Chapter 2 Conceptual Foundations of CBA

Pareto Efficiency

Most important **criterion** on microeconomics theory

Efficiency = **Pareto Efficiency**

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

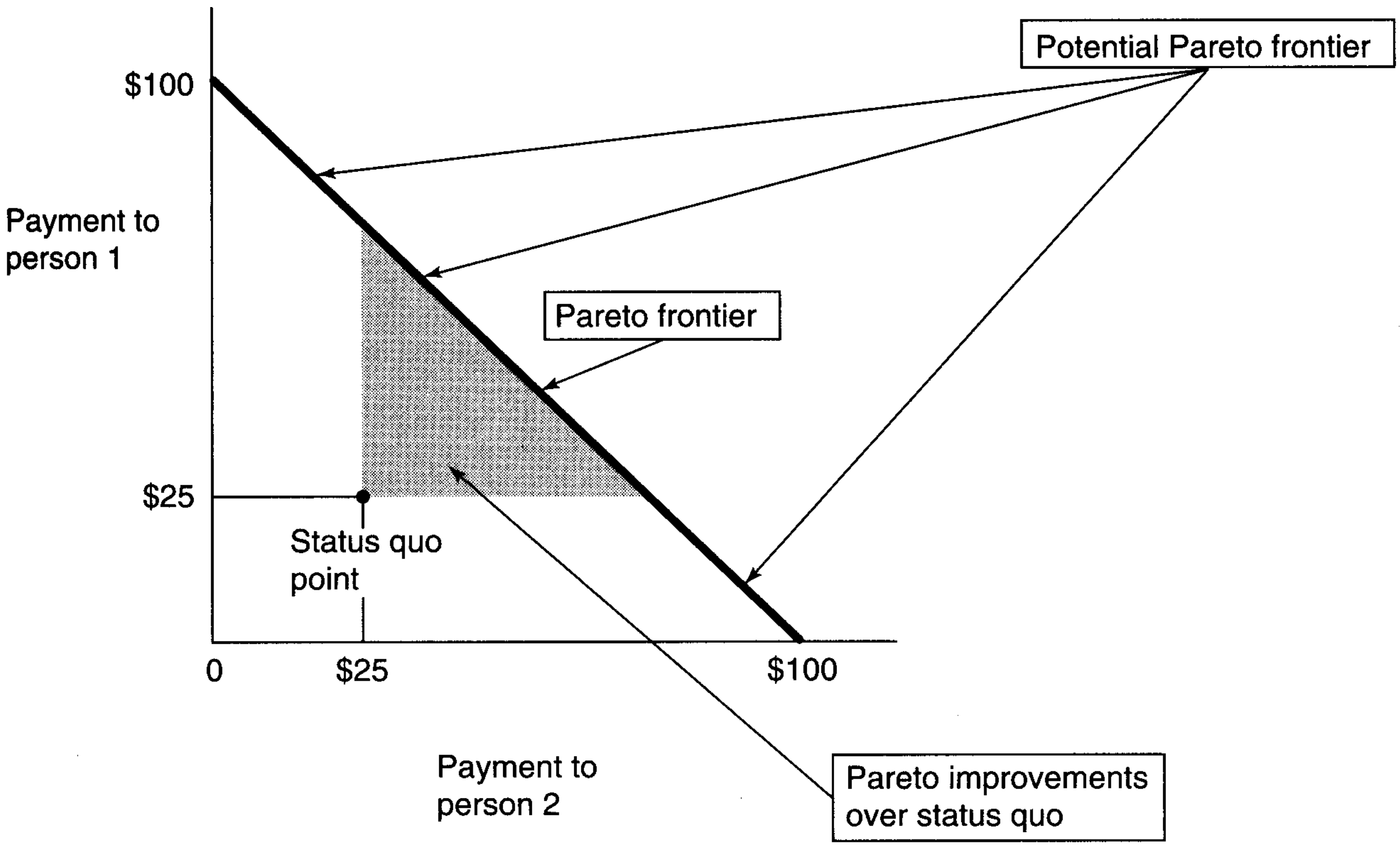
Pareto Improvement ← **Pareto Inefficiency**

