

Thinking like an economist

Hussain Hadah

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The Economist as Scientist

Economics as a science

Economists approach their subjects with scientific objectivity. Just as in physics or biology, economists suggest a theory, collect data to analyze the theory to reject or accept it. Just like other scientists, economics at its core uses the *scientific method*.

The Scientific Method: Observation, Theory, and More Observations

- Economists observe the world and devise theories

For example, an economist can observe that different countries experience different economic growth and could attribute that to the differences in institutions.

The Role of Assumptions

- Economists make assumptions
- These assumptions simplify the complexity of the world

Example:

Economists often assume that people are rational agents. Therefore, the decision-making process is rational. This assumption is unrealistic, but it does help us understand how people make decisions.

Economic Models

Economist use models to understand

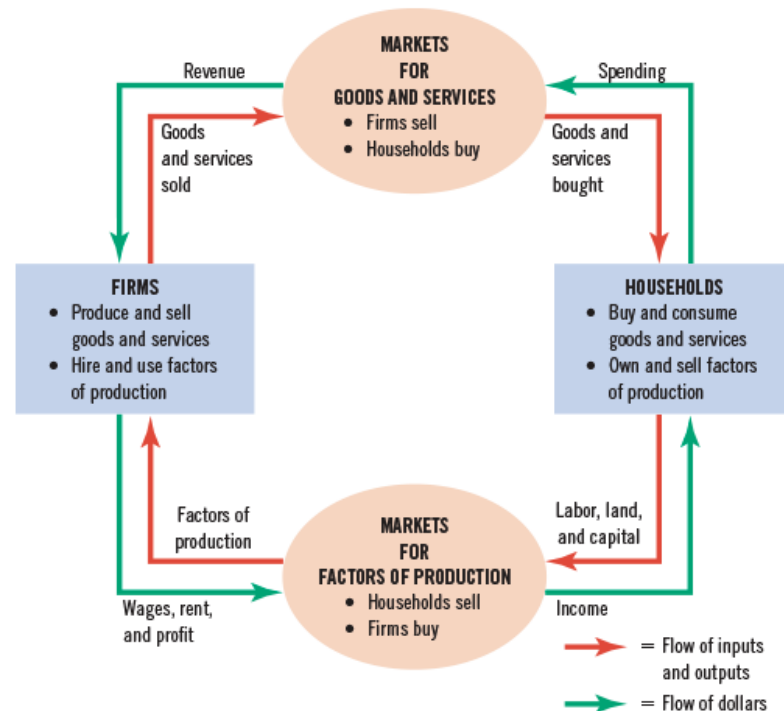
“All models are wrong, but some are useful”. George E. P. Box

Economists use models to simplify how the world works and learn about it. Economic models consist of diagrams and equations. Economists use models to study economic issues, and you will encounter a few of them in this class and all of these models will have assumptions.

The Circular-Flow Diagram

Figure 1 The Circular Flow

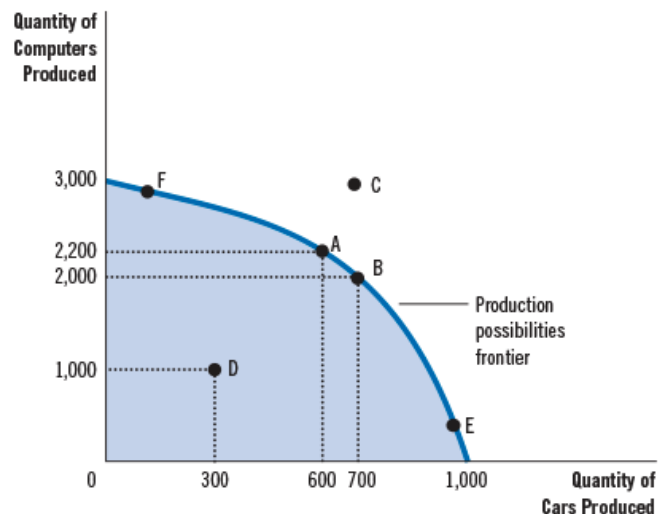
This diagram is a schematic representation of the organization of the economy. Decisions are made by households and firms. Households and firms interact in the markets for goods and services (where households are buyers and firms are sellers) and in the markets for the factors of production (where firms are buyers and households are sellers). The outer set of arrows shows the flow of dollars, and the inner set of arrows shows the corresponding flow of inputs and outputs.



