



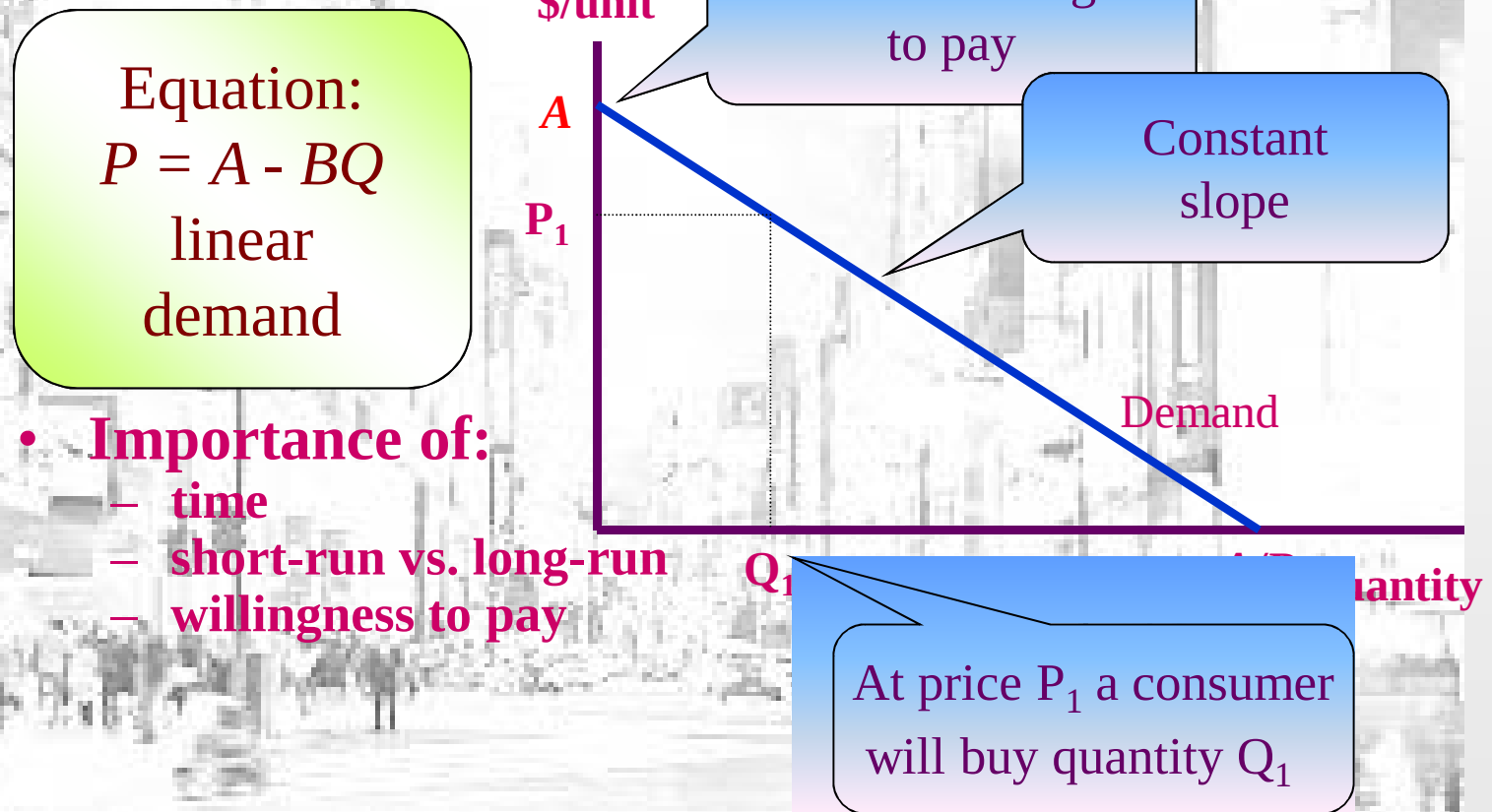
Basic Microeconomics

Efficiency and Market Performance

- **Contrast two polar cases**
 - perfect competition
 - monopoly
- **What is *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 Maximization: the Basics

- Focus on profit maximizing behavior of firms
- Take as given the **market demand curve**



