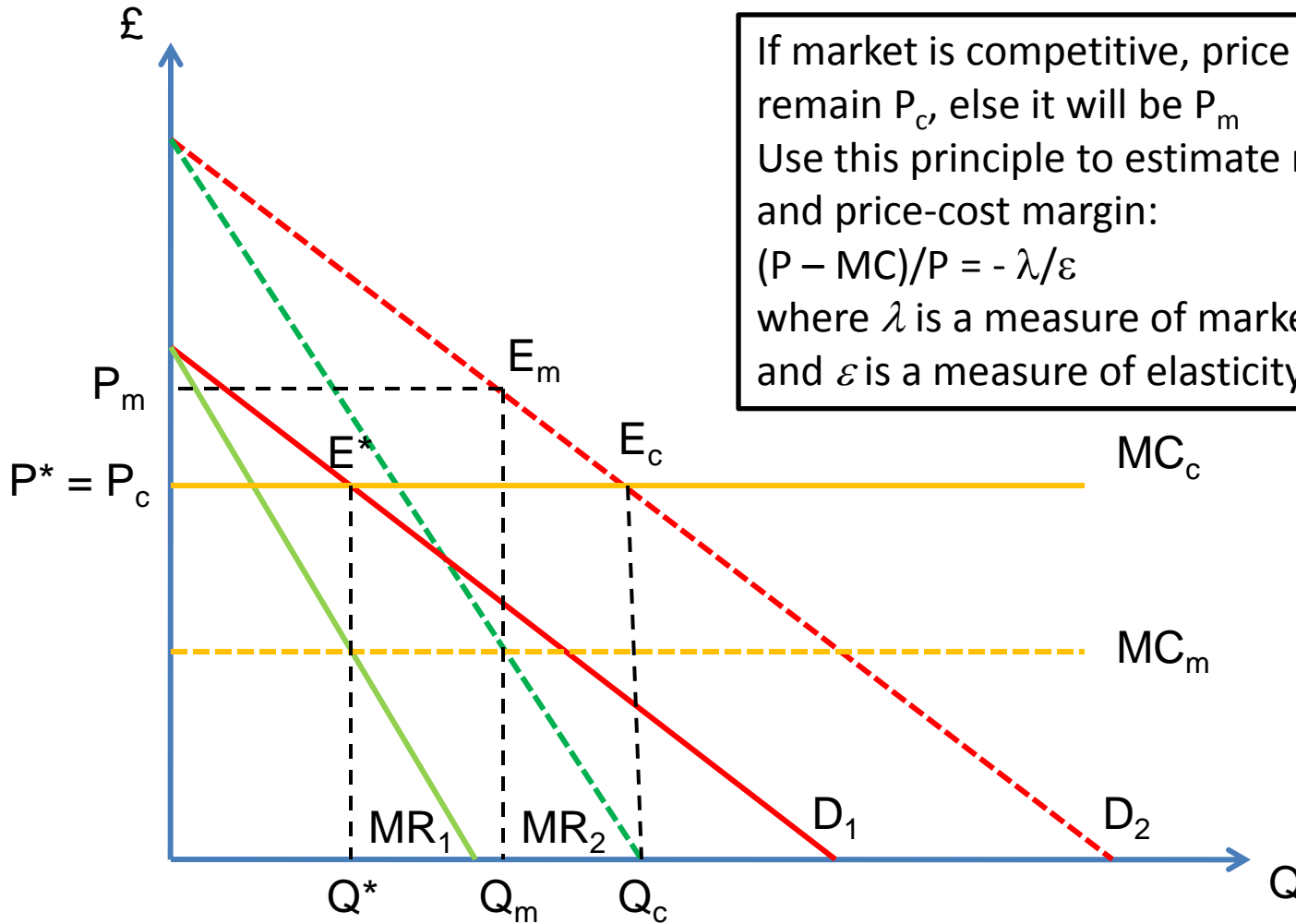
- In a perfectly competitive market, $\varepsilon = \text{infinity}$
- In a perfectly competitive market, $P = MC$

Performance – measurement

Price-cost margin (contd.)

