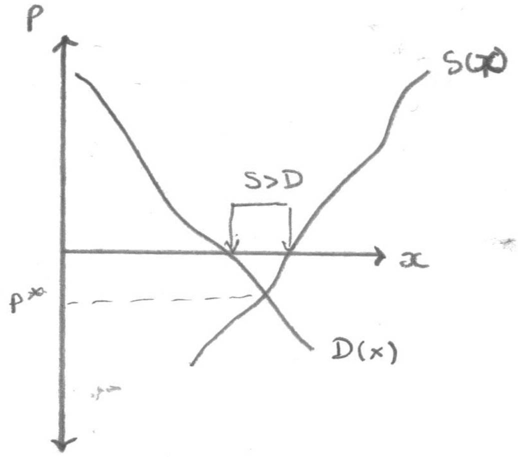
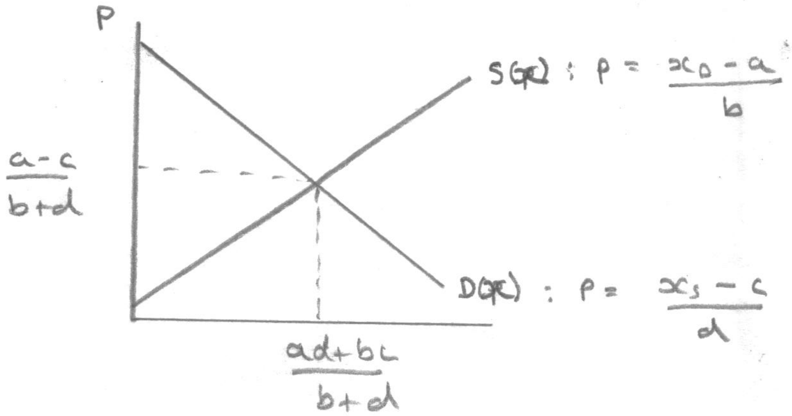
Tutorial 2

1. "Talk is cheap..."



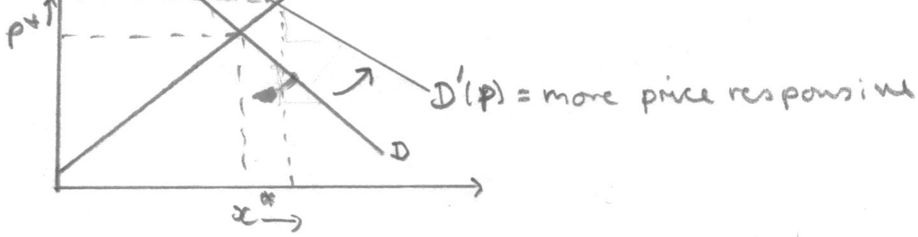
2. (a) $x_D = x_S \Rightarrow a - bp = c + dp \Rightarrow a - c = dp + bp$

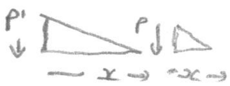
$\Rightarrow \boxed{\frac{a-c}{b+d} = p^*}$



$$S(p) = c + dp^*$$
$$= c + d\left(\frac{a-c}{b+d}\right)$$
$$= c + \frac{ad - cd}{b+d}$$

$x^* = \frac{c(b+d)}{b+d} + \frac{ad-cd}{b+d} = \frac{ad+bc}{b+d}$ Same process for D(p)





(b) $$P_D = P_S(1+t)$$

$$D(P_D) = a - bP_D$$

$$S(P_S) = c + dP_S$$

In terms of P_S

$$D(P_S) = a - bP_S(1+t)$$

$$S(P_S) = c + dP_S$$

$D(P_S) = S(P_S) \Rightarrow \quad a - bP_S(1+t) = c + dP_S$

$$\Rightarrow \quad P_S = \frac{a-c}{d+b(1+t)}$$

and $P_D = P_S(1+t) \Rightarrow \quad P_D = \dfrac{(a-c)(1+t)}{d+b(1+t)}$

Note. $t=0 \Rightarrow$ this collapses back to the no-tax equilibrium.

