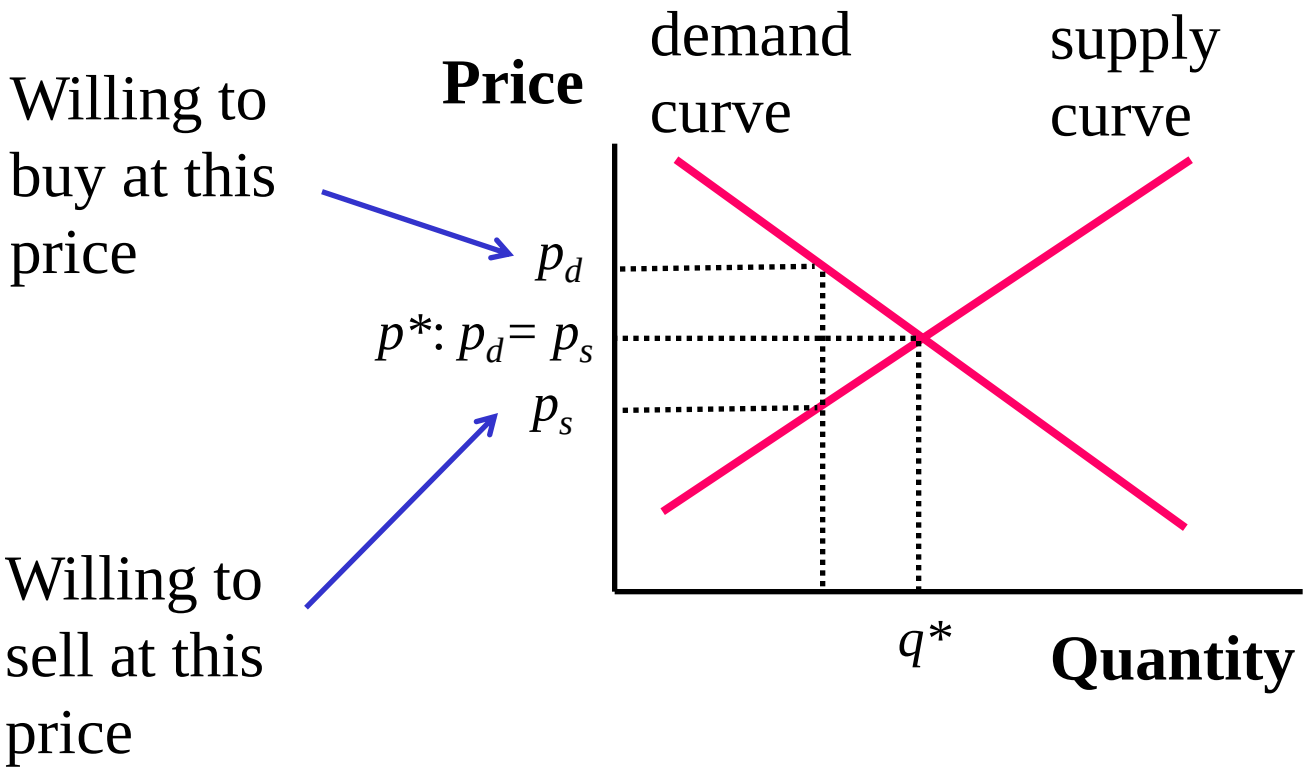
Chapter 2 Conceptual Foundations of CBA

Pareto Efficiency (1)

