

Chapter 2 Conceptual Foundations of CBA

Pareto Efficiency

Most important **criterion** on microeconomics theory

Efficiency = **Pareto Efficiency**

We cannot find a way to make some people better off without making anybody else worse off

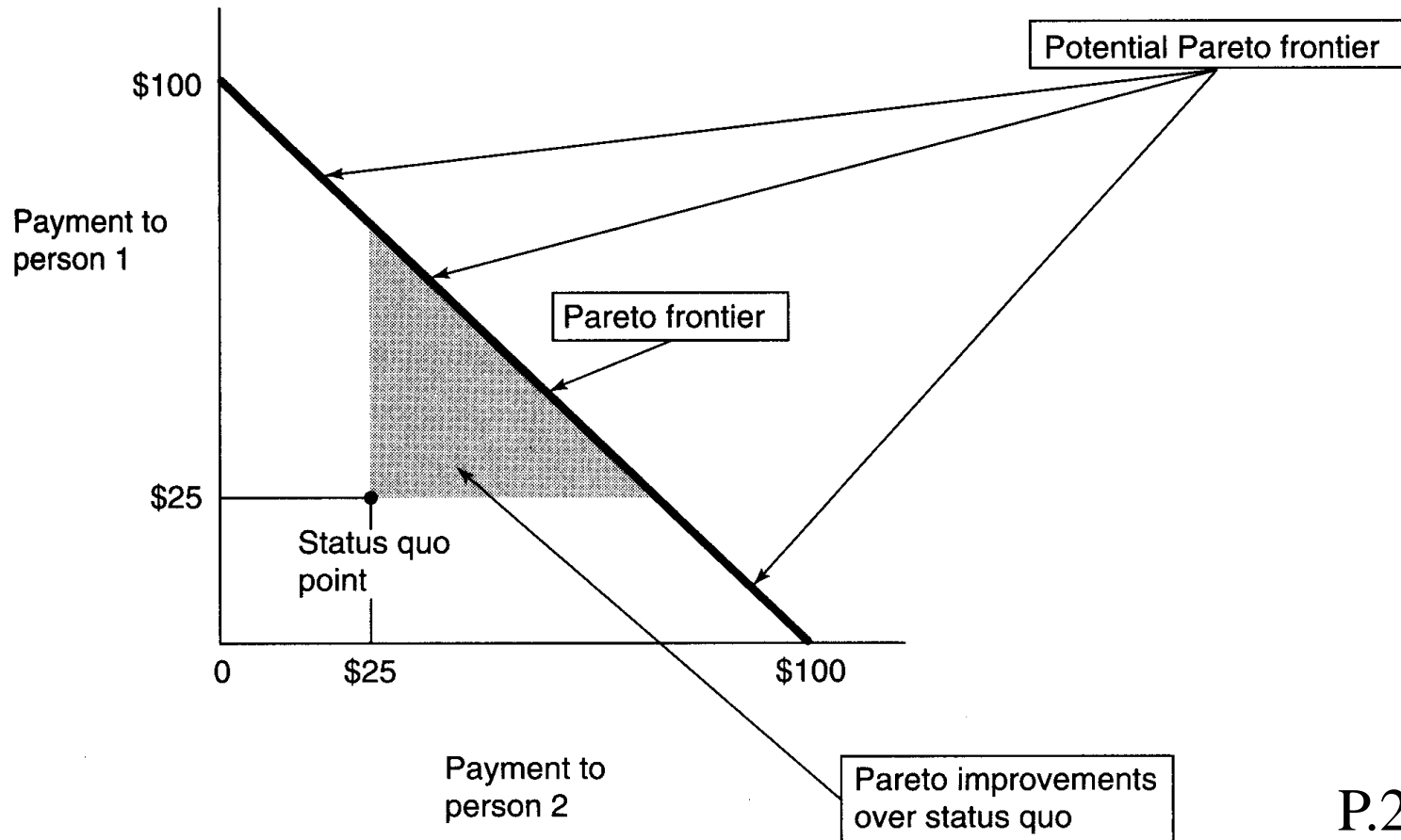
Pareto Improvement  **Pareto Inefficiency**

No Pareto Improvement  **Pareto Efficiency**

* The outcome of the competitive market is Pareto efficient

Pareto Efficiency

We cannot find a way to make some people better off without making anybody else worse off



Net (Social) Benefits and Pareto Efficiency

If a policy (or project, measure) has positive net social benefits (= present social benefit – present social cost), then it is possible to find a set of transfer that makes at least one person better off without making anyone else worse off.