The Production Possibilities Frontier

Figure 2 The Production Possibilities Frontier

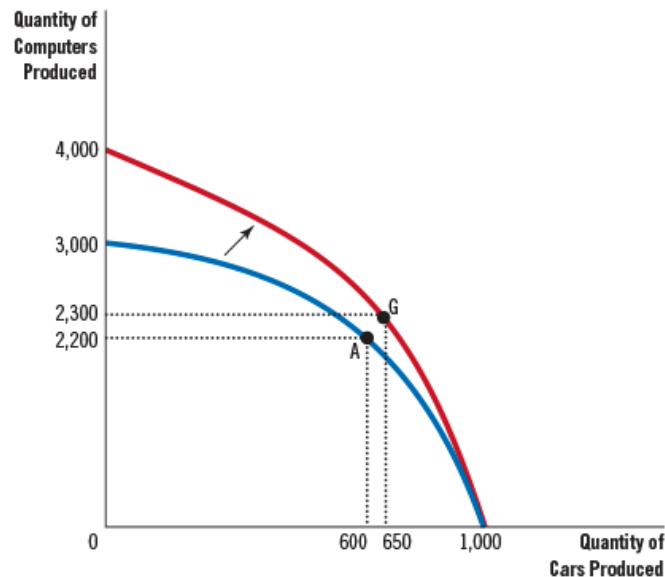
The production possibilities frontier shows the combinations of output—in this case, cars and computers—that the economy can possibly produce. The economy can produce any combination on or inside the frontier. Points outside the frontier are not feasible given the economy's resources. The slope of the production possibilities frontier measures the opportunity cost of a car in terms of computers. This opportunity cost varies, depending on how much of the two goods the economy is producing.



A technological shock shifts the PPF

Figure 3 A Shift in the Production Possibilities Frontier

A technological advance in the computer industry enables the economy to produce more computers for any given number of cars. As a result, the production possibilities frontier shifts outward. If the economy moves from point A to point G, then the production of both cars and computers increases.



Microeconomics vs Macroeconomics

Definitions

1. Microeconomics is the study of how households and firms make decisions and how they interact in a market. A microeconomist studies the effect of college education on income, the effect of minimum wage on wellbeing and hours worked.
2. Macroeconomics is the study of an economy-wide phenomenon. A macroeconomist studies the effect of the unemployment rate on inflation.

The Economist as a Policy Advisor

Positive versus Normative Analysis

1. Positive statements are claims about how the world *is*. Positive statements are descriptive.
2. Normative statements are claims about how the world *ought to be*. Normative statements are prescriptive.