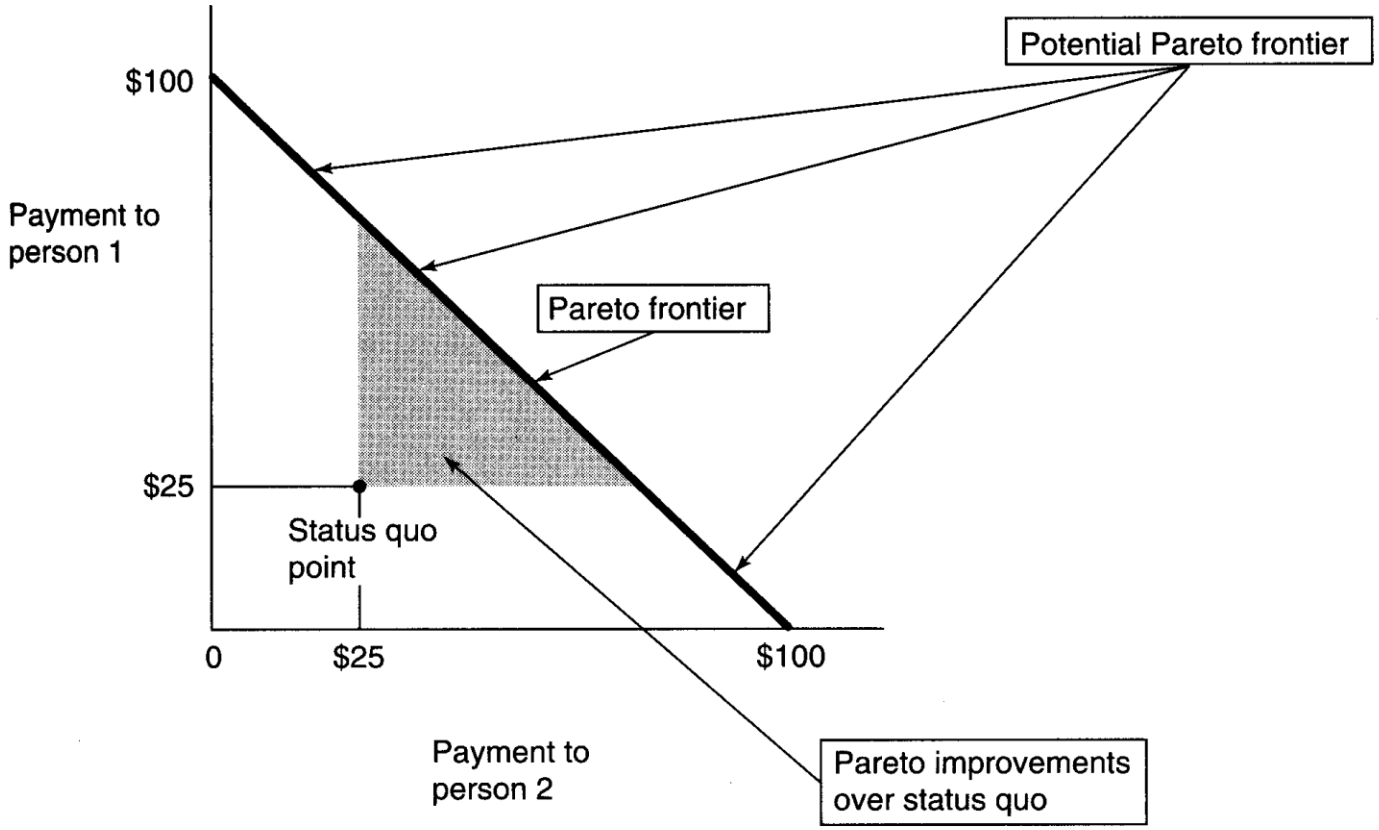


Competitive market produce **Pareto efficient** amount of output

Pareto Efficiency (2)

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

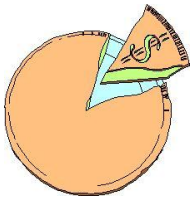
Criterion for comparing the outcomes of different situation

Definition

If there is no way to make any person better off without hurting anybody else.

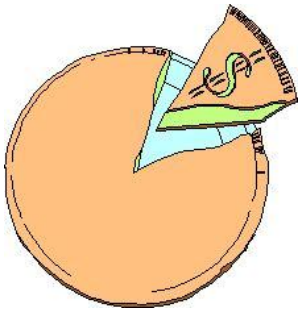
Social net benefit express <u>efficiency</u>, but do not consider <u>equity.</u>