Willingness-to-Pay (WTP)

Person 1: \$100

Person 2: \$200

Person 3: - \$250 (Willingness-to-Accept, WTA)

Net Benefit +\$50

(Not Pareto Efficiency)



Compensation

1 to 3: \$75

2 to 3: \$175

1: \$25 (=100-75)

2: \$25 (=200-175)

3: \$ 0 (=75+175-250)

Potential Pareto Efficiency

Kaldor-Hicks Criterion

Basis for the Potential Pareto Efficiency rule = Net Benefit Criterion
Positive Net Benefit

A policy should be adopted if and only if those who will gain could fully compensate those who will lose and still be better off.

Justification of Potential Pareto Efficiency

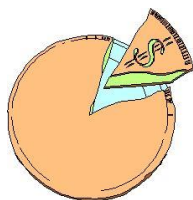
- Society maximizes aggregate wealth
- Different policies will have different sets of winners and losers
- Contrast to the incentives in representative political systems
- Equity of wealth or income will be addressed after adopting efficient policies

Pareto Efficiency and Equity

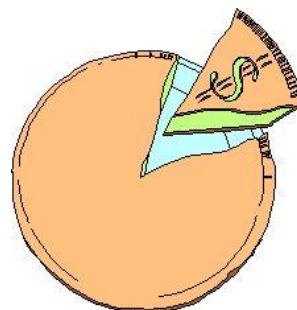
Criterion for comparing the outcomes of different situation

Social Net Benefit express efficiency, but do not consider equity.

