Overview: Analysis of Competitive Markets

• Brief Review
  – Market Equilibrium and Surplus
  – Examples: Welfare Analysis of Government Intervention
    • Tax
    • Quota

• The US Sugar Price Support Program
  – How does it work?
  – Who are the winners and losers?
Market Equilibrium and Surplus

Concepts: Market Equilibrium

- Demand, Supply, Market Equilibrium
- Consumer Surplus, Producer Surplus
- Total Revenue
Example: Imposition of a Tax

Concepts: Imposition of a Tax

- Two Prices: Before and After Tax
- Equilibrium
- Consumer and Producer Surplus
- Government Revenue
- Dead Weight Loss
- Incidence of a Tax (Who pays?)
  - Fraction ‘paid’ by buyers is \( \frac{Es}{Es - Ed} \)
  - “Pass Through Formula”
Example: Imports

Concepts: Imports

• Elastic World Supply
• Total Supply
• Equilibrium
Example: Import Quota

Concepts: Import Quota

- Impact of an Import Quota
- Tariff and Import Quota Equivalent or Not?
The U.S. Sugar Price Support Program

- How do market stabilization prices work?
- Aims of sugar price support program?
- Why quota rather than a tariff?
Analysis of U.S. Sugar Program

- Quantify transfers and deadweight losses.

- Objective:
  - Get practice with market analysis
  - Determine winners and losers
  - Get idea of the size of the effects

- (Simple) Modeling of the sweetener market
  - Using 2000 data, assumptions as given before.
  - Assume sugar and HFCS are perfect substitutes
  - Need Demand, Supply, etc.

Assumptions: Analysis of U.S. Sugar Program

Market for sweetener with HFCS
- \( Es = 1.53, \quad Ed = -0.3 \)
- \( Q(\text{demand}) = 38.6 \text{ bil \ lbs} \)
- \( Q(\text{sugar supply}) = 19.4 \)
- \( Q(\text{hfcs supply}) = 15.7 \) at a price of 11.3c
  - hfcs supply perfectly elastic on 1-15.7 bil. lbs.
  - hfcs supply perfectly inelastic above 15.7 bil. lbs.

- Ignore Canada
- Use US cents/lb
- World price = 11c/lb. US price 21.8c/lb.
US Sugar Program - 2000 Data

• Domestic Demand for Sweetener
  – \( Q^{US} = 20.2 + 18.4 = 38.6 \text{ bill. lbs} \); \( P = 21.8 \text{c/lb} \); \( E_d = -0.3 \)
  – “Back of the Envelope” Approach:
    \[
    E_d = \frac{P}{Q} \frac{\partial Q}{\partial P} \Rightarrow b = E_d \frac{Q}{P} \\
    a = Q - bP
    \]
  – So \( b = -0.3 \times \frac{38.6}{21.8} = -0.53 \); \( a = 38.6 - (-0.53) \times 21.8 = 50.1 \)
  – Namely, \( Q_d = 50.1 - 0.53 \times P \)

• Domestic Supply for Sugar
  – By Same Method: \( Q_s = -10.3 + 1.36 \times P \)
Sugar + HFCS = Sweetener Supply

HFCS:
- 0-15.7 perfectly elastic supply
- >15.7 perfectly inelastic supply
Analysis of the Quota in the Sweetener Market

Surplus Analysis: Highlights

- Extra Producer Surplus for Domestic Firms = $1.3 bil (non HFCS)
- Surplus on HFCS = $1.65 bil
- Extra Cost of Domestic Production = $794 mil
- Change In Consumer Surplus = $4.48 bil
- Revenue to Importers = $378 mil
- Deadweight Loss = $1.15 bil
Surplus Analysis in Practice

• More Extensive Analysis Involves Data and Econometric Estimation of Equations

• Example: Demand for Sweetener in Candy Production

\[ \ln(Q_{\text{sweet}}) = 2.83 - 0.32 \ln(P_{\text{sweet}}) + 0.62 \ln(\text{CandyShip}) \]

  – \( Q_{\text{sweet}} \): Quantity of Sweetener
  – \( P_{\text{sweet}} \): Price of Sweetener
  – CandyShip: Amount candy shipped

Take Away Points

• Surplus is the value created by trade.
• Surplus Analysis quantifies distortions and transfers.
• Politics impacts economics and business strategy
  – Sugar Quota has geopolitical ramifications
  – HFCS profits depend on quotas
  – Anti-trust, taxes, regulations, ...