- $\dfrac{\Delta P_s}{\Delta t} < 0$ depends on b essentially (slope of d-curve)

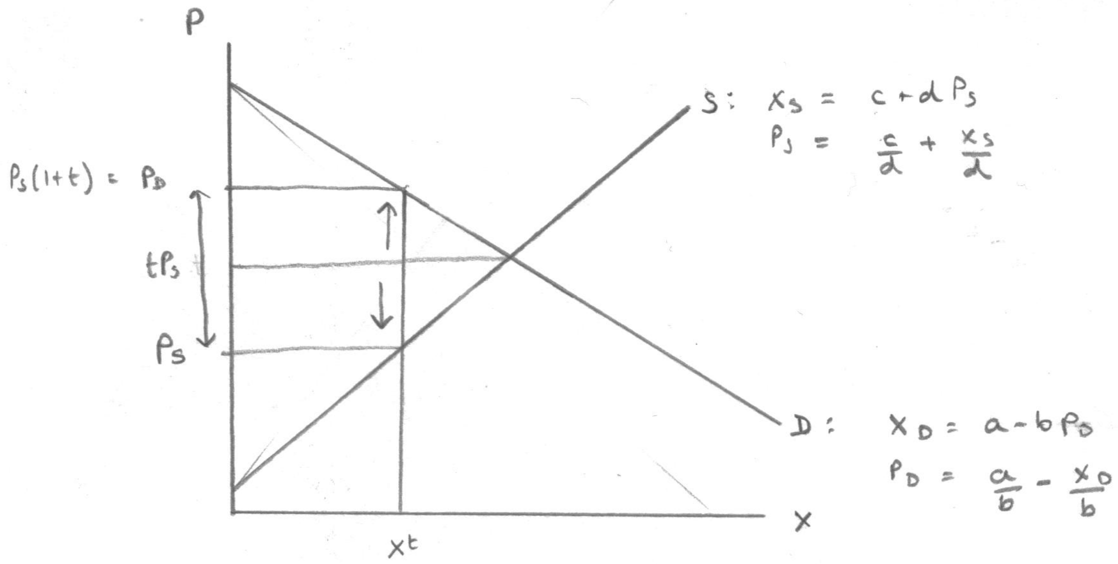
- $\dfrac{\Delta P_d}{\Delta P_t} > 0$ depends on both c and d

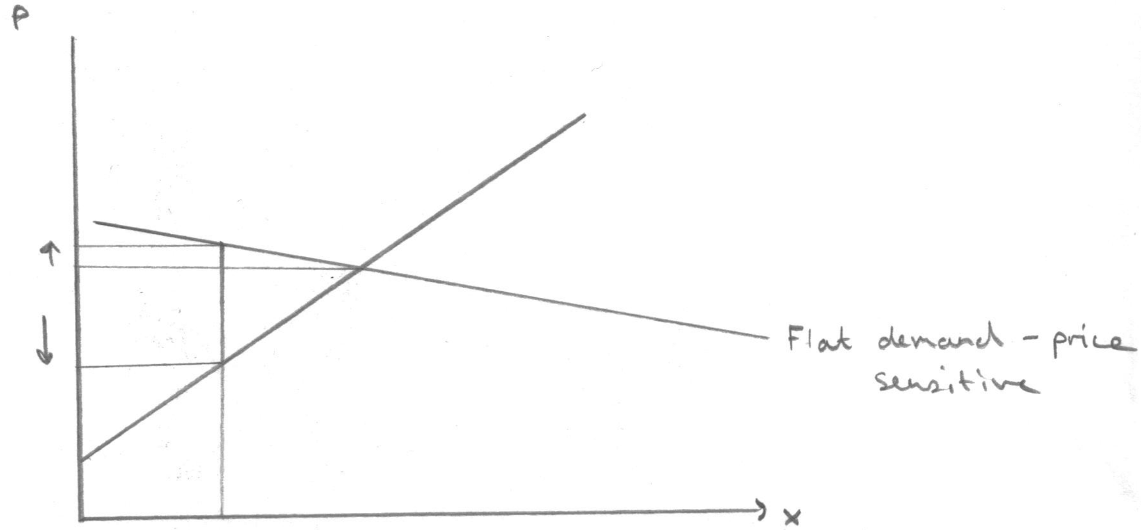
- If $b = 0$ d-curve is flat - extremely price insensitive the producer doesn't drop at all, all incident on consumer