Raw
Material



or



Pareto inefficient

Pareto efficient

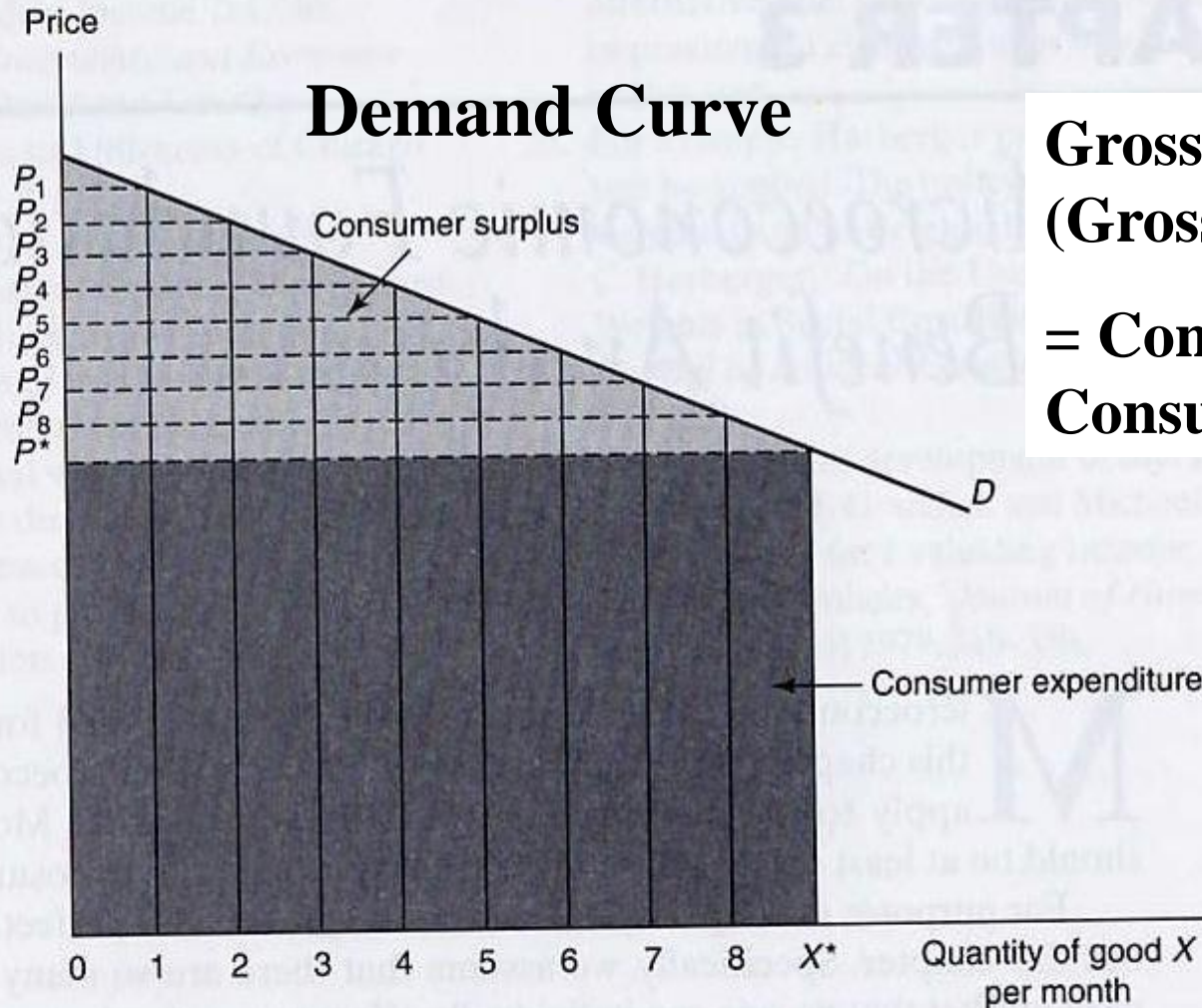
How to distribute?
= Equity

e.g. USA (2012)
“We are the 99%”