No Pareto Improvement ← **Pareto Efficiency**

* The outcome of the competitive market is Pareto efficient

Pareto Efficiency

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



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

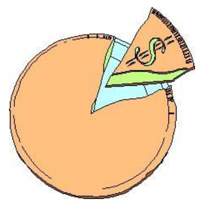
- Society maximizes aggregate wealth
- Different policies will have different sets of winners and losers
- Contrast to the incentives in representative political systems
- Equity of wealth or income will be addressed after adopting efficient policies

Pareto Efficiency and Equity

Criterion for comparing the outcomes of different situation

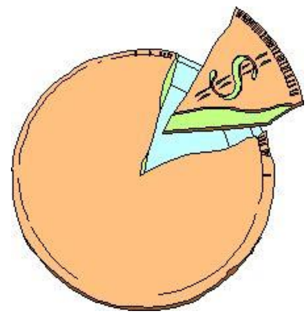
Social Net Benefit express <u>efficiency</u>, but do not consider <u>equity.</u>

Raw Material



Pareto inefficient

or



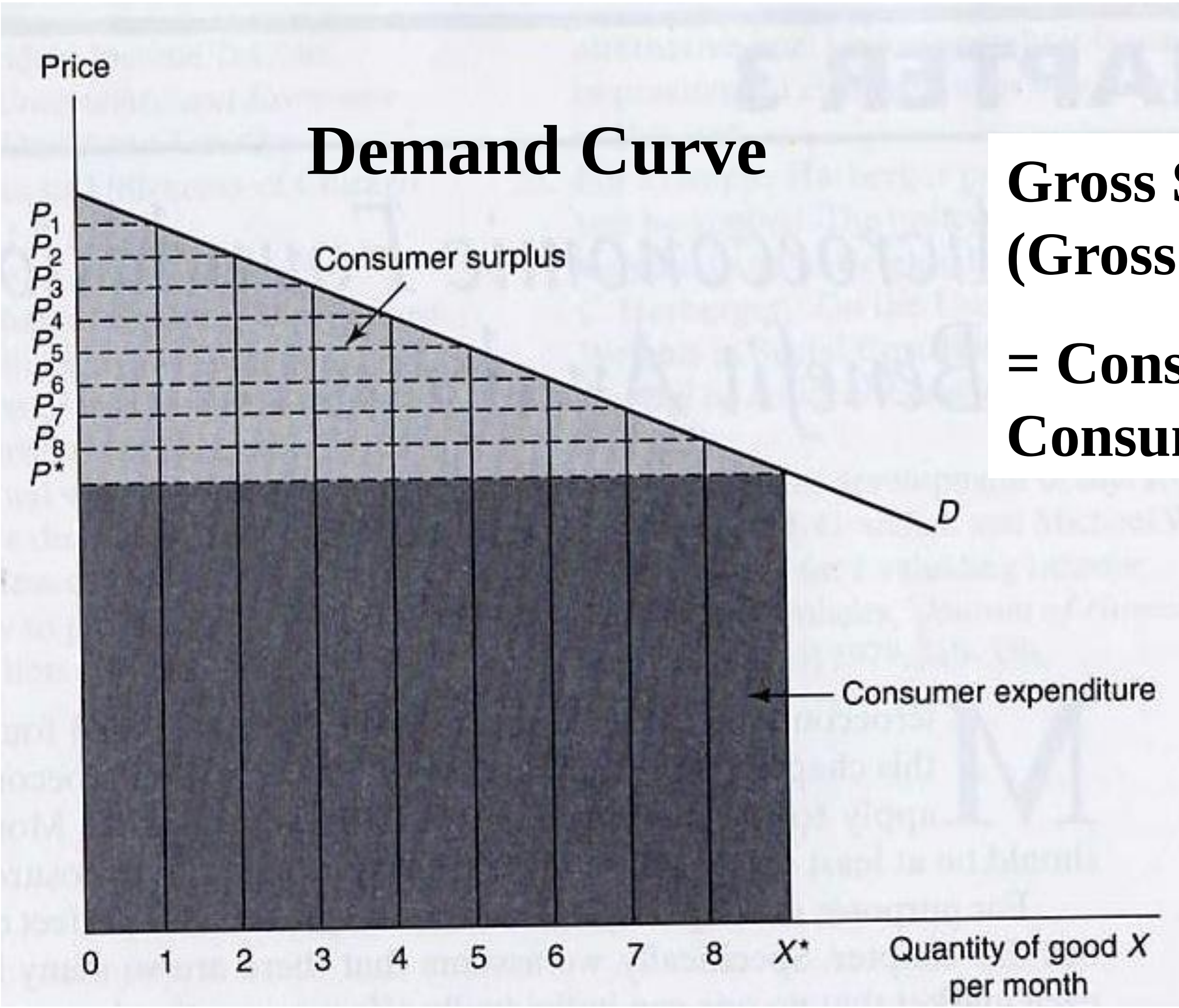
Pareto efficient

How to distribute?
= Equity

e.g. USA (2012)
"We are the 99%"

