Application : Consumer / Producer surplus

- Consider a product with

  Demand curve : $p = D(q)$

  Supply curve : $p = S(q)$

  with p = price and q = quantity.

- The equilibrium price p_0 occurs at quantity q_0 that satisfies

$$D(q_0) = S(q_0)$$

with $p_0 = D(q_0) = S(q_0)$.

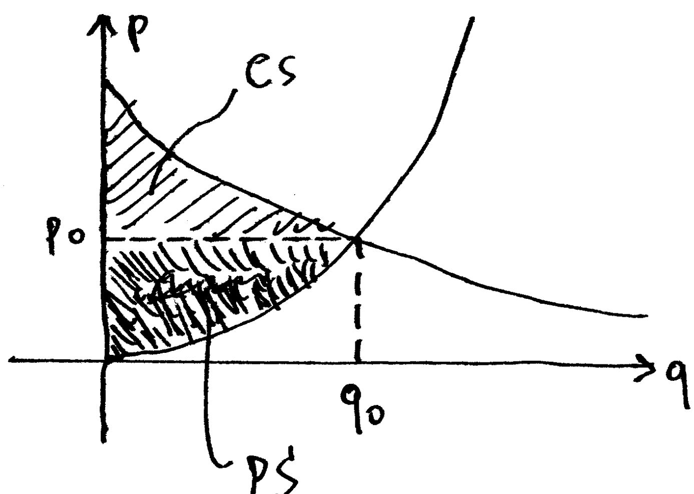
- Define:

1) Consumer Surplus

$$CS = \int_0^{q_0} [D(q) - p_0]\, dq$$

2) Producer Surplus

$$PS = \int_0^{q_0} [p_0 - S(q)]\, dq.$$



- <u>Interpretation</u>

a) The <u>consumer surplus</u> represents how much more than the equilibrium price p_0 would some consumers be willing to pay. Thus consumer surplus measures the efficiency of the market with respect to the interest of the consumer.

b) The <u>producer surplus</u> represents how much less than the equilibrium price p_0 would some producers be willing to charge. Thus producer surplus measures the efficiency of the market with respect to the interest of the producer.

<u>example</u> : Find CS and PS when

$$\begin{cases} S(q) = 2q^2 \\ D(q) = 6 - 4q \end{cases}$$

<u>example</u> : Find CS and PS when

$$\begin{cases} S(q) = e^{q/2} - 1 \\ D(q) = 199 - e^{q/2} \end{cases}$$