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
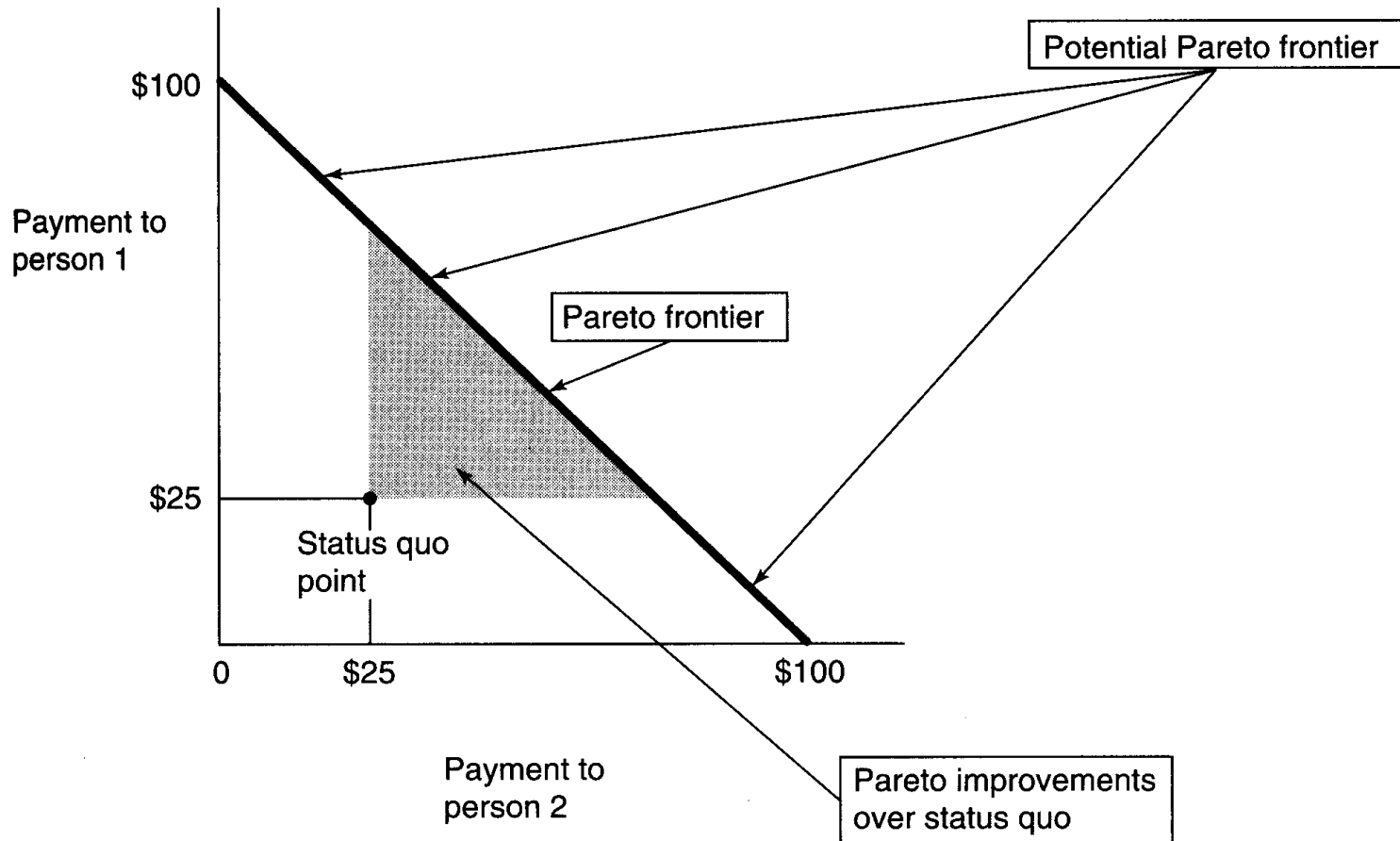
Pareto Improvement → **Pareto Inefficiency**

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 <u>positive</u> net social benefits (= present social benefit – present social cost), then it is possible to find a set of transfer that makes <u>at least one person better off without making anyone else worse off</u>.