Chapter 3 Microeconomic Foundations of CBA

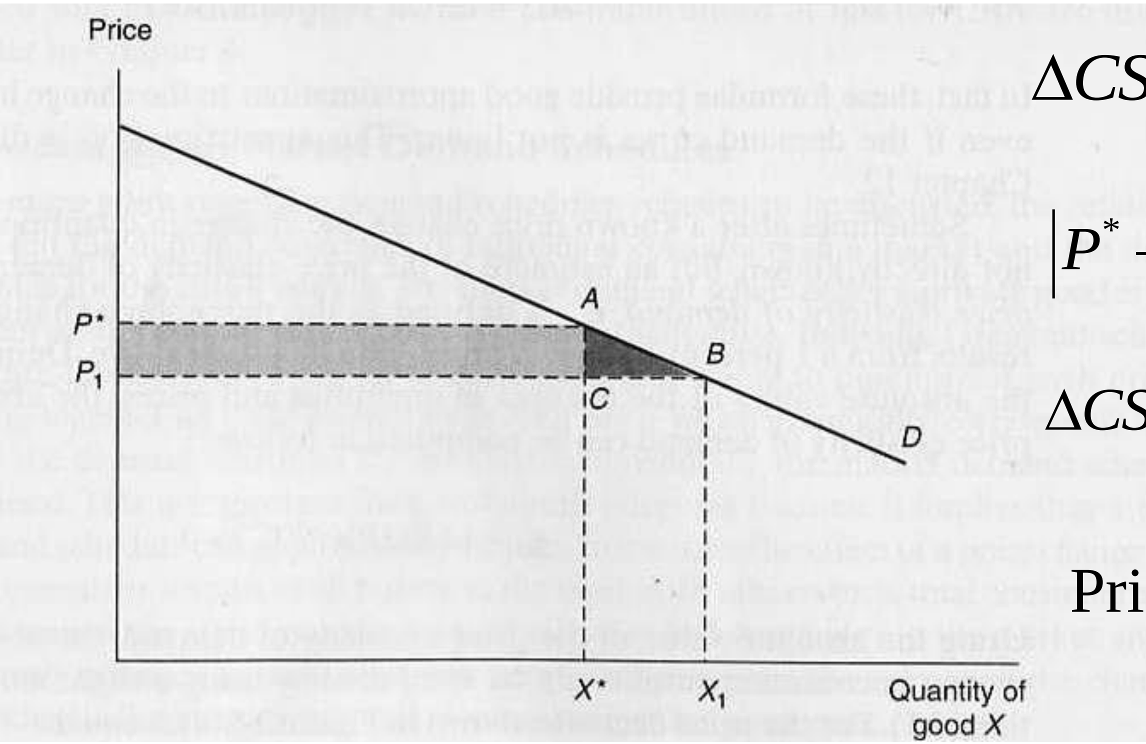
Demand Curve



Gross Surplus (Gross Benefit)