Raw Material



Pareto inefficient

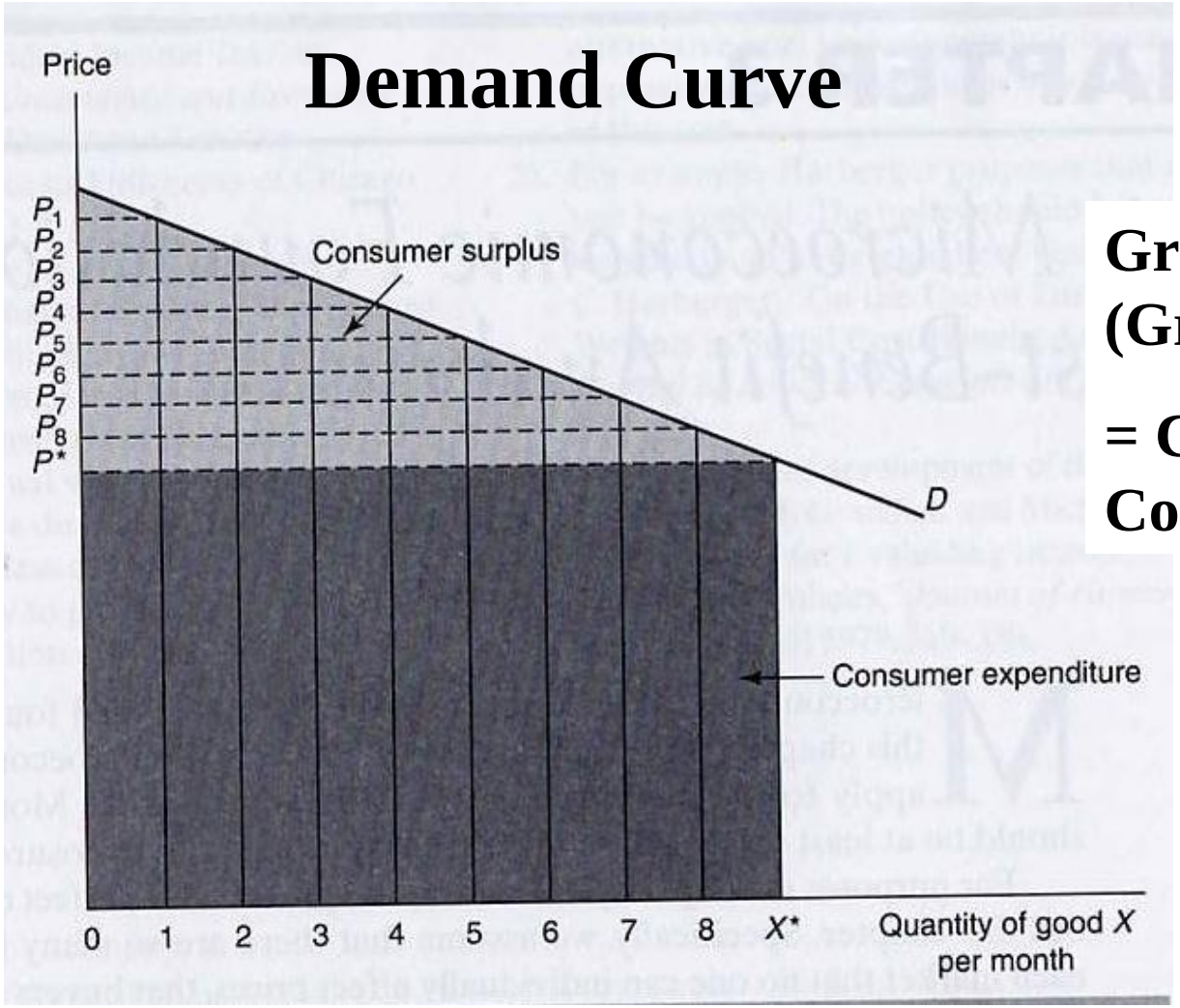
or



Pareto efficient

How to distribute? = Equity

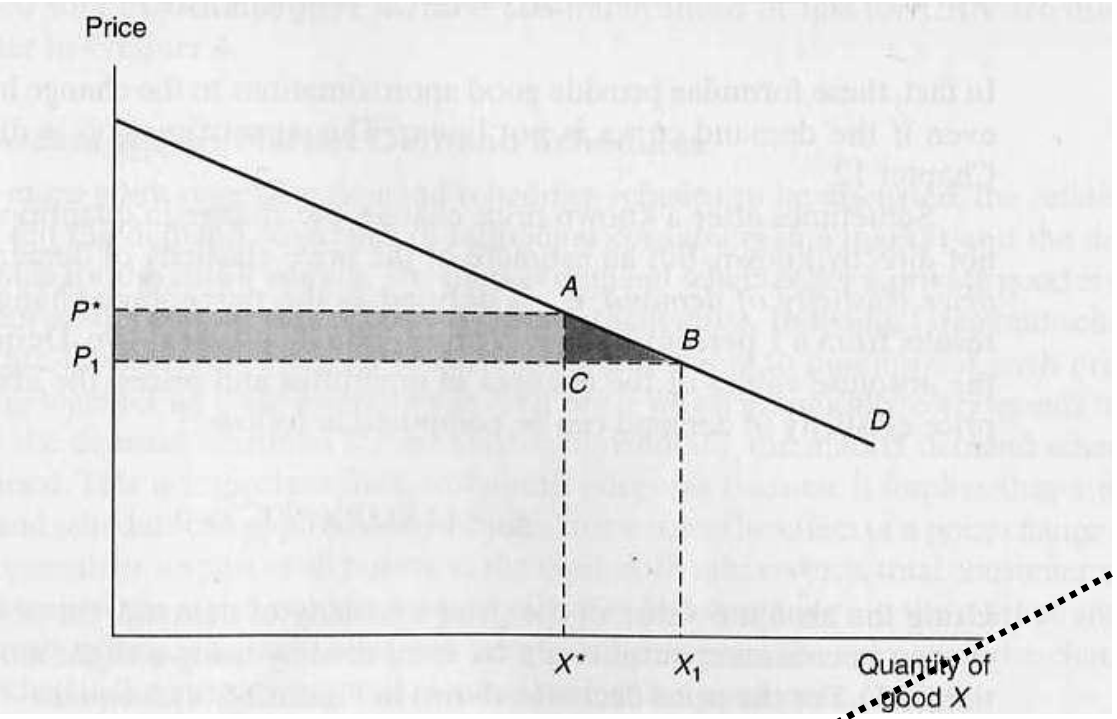
Chapter 3 Basic Microeconomic Foundations of CBA