<u>Willingness-to-Pay (WTP)</u>

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
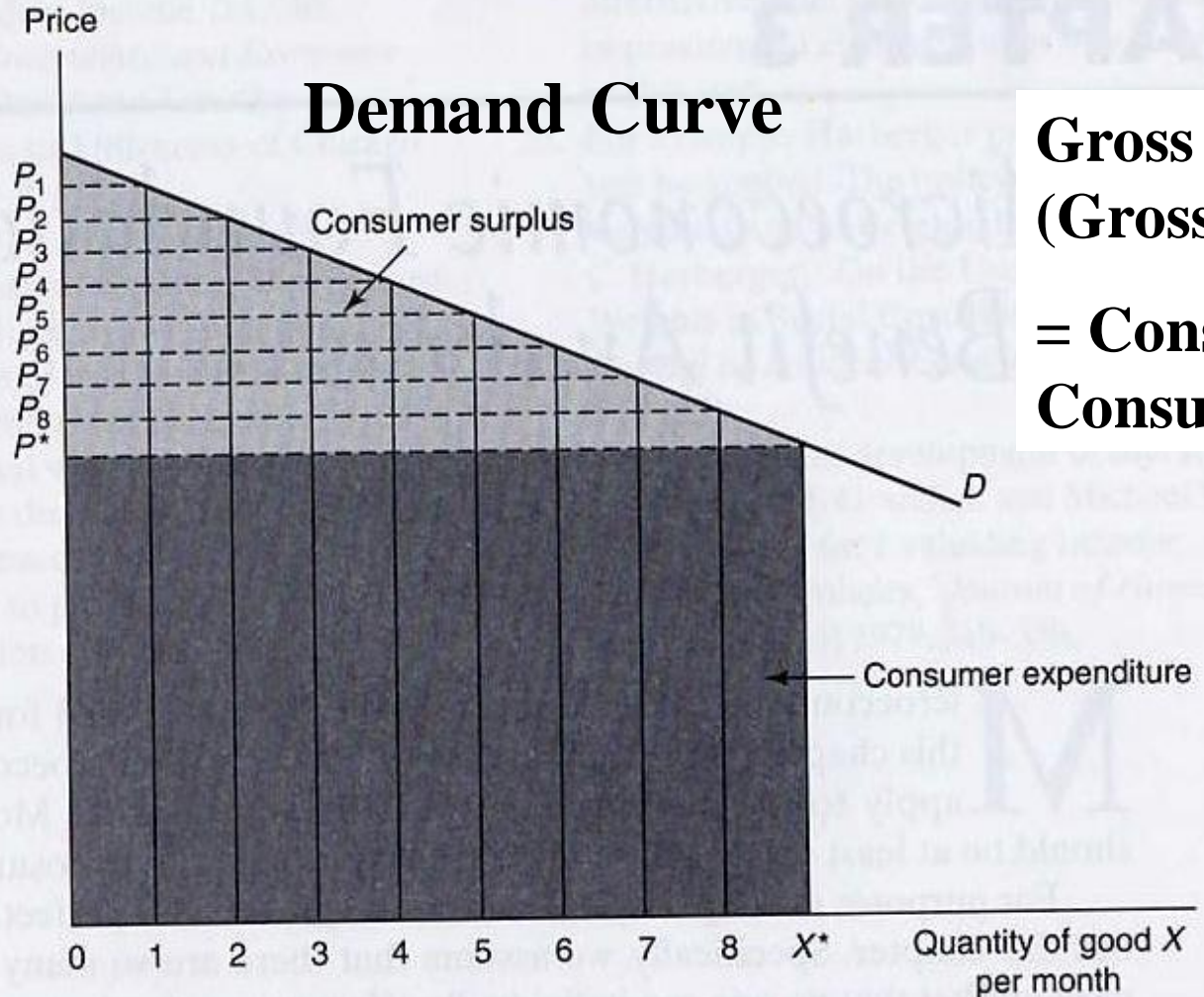
Pareto Efficiency and Equity

