LECTURE 5: APPLICATIONS 1

Today’s Topics

1. **Price Controls**: ceilings, floors, rationing, unemployment.
2. **Taxes**: on buyers, on sellers, elasticity and tax incidence.
3. **Consumer surplus**: willingness to pay, graphically.
4. **Producer surplus**: willingness to sell, graphically.
5. **Market Efficiency**: why competitive markets? the Dead Weight Losses of taxes.
6. **Two Cases**: fur sales, newspaper sales.
1. PRICE CONTROLS

Governments may try to control prices. Why?

Price ceiling: $\bar{P}$, a maximum price.
Price floor: $\underline{P}$, a minimum price.

If the ceiling is not binding ($\bar{P} > P^*$, the market-clearing, equilibrium price), or the floor is not binding ($\underline{P} < P^*$), then no concern.

If the ceiling is binding ($\bar{P} < P^*$) $\rightarrow$ a shortage.
If the floor is binding ($\underline{P} > P^*$) $\rightarrow$ a glut.

GLUTS AND SHORTAGES

From Lecture 3:

When \( P = P^* \) and \( S = D \), market-clearing equilibrium, at \( P^*, Q^* \).

When \( P = \bar{P} \), \( D > S \), a sellers’ market and shortage.

When \( P = \underline{P} \), \( S > D \), a buyers’ market and glut.
NON-PRICE RATIONING

A shortage of petrol when the refinery is off-line but there is a price ceiling $\bar{P} < P^*$ the new equilibrium price $P^* \to$ queues, or first-come-first-served.

Rent control $\to$ shortages: $\bar{P} < P^*$, with long-term deterioration of the quality of rent-controlled housing. Why?

Minimum wage laws: a floor $\underline{w}$ on wages $\to$ a glut in the labour market, called unemployment, with $\underline{w} > w^*$, the market-clearing wage. By maintaining the wages of the low-paid, the government reduces the number of their jobs.
2. TAXES ON BUYERS

A unit tax on buyers: each unit bought costs 50¢ more, but the seller gets only (price paid – tax): a wedge between the buyers’ price $P_D$ and the sellers’ price $P_S$. How do equilibrium price and quantity change?
SHIFTED DEMAND AND THE BURDEN

If the previous (before-tax) price $P^*$ was $2.00, the buyers’ price is now $2.50; but at the higher price, buyers demand less: to sell the same quantity, the before-tax price must be 50¢ less. The demand curve in effect shifts down by 50¢ to $D_2$.

The after-tax quantity falls to $Q_2$, and the price paid ($P^D_2$) is 50¢ higher than the price received by sellers ($P^S_2$).

Who bears the burden of the tax? Sellers receive ($P_1 - P^S_2$), i.e. less per unit; buyers pay ($P^D_2 - P_1$), i.e. more. And less is sold: both sides bear the tax burden.
TAXES ON SELLERS

A unit tax on sellers: no shift in demand, but the cost of selling has risen by 50¢ a unit: the supply curve in effect shifts up by 50¢ to $S_2$. 
TAX INCIDENCE

Taxes on buyers and sellers are equivalent: the after-tax prices and quantities and burdens identical, as seen above: $P_D^2, P_S^2, Q_2$.

How the burden is shared depends on the elasticities: the burden is heavier on the more inelastic side of the market.

The burdens are measured by the relative movements of the buyers’ price $P_D^2$ and the sellers’ price $P_S^2$ from the before-tax equilibrium price of $P^*$. 
TAX BURDEN & ELASTICITIES

Elastic supply; inelastic demand.
Consumers’ burden is greater than producers’.

Inelastic supply; elastic demand.
Consumers’ burden is less than producers’.

tax=50¢
3. CONSUMER SURPLUS

Remember: The market demand curve measures the maximum quantity demanded at any price, or the maximum *willingness to pay* for any quantity.

At any price $P_1$, consumers buy $Q_1$ units, and are left with a positive net willingness to pay: their *consumers’ surplus*, which equals the area above the price and below the demand curve.

So consumers’ surplus is a willingness to pay over and above the price, or net willingness to pay.
If price rises, C.S. shrinks. From C.S.1 at $P_1$ to C.S.2 at $P_2$. Some demand is choked off $(Q_1 - Q_2)$, and for the first $Q_2$ units, the net willingness to pay is less. If price falls, C.S. grows.
4. PRODUCER SURPLUS

Remember: Each point on the supply curve gives the lowest price at which suppliers are willing to sell the corresponding quantity of output, or the maximum quantity they will supply at any price.
WILLINGNESS TO SUPPLY

At $P_1$ some producers (at the bottom of the supply curve) would sell at prices below $P_1$: their net willingness to supply at $P_1$ is still positive.

At $P_1$ they gain producers’ surplus, or economic rent: a return to producers over and above the minimum necessary to induce them to supply $Q_1$ in aggregate. P.S. equals the area below the price and above the supply curve.
5. MARKET EFFICIENCY
TAXES AND EFFICIENCY

The tax drives a wedge between $P^D_2$ and $P^S_2$, and the quantity supplied falls from $Q_1$ to $Q_2$.

Consumer surplus falls as the price paid rises: shrinks by area A+B. Producer surplus falls as the price received falls: shrinks by area C+D. Tax revenue is area A+C.

So what happens to area B+D?

This is the Dead Weight Loss (DWL) associated with the tax: an inefficiency.

*Efficient allocation* maximizes the Total Surplus = C.S. + P.S.
6A. U.S. FUR SALES

\[
\frac{\Delta Q}{Q} = \eta \frac{\Delta P}{P} + \varepsilon \frac{\Delta I}{I} + \eta_X Y \frac{\Delta P_Y}{P_Y} + \Delta \text{temperatures} + \Delta \text{tastes}
\]

\[
\frac{\Delta Q}{Q} = \_, \eta = \_, \frac{\Delta P}{P} = \_, \varepsilon = \_, \frac{\Delta I}{I} = \_
\]
### 6B. LONDON NEWSPAPER SALES

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<th>Newspaper</th>
<th>August 1993</th>
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<td>The Times</td>
<td>355,000</td>
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<td>The Independent</td>
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<td>The Guardian</td>
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\frac{\Delta P_{\text{Times}}}{P} = -____
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