

1 What is Economics?

Economics studies the allocation of scarce resources among people – examining what goods and services wind up in the hands of which people. Why scarce resources? Absent scarcity, there is no significant allocation issue. All practical, and many impractical, means of allocating scarce resources are studied by economists. Markets are an important means of allocating resources, so economists study markets. Markets include stock markets like the New York Stock Exchange, commodities markets like the Chicago Mercantile, but also farmer’s markets, auction markets like Christie’s or Sotheby’s (made famous in movies by people scratching their noses and inadvertently purchasing a Ming vase) or eBay, or more ephemeral markets, such as the market for music CDs in your neighborhood. In addition, goods and services (which are scarce resources) are allocated by governments, using taxation as a means of acquiring the items. Governments may be controlled by a political process, and the study of allocation by the politics, which is known as political economy, is a significant branch of economics. Goods are allocated by certain means, like theft, deemed illegal by the government, and such allocation methods nevertheless fall within the domain of economic analysis; the market for marijuana remains vibrant despite interdiction by the governments of most nations. Other allocation methods include gifts and charity, lotteries and gambling, and cooperative societies and clubs, all of which are studied by economists.

Some markets involve a physical marketplace. Traders on the New York Stock Exchange get together in a trading pit. Traders on eBay come together in an electronic marketplace. Other markets, which are more familiar to most of us, involve physical stores that may or may not be next door to each other, and customers who search among the stores, purchasing when the customer finds an appropriate item at an acceptable price. When we buy bananas, we don’t typically go to a banana market and purchase from one of a dozen or more banana sellers, but instead go to a grocery store. Nevertheless, in buying bananas, the grocery stores compete in a market for our banana patronage, attempting to attract customers to their stores and inducing them to purchase bananas.

Price – exchange of goods and services for money – is an important allocation means, but price is hardly the only factor even in market exchanges. Other terms, such as convenience, credit terms, reliability, and trustworthiness are also valuable to the participants in a transaction. In some markets such as 36 inch Sony WEGA televisions, one ounce bags of Cheetos, or Ford Autolite spark plugs, the products offered by distinct sellers are identical, and for such products, price is usually the primary factor considered by buyers, although delivery and other aspects of the transaction may still matter. For other products, like restaurant meals, camcorders by different manufacturers, or air travel on distinct airlines, the products differ to some degree, and thus the qualities of the product are factors in the decision to purchase. Nevertheless, different products may be considered to be in a single market if the products are reasonable substitutes, and we can consider a “quality-adjusted” price for these different goods.

Economic analysis is used in many situations. When British Petroleum sets the price for its Alaskan crude oil, it uses an estimated demand model, both for gasoline consumers and also for the refineries to which BP sells. The demand for oil by refineries is governed by a complex economic model used by the refineries and BP estimates the demand by refineries by estimating the economic model used by refineries. Economic analysis was used by experts in the antitrust suit brought by the U.S. Department of Justice both to understand Microsoft's incentive to foreclose (eliminate from the market) rival Netscape and consumer behavior in the face of alleged foreclosure. Stock market analysts use economic models to forecast the profits of companies in order to predict the price of their stocks. When the government forecasts the budget deficit or considers a change in environmental regulations, it uses a variety of economic models. This book presents the building blocks of the models in common use by an army of economists thousands of times per day.

1.1.1 Normative and Positive Theories

Economic analysis is used for two main purposes. The first is a scientific understanding of how allocations of goods and services – scarce resources – are actually determined. This is a *positive* analysis, analogous to the study of electromagnetism or molecular biology, and involves only the attempt to understand the world around us. The development of this positive theory, however, suggests other uses for economics. Economic analysis suggests how distinct changes in laws, rules and other government interventions in markets will affect people, and in some cases, one can draw a conclusion that a rule change is, on balance, socially beneficial. Such analyses combine positive analysis – predicting the effects of changes in rules – with value judgments, and are known as *normative* analyses. For example, a gasoline tax used to build highways harms gasoline buyers (who pay higher prices), but helps drivers (who face fewer potholes and less congestion). Since drivers and gasoline buyers are generally the same people, a normative analysis may suggest that everyone will benefit. This type of outcome, where everyone is made better off by a change, is relatively uncontroversial.

