

## Constraints, Subsidies and Taxes

# Goals

- ▶ Deep review of consumer and producer surplus
- ▶ What they really mean
- ▶ Work Examples

# Welfare Measure

- ▶ CS/PS is a welfare measure
- ▶ There are others
  - ▶ Compensating Variation – How much money would be required after a changes in prices to give you the same utility.
  - ▶ Equivalent Variation – What you would pay to avoid the price change.

# Why CV or EV?

- ▶ They use the expenditure function.
- ▶ Capture general equilibrium effects
- ▶ CS/PS only captures one market, CV and EV capture all markets.
- ▶ Almost all the of the time CS/PS is not that far off.

# Producer Surplus

- ▶  $\int_0^q (p - S(q)) dq$
- ▶ Roughly the area below price and above supply up to the quantity.
- ▶ Gets complex when quantities and prices don't line up nice.

# Decompose

- ▶ Total Revenue (TR):  $p \cdot q$
- ▶ Variable Cost (VC): area under the supply curve
- ▶ Producer surplus ( $\Pi + FC$ ): Profit + FC

$$\Pi = TR - (VC - FC)$$

# Consumer Surplus

- ▶ Total Surplus: Area under the demand function up to  $q$ .
- ▶ Total Surplus: Integral of  $D$  is the expenditure function, how much money to achieve a level of utility.
- ▶ The benefit of being able to purchase

Consumer surplus subtracts off what you pay and give net benefit of being able to buy in the market.

## Example 1: Competitive Market



## Example 2: Ceiling

### Example 3: Ceiling but must provide

This is what happens when you keep gas or electricity cheap for locals.

## Example 4: Tax on Oil (No Trade)

## Comments About Tax

- ▶ Yes, there is deadweight loss.
- ▶ Remember, the tax revenue should be paying for things that have value to society greater than cost.

Incidence: Who Pays?

## Example 5: Export Oil

## Example 6: Tax on Oil with Export Market