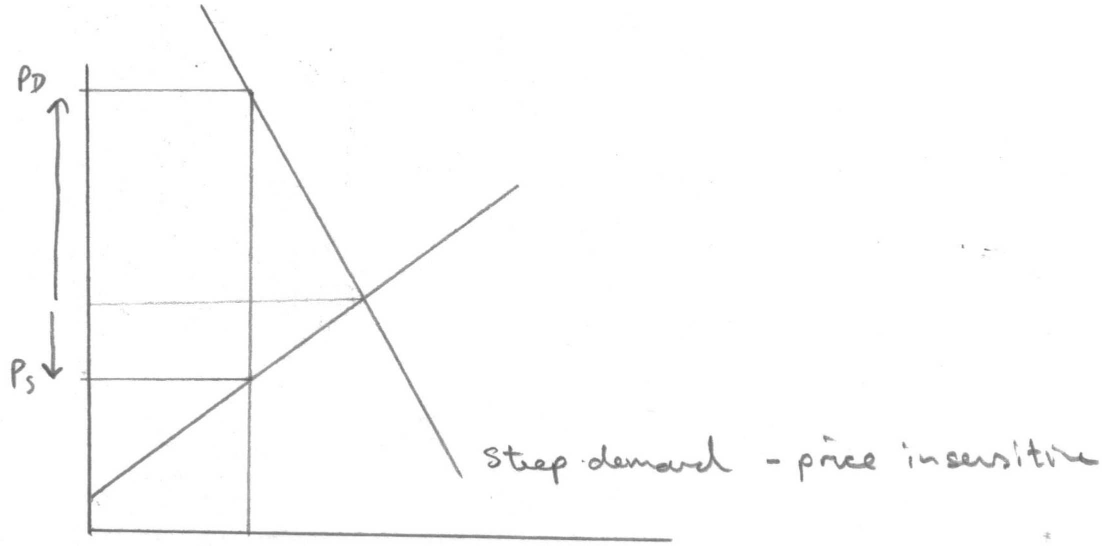
- If $b \to \infty$ d-curve vertical 

- extremely price sensitive - incident on supplier

- If $c \to \infty$ supply curve steeper supply curve more price sensitive

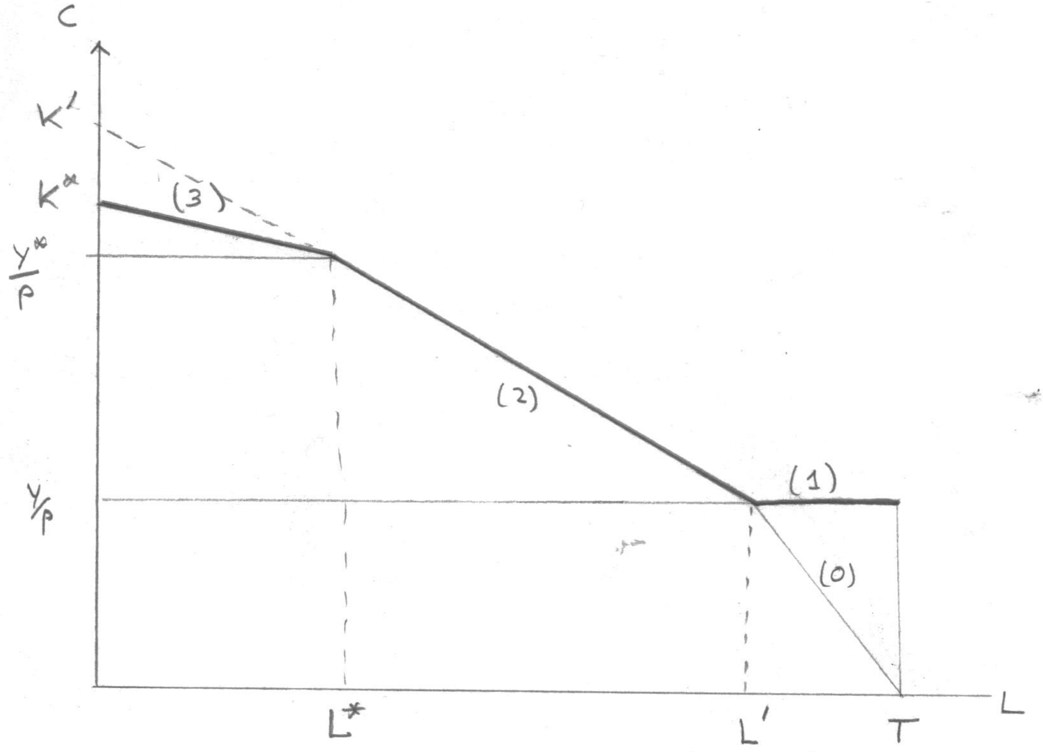






$\frac{\Delta P_s}{\Delta t} < 0$ $\quad \frac{\Delta P_s}{\Delta b} < 0$ $\quad b\uparrow$ demand more sensitive $\quad P_s \downarrow$

$\frac{\Delta P_s}{\Delta d} < 0$ $\quad d\uparrow$ " " sensitive $\quad P_s \downarrow$



Part (0). As per lecture $\boxed{C = \frac{\omega}{P}T - \frac{\omega}{P}L}$

Part (1). $\boxed{C = Y/P}$

L' : As per lecture. The point $\{Y/P, L'\}$ lies on section (0) of the constraint. Therefore it satisfies

$$C = \frac{\omega}{P}T - \frac{\omega}{P}L$$

$$C = Y/P$$

$$L = L'$$

$$\Rightarrow \quad \frac{Y}{\cancel{P}} = \frac{\omega}{\cancel{P}}T - \frac{\omega}{\cancel{P}}L' \quad \Rightarrow \quad \boxed{L' = T - \frac{Y}{\omega}}$$

Part (2). As per lecture : $\boxed{C = \frac{\omega}{P}(T - tL') - (1-t)\frac{\omega}{P}L}$

We know the slope of section (2) is $-(1-t)\frac{\omega}{P}$ and this equals $-\frac{(K' - Y/P)}{L'}$ where K' is the vertical intercept