In contrast, *cost-benefit analysis* weighs the gains and losses to different individuals and suggests carrying out changes that provide greater benefits than harm. For example, a property tax used to build a local park creates a benefit to those who use the park, but harms those who own property (although, by increasing property values, even non-users obtain some benefits). Since some of the taxpayers won't use the park, it won't be the case that everyone benefits on balance. Cost-benefit analysis weighs the costs against the benefits. In the case of the park, the costs are readily monetized (turned into dollars), because the costs to the tax-payers are just the amount of the tax. In contrast, the benefits are much more challenging to estimate. Conceptually, the benefits are the amount the park users would be willing to pay to use the park if the park charged admission. However, if the park doesn't charge admission, we would have to estimate willingness-to-pay. In principle, the park provides greater benefits than costs if the benefits to the users exceed the losses to the taxpayers. However, the park also involves transfers from one group to another.

Welfare analysis provides another approach to evaluating government intervention into markets. Welfare analysis posits social preferences and goals, like helping the poor. Generally a welfare analysis involves performing a cost-benefit analysis taking account

not just of the overall gains and losses, but also weighting those gains and losses by their effects on other social goals. For example, a property tax used to subsidize the opera might provide more value than costs, but the bulk of property taxes are paid by lower and middle income people, while the majority of opera-goers are rich. Thus, the opera subsidy represents a transfer from relatively low income people to richer people, which is not consistent with societal goals of equalization. In contrast, elimination of sales taxes on basic food items like milk and bread generally has a relatively greater benefit to the poor, who spend a much larger percentage of their income on food, than to the rich. Thus, such schemes may be considered desirable not so much for their overall effects but for their redistribution effects. Economics is helpful not just in providing methods for determining the overall effects of taxes and programs, but also the *incidence* of these taxes and programs, that is, who pays, and who benefits. What economics can't do, however, is say who ought to benefit. That is a matter for society at large to decide.

1.1.2 Opportunity Cost

Economists use the idea of cost in a slightly quirky way that makes sense once you think about it, and we use the term *opportunity cost* to remind you occasionally of our idiosyncratic notion of cost. For an economist, the cost of something is not just the cash payment, but all of the value given up in the process of acquiring the thing. For example, the cost of a university education involves tuition, and text book purchases, and also the wages that would have been earned during the time at university, but were not. Indeed, the value of the time spent in acquiring the education – how much enjoyment was lost – is part of the cost of education. However, some “costs” are not opportunity costs. Room and board would not generally be a cost because, after all, you are going to be living and eating whether you are in university or not. Room and board are part of the cost of an education only insofar as they are more expensive than they would be otherwise. Similarly, the expenditures on things you would have otherwise done – hang-gliding lessons, a trip to Europe – represent savings. However, the value of these activities has been lost while you are busy reading this book.

The concept of opportunity cost can be summarized by a definition:

The opportunity cost is the value of the best foregone alternative.

This definition captures the idea that the cost of something is not just its monetary cost but also the value of what you didn't get. The opportunity cost of spending \$17 on a CD is what you would have done with the \$17 instead, and perhaps the value of the time spent shopping. The opportunity cost of a puppy includes not just the purchase price of the puppy, but also the food, veterinary bills, carpet cleaning, and the value of the time spent dealing with the puppy. A puppy is a good example, because often the purchase price is a negligible portion of the total cost of ownership. Yet people acquire puppies all the time, in spite of their high cost of ownership. Why? The economic view of the world is that people acquire puppies because the value they expect to get exceeds the opportunity cost. That is, they acquire a puppy when the value of a puppy is higher than the value of what is foregone by the acquisition of a puppy.

Even though opportunity costs include lots of non-monetary costs, we will often monetize opportunity costs, translating the costs into dollar terms for comparison

purposes. Monetizing opportunity costs is clearly valuable, because it gives a means of comparison. What is the opportunity cost of 30 days in jail? It used to be that judges occasionally sentenced convicted defendants to “thirty days or thirty dollars,” letting the defendant choose the sentence. Conceptually, we can use the same idea to find out the value of 30 days in jail. Suppose you would choose to pay a fine of \$750 to avoid the thirty days in jail, but wouldn’t pay \$1,000 and instead would choose time in the slammer. Then the value of the thirty day sentence is somewhere between \$750 and \$1000. In principle, there exists a price where at that price you pay the fine, and at a penny more you go to jail. That price – at which you are just indifferent to the choice – is the monetized or dollar cost of the jail sentence.