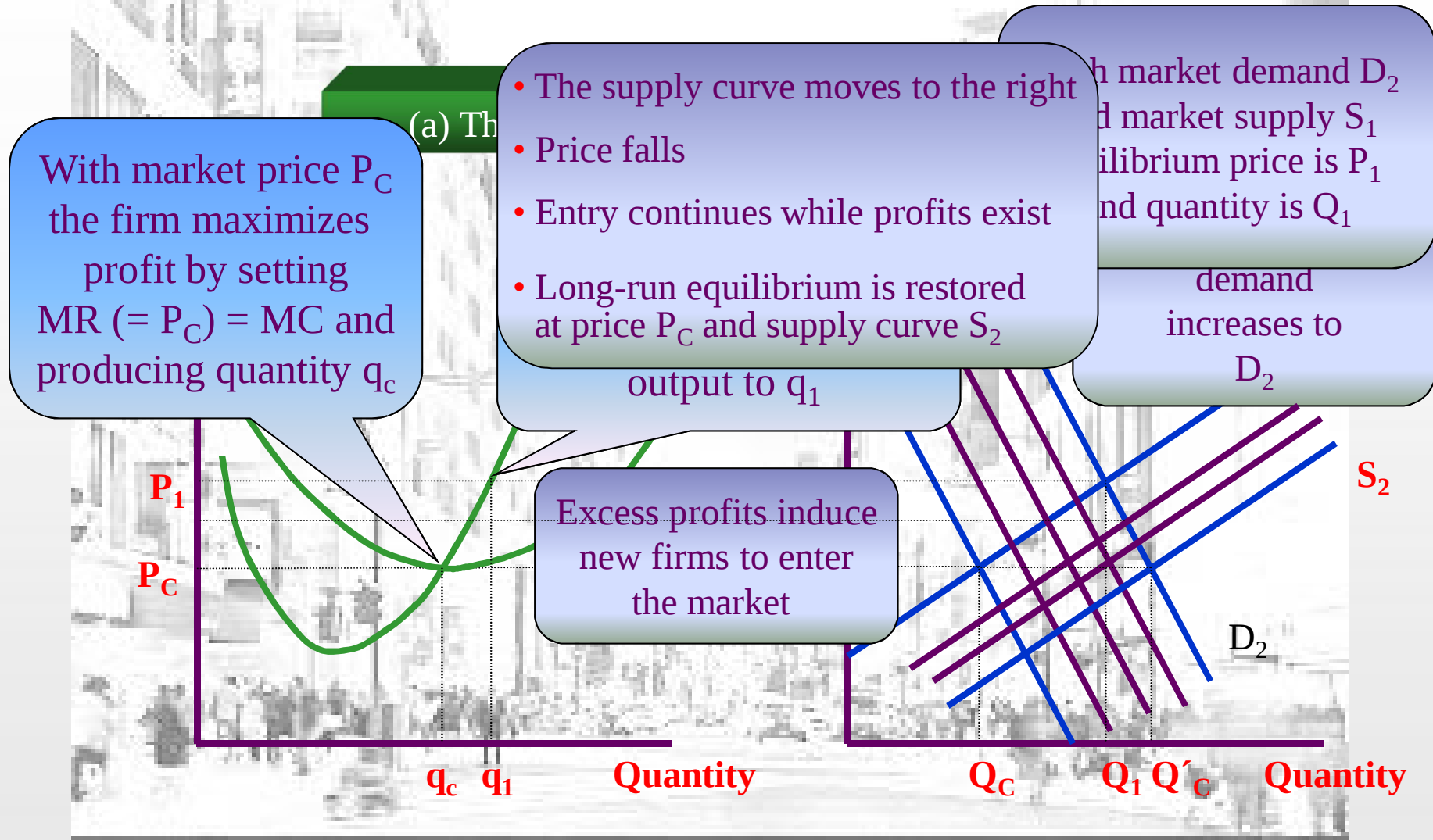
Perfect Competition

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

The First Order Condition: $MR = MC$

- Profit is $\pi(q) = R(q) - C(q)$
- Profit maximization: $d\pi/dq = 0$
- This implies $dR(q)/dq - dC(q)/dq = 0$
- But $dR(q)/dq =$ marginal revenue
- $dC(q)/dq =$ marginal cost
- So profit maximization implies $MR = MC$

Perfect competition: an illustration



Perfect competition: additional points

- Derivation of the short-run supply curve
 - this is the *horizontal* summation of the individual firms' marginal cost curves