Criterion for comparing the outcomes of different situation

Social Net Benefit express <u>efficiency</u>, but do not consider <u>equity.</u>

Raw
Material

or

How to
distribute? =
Equity

Pareto inefficient

Pareto efficient
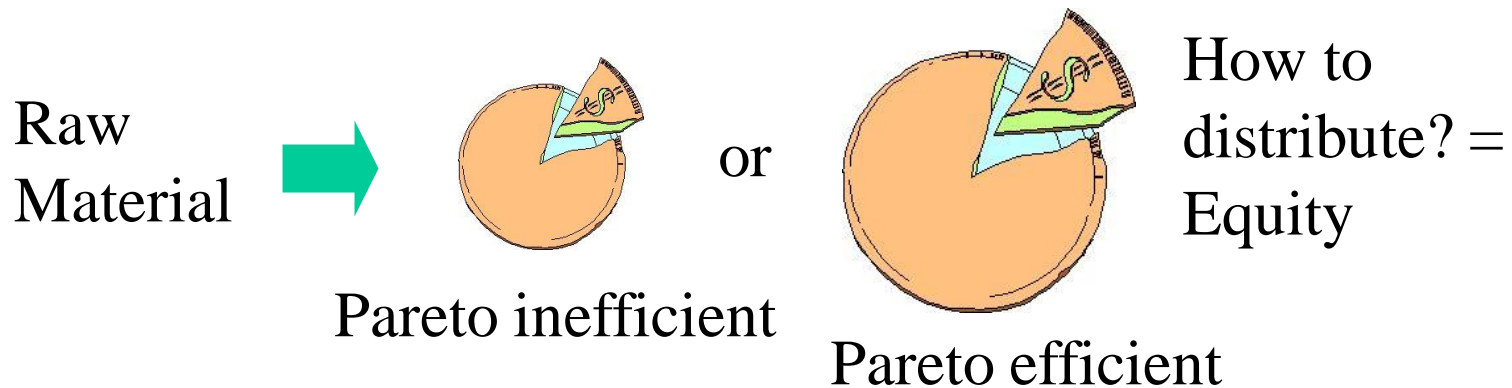
Chapter 3 Microeconomic Foundations of CBA

Demand Curve

Consumer surplus

Consumer expenditure

Price

P_1
P_2
P_3
P_4
P_5
P_6
P_7
P_8
P^*

D

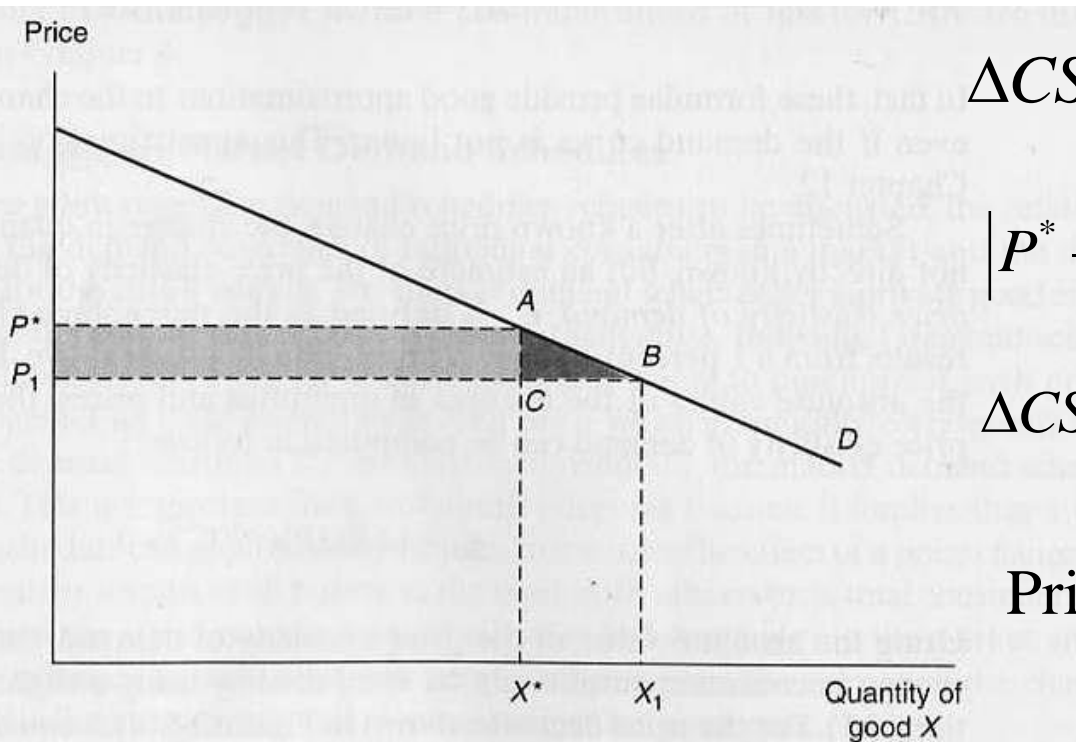0 1 2 3 4 5 6 7 8 X^* Quantity of good X per month

