

## Homework 2

### Problem 1 (Supply, demand, and elasticity II)

According to Borjas (2003), immigration into the US increased the labor supply of working men by 11% between 1980 and 2000 and reduced the wage rate by 3.2%. From these data, can we make any inferences about the elasticity of supply or demand? Which of the two curves is likely to be relatively more elastic?

### Problem 2 (Elasticity and tax incidence)

Green et. al. estimate that the demand elasticity is -0.47 and the long-run supply elasticity is 12.0 for almonds. The corresponding elasticities are -0.68 and 0.73 for cotton, and -0.26 and 0.64 for processing tomatoes. If the government were to apply a per-unit tax to each of these commodities, what incidence would fall on consumers?

### Problem 3 (Constant elasticity supply and demand curves)

a. Prove that a demand curve given by  $Q = Ap^\epsilon$  has elasticity  $\epsilon$  at all points along the curve (hints: the curve  $Ap^\epsilon$  has slope  $\epsilon Ap^{\epsilon-1}$ , and  $\epsilon$  is probably a negative number).

b. Prove that a supply curve of the form  $Q = Bp^\eta$  has elasticity  $\eta$  at all points along the curve.

### Problem 4 (cross price elasticity)

Calculate the price and cross-price elasticities of demand for coconut oil. The coconut oil demand function (Buschena and Perloff, 1991) is

$$Q = 1,200 - 9.5p + 16.2p_p + 0.2Y \quad (1)$$

where  $Q$  is quantity of coconut oil demanded in thousands of metric tons per year,  $p$  is the price of coconut oil in cents per pound,  $p_p$  is the price of palm oil in cents per pound, and  $Y$  is the income of consumers. Assume that  $p$  is initially \$.45/pound,  $p_p$  is \$.31/pound, and  $Q$  is 1,275 thousand metric tons per year.

### Problem 5 (per-unit taxes and elasticity)

Suppose the supply and demand curves for cigarettes, in millions of packs sold per month, are given by

$$Q^d = 11 - \frac{1}{5}p$$

$$Q^s = 2p$$

- a. Solve for equilibrium price and quantity.
- b. Solve for price elasticity of demand and supply at the equilibrium.
- c. Suppose the government imposes a \$1/pack tax on cigarettes, paid by buyers. Solve for the new equilibrium, making sure to note both the before-tax and after-tax prices. What portion of the tax is paid by consumers, and what portion by sellers?
- d. Would your answer to c. change were the taxed paid by the sellers instead of the buyers?