= Consumer Surplus + Consumer Expenditure

Change in Consumer Surplus = Benefit



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

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

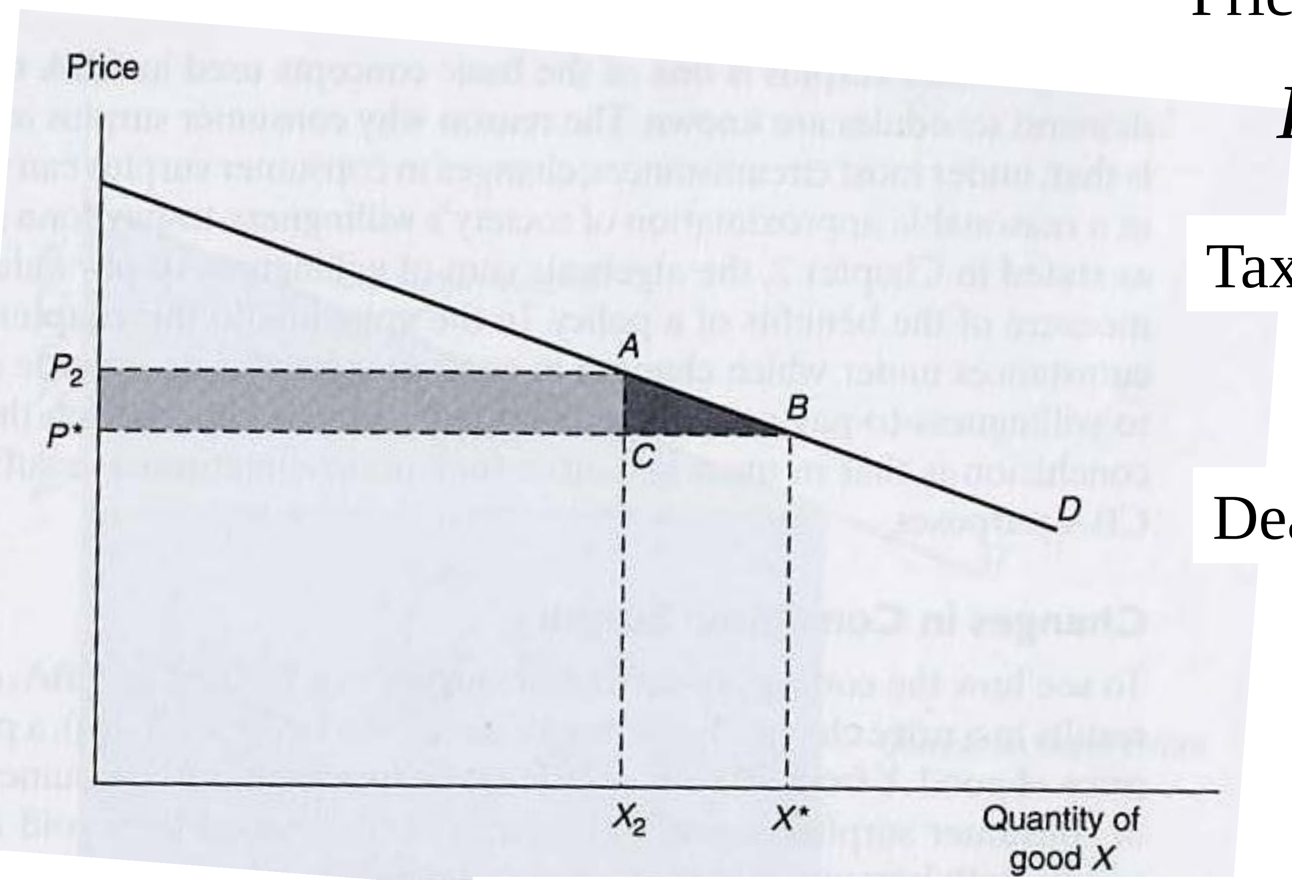
$$\Delta CS = (\Delta P)(X^*) + \frac{1}{2}(\Delta P)(\Delta X)$$

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_2ACP^*

"Transfer"

Deadweight Loss ΔABC

No offset benefit

Pareto Inefficiency

Supply Side and Cost

Average cost (AC)

<u>Cost per unit output</u>

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)