Chapter 3 Microeconomic Foundations of CBA

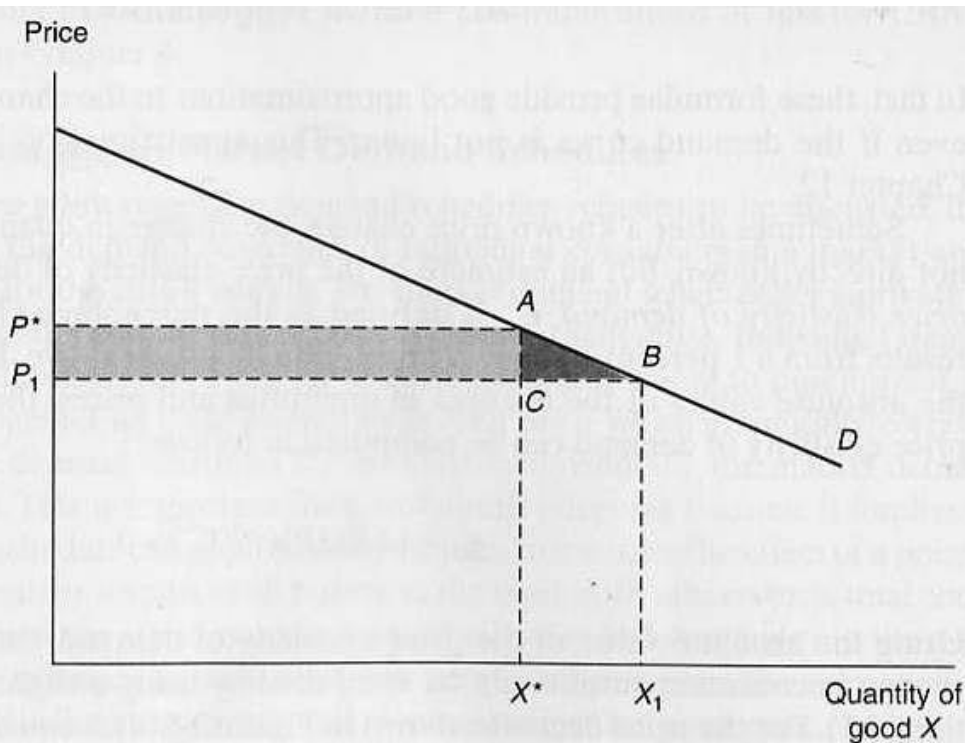
Demand Curve



**Gross Surplus
(Gross Benefit)**

**= Consumer Surplus +
Consumer Expenditure**

Change in Consumer Surplus = Benefit



$$\Delta CS = \frac{1}{2}(P^* - P_1)(X^* + X_1)$$

$$|P^* - P_1| = \Delta P, |X^* - X_1| = \Delta X$$

$$\Delta CS = (\Delta P)(X^*) + \frac{1}{2}(\Delta P)(\Delta X)$$

Price elasticity of demand

$$E_d = \frac{|\Delta X / X^*|}{|\Delta P / P^*|} = \frac{P^*}{X^*} \frac{\Delta X}{\Delta P}$$

P.54

% change of in quantity divided by
% change of in price

Tax and Deadweight Loss

Price increase by tax

$$P^* \rightarrow P_2$$

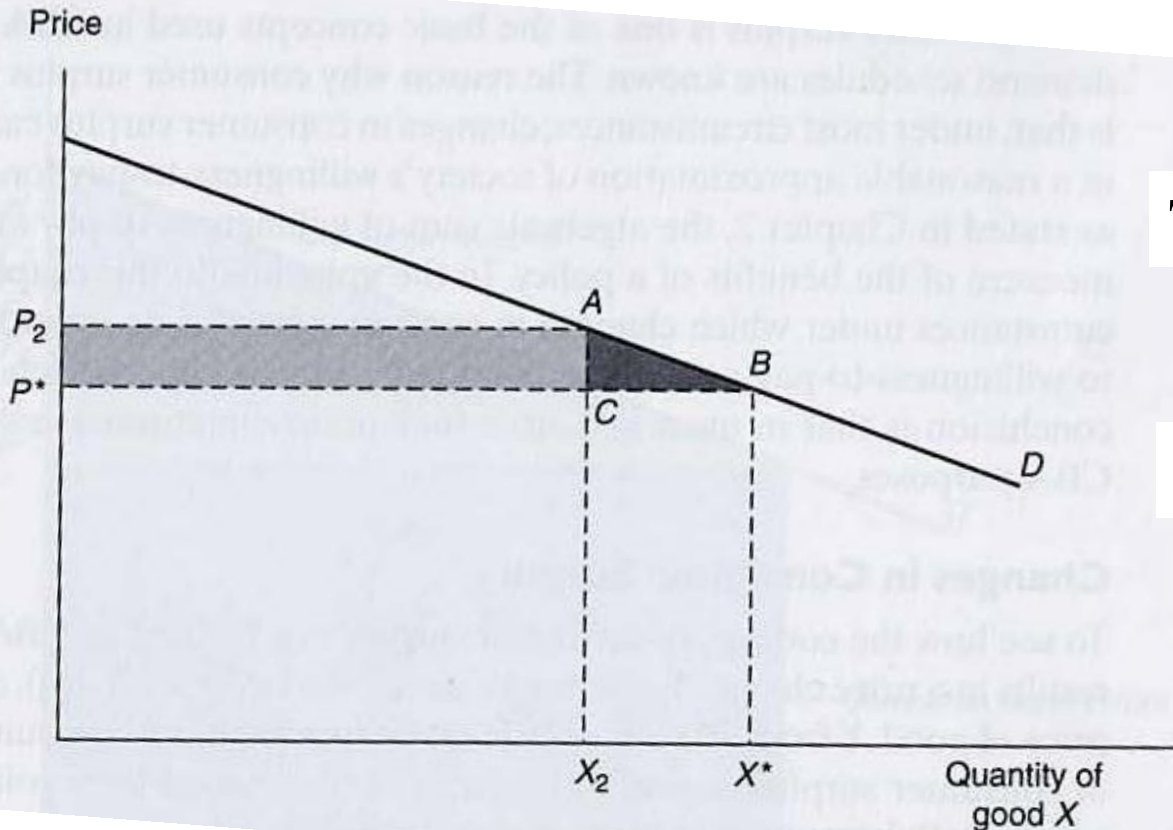
Tax Revenue P_2ACP^*

“Transfer”

