the price of computers low, which stimulated demand for Microsoft's operating system.

We can estimate factor elasticities by using a formula analogous to the estimated price elasticity formula, and we can use factor elasticities to forecast or predict changes over time or even changes from one geographic area to another. Suppose you're trying to compare the year-to-year performance of one of your regional salespeople over a period in which income grew by 3%. If demand for your products has an income elasticity of 2, you would expect quantity to increase by 6%. You don't want to reward the salesperson for increases in quantity that are largely unrelated to her effort. A performance measure more closely related to effort would subtract 6% from the actual growth because that is the growth related to income.

Alternatively, suppose the *New York Times* is trying to decide whether to begin home delivery of its newspaper in Nashville. The paper needs to know whether enough Nashvillians will choose home delivery to justify the investment in this service. If the *New York Times* recently began home delivery in Charlotte, and the income in Nashville is 5% higher than in Charlotte, you would expect a 10% higher per-capita consumption of the newspaper in Nashville than in Charlotte if the income elasticity of demand for the paper is 2. If the forecast quantity would allow you to break even, then begin home delivery in Nashville.

6.6 Stay-Even Analysis, Pricing, and Elasticity

Stay-even analysis is a simple tool that allows you to do marginal analysis of pricing. In particular, it is used to determine the volume required to offset a change in price. For example, you know from the First Law of Demand that raising price will result in selling fewer units. Stay-even analysis tells you how many unit sales you can lose before a price increase becomes unprofitable. When combined with information about elasticity of demand, the analysis will give you a quick answer to the question of whether changing price makes sense. If the predicted quantity decrease is bigger than the stay-even quantity decrease, then the price increase is not profitable, and vice versa.

Let's go back to the Mattel's pricing question from the beginning of this chapter: should they double the price of their Hot Wheels cars? Imagine that it costs Mattel \$0.50 to manufacture, package, and distribute a car, which it currently sells to retailers for \$0.75. If Mattel were to double the wholesale price to \$1.50, the profit per car would increase *fourfold* from \$0.25 to \$1.00. This means that Mattel could lose three-fourths of its customers and still earn the same profit that it earned prior to the price increase. Thus, Mattel's stay-even quantity for a 100% increase in price is a 75% decrease in quantity. Since quantity fell by less than 75%, the price increase was profitable.

The stay-even quantity is a simple function of the size of the price increase and the contribution margin, $\%\Delta Q = \%\Delta P/(\%\Delta P + \text{margin})$,

- Inelastic Demand ($|e| < 1$): Quantity changes less than price.

	ΔRevenue
Price ↑	+
Price ↓	−

- MR > MC implies that $(P - MC)/P > 1/|e|$; that is, the more elastic is demand, the lower the optimal price.
- Five factors affect elasticity:
  1. Products with close **substitutes** have more elastic demand.
  2. Products with may **complements** have less elastic demand.
  3. Demand for brands is more elastic than industry demand.
  4. In the long run, demand becomes more elastic.
  5. As price increases, demand becomes more elastic.
- **Income elasticity, cross-price elasticity,** and advertising elasticity are measures of how changes in these other factors affect demand.
- It is possible to use elasticity to forecast changes in demand: %ΔQuantity = (factor elasticity)(%ΔFactor).
- **Stay-even analysis** can be used to determine the quantity change required to offset a price change. The stay-even quantity is $\%\Delta Q = \%\Delta P/(\%\Delta P + \text{margin})$.
- A proposed price increase is profitable if the predicted quantity loss is less than the stay-even quantity.

Multiple-Choice Questions

1. Jim has estimated elasticity of demand for gasoline to be −0.7 in the short run and −1.8 in the long run. A decrease in taxes on gasoline would
   a. lower tax revenue in both the short and long run.
   b. raise tax revenue in both the short and long run.
   c. raise tax revenue in the short run but lower tax revenue in the long run.
   d. lower tax revenue in the short run but raise tax revenue in the long run.
2. Which one of the following is true?
   a. Nike has a less elastic demand curve than shoes.
   b. The demand curve for gas is more elastic in the short run than in the long run.
   c. Cigarettes have a more elastic demand than televisions.
   d. Salt has a less elastic demand than ice cream.
3. Jim recently graduated from college. His income increased tremendously from \$5,000 a year to \$60,000 a year. Jim decided that instead of renting he will buy a house. This implies that
   a. houses are normal goods for Jim.
   b. houses are inferior goods for Jim.
   c. renting and owning are complementary for Jim.
   d. need information on the price of houses.
4. Which of the following goods has a negative income elasticity of demand?
   a. Cars
   b. Items from Dollar stores
   c. Shoes
   d. Bread
5. An economist estimated the cross-price elasticity for peanut butter and jelly to be 1.5. Based on this information, we know the goods are
   a. inferior goods.
   b. complements.
   c. inelastic.
   d. substitutes.
6. Christine has purchased five bananas and is considering the purchase of a sixth. It is likely she will purchase the sixth banana if
   a. the marginal value she gets from the sixth banana is lower than its price.
   b. the marginal benefit of the sixth banana exceeds the price.
   c. the average value of the sixth banana