The same idea as choosing the jail sentence or the fine justifies monetizing opportunity costs in other contexts. For example, a gamble has a *certainty equivalent*, which is the amount of money that makes one indifferent to choosing the gamble versus the certain amount. Indeed, companies buy and sell risk, and much of the field of *risk management* involves buying or selling risky items to reduce overall risk. In the process, risk is valued, and riskier stocks and assets must sell for a lower price (or, equivalently, earn a higher average return). This differential is known as a *risk premium*, and it represents a monetization of the risk portion of a risky gamble.

Home buyers considering various available houses are presented with a variety of options, such as one or two story, building materials like brick or wood, roofing materials, flooring materials like wood or carpet, presence or absence of swimming pools, views, proximity to parks, and so on. The approach taken to valuing these items is known as *hedonic pricing*, and corresponds to valuing each item separately – what does a pool add to value on average? – and then summing the value of the components. The same approach is used to value old cars, making adjustments to a base value for the presence of options like leather interior, CD changer, and so on. Again, such a valuation approach converts a bundle of disparate attributes into a monetary value.

The conversion of costs into dollars is occasionally controversial, and nowhere is it more controversial than in valuing human life. How much is your life worth? Can it be converted into dollars? A certain amount of insight into this question can be gleaned by thinking about risks. Wearing seatbelts and buying optional safety equipment reduce the risk of death by a small but measurable amount. Suppose a \$400 airbag option reduces the overall risk of death by 0.01%. If you are indifferent to buying the option, you have implicitly valued the probability of death at \$400 per 0.01%, or \$40,000 per 1%, or around \$4,000,000 per life. Of course, you may feel quite differently about a 0.01% chance of death than a risk ten thousand times greater, which would be a certainty. But such an approach provides one means of estimating the value of the risk of death – an examination what people will, and will not, pay to reduce that risk.

Opportunity cost – the value of the best foregone alternative – is a basic building block of economic analysis. The conversion of costs into dollar terms, while sometimes controversial, provides a convenient means of comparing costs.

1.1.3 Economic Reasoning and Analysis

What this country needs is some one-armed economists.

-Harry S Truman

Economic reasoning is rather easy to satirize. One might want to know, for instance, what the effect of a policy change – a government program to educate unemployed workers, an increase in military spending, or an enhanced environmental regulation – will be on people and their ability to purchase the goods and services they desire. Unfortunately, a single change may have multiple effects. As an absurd and tortured example, government production of helium for (allegedly) military purposes reduces the cost of children’s birthday balloons, causing substitution away from party hats and hired clowns. The reduction in demand for clowns reduces clowns’ wages and thus reduces the costs of running a circus. This cost reduction increases the number of circuses, thereby forcing zoos to lower admission fees to compete with circuses. Thus, were the government to stop subsidizing the manufacture of helium, the admission fee of zoos would likely rise, even though zoos use no helium. This example is superficially reasonable, although the effects are miniscule.

To make any sense at all of the effects of a change in economic conditions, it is helpful to divide up the effect into pieces. Thus, we will often look at the effects of a change “other things equal,” that is, assuming nothing else changed. This isolates the effect of the change. In some cases, however, a single change can lead to multiple effects; even so, we will still focus on each effect individually. A gobbledygook way of saying “other things equal” is to use Latin and say “*ceteris paribus*.” Part of your job as a student is to learn economic jargon, and that is an example. Fortunately, there isn’t too much jargon.

We will make a number of assumptions that you may not find very easy to believe. Not all of the assumptions are required for the analysis, and instead merely simplify the analysis. Some, however, are required but deserve an explanation. There is a frequent assumption that the people we will talk about seem exceedingly selfish relative to most people we know. We model the choices that people make, assuming that they make the choice that is best for them. Such people – the people in the models as opposed to real people – are known occasionally as “homo economicus.” Real people are indubitably more altruistic than homo economicus, because they couldn’t be less: homo economicus is entirely selfish. (The technical term is acting in one’s *self-interest*.) That doesn’t necessarily invalidate the conclusions drawn from the theory, however, for at least four reasons:

- People often make decisions as families or households rather than individuals, and it may be sensible to consider the household as the “consumer.” That households are fairly selfish is more plausible perhaps than individuals being selfish.
- Economics is pretty much silent on *why* consumers want things. You may want to make a lot of money so that you can build a hospital or endow a library, which would be altruistic things to do. Such motives are broadly consistent with self-interested behavior.
- Corporations are often required to serve their shareholders by maximizing the share value, inducing self-interested behavior on the part of the corporation. Even if corporations had no legal responsibility to act in the financial interest of

their shareholders, capital markets may force them to act in the self-interest of the shareholders in order to raise capital. That is, people choosing investments that generate a high return will tend to force corporations to seek a high return.

- There are many good, and some not-so-good, consequences of people acting in their own self-interest, which may be another reason to focus on self-interested behavior.

Thus, while there are limits to the applicability of the theory of self-interested behavior, it is a reasonable methodology for attempting a science of human behavior.

Self-interested behavior will often be described as “maximizing behavior,” where consumers maximize the value they obtain from their purchases, and firms maximize their profits. One objection to the economic methodology is that people rarely carry out the calculations necessary to literally maximize anything. However, that is not a sensible objection to the methodology. People don’t carry out the physics calculations to throw a baseball or thread a needle, either, and yet they accomplish these tasks. Economists often consider that people act “as if” they maximize an objective, even though no calculations are carried out. Some corporations in fact use elaborate computer programs to minimize costs or maximize their profits, and the entire field of operations research is used to create and implement such maximization programs. Thus, while individuals don’t carry out the calculations, some companies do.

A good example of economic reasoning is the sunk cost fallacy. Once one has made a significant non-recoverable investment, there is a psychological tendency to invest more even when the return on the subsequent investment isn’t worthwhile. France and Britain continued to invest in the Concorde (a supersonic aircraft no longer in production) long after it became clear that the project would generate little return. If you watch a movie to the end, long after you become convinced that it stinks, you have exhibited the sunk cost fallacy. The fallacy is the result of an attempt to make an investment that has gone bad turn out to be good, even when it probably won’t. The popular phrase associated with the sunk cost fallacy is “throwing good money after bad.” The fallacy of sunk costs arises because of a psychological tendency to try to make an investment pay off when something happens to render it obsolete. It is a mistake in many circumstances.

The fallacy of sunk costs is often thought to be an advantage of casinos. People who lose a bit of money gambling hope to recover their losses by gambling more, with the sunk “investment” in gambling inducing an attempt to make the investment pay off. The nature of most casino gambling is that the house wins on average, which means the average gambler (and even the most skilled slot machine or craps player) loses on average. Thus, for most, trying to win back losses is to lose more on average.

The way economics is performed is by a proliferation of mathematical models, and this proliferation is reflected in this book. Economists reason with models. Models help by removing extraneous details from a problem or issue, letting one analyze what remains more readily. In some cases the models are relatively simple, like supply and demand. In other cases, the models are relatively complex (e.g. the over-fishing model of Section 6.3.6). In all cases, the models are the simplest model that lets us understand the question or phenomenon at hand. The purpose of the model is to illuminate

connections between ideas. A typical implication of a model is “when A increases, B falls.” This “*comparative static*” prediction lets us see how A affects B , and why, at least in the context of the model. The real world is always much more complex than the models we use to understand the world. That doesn’t make the model useless, indeed, exactly the opposite. By stripping out extraneous detail, the model represents a lens to isolate and understand aspects of the real world.

Finally, one last introductory warning before we get started. A parody of economists talking is to add the word *marginal* before every word. Marginal is just economist’s jargon for “the derivative of.” For example, marginal cost is the derivative of cost; marginal value is the derivative of value. Because introductory economics is usually taught to students who have not yet studied calculus or can’t be trusted to remember even the most basic elements of it, economists tend to avoid using derivatives and instead talk about the value of the next unit purchased, or the cost of the next unit, and describe that as the marginal value or cost. This book uses the term marginal frequently because one of the purposes of the book is to introduce the necessary jargon so that you can read more advanced texts or take more advanced classes. For an economics student not to know the word marginal would be akin to a physics student not knowing the word mass. The book minimizes jargon where possible, but part of the job of a principles student is to learn the jargon, and there is no getting around that.