Example 1: Three firms

Firm 1: $q = MC/4 - 2$

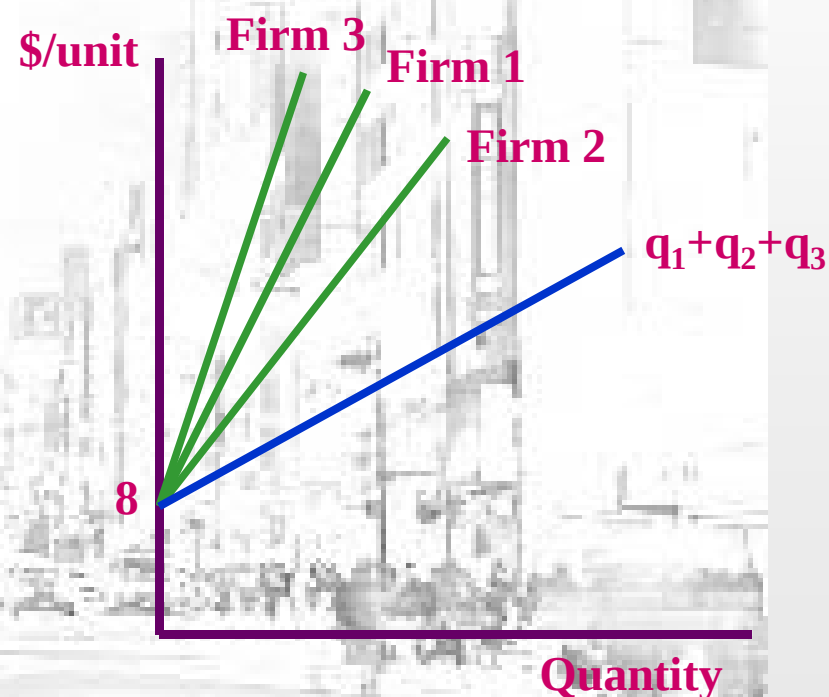
Firm 2: $q = MC/2 - 4$

Firm 3: $q = MC/6 - 4/3$

Invert these

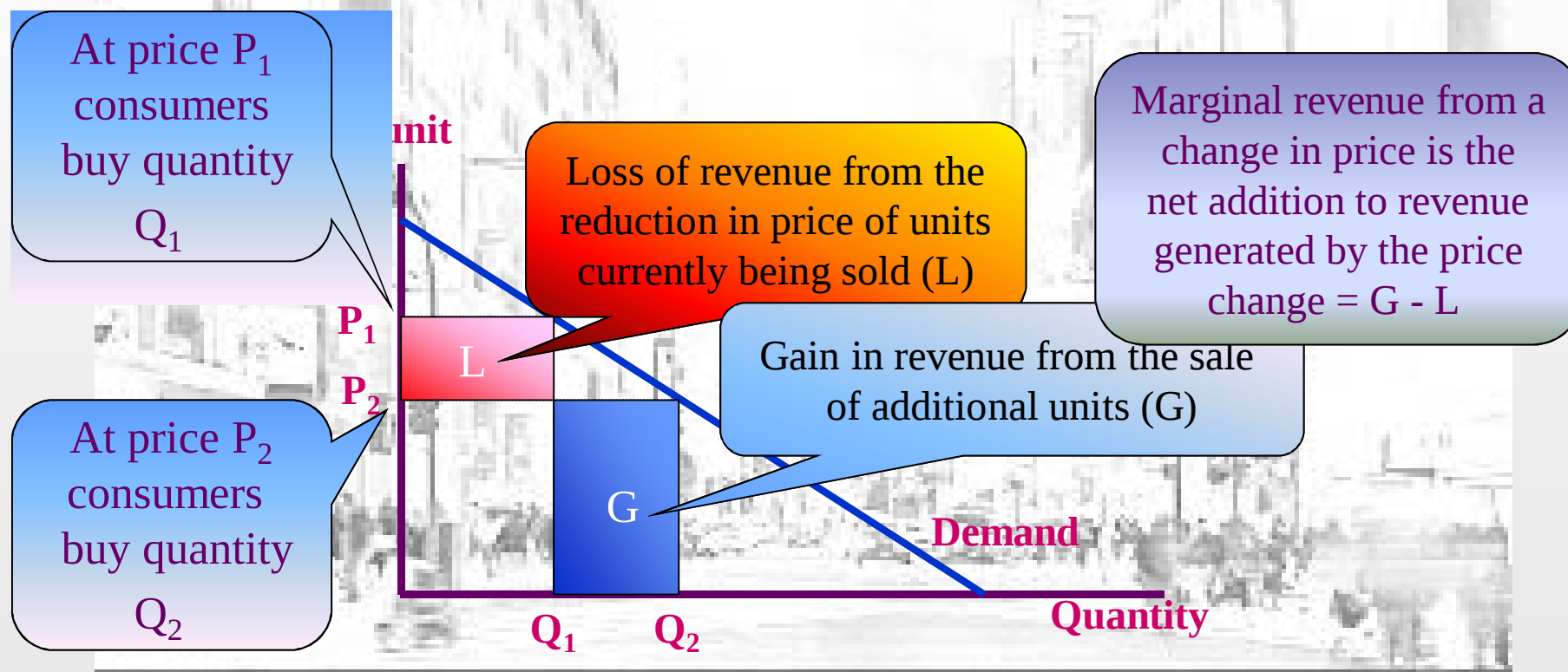
Aggregate: $Q = q_1 + q_2 + q_3$
 $= 11MC/12 - 22/3$

$MC = 12Q/11 + 8$



Monopoly

- The only firm in the market
 - market demand is the firm's demand
 - output decisions affect market clearing price



Monopoly 2

- Derivation of the monopolist's marginal revenue

Demand: $P = A - B.Q$

Total Revenue: $TR = P.Q = A.Q - B.Q^2$

Marginal Revenue: $MR = dTR/dQ$

∴ $MR = A - 2B.Q$

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

\$/unit

A

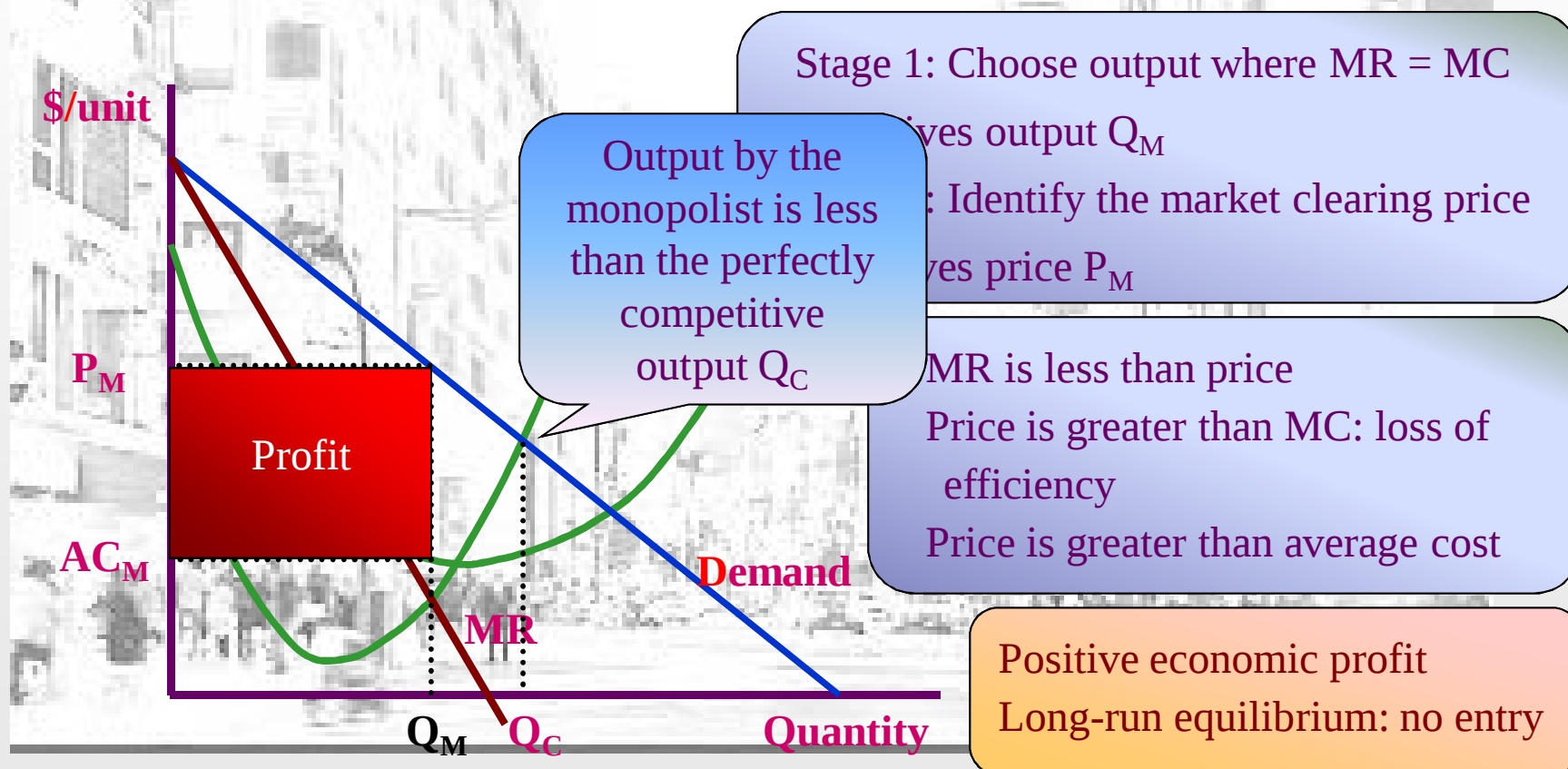
Demand

Quantity

MR

Monopoly and Profit Maximization

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



Efficiency and Surplus

- Can we reallocate resources to make some individuals better off without making others worse off?
- 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