Therefore $\dfrac{K' - \frac{Y}{p}}{L'} = (1-t)\dfrac{w}{p} \Rightarrow K' = (1-t)\dfrac{w}{p}L' + \dfrac{Y}{p}$

So $K' = (1-t)\frac{w}{p}L' + \frac{Y}{p}$ is the vertical intercept and

$$C = (1-t)\frac{w}{p}L' + \frac{Y}{p} - (1-t)\frac{w}{p}L \quad \text{is fine.}$$

To simplify:

$$K' = \frac{w}{p}\left((1-t)L' + \frac{Y}{w}\right)$$

Sub in $\frac{Y}{w} = T - L'$ from $L' = T - \frac{Y}{w}$

$$K' = \frac{w}{p}\left((1-t)L' + T - L'\right) = \frac{w}{p}\left(T - tL'\right)$$

$$\Rightarrow \boxed{C = \frac{w}{p}\left(T - tL'\right) - (1-t)\frac{w}{p}L}$$

L^*: The point $\{Y^*/p, L^*\}$ lies on section (2) of the constraint. Therefore it satisfies:

$$C = \frac{w}{p}(T - tL') - (1-t)\frac{w}{p}L$$

$$C = \frac{Y^*}{p}$$

$$L = L^*$$

$$\Rightarrow \frac{Y^*}{\cancel{p}} = \frac{w}{\cancel{p}}(T - tL') - (1-t)\frac{w}{\cancel{p}}L^*$$

$$\Rightarrow \boxed{L^* = \left(\frac{1}{1-t}\right)\left(T - tL' - \frac{Y^*}{w}\right)}$$

Part (3). We know the slope is $-(1-t^*)\frac{w}{p}$ and that this equals $-\frac{K^* - Y^*/p}{L^*}$ where K^* is the vertical intercept.

