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**Lecture 04: Price Controls and Production Quotas**

1. Price controls
	1. Recall how price ceilings and floors work:

Quantity

Price

S

D

Price Ceiling

DWL

Shortage

QD

QS

PL

PT

Quantity

Price

S

D

Price Floor

DWL

Surplus

QS

QD

PT

PL

* 1. Let’s take this one step farther and mathematically solve price controls. This will allow us to determine the *size* of the shortage or surplus and the *size* of the deadweight loss.
		1. We start with the following supply and demand curves:

$$Q\_{S}=2+P$$

$$Q\_{D}=17-2P$$

* + 1. Begin by setting QS to QD to see what would happen under equilibrium.

$$2+P=17-2P$$

$$3P=15, P^{\*}=5 $$

$$Q^{\*}=2+\left(5\right)=17-2\left(5\right)=7$$

* + 1. Suppose there’s a price ceiling of 1 (PL = 1). That means:

$$Q\_{S}=2+\left(1\right)=3$$

$$Q\_{D}=17-2\left(1\right)=15$$

We now have a shortage of 12 (=15 – 3).

* + 1. To find DWL, note that the DWL makes a triangle. We can find it by determine the area. To find the base, we’ll need the true price which is QS put in demand’s equation.

$$3=17-2P\_{T}$$

$$2P\_{T}=14, P\_{T}=7$$

Then we take the difference between the true price and the legal price. It’s 6 (=7 – 1).

* + 1. Thanks to previous work, we know the height of the triangle is 4. (How did I get that? Think carefully about the information we have.) That means DWL = ½(4)(6) = 12.
	1. Now let’s try a price floor set at 6.
1. Production Quotas
	1. Sometimes the government puts controls on production, rather than price.
		1. The French government requires at least 40% of French-language movies to be shown on TV.
		2. A 1989 EU directive requires no more than 49% of broadcast transmission time go to programs not of European origin.
		3. OPEC establishes production quotas on how much oil they pump.
	2. Which is a maximum quota and which is a minimum quota? How do you know?

Quantity

Price

S

D

Quota

DWL

QL

P

Quantity

Price

S

D

Quota

DWL

QL

P

* 1. Note how surpluses change as quotas are introduced. Maximums help suppliers by pushing up prices. Minimums help demanders by pushing down prices.
		1. We reference the demand curve because these are *production* quotes. If they were consumption quotas, we would reference the supply curve. Low ones would decrease price and high ones would increase price.
	2. We can do the same math here as we did with price controls, the only difference is that we’re setting quantity rather than price.
		1. We start with the same supply and demand curves: (Note that P\* will still be 4 and Q\* will still be 6.)

$$Q\_{S}=2+P$$

$$Q\_{D}=17-2P$$

* + 1. Suppose there’s a minimum quota of 9 (QL = 9). That means:

$$9=17-2P\_{D}, P\_{D}=4$$

* + 1. To find DWL, we need what the price for supply would be.

$$9=2+P\_{S}, P\_{S}=7$$

That’s a difference of three.

* + 1. Thanks to previous work, we know the height of the triangle is 3. (=9 – 6) That means DWL = ½(3)(3) = 4.5.
	1. Now let’s try a maximum quota of 3. Note that this deadweight loss is different than what we just calculated even though this is 3 units below equilibrium and the other was 3 units above. Why this difference?