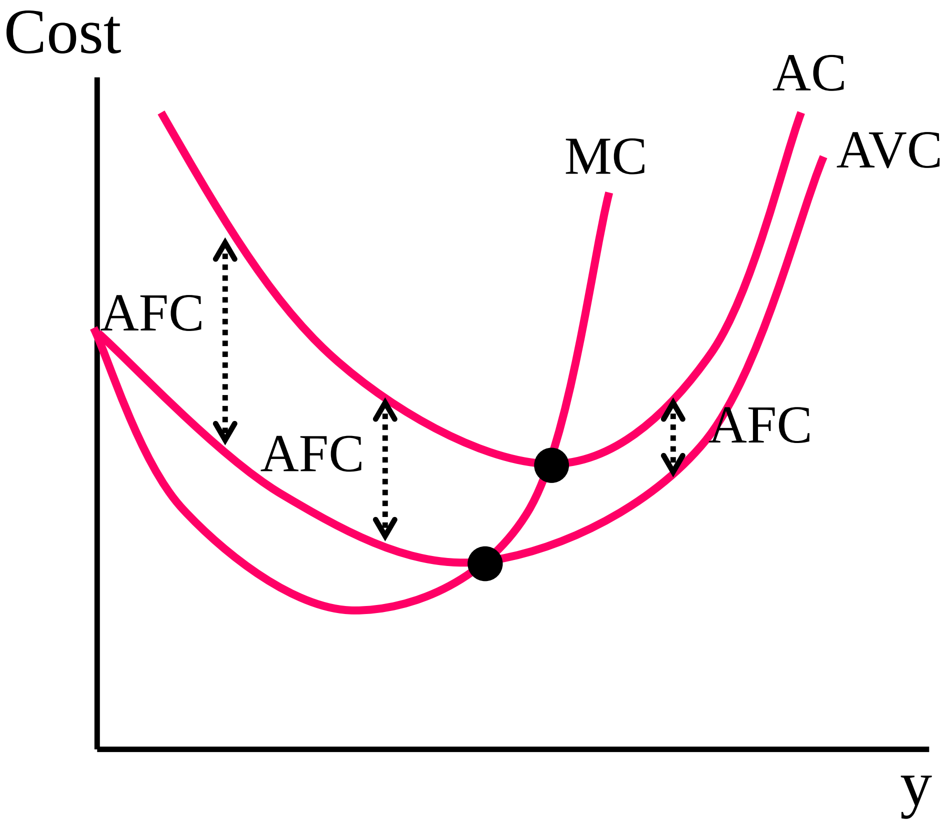
<u>Change in cost due to change in output</u> (Rate of change as increased by one unit)

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



• 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.