Gross Surplus (Gross Benefit)

= Consumer Surplus + Consumer Expenditure

Change in Consumer Surplus = Benefit

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

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

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

Price elasticity of demand

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

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

Tax and Deadweight Loss
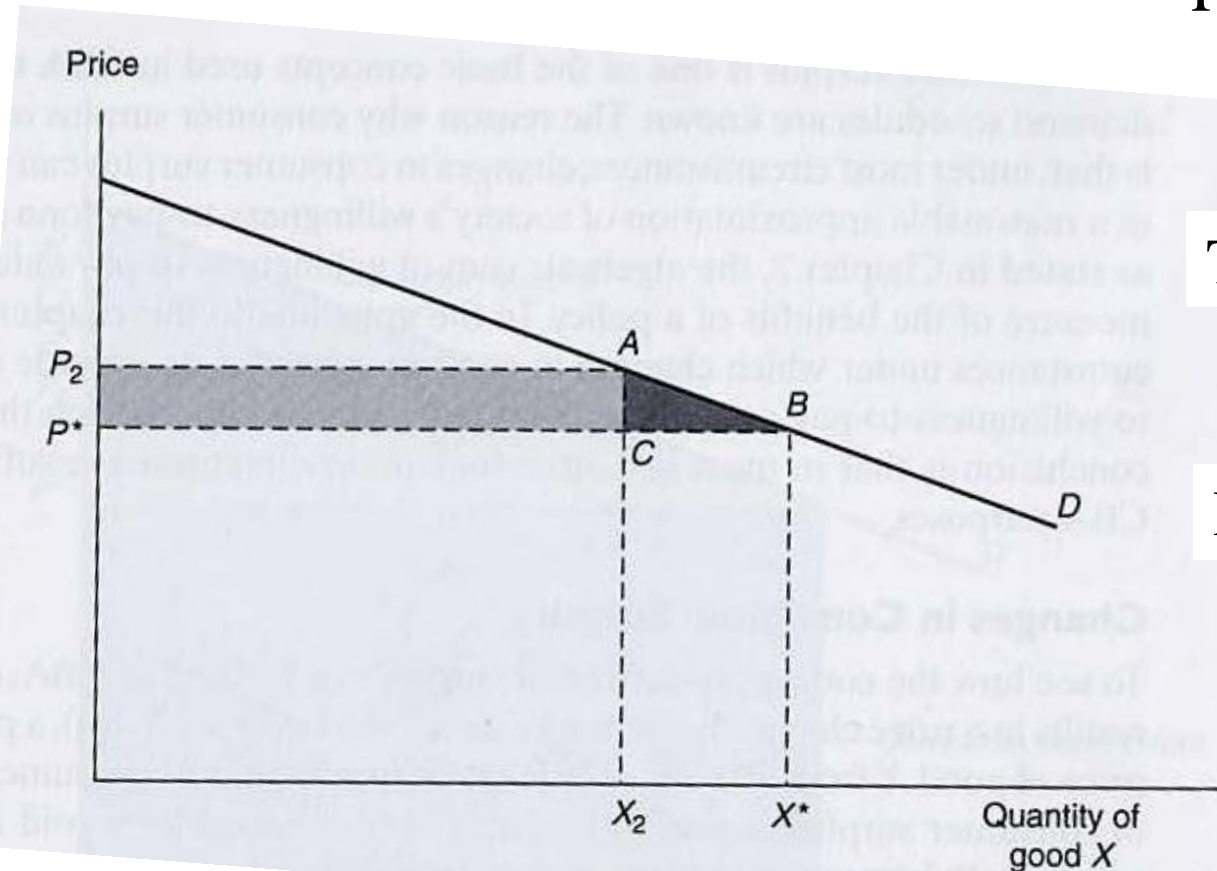
Price increase by tax