Gross Surplus (Gross Benefit)

= Consumer Surplus + Consumer Expenditure

Change in Consumer Surplus = Benefit



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

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

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

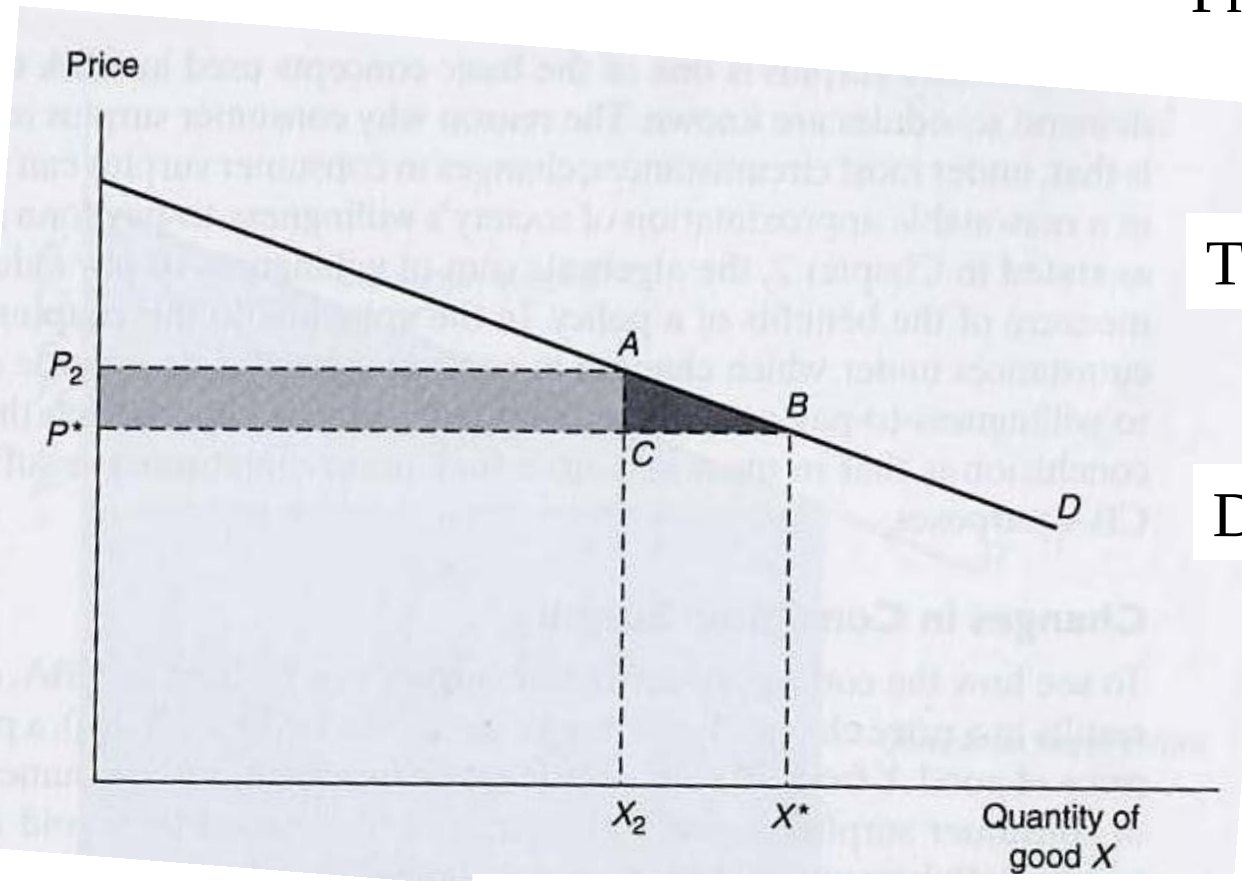
Price elasticity of demand

$$\varepsilon_d = \frac{\left|\Delta X / X^*\right|}{\left|\Delta P / P^*\right|} = (\Delta X / \Delta P)(P^* / X^*)$$