Deadweight Loss ΔABC

No offset benefit

Pareto Inefficiency



Supply Side and Cost

Average cost (AC)

Cost per unit output

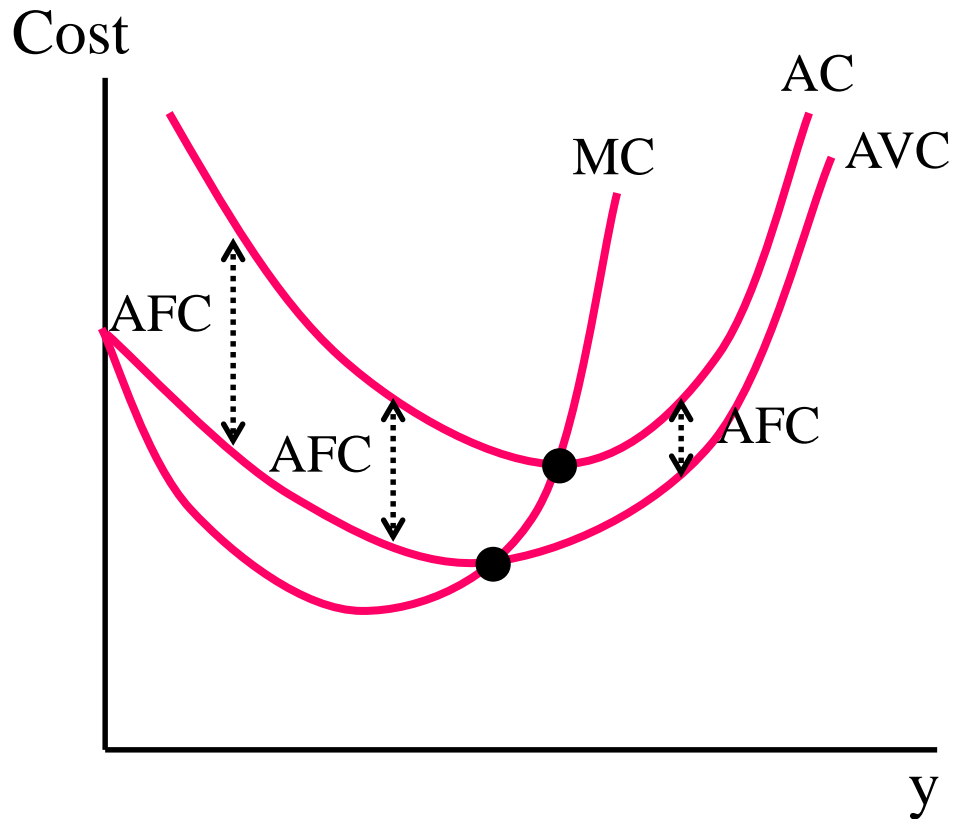
$$\begin{aligned} \text{AC (y)} &= \text{Total cost (TC)} / \text{output (y)} \\ &= \text{Variable cost (VC)} / y + \text{Fixed cost (FC)} / y \\ &= \text{Average variable cost (AVC)} + \text{Average fixed cost (AFC)} \end{aligned}$$

Marginal Cost (MC)

Change in cost due to change in output (Rate of change as increased by one unit)

$$\begin{aligned} \text{MC (y)} &= \Delta \text{TC} / \Delta y \\ &= \Delta \text{VC} / \Delta y + (\Delta \text{FC} / \Delta y = 0): \text{ fixed cost do not change as output changes} \\ &= \Delta \text{VC} / \Delta y = \text{VC}' (y) \end{aligned}$$

Cost Curve



- MC and AVC may initially slope down but need not. It will eventually rise for fixed factors that constrain production.
- AC will initially fall due to declining fixed costs but rise due to the increasing AVC.
- MC passes through the minimum point of both AVC and AC.