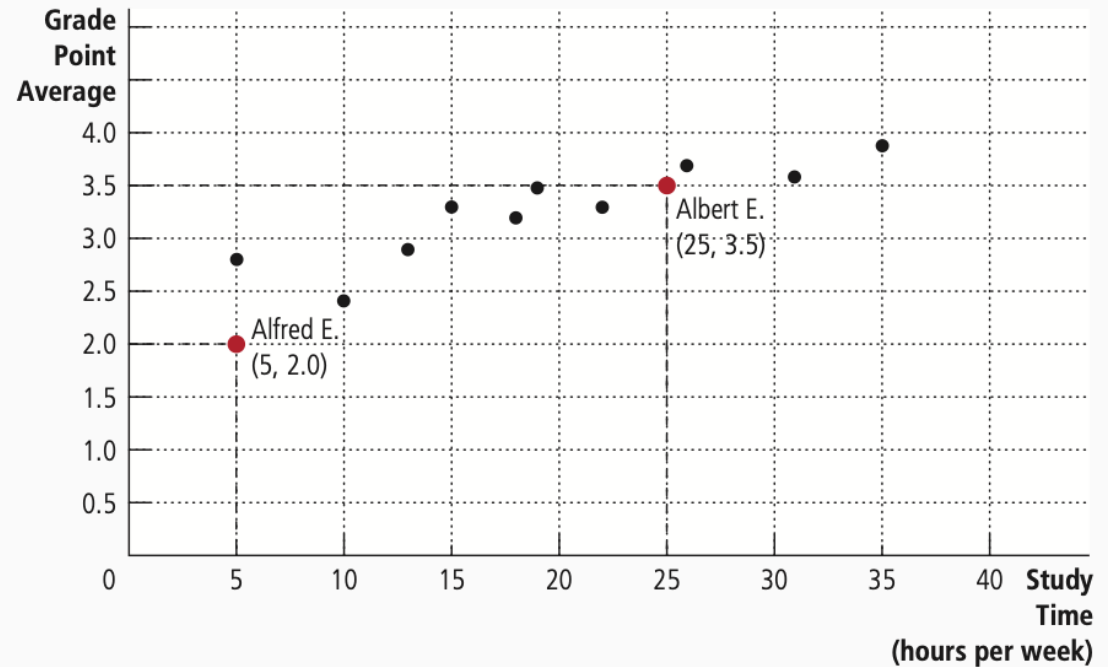
Examples of how Economist Analyze Data

Scatter plots

FIGURE A-2

Using the Coordinate System

Grade point average is measured on the vertical axis and study time on the horizontal axis. Albert E., Alfred E., and their classmates are represented by various points. We can see from the graph that students who study more tend to get higher grades.



Tables

Price	For \$30,000 Income:	For \$40,000 Income:	For \$50,000 Income:
\$10	2 novels	5 novels	8 novels
9	6	9	12
8	10	13	16
7	14	17	20
6	18	21	24
5	22	25	28
	Demand curve, D_3	Demand curve, D_1	Demand curve, D_2