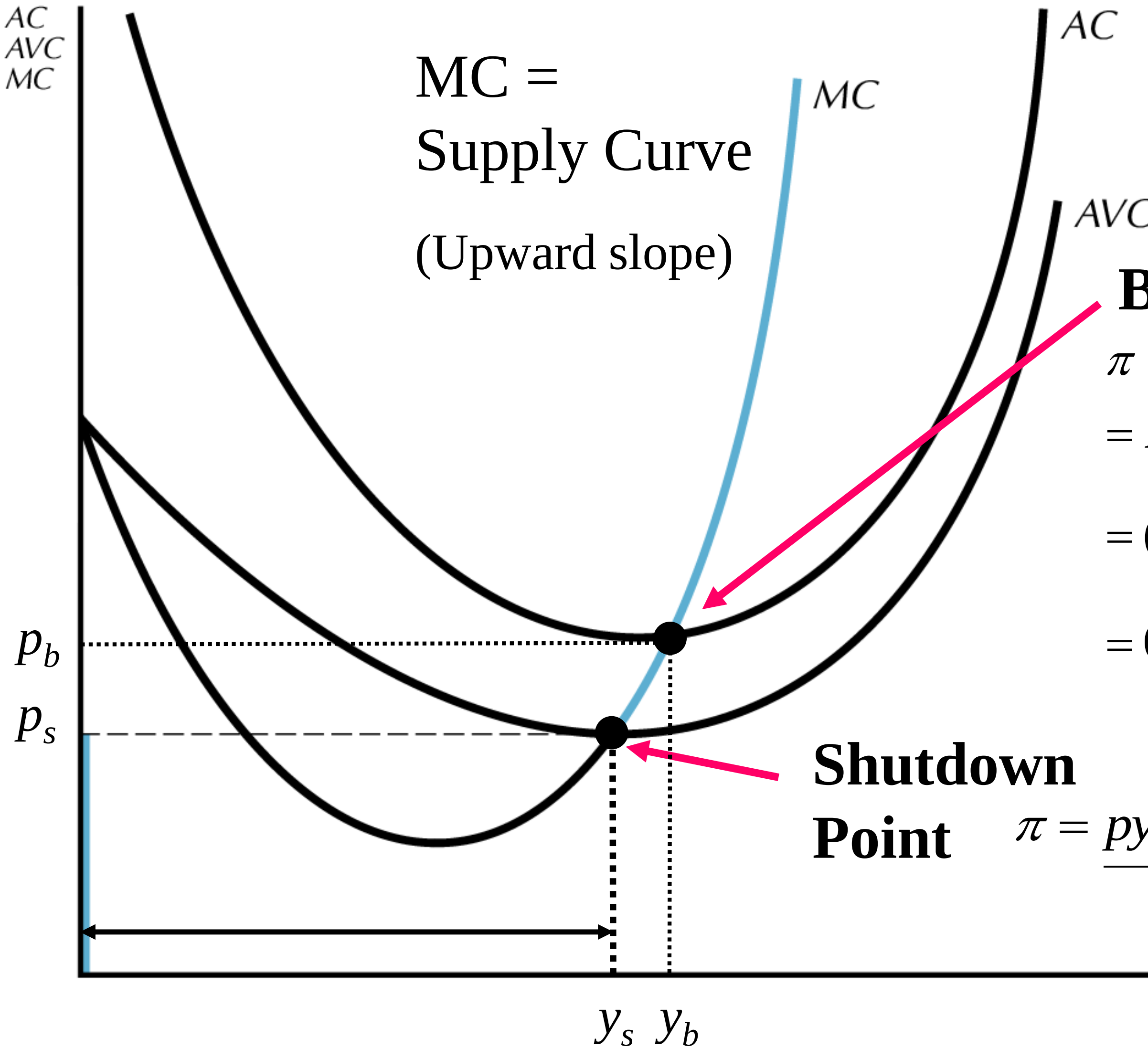
Ex. MC is constant

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



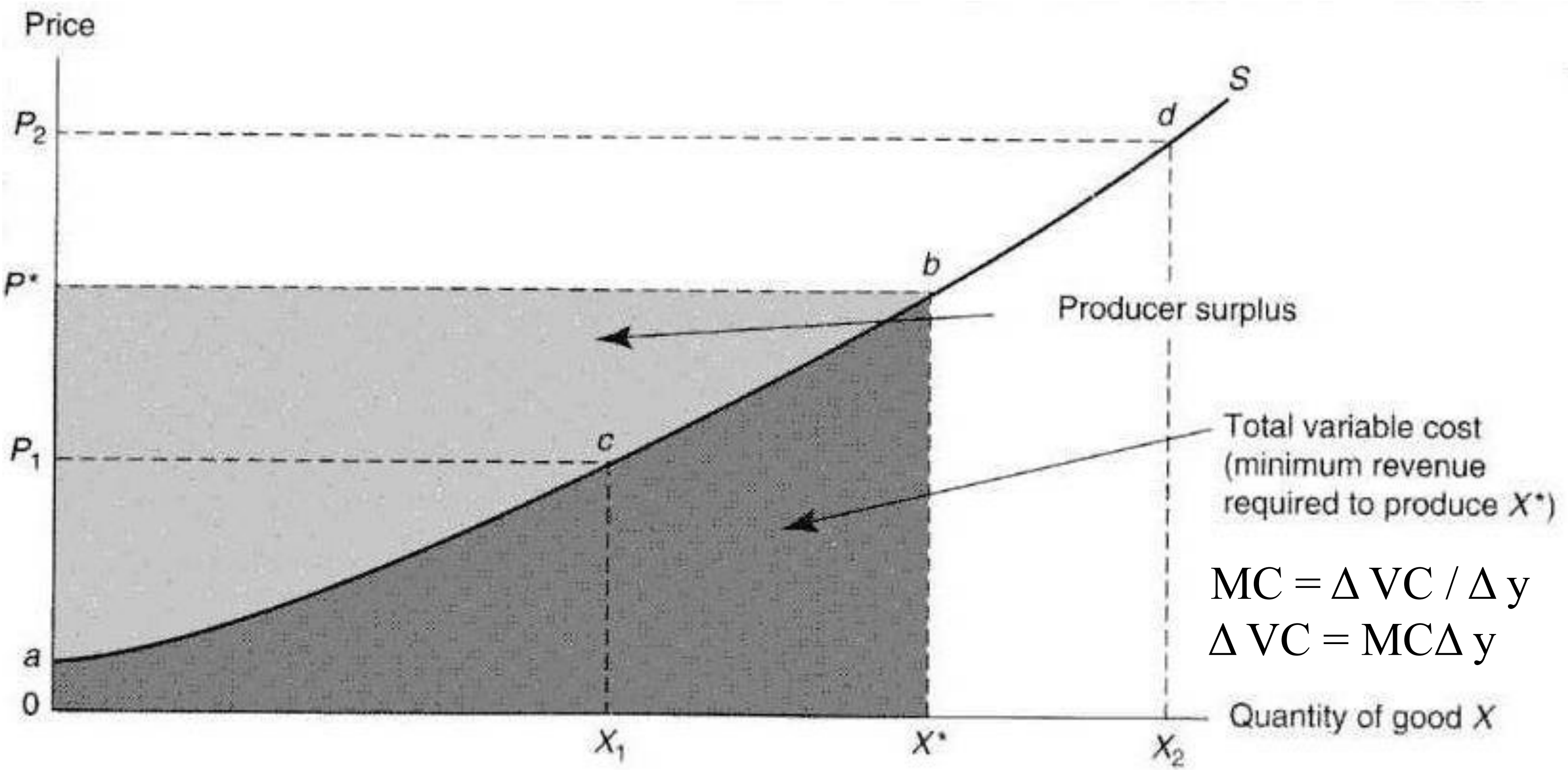
Breakeven Point

$$\pi = P_b y - VC - FC$$
$$= AC \cdot y - VC - FC$$
$$= \left(\frac{VC}{y} + \frac{FC}{y}\right) y - VC - FC$$
$$= 0 \quad \text{(Profit = 0)}$$

