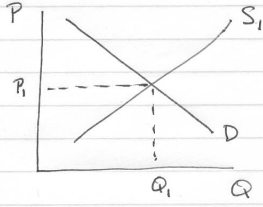
Calculation of Deadweight Loss for a tax on Suppliers

Pre tax equilibrium

Price = P_1

Quantity = Q_1



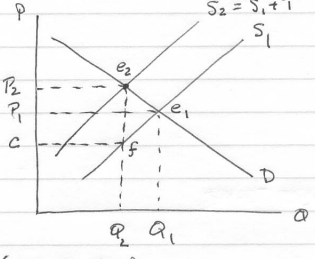
Levy tax on S; Supply shifts leftward from S_1 to S_2

T = lump sum tax

P_2, Q_2 = post tax equilibrium

P_2 = demand price

c = supply price



$P_2 - c = T$

$T * Q_2$ = tax revenue (area $P_2 c f e_2$)

Due to tax:

loss of Consumer Surplus	$P_1 P_2 e_2 e_1$	These define areas
+ loss of Producer Surplus	$P_1 c f e_1$	
= loss of surplus	$P_2 c f e_1 e_2$	

Dead weight Loss

= loss of surplus − gain of Tax Revenue

= $P_2 c f e_1 e_2 - P_2 c f e_2 = e_1 e_2 f$

Deadweight loss is the area of $e_1 e_2 f$

$e_1 e_2 f$ is 2 right triangles.

(A) Area of top is $\frac{1}{2}(P_2 - P_1)(Q_1 - Q_2)$

(B) Area of bottom is $\frac{1}{2}(P_1 - c)(Q_1 - Q_2)$

Dead weight Loss is the sum of area A & area B

if $P_1 = \$10$ $Q_1 = 100$
$P_2 = \$12$ $Q_2 = 80$
$T = P_2 - c = \$4$

then Area of top is $\frac{1}{2}(2)(20) = \$20$
Area of bottom is $\frac{1}{2}(2)(20) = \$20$

Dead weight loss is $\$40$

Tax Revenue is $\$320$

Total Loss is $\$360$