Efficiency and Surplus 2

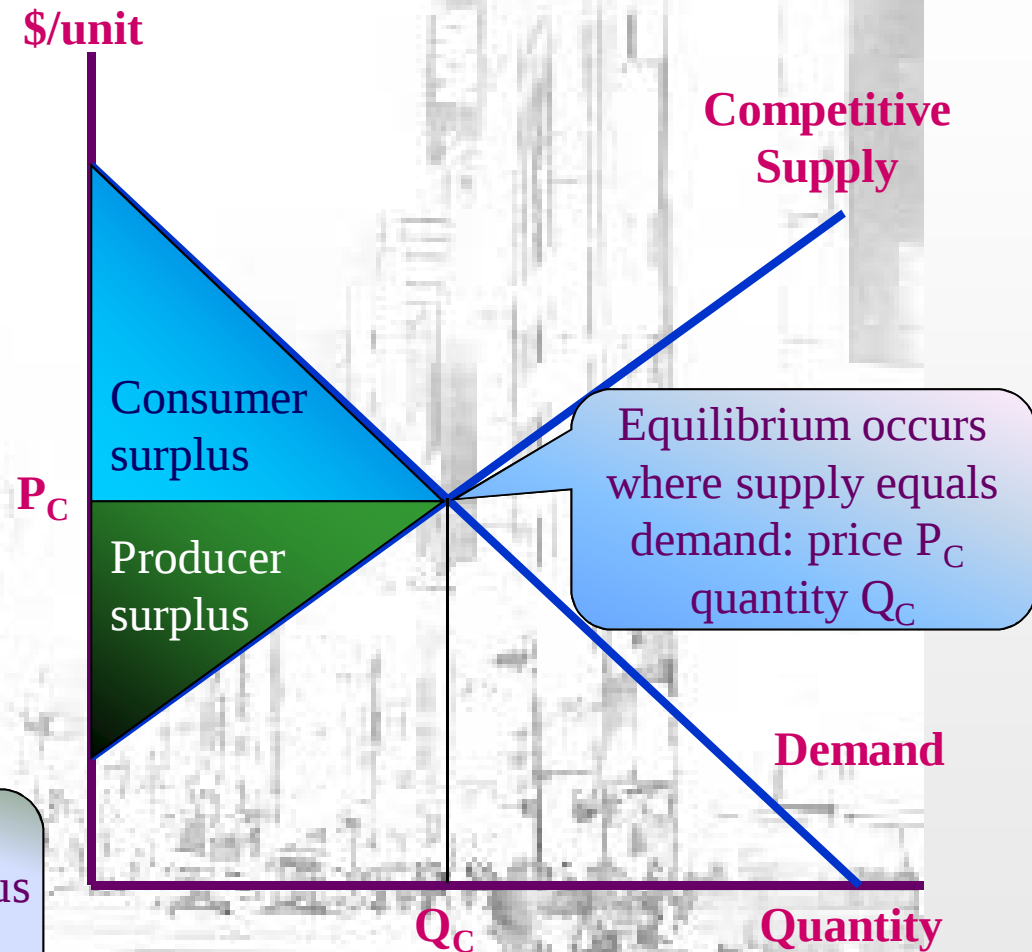
- ***producer surplus***: difference between the amount a producer receives from the sale of a unit and the amount that unit costs to produce
- aggregate producer surplus is the sum over all units produced and all producers
- ***total surplus*** = consumer surplus + producer surplus

