

2 | DEMAND FUNCTIONS AND DEMAND CURVES

Purpose: To emphasize the distinction between movements along demand curves and shifts of demand curves. To show using graphs how to compute quantities demanded.

Computer file: **demand98.xls**

Instructions and background information:

Open the Excel file **demand98.xls**, and choose whether you want to do the problems as practice, or whether you want to take the test to hand in for credit. If you choose the test option, you will be prompted to enter your name and student number.

The demand for any good is the amount consumers want to buy and are able to buy in a particular period of time. The basic model of demand says that the amount demanded of any good depends on the good's own price, consumer income, the prices of substitutes and complements, consumer preferences, and perhaps other factors.

In this example, the spreadsheet shows a hypothetical demand curve for spaghetti in San Francisco, measured in plates per day. Demand depends on the price of spaghetti, average annual money income of consumers, the price of tacos, and the price of wine. You can change all of the prices and income and the spaghetti demand will be updated. The graph of the demand curve will be redrawn to show the effects of your changes.

Economists make an important distinction between the effects on the amount demanded of changing a good's own price, and the effects on the amount demanded when one of the other determinants of demand varies, such as income. When a good's own price changes, consumers move along a particular demand curve. When any other determinant changes, the demand curve shifts. Changes in a good's own price are said to cause a "change in quantity demanded", while changes in other factors are said to cause a "change in demand".

Experiment with the worksheet by changing the current values of prices and income and seeing the effect on demand and on the graph of the demand curve.

Your task in doing these problems is to figure out and record the effects of the variables that affect demand.

All of the questions can be answered using trial and error. A shortcut is available in Excel that will make finding the answers a lot quicker. Goal Seek is a computer program that can be found as an item under the Tools menu in Excel. You can tell Goal Seek to find the value of a variable that will make a function (or equation) equal to a particular value. For example, you could get Goal Seek to find the price of spaghetti that would make the demand for spaghetti equal to 3,000 plates per day. For help in using Goal Seek, check the introductory section of these problems.

Here are some important results to watch for:

- 1) Only changes in a good's own price move consumers along their demand curve for the good.
- 2) Changes in all of the other factors affecting demand cause the demand curve to shift.
- 3) Changes in prices of related goods can cause demand to increase or decrease depending on whether the related goods are *substitutes* or *complements*.
- 4) Changes in income can either increase or decrease demand, depending on whether the good is *normal* or *inferior*.

MATH MAVEN'S CORNER: The demand function for spaghetti is given by $Q(D) = (a)(p_s^b)(I^c)(p_t^d)(p_w^e)$, where p_s is the price of spaghetti, p_t is the price of tacos, p_w is the price of wine, and I is income. The numbers a , b , c , d , and e are randomly assigned parameters that vary from one user to another.

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Questions

Set all variables to their baseline values.

- 1) How much spaghetti is demanded when its price is \$25 per plate?
- 2) How much is demanded when price is \$15 per plate?

Set all variables to their baseline values.

- 3) When the price of spaghetti is \$25 per plate, how much do consumers want to spend on spaghetti?

Set all variables at their baseline values.

- 4) When the price of spaghetti is \$15 per plate, how much do consumers want to spend on spaghetti? [Compare your answer to the answer to 3).]

Set all variables to their baseline values.

- 5) With the price of spaghetti at \$12, how much does demand increase when income rises to \$25,000?
- 6) Set all variables to their baseline values and set the price of spaghetti to \$12. Increase the price of wine to \$35 per bottle. Does the demand for spaghetti increase or decrease?
- 7) Based on the analysis of the previous question, by how much did the demand for spaghetti change when the price of wine increased from \$20 to \$35 per bottle?
- 8) Set all variables to their baseline values, and set the price of spaghetti to \$12. What would income have to be to make demand increase to 5000?
- 9) Set all variables to their baseline values, and set the price of spaghetti to \$12. What would the price of wine have to be to make demand equal to 2,000?
- 10) Set income to \$30,000, and all other variables at their baseline values. What would the price of spaghetti have to be to make demand equal to 4,000?
- 11) Set income to \$30,000, and all other variables to their baseline values. What would the price of spaghetti have to be to make demand equal to 5,000?
- 12) Are tacos and spaghetti substitutes or complements in this problem?