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

$$\Delta CS = (\Delta P)(X^*)\left[1 + \frac{1}{2}(\Delta P / P^*)\,\varepsilon_d\right]$$

Tax and Deadweight Loss



Price increase by tax

$$P^* \rightarrow P_2$$

Tax Revenue $P_2 ACP^*$

"Transfer"

Deadweight Loss ΔABC

No offset benefit

Pareto Inefficiency

Supply Side, Producer 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

$= \Delta VC / \Delta y = VC'(y)$

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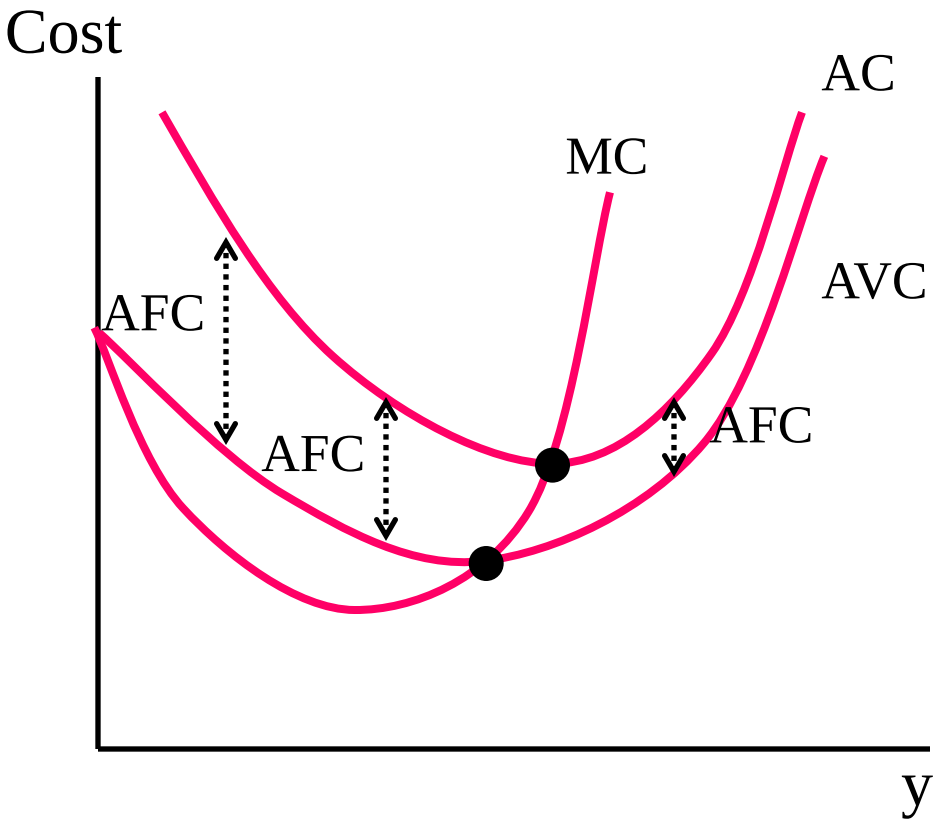


- MC and AVC may initially slope down but need not. It will eventually rise for fixed factors that constrain production.
- AC will initially fall due to declining fixed costs but rise due to the increasing AVC.
- MC passes through the minimum point of both AVC and AC.