Efficiency and surplus: illustration

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

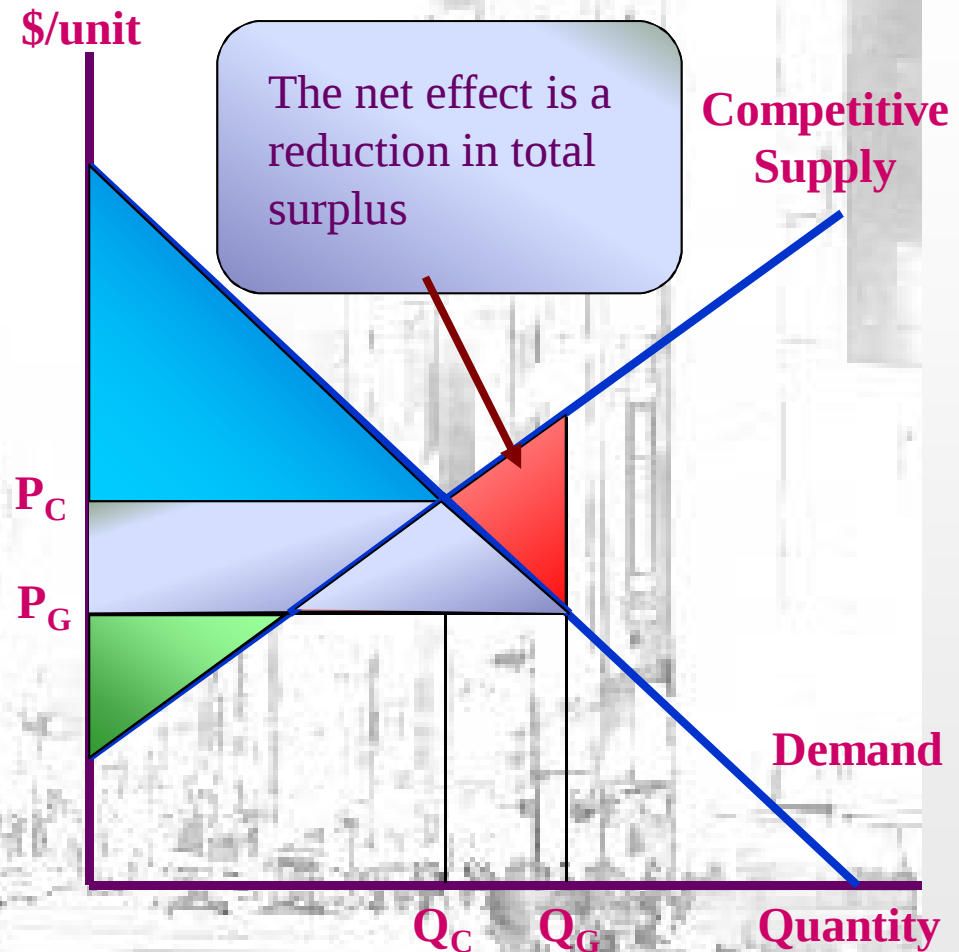


Efficiency and Surplus Illustration 2

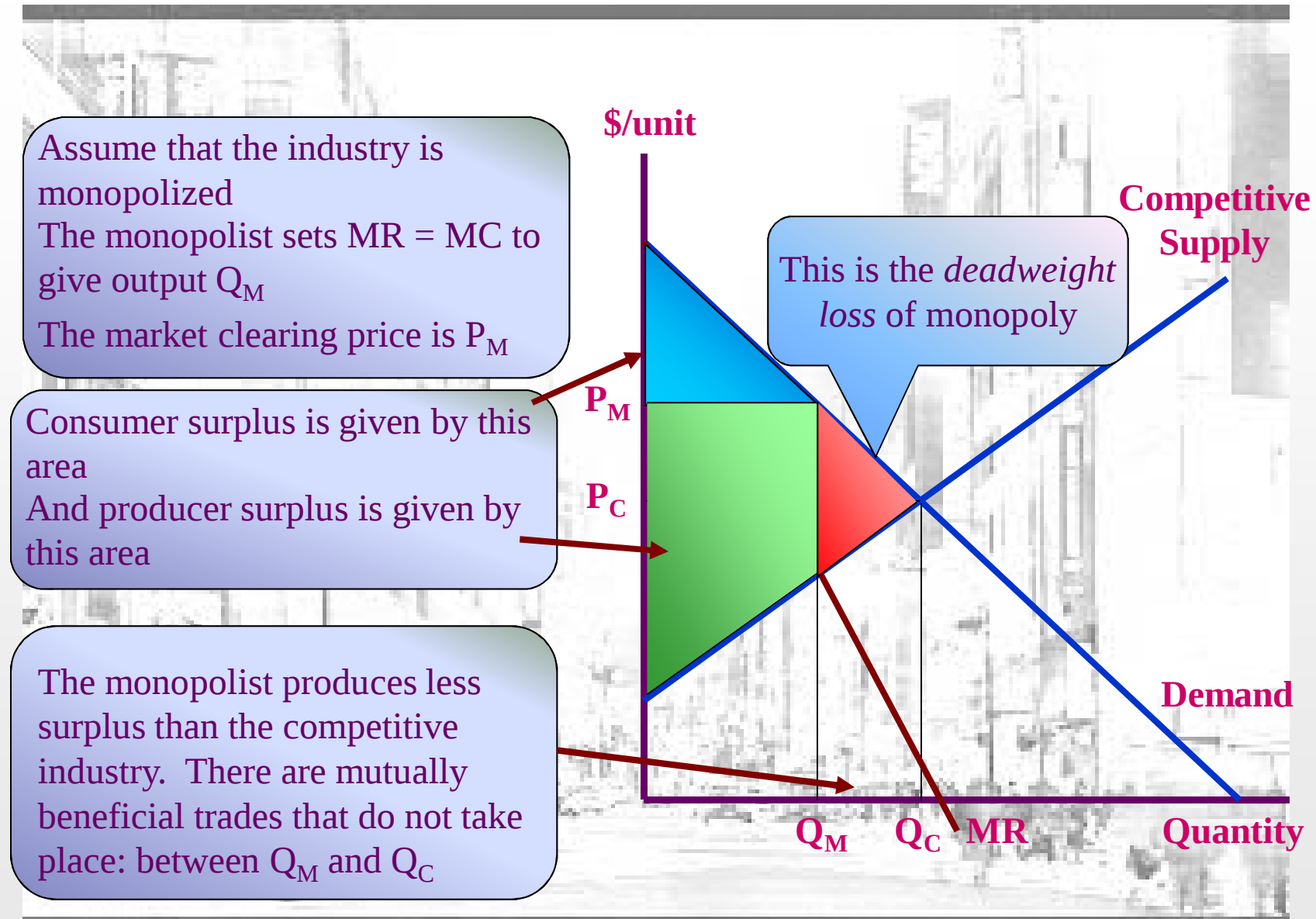
Assume that a greater quantity Q_G is traded
Price falls to P_G