$$P^* \rightarrow P_2$$

Tax Revenue $P_2 A C P^*$

"Transfer"

Deadweight Loss ΔABC

No offset benefit

Pareto Inefficiency

Price

P_2

P^*

A

B

C

D

X_2 X^*

Quantity of good X

Supply Side and Cost

Average cost (AC)

Cost per unit output

AC (y) = Total cost (TC) / output (y)

= Variable cost (VC) / y + Fixed cost (FC) / y

= Average variable cost (AVC) + Average fixed cost (AFC)

Marginal Cost (MC)

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

MC (y) $= \Delta \, TC / \Delta \, y$

$= \Delta \, VC / \Delta \, y + (\Delta \, FC / \Delta \, y = 0)$: fixed cost do not change as output changes

$= \Delta \, VC / \Delta \, y = VC' \, (y)$
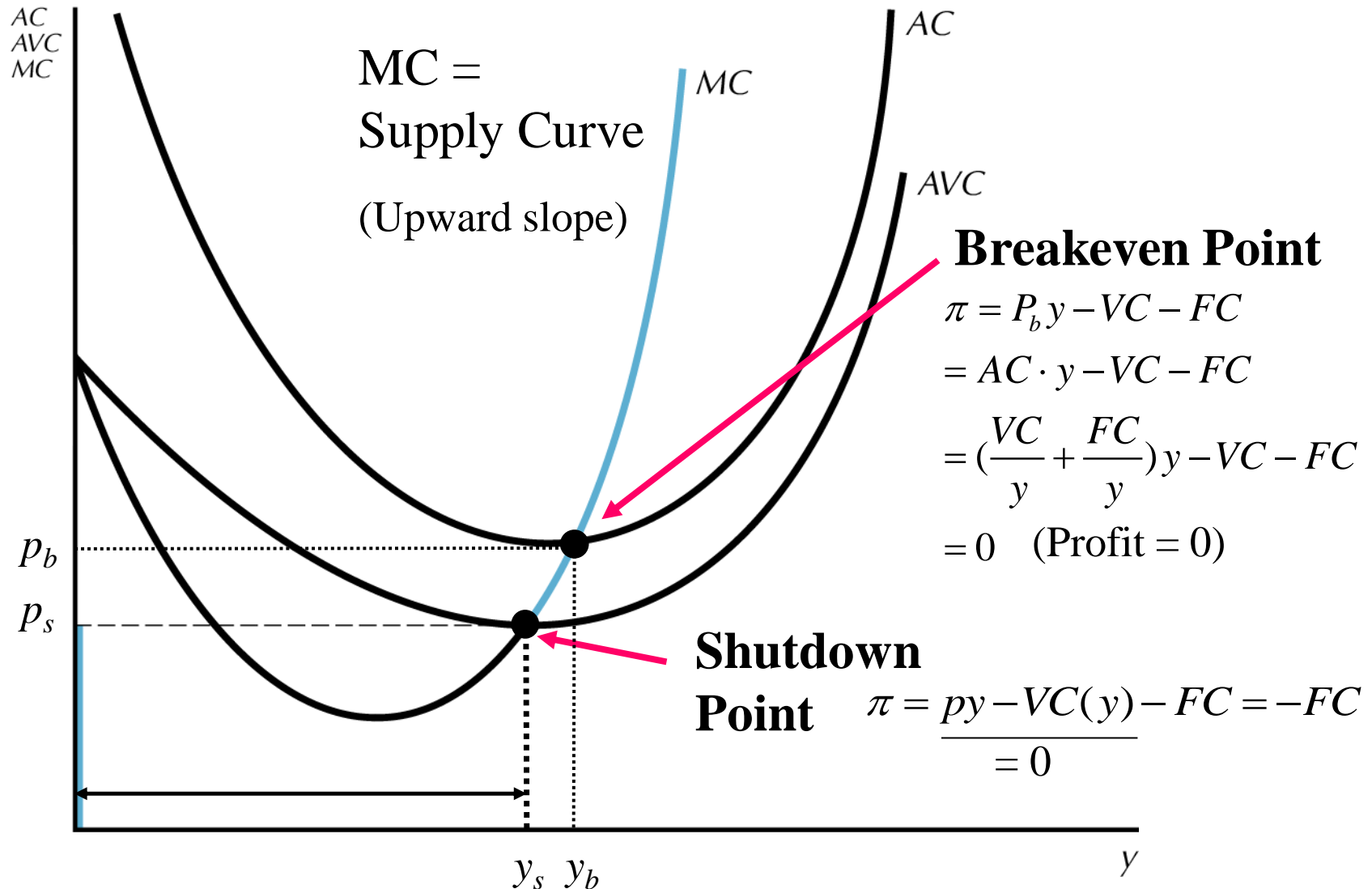
Cost Carve