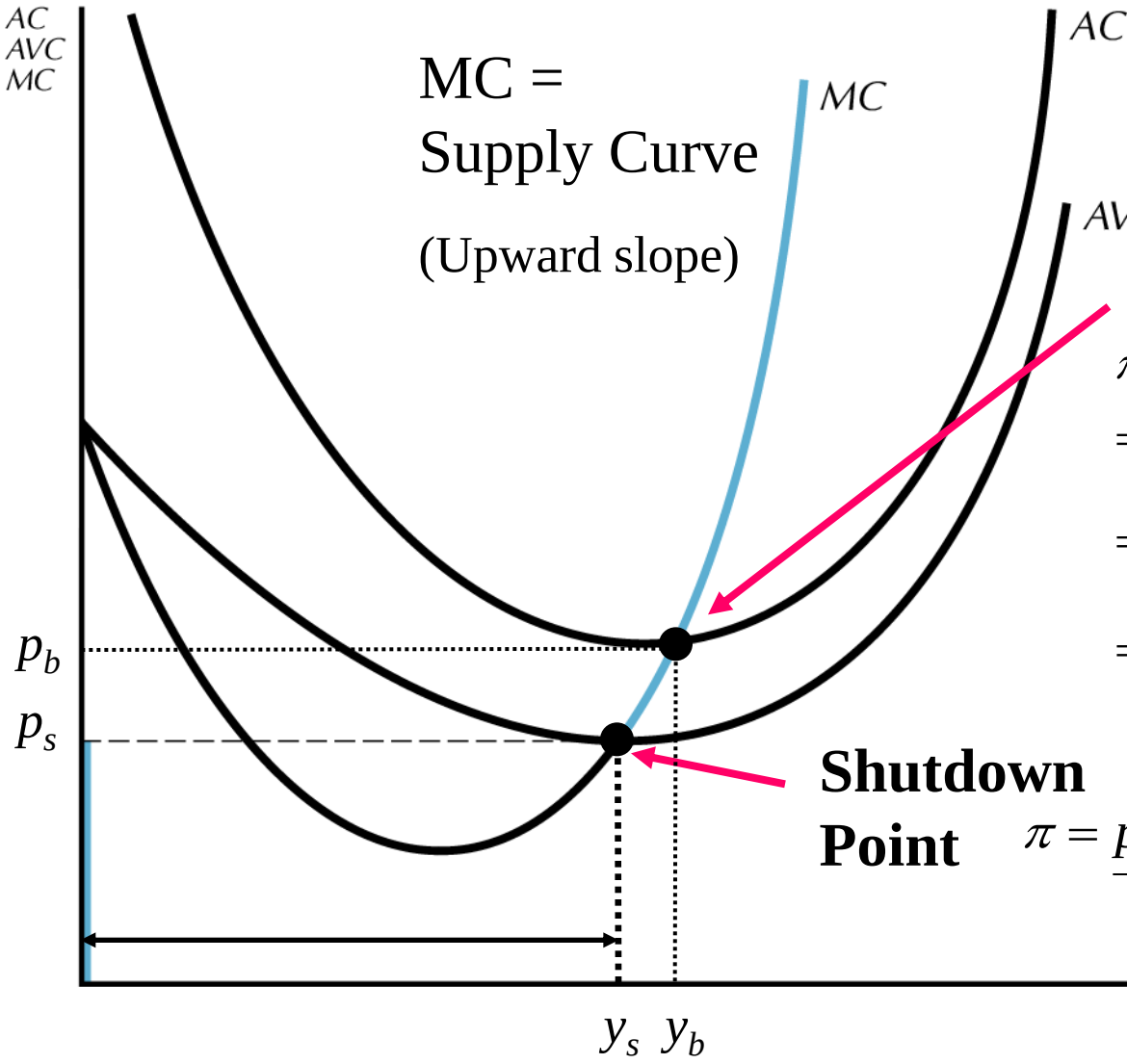
Ex. MC is constant

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



MC = Supply Curve

(Upward slope)