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

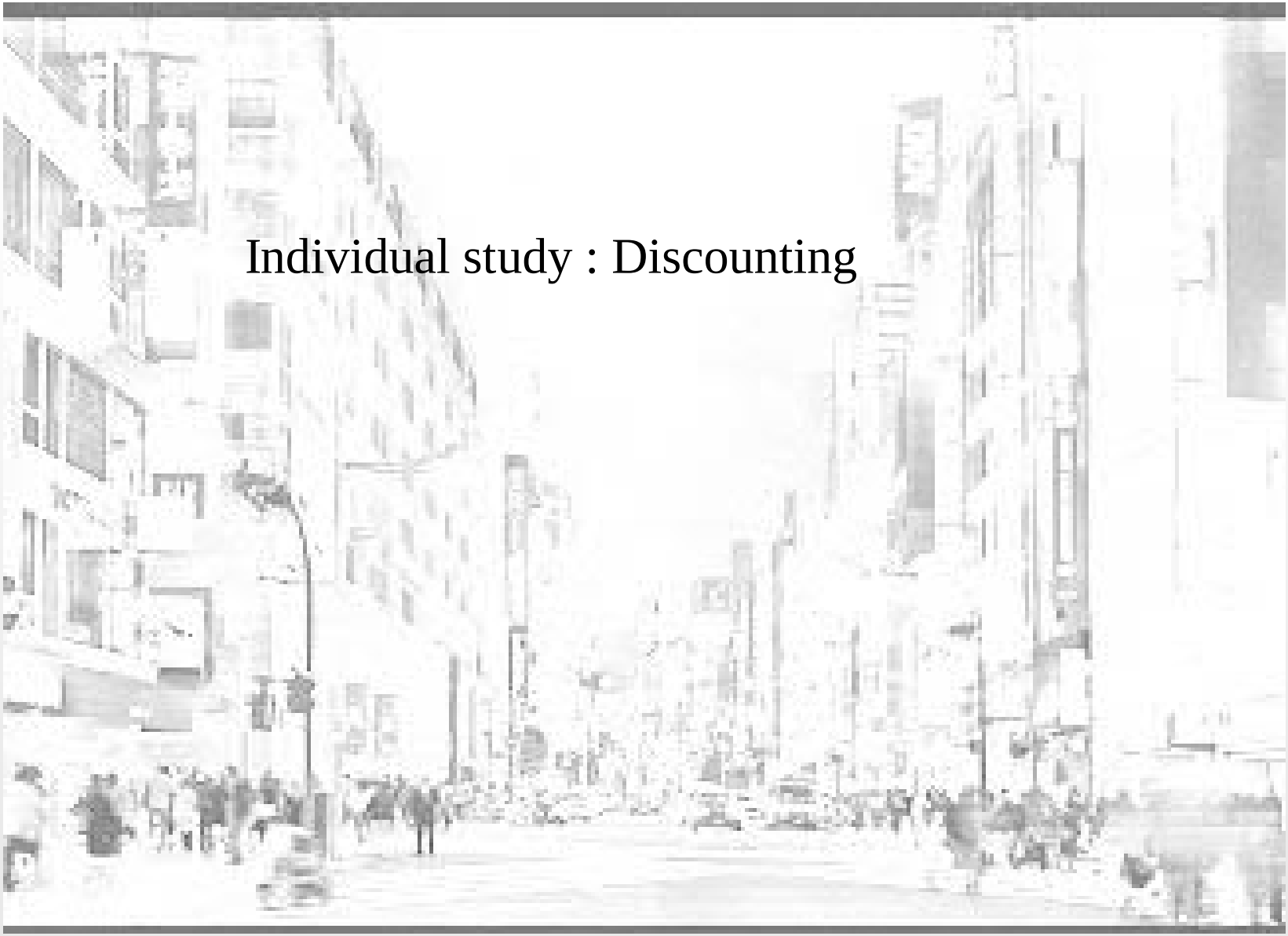


Deadweight loss of Monopoly



Deadweight loss of Monopoly 2

- 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*



Individual study : Discounting

Profit today versus profit tomorrow

- **Money today is not the same as money tomorrow**
 - need way to *convert* tomorrow's money into today's
 - important since firms make decisions over time
 - is it better to make profit now or invest for future profit?
 - how should investment in durable assets be judged?
 - sacrificing profit today imposes a cost
 - is this cost justified?
- **Financial market techniques can be applied**
 - the concept of *discounting* and *present value*

The concept of discounting

- Take a simple example:
 - you have \$1,000
 - this can be deposited in the bank at 5% per annum interest
 - or it can be loaned to a start-up company for one year
 - how much will the start-up have to contract to repay?
 - $\$1,000 \times (1 + 5/100) = \$1,000 \times 1.05 = \$1,050$
- More generally:
 - you have a sum of money Y
 - can generate an interest rate r per annum (in the example $r = 0.05$)
 - so it will grow to $Y(1 + r)$ in one year
 - but then Y today trades for $Y(1 + r)$ in one year's time

Concept of Discounting 2

- Put this another way:
 - assume an interest rate of 5% per annum
 - the start-up contracts to pay me \$1,050 in one year's time
 - how much do I have to pay for that contract today?
 - Answer: \$1,000 since this would grow to \$1,050 in one year
 - so in these circumstances \$1,050 in one year is worth \$1,000 today
 - the current price of the contract is $\$1,050/1.05 = \$1,000$
 - *the present value of \$1,050 in one year's time at 5% is \$1,000*
- More generally
 - the present value of Z in one year at interest rate r is $Z/(1 + r)$
- The **discount factor** is defined as $R = 1/(1 + r)$
- The present value of Z in one year is then RZ

Concept of Discounting 3

- **What if the loan is for two years?**
 - How much must start-up promise to repay in two years' time?
 - \$1,000 grows to \$1,050 in one year
 - the \$1,050 grows to \$1,102.50 in a further year
 - so the contract is for \$1,102.50
 - note: $\$1,102.50 = \$1,000 \times 1.05 \times 1.05 = \$1,000 \times 1.05^2$
- **More generally**
 - a loan of Y for 2 years at interest rate r grows to $Y(1 + r)^2 = Y/R^2$
 - Y today grows to Y/R^2 in 2 years
 - a loan of Y for t years at interest rate r grows to $Y(1 + r)^t = Y/R^t$
 - Y today grows to Y/R^t in t years
- **Put another way**
 - *the present value of Z received in 2 years' time is R^2Z*
 - *the present value of Z received in t years' time is R^tZ*

Concept of Discounting 4

- Now consider how to evaluate an investment project
 - generates Z_1 net revenue at the end of year 1
 - Z_2 net revenue at the end of year 2
 - Z_3 net revenue at the end of year 3 and so on for T years
- What are the net revenues worth today?
 - Present value of Z_1 is RZ_1
 - Present value of Z_2 is R^2Z_2
 - Present value of Z_3 is $R^3Z_3 \dots$
 - Present value of Z_T is R^TZ_T
 - so the present value of these revenue streams is:
 - $PV = RZ_1 + R^2Z_2 + R^3Z_3 + \dots + R^TZ_T$

Concept of Discounting 5

- **Two special cases can be considered**

Case 1: The net revenues in each period are identical

$$Z_1 = Z_2 = Z_3 = \dots = Z_T = Z$$

Then the present value is:

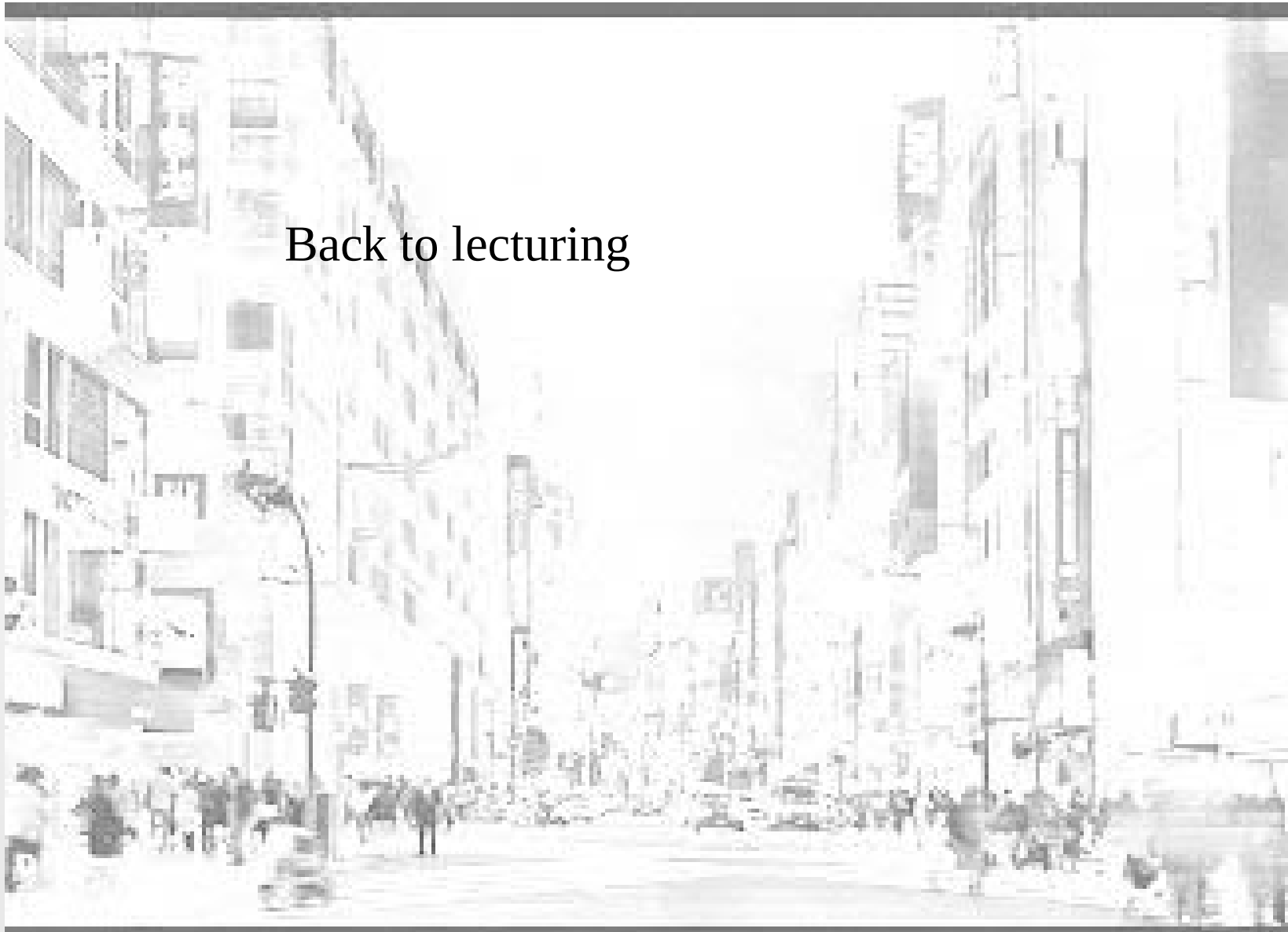
$$PV = \frac{Z}{(1 - R)} (R - R^{T+1})$$

Case 2: These net revenues are constant and perpetual

Then the present value is:

$$PV = Z \frac{R}{(1 - R)} = Z/r$$

Back to lecturing



Present value and profit maximization

- Present value is directly relevant to profit maximization
- 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 maximize its value

Time and the Evolution of Industry Structure

- How did an industry evolve to its current structure?
- In the long-run there must be no incentive for the industry structure to change
- No firm can profitably enter or exit
 - Price less than average cost for potential entrants
 - Price covers costs for incumbents
- Incumbents may take actions to deter entrants



Market Structure and Market Power

Introduction

- Industries have very different structures
 - numbers and size distributions of firms
 - **ready-to-eat breakfast cereals: high concentration**
 - **newspapers: low concentration**
- How best to measure market structure
 - summary measure
 - concentration curve is possible
 - preference is for a *single number*
 - **concentration ratio or Herfindahl-Hirschman index**

Measure of concentration

- Compare two different measures of concentration:

Firm Rank Market	Market Share (%)	Squared Share
1	25	625
2	25	625
3	25	625
4	5	25
5	5	25
6	5	25
7	5	25
8	5	25
Concentration Index	$CR_4 = 80$	$H = 2,000$

Concentration index is affected by, e.g. merger

Firm Rank	Market Share (%)	Squared Market Share
1	25	625
2	25	625
3	25	625
4	5	25
5	5	25
6	5	25
7	5	25
8	5	25
Concentration Index		CR ₄ = 80
		85
		H = 2,000
		2,050

Assume that firms 4 and 5 decide to merge

Market shares change

The Concentration Index changes

10

100

What is a market?

- No clear consensus
 - the market for automobiles
 - *should we include light trucks; pick-ups SUVs?*
 - the market for soft drinks
 - *what are the competitors for Coca Cola and Pepsi?*
 - With whom do McDonalds and Burger King compete?
- Presumably define a market by *closeness* in substitutability of the commodities involved
 - how close is close?
 - how homogeneous do commodities have to be?
 - *Does wood compete with plastic? Rayon with wool?*



Market definition 2

- **Definition is important**
 - without consistency concept of a market is meaningless
 - need indication of competitiveness of a market: affected by definition
 - public policy: decisions on mergers can turn on market definition
 - *Staples/Office Depot* merger rejected on market definition
 - *Coca Cola* expansion turned on market definition
- **Standard approach has some consistency**
 - based upon industrial data
 - substitutability in production not consumption (ease of data collection)