Cost

AC
MC
AVC
AFC
AFC
AFC
y
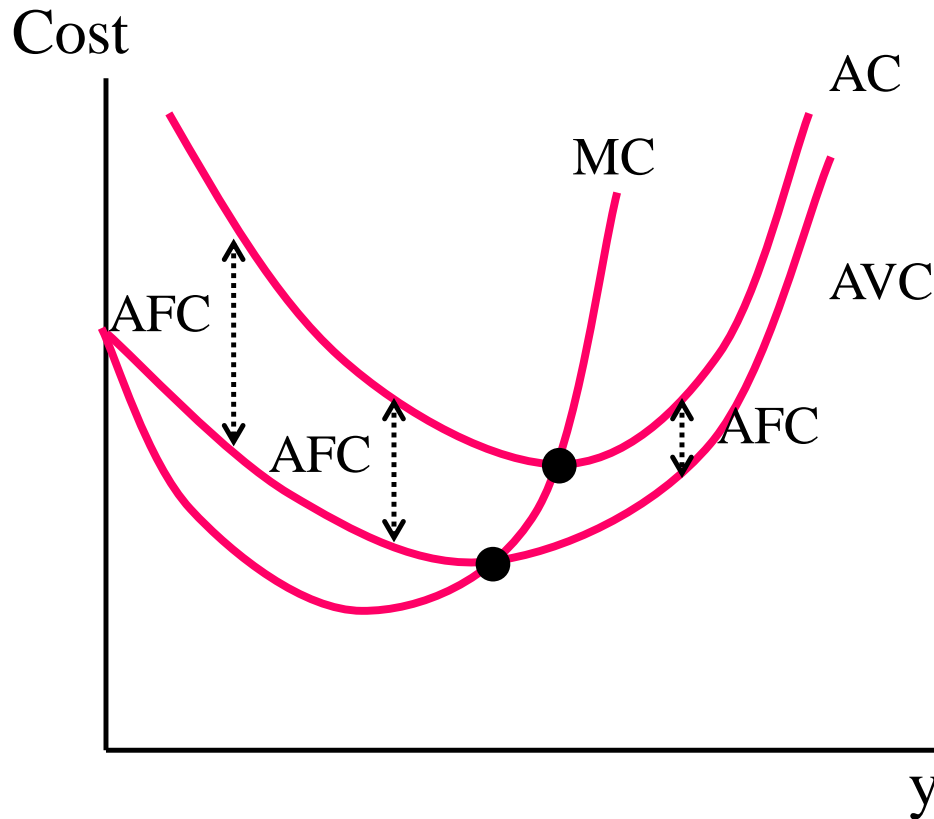
• MC and AVC may initially slope down but need not. It will eventually rise for fixed factors that constrain production.

