

## CHAPTER 2 Fundamental Economic Concepts

### Exercises

1. For each of the determinants of demand in Equation 2.1, identify an example illustrating the effect on the demand for hybrid gasoline-electric vehicles such as the Toyota Prius. Then do the same for each of the determinants of supply in

Equation 2.2. In each instance, would equilibrium market price increase or decrease? Consider substitutes such as plug-in hybrids, the Nissan Leaf and Chevy Volt, and complements such as gasoline and lithium ion laptop computer batteries.

2. Gasoline prices above \$3 per gallon have affected what Enterprise Rental Car Co. can charge for various models of rental cars. SUVs are \$37 with one-day return and subcompacts are \$41 with one-day return. Why would the equilibrium price of SUVs be lower than the equilibrium price of subcompacts?

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3. The Ajax Corporation has the following set of projects available to it:

PROJECT\*

INVESTMENT REQUIRED

(\$ MILLION)

EXPECTED RATE

OF RETURN (%)

A 500 23.0

B 75 18.0

C 50 21.0

D 125 16.0

E 300 14.0

F 150 13.0

G 250 19.0

Ajax can raise funds with the following marginal costs:

First \$250 million 14.0%

Next 250 million 15.5

Next 100 million 16.0

Next 250 million 16.5

Next 200 million 18.0

Next 200 million 21.0

Use the marginal cost and marginal revenue concepts developed in this chapter to derive an optimal capital budget for Ajax.

4. ESPN currently pays the NFL \$1.1 billion per year for eight years for the right to exclusively televise Monday Night Football. What is the net present value of this investment if the parent Disney Company has an opportunity interest rate equal to its cost of capital of 9 percent. Fox and CBS agreed to pay \$712 million and \$622 million respectively for six years to televise Sunday afternoon NFC games. What was that worth?

5. The demand for MICHTEC's products is related to the state of the economy. If the economy is expanding next year (an above-normal growth in GNP), the company expects sales to be \$90 million. If there is a recession next year (a decline in GNP), sales are expected to be \$75 million. If next year is normal (a moderate growth in GNP), sales are expected to be \$85 million. MICHTEC's economists have estimated the chances that the economy will be either expanding, normal, or in a recession next year at 0.2, 0.5, and 0.3, respectively.

a. Compute expected annual sales.

b. Compute the standard deviation of annual sales.

c. Compute the coefficient of variation of annual sales.

6. Two investments have the following expected returns (net present values) and standard deviation of returns:

PROJECT EXPECTED RETURNS (\$) STANDARD DEVIATION (\$)

A 50,000 40,000

B 250,000 125,000

Which one is riskier? Why?

\*Note: All projects have equal risk.

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7. The manager of the aerospace division of General Aeronautics has estimated the price it can charge for providing satellite launch services to commercial firms. Her most optimistic estimate (a price not expected to be exceeded more than 10 percent of the time) is \$2 million. Her most pessimistic estimate (a lower price than this one is not expected more than 10 percent of the time) is \$1 million. The expected value estimate is \$1.5 million. The price distribution is believed to be approximately normal.

- a. What is the expected price?
- b. What is the standard deviation of the launch price?
- c. What is the probability of receiving a price less than \$1.2 million?

## Case Exercises

### Revenue Management at American Airlines<sup>10</sup>

Airlines face highly cyclical demand; American reported profitability in the strong expansion of 2006–2007 but massive losses in the severe recession of 2008–2009.

Demand also fluctuates day to day. One of the ways American copes with random demand is through marginal analysis using revenue management techniques. Revenue or “yield” management (RM) is an integrated demand-management, order-booking, and capacity-planning process.

To win orders in a service industry without slashing prices requires that companies create perceived value for segmented classes of customers. Business travelers on airlines, for example, will pay substantial premiums for last-minute responsiveness to their flight

change requests. Other business travelers demand exceptional delivery reliability and ontime performance. In contrast, most vacation excursion travelers want commodity-like service at rock-bottom prices. Although only 15 to 20 percent of most airlines' seats are in the business segment, 65 to 75 percent of the profit contribution on a typical flight comes from this group.

The management problem is that airline capacity must be planned and allocated well in advance of customer arrivals, often before demand is fully known, yet unsold inventory perishes at the moment of departure. This same issue faces hospitals, consulting firms, TV stations, and printing businesses, all of whom must acquire and schedule capacity before the demands for elective surgeries, a crisis management team, TV ads, or the next week's press run are fully known.

One approach to minimizing unsold inventory and yet capturing all last-minute highprofit business is to auction off capacity to the highest bidder. The auction for freewheeling electricity works just that way: power companies bid at quarter 'til the hour for excess supplies that other utilities agree to deliver on the hour. However, in airlines, prices cannot be adjusted quickly as the moment of departure approaches. Instead, revenue managers employ large historical databases to predict segmented customer demand in light of current arrivals on the reservation system. They then analyze the expected marginal profit from holding in reserve another seat in business class in anticipation of additional "last-minute" demand and compare that seat by seat to the alternative expected marginal profit from accepting one more advance reservation request from a discount traveler.

<sup>10</sup>Based on Robert Cross, *Revenue Management* (New York: Broadway Books, 1995); and Frederick Harris and Peter Peacock, "Hold My Place Please: Yield Management Improves Capacity Allocation Guesswork," *Marketing Management* (Fall 1995), pp. 34–46.

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Suppose on the 9:00 A.M. Dallas to Chicago flight next Monday, 63 of American's 170 seats have been "protected" for first class, business class, and full coach fares but only 50

have been sold; the remaining 107 seats have been authorized for sale at a discount.

Three days before departure, another advance reservation request arrives in the discount class, which is presently full. Should American reallocate capacity and take on the new discount passenger? The answer depends on the marginal profit from each class and the predicted probability of excess demand (beyond 63 seats) next Monday in the business classes.

If the \$721 full coach fare has a \$500 marginal profit and the \$155 discount fare has a \$100 marginal profit, the seat in question should not be reallocated from business to discount customers unless the probability of “stocking out” in business is less than 0.20 (accounting for the likely incidence of cancellations and no-shows). Therefore, if the probability of stocking out is 0.25, the expected marginal profit from holding an empty seat for another potential business customer is \$125, whereas the marginal profit from selling that seat to the discount customer is only \$100 with certainty. Even a pay-inadvance no-refund seat request from the discount class should be refused. Every company has some viable orders that should be refused because additional capacity held in reserve for the anticipated arrival of higher profit customers is not “idle capacity” but rather a predictable revenue opportunity waiting to happen.

In this chapter, we developed the marginal analysis approach used in solving American’s seat allocation decision problem. The Appendix to Chapter 14 discusses further the application of revenue management to baseball, theatre ticketing, and hotels.

## Questions

1. Make a list of some of the issues that will need to be resolved if American Airlines decides to routinely charge different prices to customers in the same class of service.
2. Would you expect these revenue management techniques of charging differential prices based on the target customers’ willingness to pay for change order responsiveness, delivery reliability, schedule frequency, and so forth to be more effective in the trucking industry, the outpatient health care industry, or the hotel industry?

Why or why not?

3. Sometimes when reservation requests by deep discount travelers are refused, demanders take their business elsewhere; they “balk.” At other times, such demanders negotiate and can be “sold up” to higher fare service like United’s Economy Plus. If United experiences fewer customers balking when reservation requests for the cheapest seats are refused, should they allocate preexisting capacity to protect fewer seats (or more) for late-arriving full-fare passengers?

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