Breakeven Point

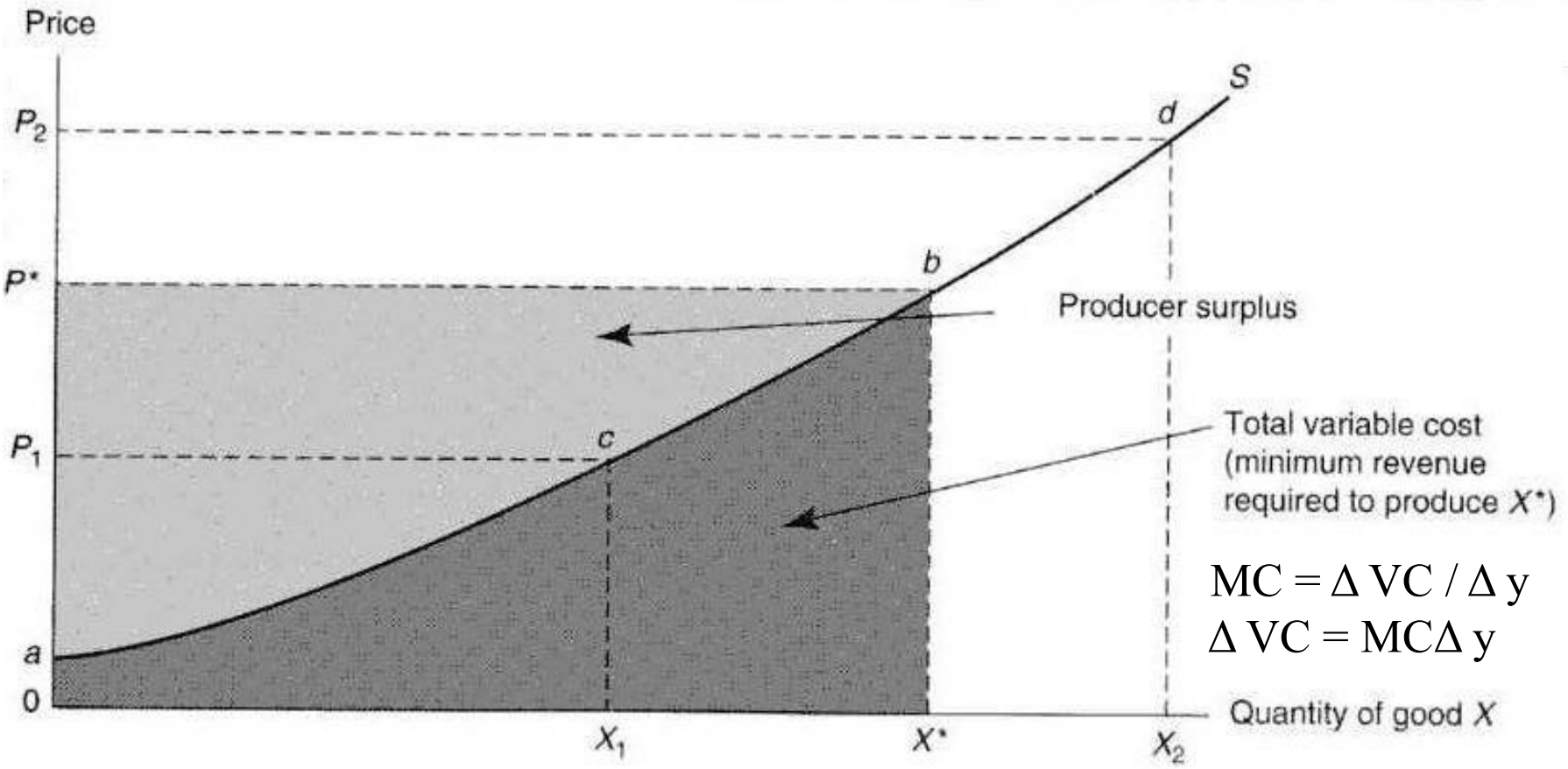
$$\pi = P_b y - VC - FC$$
$$= AC \cdot y - VC - FC$$
$$= \left(\frac{VC}{y} + \frac{FC}{y}\right) y - VC - FC$$
$$= 0 \quad \text{(Profit = 0)}$$

Shutdown Point

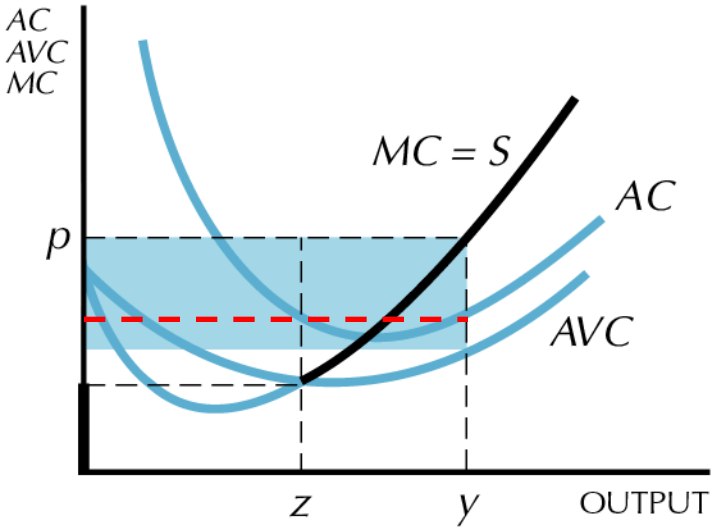
$$\pi = \underbrace{py - VC(y)}_{=0} - FC = -FC$$