• 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.
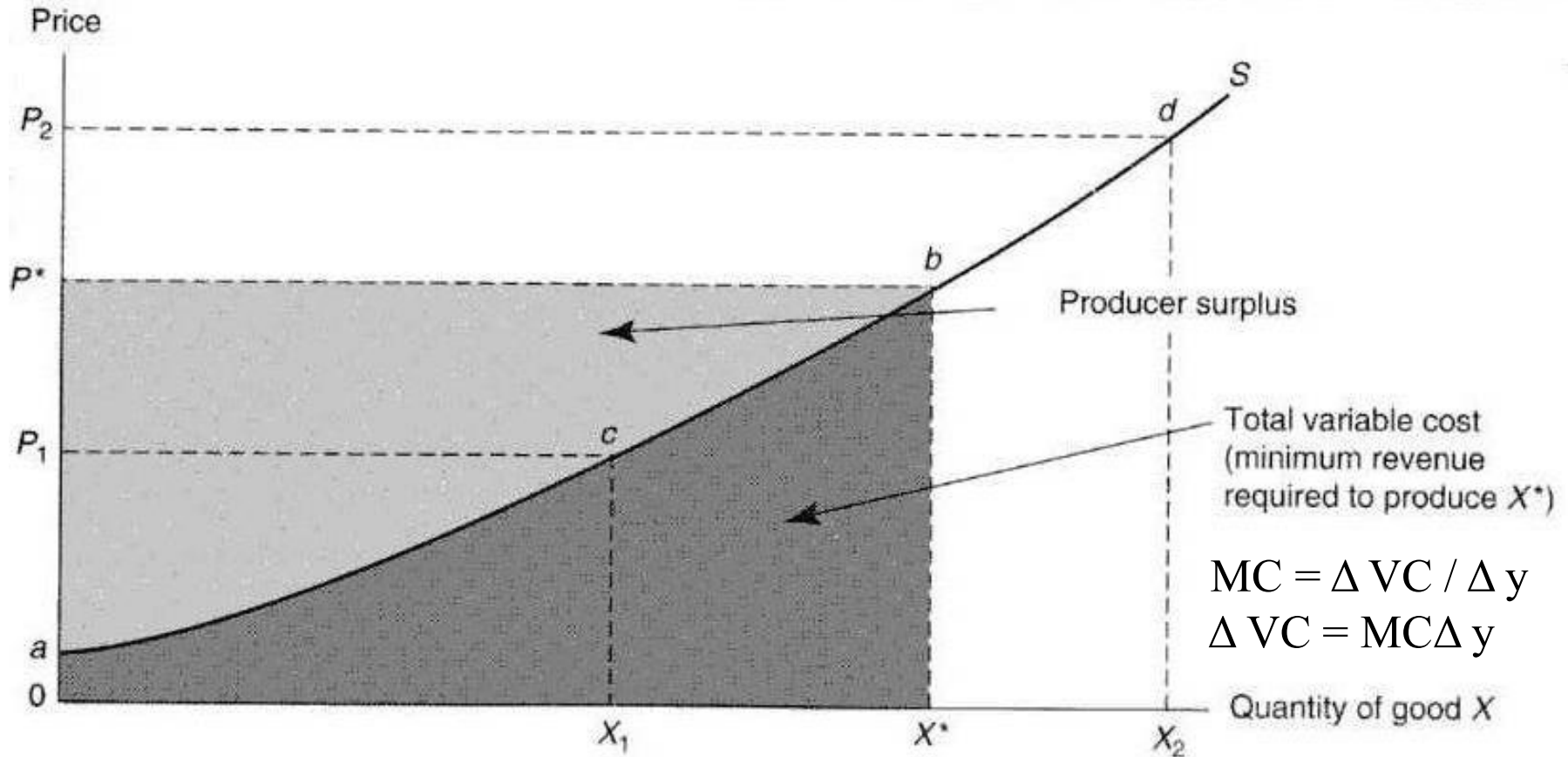
Ex. MC is constant

