

demand curve. Compensating variation is represented in Figure 3A-1(b) by the area $P_a a' c' P_c$ and equivalent variation by the area $P_a d' b' P_c$.

As indicated by Figure 3A-1(b), the compensating variation that results from the price increase is larger than the change in consumer surplus measured with the Marshallian demand curve (by the triangular area $a' b' c'$), while the resulting equivalent variation is smaller (by area $b' d' a'$). The opposite would be true in the case

of a price decrease. The size of these differences, as previously discussed, depends on the size of the income effect resulting from the change in prices. If they are large, then it is equivalent variation that should ideally be used to measure the change in welfare resulting from a price change, rather than either Marshallian consumer surplus or compensating variation. This is often, but not always, possible if a measure of Marshallian consumer surplus is available.⁹

EXERCISES FOR CHAPTER 3

1. A person's demand for gizmos is given by the following equation:

$$q = 6 - 0.5p + 0.0002I$$

where q is the quantity demanded at price p when the person's income is I . Assume initially that the person's income is \$40,000.

- a. At what price will demand fall to zero? (This is sometimes called the choke price because it is the price that chokes off demand.)
 - b. If the market price for gizmos is \$10, how many will be demanded?
 - c. At a price of \$10, what is the price elasticity of demand for gizmos?
 - d. At a price of \$10, what is the consumer surplus?
 - e. If price rises to \$12, how much consumer surplus is lost?
 - f. If income were \$60,000, what would be the consumer surplus loss from a price rise from \$10 to \$12?
2. At the current market equilibrium, the price of a good equals \$40 and the quantity equals 10 units. At this equilibrium, the price elasticity of supply is 2.0. Assume that the supply curve is linear.
 - a. Use the price elasticity and market equilibrium to find the supply curve. (Hint: the supply curve has the following form: $q = a + (\Delta q/\Delta p)p$. First, find the value of $\Delta q/\Delta p$; then, find the value of a .)
 - b. Calculate the producer surplus in the market.
 - c. Imagine that a policy results in the price falling from \$40 to \$30. By how much does producer surplus fall?
 - d. What fraction of the lost producer surplus is due to the reduction in the quantity supplied and what fraction is due to the fall in price received per unit sold?
 3. (This question pertains to Appendix 3-1; instructor-provided spreadsheet recommended.) Imagine a person's utility function over two goods, X and Y , where Y represents dollars. Specifically, assume a Cobb-Douglas utility function:

$$U(X, Y) = X^a Y^{(1-a)}$$

where $0 < a < 1$.

Let the person's budget be B . The feasible amounts of consumption must satisfy the following equation:

$$B = pX + Y$$