Ex. MC is constant

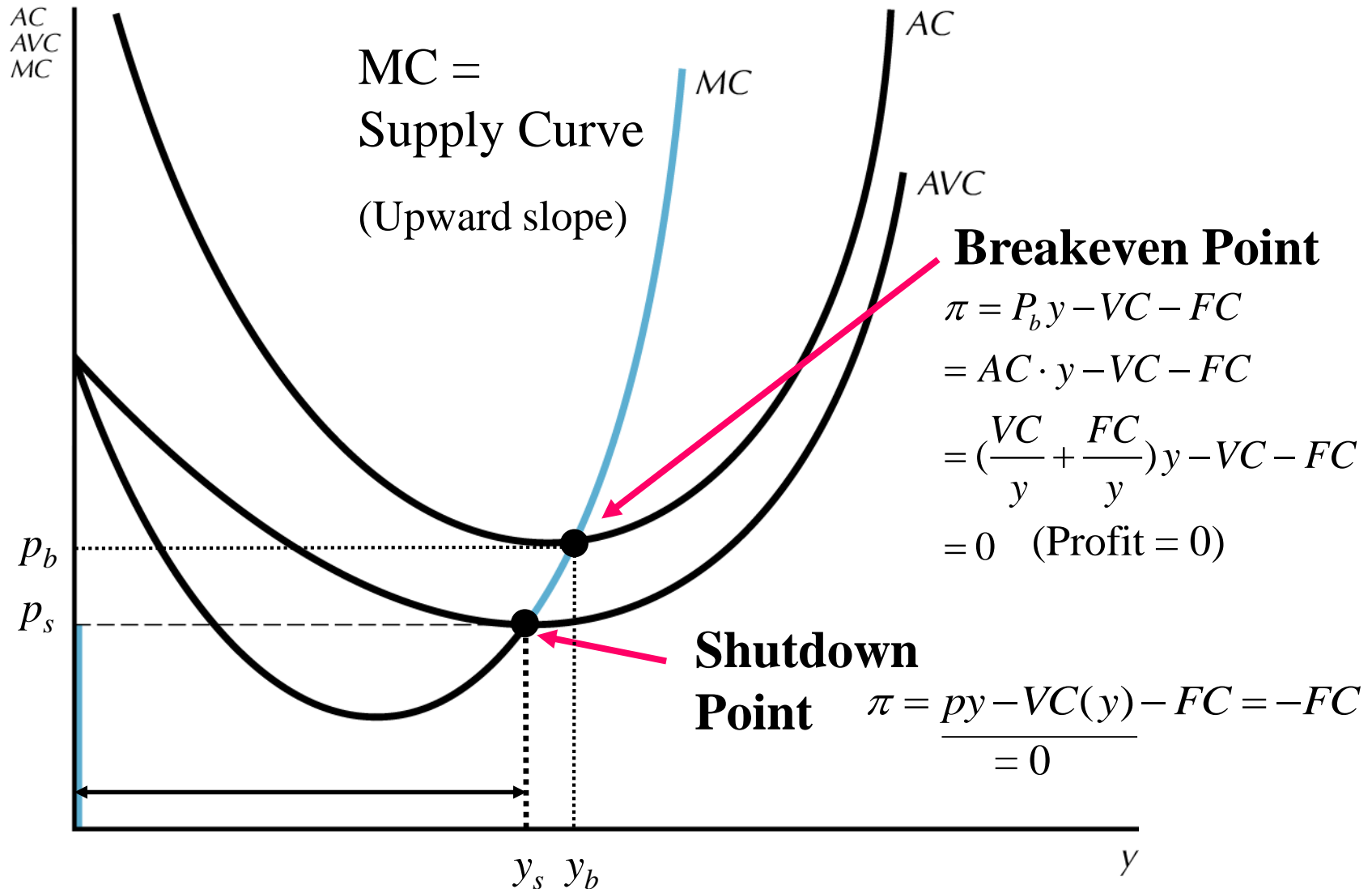
Ex. MC has optimum value

Q	MC	AVC	AFC	AC	Q	MC	AVC	AFC	AC
1	100	100	100	200	1	100	100.0	100	200
2	100	100	50	150	2	95	97.5	50	148
3	100	100	33	133	3	90	95.0	33	128
4	100	100	25	125	4	80	91.3	25	116
5	100	100	20	120	5	70	87.0	20	107
6	100	100	17	117	6	60	82.5	17	99
7	100	100	14	114	7	70	80.7	14	95
8	100	100	13	113	8	80	80.6	13	93.1
9	100	100	11	111	9	90	81.7	11	92.8
10	100	100	10	110	10	95	83.0	10	93.0
11	100	100	9	109	11	100	84.5	9	94
12	100	100	8	108	12	110	86.7	8	95
13	100	100	8	108	13	120	89.2	8	97
14	100	100	7	107	14	130	92.1	7	99
15	100	100	7	107	15	140	95.3	7	102