TABLE A-1

Novels Purchased by Emma

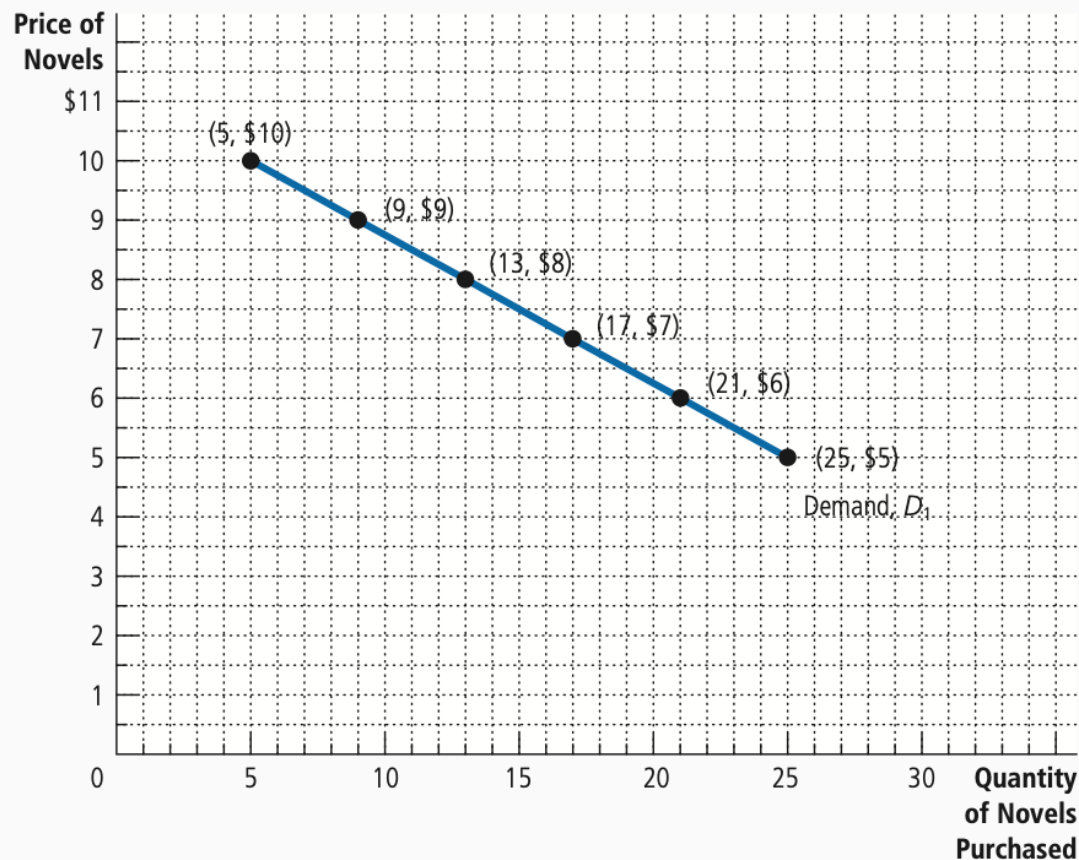
This table shows the number of novels Emma buys at various incomes and prices. For any given level of income, the data on price and quantity demanded can be graphed to produce Emma's demand curve for novels, as shown in Figures A-3 and A-4.

We can plot the data in a table

FIGURE A-3

Demand Curve

The line D_1 shows how Emma's purchases of novels depend on the price of novels when her income is held constant. Because the price and the quantity demanded are negatively related, the demand curve slopes downward.