$$\pi = \underbrace{py - VC(y)}_{=0} - FC = -FC$$

Shutdown Condition

Supply Curve and Producer Surplus



$MC = \Delta VC / \Delta y$

$\Delta VC = MC \Delta y$

$PS = PX - VC$ Producer Surplus = Revenue – Variable Cost

Equilibrium and Social Surplus

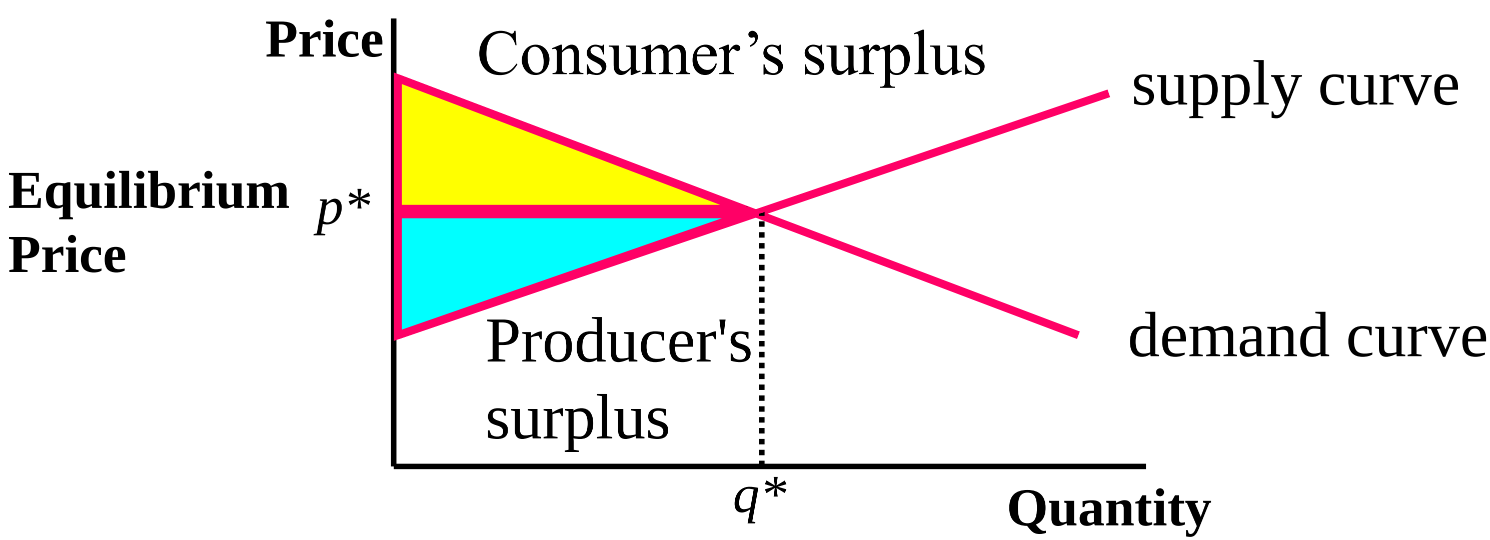
"Invisible Hand"
by Adam Smith (1776)
The Wealth of Nations