Marginal Cost Curve

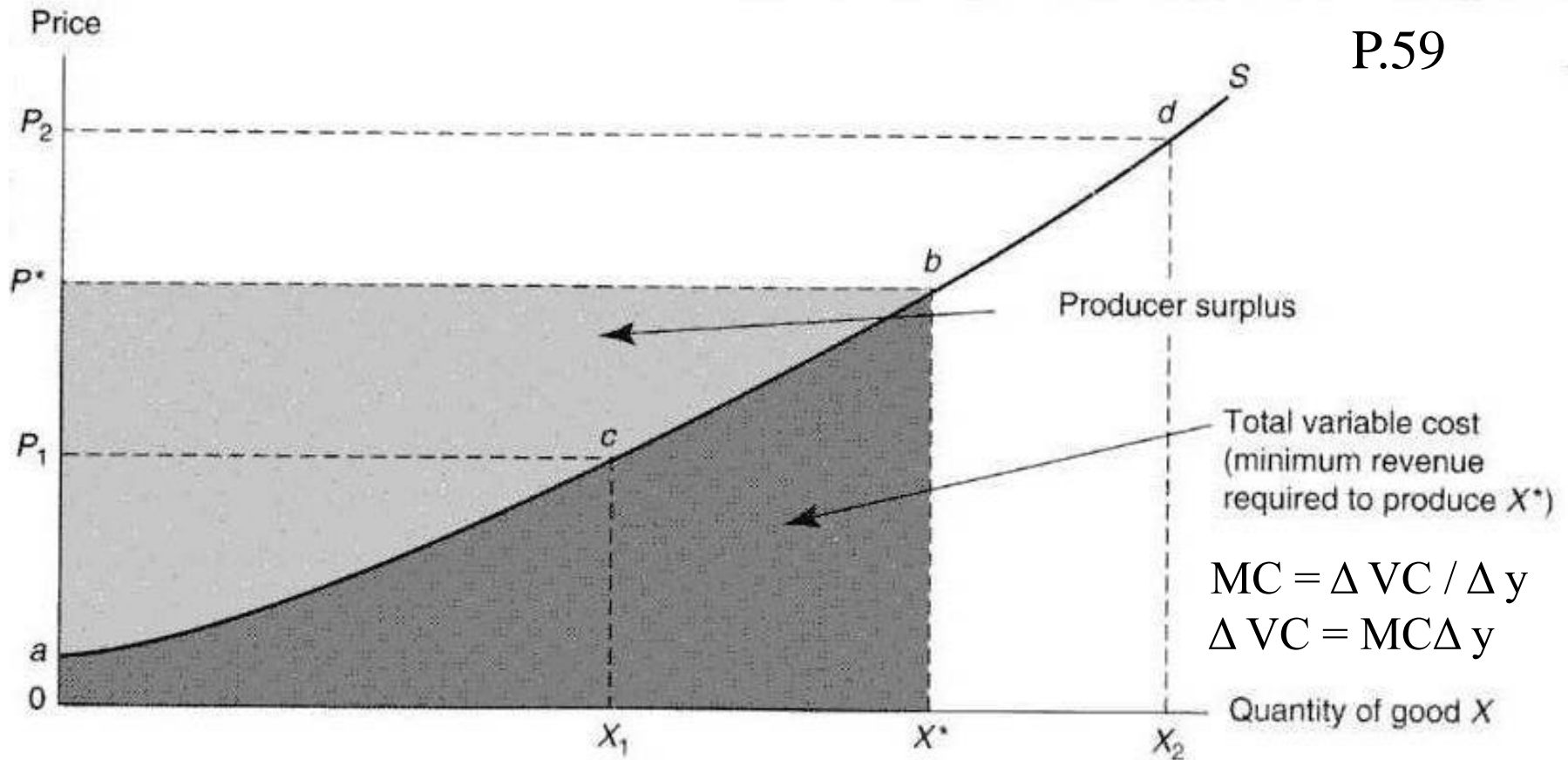


Marginal Cost = Supply Curve



Shutdown Condition

Supply Curve and Producer Surplus



$$PS = PX - VC \quad \text{Producer Surplus} = \text{Revenue} - \text{Variable Cost}$$

Equilibrium and Social Surplus

“Invisible Hand”

by Adam Smith (1776)