An income shock shifts the demand

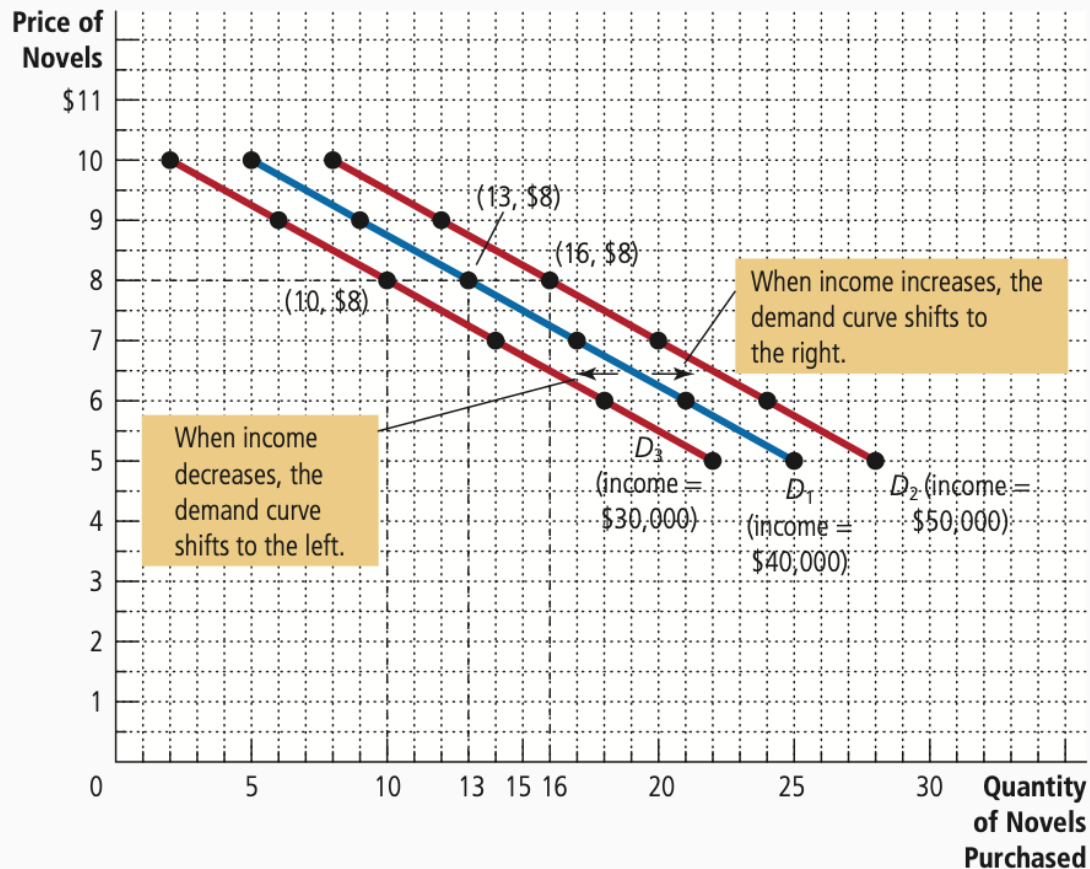


FIGURE A-4

Shifting Demand Curves

The location of Emma's demand curve for novels depends on how much income she earns. The more she earns, the more novels she will purchase at any given price, and the farther to the right her demand curve will lie. Curve D_1 represents Emma's original demand curve when her income is \$40,000 per year. If her income rises to \$50,000 per year, her demand curve shifts to D_2 . If her income falls to \$30,000 per year, her demand curve shifts to D_3 .

Calculating the slope

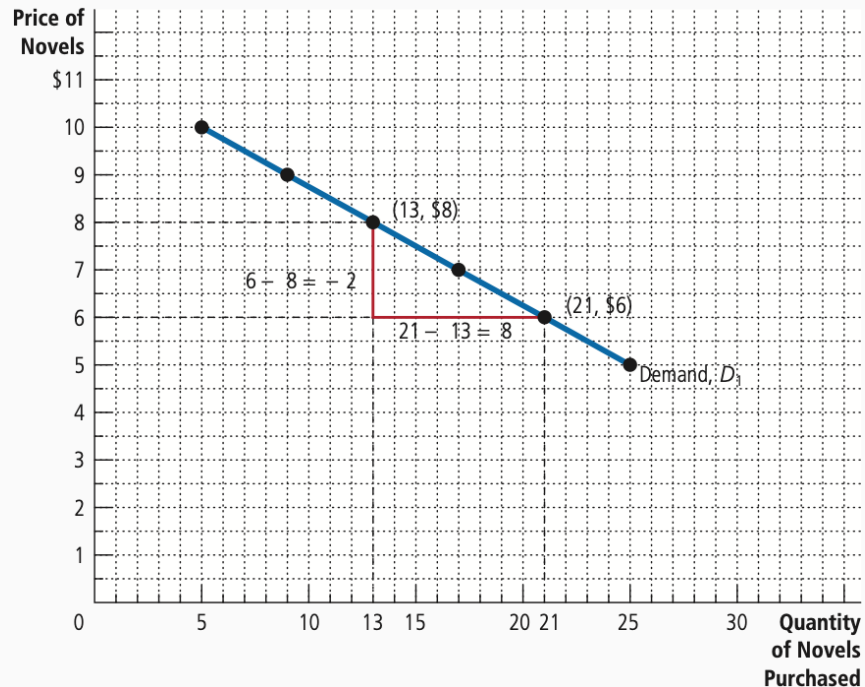
$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

The slope tells us how much the quantity demanded will change given a price change. A slope of $-\frac{1}{4}$ implies that a \$1 decrease in price will increase the number of books that are demanded by 4.