Shutdown Condition

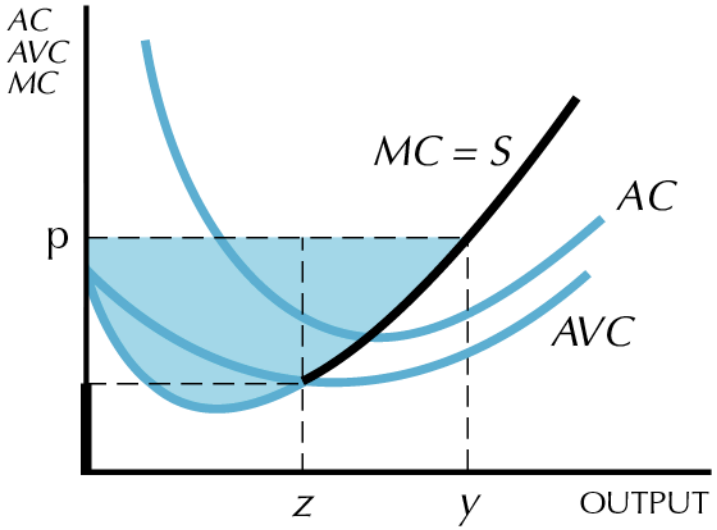
Supply Curve and Producer Surplus



Profits and Producer's Surplus

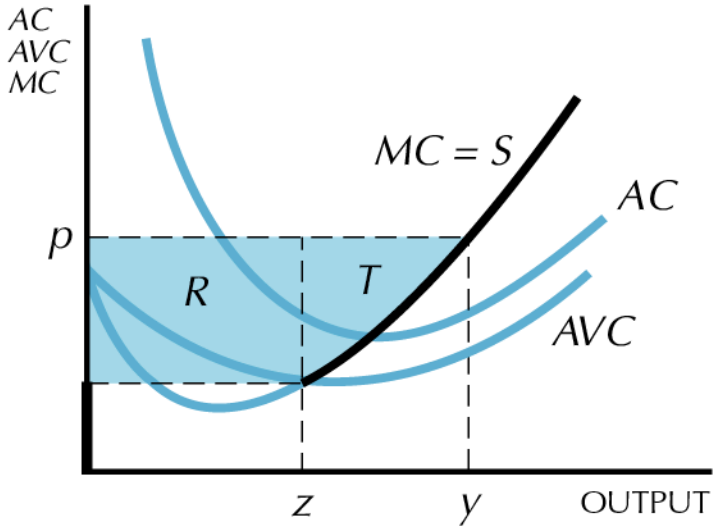


A Revenue –variable costs



B Area above *MC* curve

$$\pi = py - AC$$
$$= py - VC - FC$$
$$PS = py - VC$$



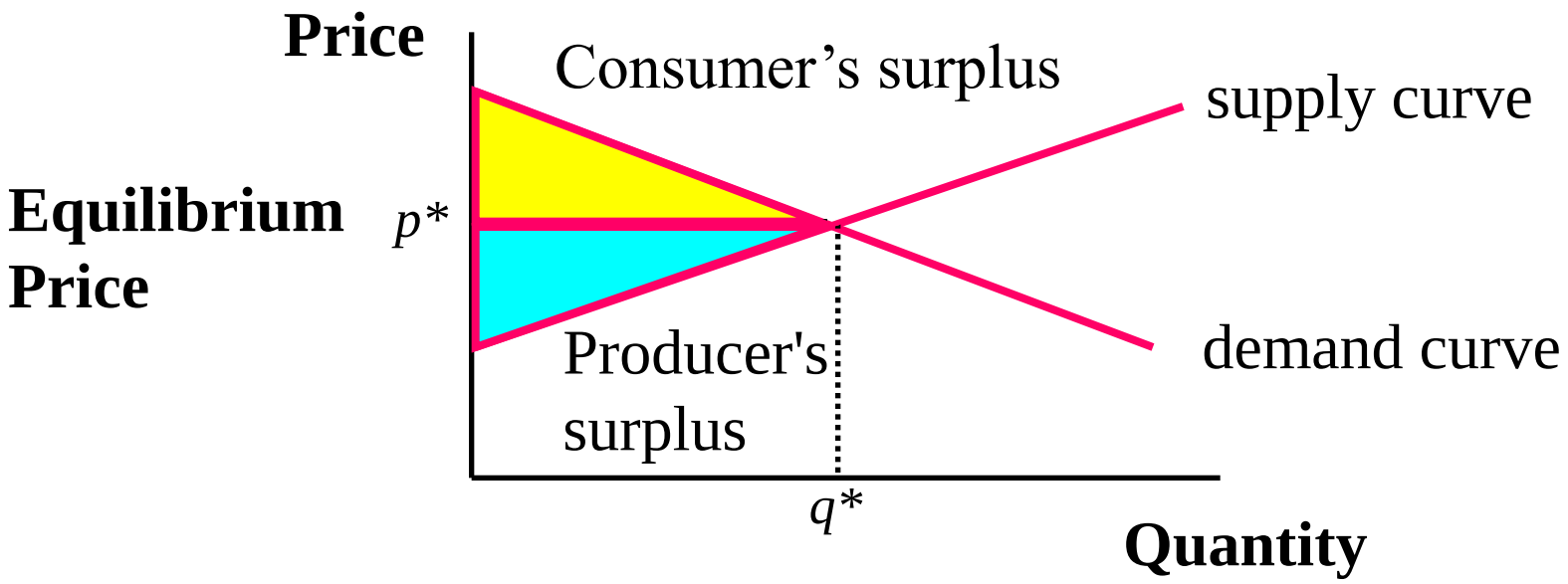
C Area to the left of the supply curve

Equilibrium and Social Surplus

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

Efficiency of Perfect Market

Target Pricing

e.g. rice in Japan