Q	MC	AVC	AFC	AC
1	100	100	100	200
2	100	100	50	150
3	100	100	33	133
4	100	100	25	125
5	100	100	20	120
6	100	100	17	117
7	100	100	14	114
8	100	100	13	113
9	100	100	11	111
10	100	100	10	110
11	100	100	9	109
12	100	100	8	108
13	100	100	8	108
14	100	100	7	107
15	100	100	7	107

Ex. MC has optimum value

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

Marginal Cost = Supply Curve

AC
AVC
MC

AC

MC =
Supply Curve

(Upward slope)

MC

AVC

Breakeven Point

$\pi = P_b y - VC - FC$

$= AC \cdot y - VC - FC$

$= (\dfrac{VC}{y} + \dfrac{FC}{y}) y - VC - FC$

$= 0$ (Profit = 0)

p_b

p_s

**Shutdown
Point**

$\pi = \underline{py - VC(y)} - FC = -FC$

$= 0$

y_s y_b

y

Shutdown Condition

Supply Curve and Producer Surplus

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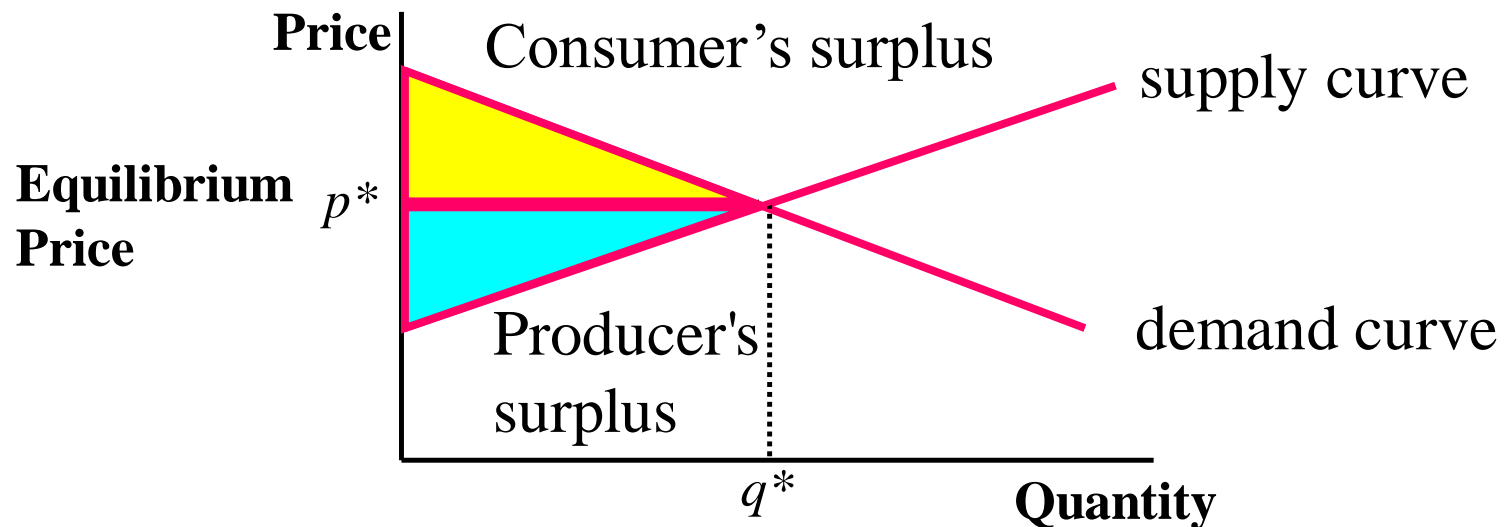
Equilibrium and Social Surplus

Competitive Market

   Consumers and Suppliers are *Price Takers*

   Market price is independent of any agent's behavior

"Invisible Hand"
by Adam Smith (1776)
The Wealth of Nations

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

Target Pricing Policy

Target Pricing

e.g. Rice in Japan