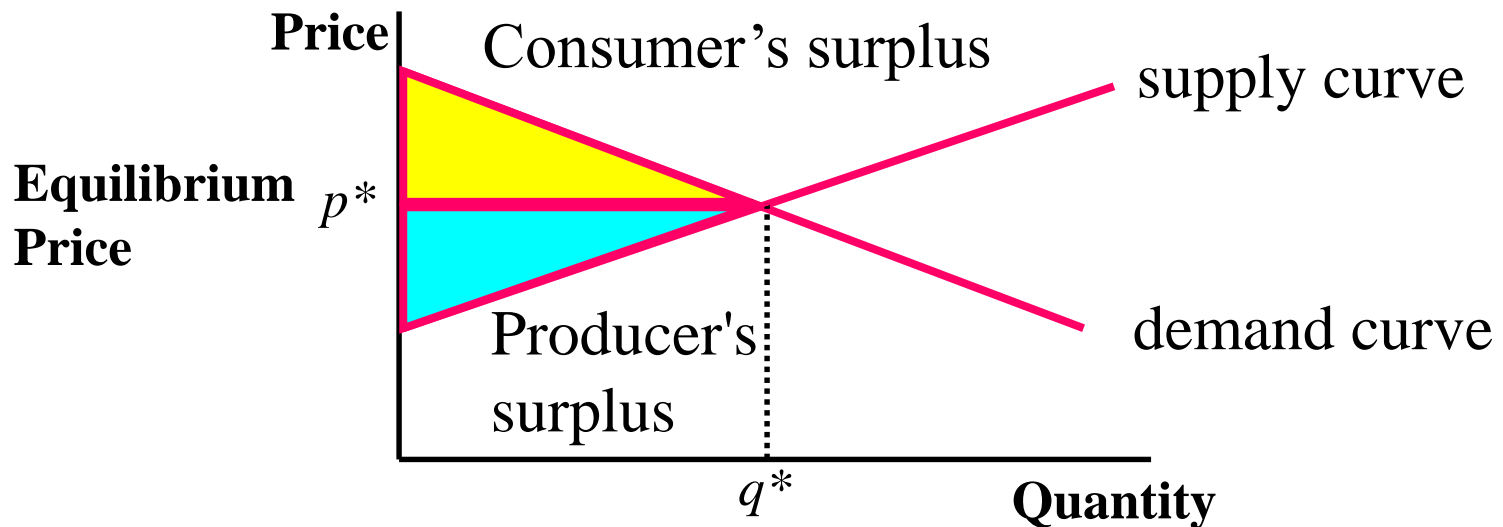
The Wealth of Nations

Competitive Market

Consumers and Suppliers are *Price Takers*

Market price is independent of any agent's behavior

Social surplus = Consumer's surplus + Producer's surplus



Target Pricing Policy

Target Pricing
e.g. Rice in Japan