FIGURE A-5

Calculating the Slope of a Line

To calculate the slope of the demand curve, we can look at the changes in the x - and y -coordinates as we move from the point (21 novels, \$6) to the point (13 novels, \$8). The slope of the line is the ratio of the change in the y -coordinate (-2) to the change in the x -coordinate ($+8$), which equals $-\frac{1}{4}$.

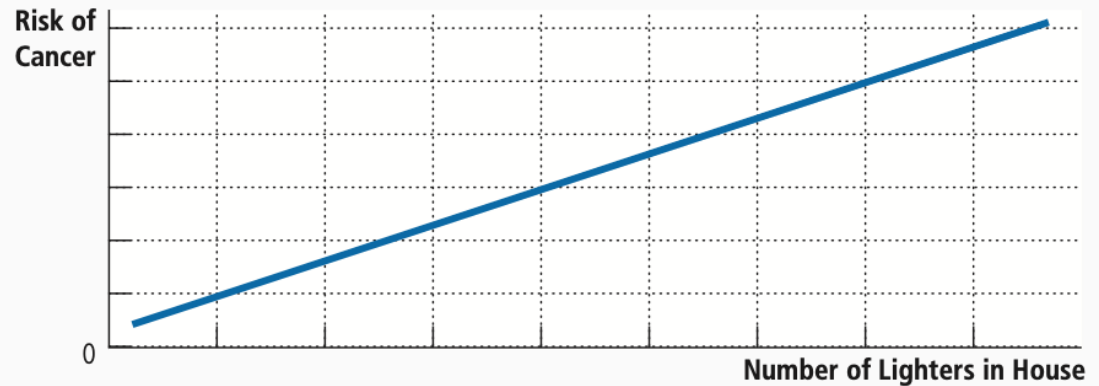


Beaware of omitted variables

FIGURE A-6

Graph with an Omitted Variable

The upward-sloping curve shows that members of households with more cigarette lighters are more likely to develop cancer. Yet we should not conclude that ownership of lighters causes cancer because the graph does not take into account the number of cigarettes smoked.



- Does buying more lighters cause cancer?
- Can you think of a reason why this relationship showed up in the data?
- What are we missing?

Beaware of omitted variables

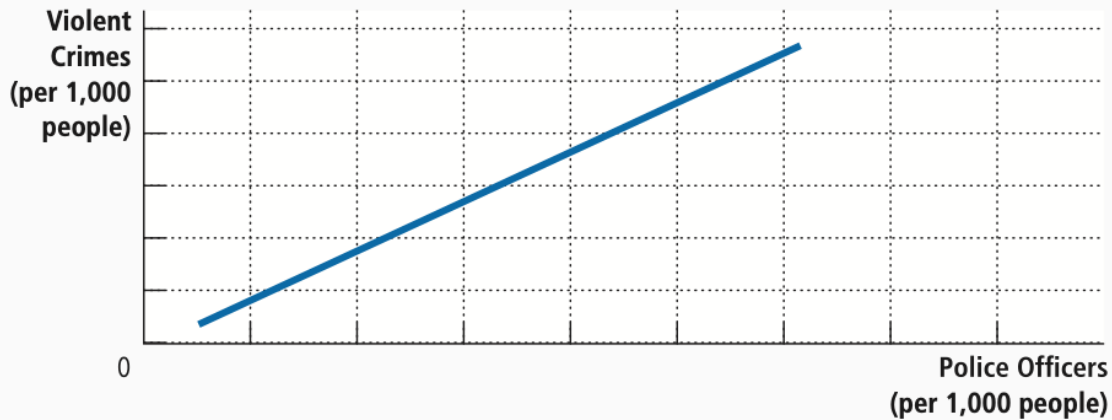


FIGURE A-7

Graph Suggesting Reverse Causality

The upward-sloping curve shows that cities with a higher concentration of police are more dangerous. Yet the graph does not tell us whether police cause crime or crime-plagued cities hire more police.

- Does having more police cause more crime?
- What is an alternative explanation?