Competitive Market

Consumers and Suppliers are *Price Takers*

Market price is independent of any agent's behavior

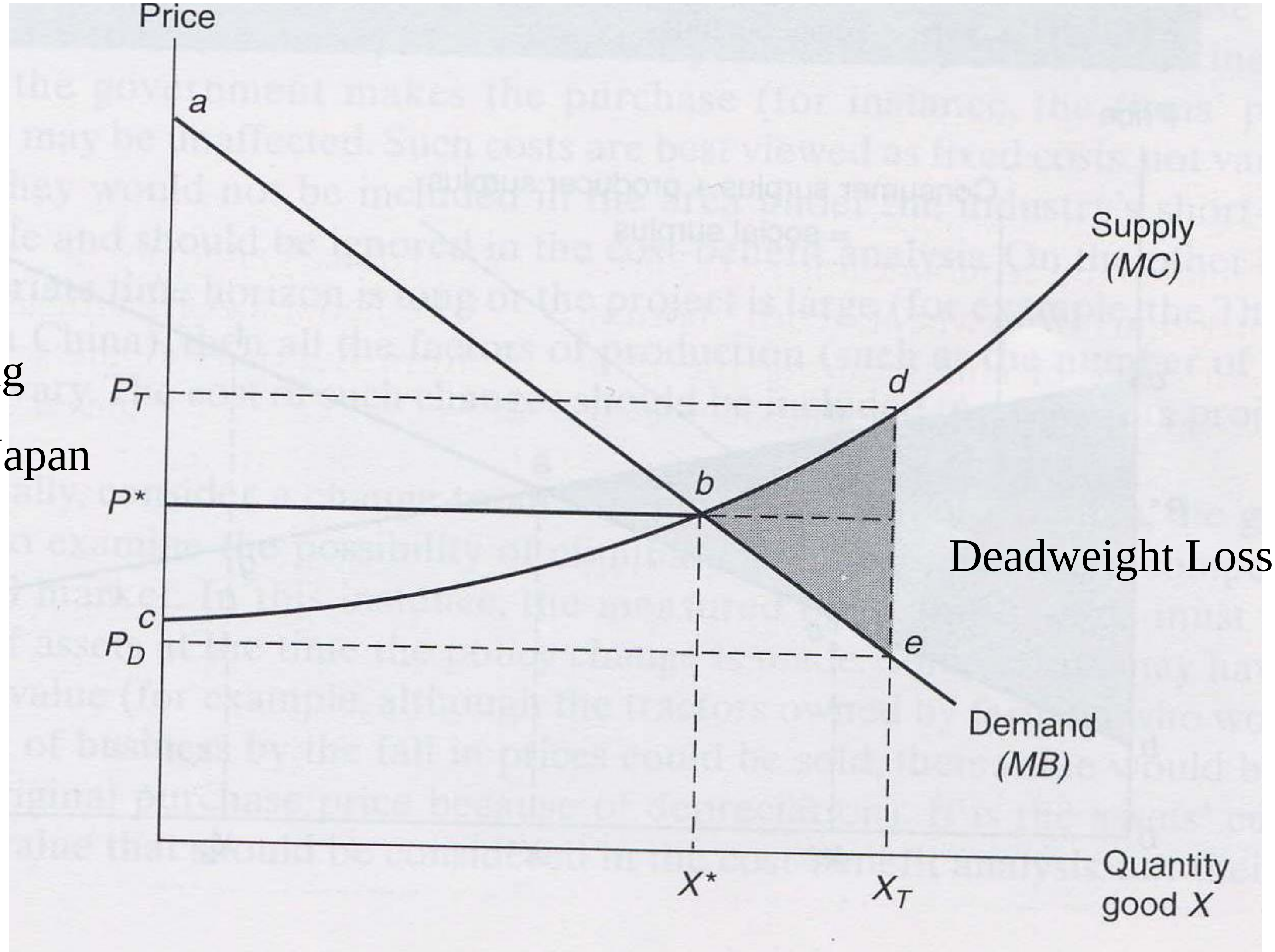
Social surplus = Consumer's surplus + Producer's surplus



Target Pricing Policy

Target Pricing

e.g. Rice in Japan



Deadweight Loss