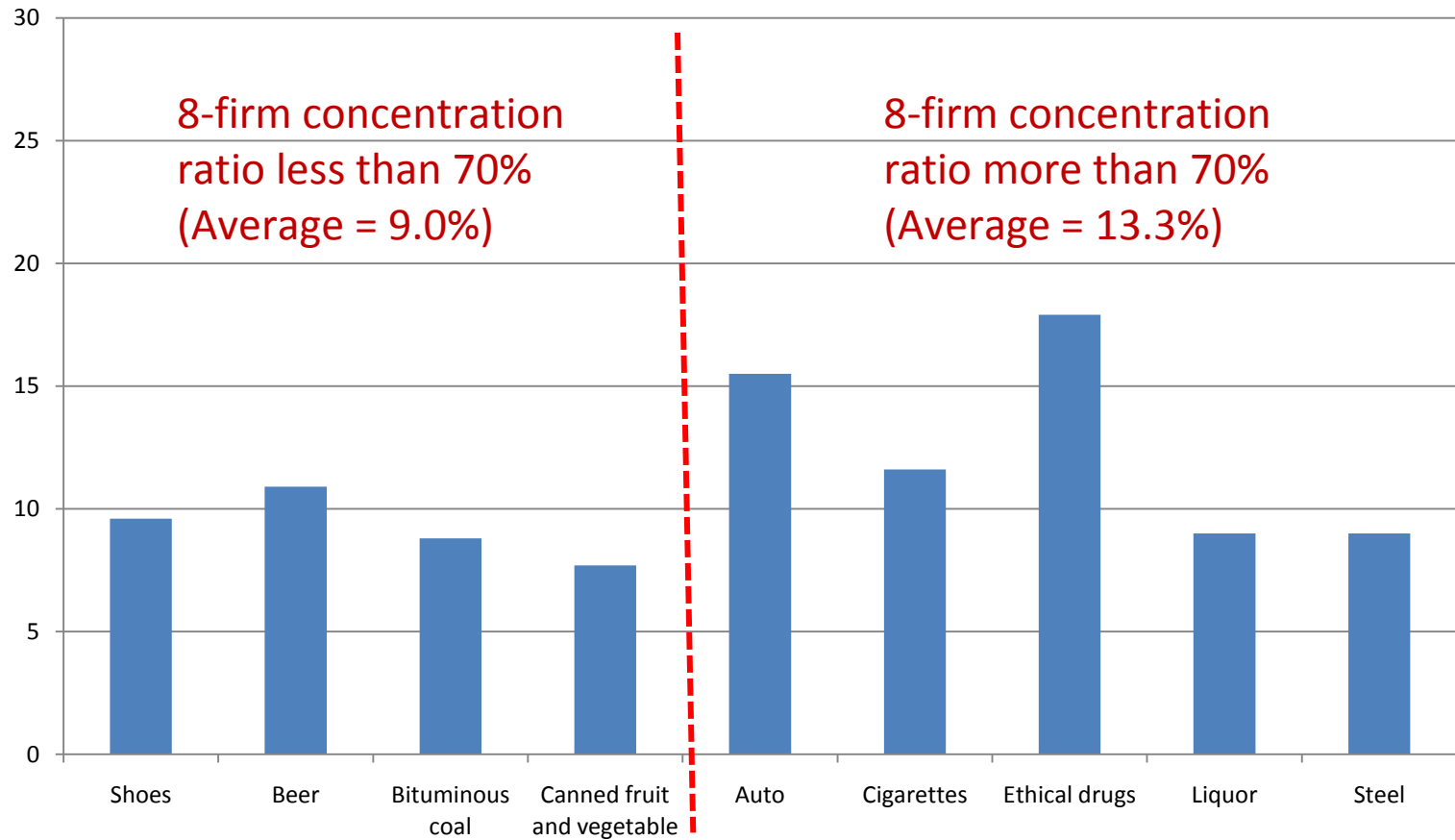
- Using AVC instead of (difficult to measure) MC
 - Implicit assumption: long-run constant returns to scale
- This results in a measurement bias: instead of (2), the price-cost margin becomes
 - $1/\varepsilon + (r + \delta)(p_K K/PQ)$

Measuring price-cost margin



If market is competitive, price will remain P_c , else it will be P_m
 Use this principle to estimate mark ups and price-cost margin:
 $(P - MC)/P = -\lambda/\varepsilon$
 where λ is a measure of market power and ε is a measure of elasticity of demand

Empirical evidence – Market structure and profitability



Source: C&P, pp. 260

Primer on linear regression models

- Model:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \varepsilon$$

- Output:

- Estimates of β_0 , β_1 and β_2
- Estimates of standard errors

- Statistical significance:

- The ratio of a β and its corresponding standard error (t-statistic) should be high (roughly, > 2)

Empirical evidence – Market structure and price-cost margin - I

- Model:
$$(P - AVC)/P = 0.16 + 0.10 C4 + 0.08 (p_K K/PQ)$$

(0.01) (0.02) (0.02)
- Implication:
 - Suppose $C4 = 0.50$ and $(p_K K/PQ) = 0.40$
 - Price-cost margin = 0.24, i.e., $P = 1.3AVC$ (P is 30% higher than average variable cost)
 - If $C4$ increases to 100% (or 1), then $P = 1.4AVC$
- Overall, the impact of concentration ratio on price-cost margin is unstable and ambiguous

Empirical evidence –

Market structure and price-cost margin - II

- Model:

$$\text{PCM} = - 22.3 + 0.183 S - 0.022 C4 + \text{others}$$

where S = market share of the firm

- An estimated positive correlation between PCM and C4 at the industry level may be incorrect, and does not reflect any causal relationship between the two variables

Empirical evidence – Conceptual problems

- The regression models estimate a long run relationship
 - How long is the “long run”?
- The regression models assume that market concentration is exogenously given
 - Scale (and scope) economies
 - Cost advantages (R&D and innovation)
 - Can incumbents influence regulation?

Sutton

- Sunk costs are exogenous
 - If firms can form cartels, profit margins are high, so new entrants are attracted and market concentration falls
 - If a market is highly contestable, profit margins are low, so new firms do not enter and market concentration remains high
- Sunk costs are endogenous
 - An increase in market size will increase average quality but will not reduce market concentration

Case study – Supermarket industry

- Observation:
 - Most retail markets are dominated by a handful of large firms
- Basis for competition:
 - Improving quality: number of products increased from 14,145 in 1980 to over 30,000 in 2004
- Sunk cost:
 - Increasing investment in stores and technology to manage products and supply chains