Market definition 3

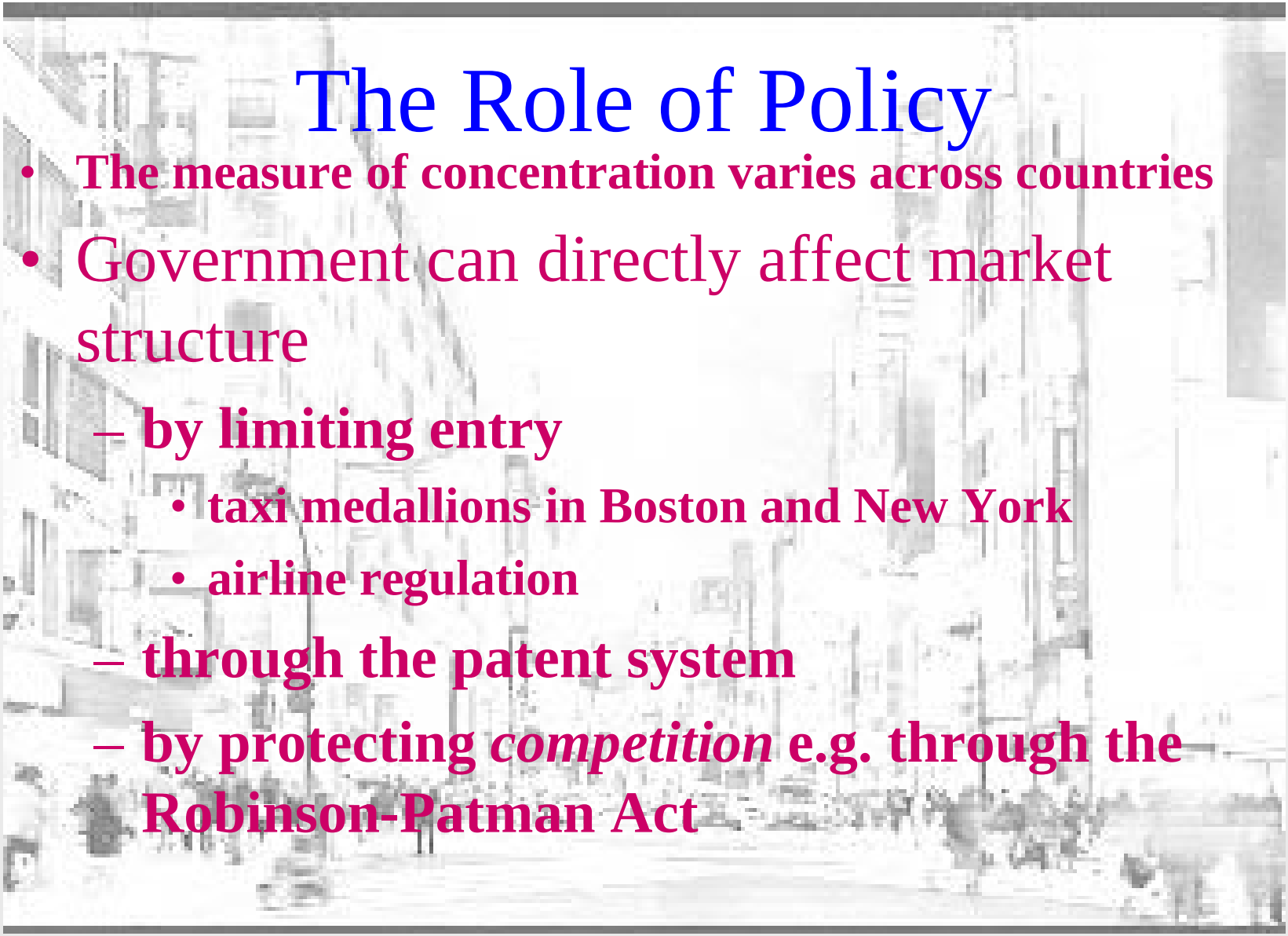
- **Government statistical sources**
 - FedStats
 - [Naics](#)
- **The measure of concentration varies across countries**
- **Use of production-based statistics has limitations:**
 - can put in different industries products that are in the same market
- **The international dimension is important**
 - Boeing/McDonnell-Douglas merger
 - relevant market for automobiles, oil, hairdressing

Market definition 4

- **Geography is important**
 - barrier to entry if the product is expensive to transport
 - *but* customers can move
 - what is the relevant market for a beach resort or ski-slope?
- **Vertical relations between firms are important**
 - most firms make *intermediate* rather than *final* goods
 - firm has to make a series of make-or-buy choices
 - upstream and downstream production
 - measures of concentration may assign firms at different stages to the same industry
 - do vertical relations affect underlying structure?

Market definition 5

- Firms at different stages may also be assigned to *different industries*
 - bottlers of soft drinks: low concentration
 - suppliers of soft drinks: high concentration
 - the bottling sector is probably not competitive.
- In sum: market definition poses real problems
 - existing methods represent a reasonable compromise



The Role of Policy

- The measure of concentration varies across countries
- Government can directly affect market structure
 - by limiting entry
 - taxi medallions in Boston and New York
 - airline regulation
 - through the patent system
 - by protecting *competition* e.g. through the Robinson-Patman Act

More Market Definitions

- One measure of the closeness of products is the *cross-price elasticity of demand*

$$\eta_{ij} = \frac{\partial q_i}{\partial p_j} \frac{p_j}{q_i}$$

- Antitrust authorities use the smallest set of products in which a hypothetical monopolist could profitably impose a small (say five percent) “but significant and non-transitory price increase” (SSNIP)

Measuring Market Power/Performance

- Market structure is often a guide to market performance
- But this is not a perfect measure
 - can have near competitive prices even with “few” firms
- Also, strong price competition may allow fewer firms to survive, leading to higher concentration
- Measure market performance using the *Lerner Index*

$$LI = \frac{P - MC}{P}$$

Market Performance 2

- **Perfect competition: $LI = 0$ since $P = MC$**
- **Monopoly: $LI = 1/\eta$ – inverse of elasticity of demand**
- **With more than one but not “many” firms, the Lerner Index is more complicated: need to average.**
 - suppose the goods are homogeneous so all firms sell at the same price

$$LI = \frac{P - \sum s_i MC_i}{P}$$

Lerner Index: Limitations

- **LI has limitations**
 - **measurement: as with “measuring” a market**
 - **meaning: measures outcome but not necessarily performance**
 - **misspecification:**
 - **if there are sunk entry costs that need to be covered by positive price-cost margin**
 - **low price by a high-cost incumbent to protect its market**