Therefore $\frac{K^* - Y^*/p}{L^*} = (1-t^*)\frac{w}{p} \Rightarrow K^* = (1-t^*)\frac{w}{p}L^* + \frac{y^*}{p}$

$$C = (1-t^*)\frac{w}{p}L^* + \frac{y^*}{p} - (1-t^*)\frac{w}{p}L$$

To simplify

$$K^* = \frac{w}{p}\left((1-t^*)L^* + \frac{y^*}{w}\right)$$

From $L^* = \frac{1}{1-t}\left(T - tL' - \frac{y^*}{w}\right) \Rightarrow \frac{y^*}{w} = T - tL' - (1-t)L^*$

$$K^* = \frac{w}{p}\left((1-t^*)L^* + T - tL' - (1-t)L^*\right)$$

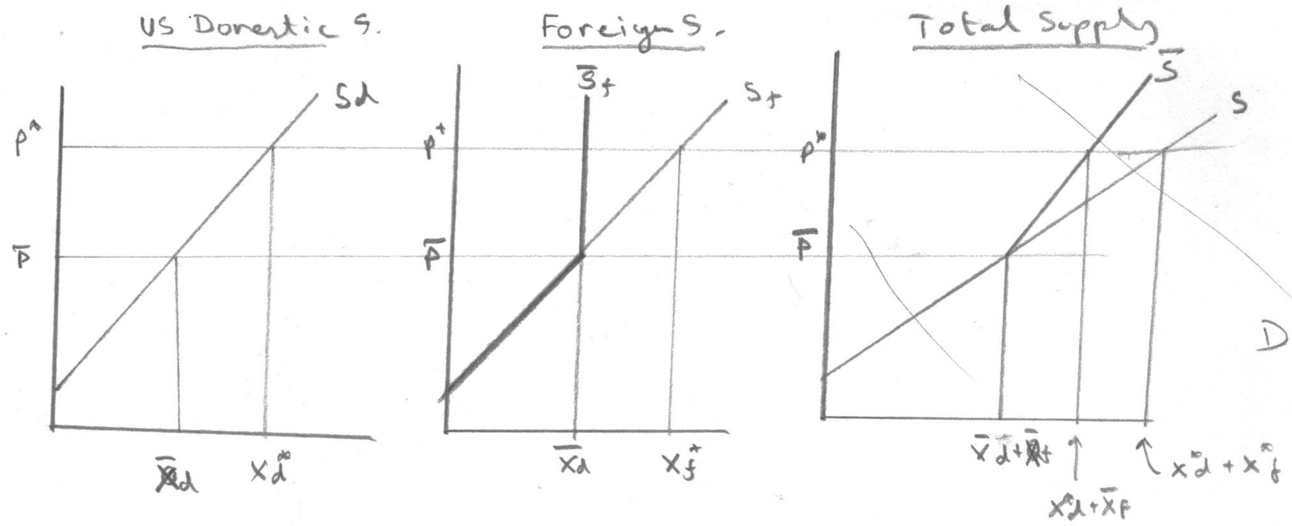
$$K^* = \frac{w}{p}\left(\cancel{L^*} - t^*L^* + T - tL' - \cancel{L^*} + tL^*\right)$$

$$K^* = \frac{w}{p}\left(T - tL' - (t^* - t)L^*\right)$$

$$\boxed{C = \frac{w}{p}\left(T - tL' - (t^* - t)L^*\right) - (1-t^*)\frac{w}{p}L}$$

Note: this is the same as Part (2) if $t^* = t$

3)



$p < \bar{p}$ quota doesn't bind

$p > p$ it does

2.