

Introduction: General Economic Concepts

At Bates, both Principles of Microeconomics and Principles of Macroeconomics are considered entry level classes with neither requiring the other as a prerequisite. We thus begin the course by defining Economics and discussing some basic economic concepts.

What is Economics?

We begin by considering the standard definition of economics: the study of how resources are used and allocated in the presence of scarcity. Scarcity simply implies that agents (a term which includes households, firms, and policy makers) are constrained by having limited amounts of wealth, time or some other valuable resource. Economics may thus also be thought of as the study of *constrained optimization*, how can people use their limited resources to achieve the best possible outcomes? We consider a few examples:

- i. A household must choose how to spend its wealth on food, housing, luxuries, etc., while also deciding how much of it to save for the future. For this household, scarcity is represented by a *budget constraint* which requires that its spending not exceed its income and assets. The household must choose how to maximize the benefit, known as *utility* of its purchases knowing that each dollar spent on an item is a dollar that cannot be spent on something else. Economics studies how households solve this problem.
- ii. A student must decide how to allocate their time. Time is also a scarce resource and scarcity is now a time constraint which requires that studying, sleeping, and other activities add up to 24 hours a day. The student must consider what is the utility provided, for example, by another hour studying. She must then balance this benefit by its *opportunity cost*, the benefit of instead choosing the next best alternative. Are the benefits from additional studying larger or smaller than those of spending the same time sleeping or watching TV?
- iii. A policy maker must choose whether to enact a regulation designed to achieve some benefit such as improved environmental quality or greater economic equality. It may be the case that such

a policy entails compliance costs, or that it possibly reduces economic growth. Here scarcity is more abstract. The policy maker may, for example, value both better environmental quality and more economic growth. Scarcity may, however, entail not being able to have the maximum amount of both of these desirable outcomes and economics studies how policy makers may make choices when more growth leads to less environmental quality or greater inequality.

A simple example of choice under scarcity

Consider an economy where income for the top half of earners is \$100,000 per year, while income for the bottom half of earners is \$40,000 per year. Average income in the economy is thus \$70,000 per year.

A policy maker must choose whether to enact a certain policy. If so, the top half of earners will see their income fall to \$70,000 while the bottom half of earners will see theirs rise to \$50,000 per year so that average income falls to \$60,000.

The policy maker here faces a *trade off* between higher average income and greater income inequality (assuming that she wants both more average income and more equality). Scarcity represents the fact that she cannot have as much wealth and equality as she would like and must instead choose how to balance these two scarce attributes.

The scientific study of economics is cautious about saying what the policy maker should do. It does examine, however, why she might make a particular choice. The first step is to determine her preferences. We can first consider where they come from. Are they her own personal preferences? Are they those of the electorate? Are they those of the drug cartel which bribed her?

Suppose we decide that she cares only about average income. We then conclude that she is likely to decide against the policy because it reduces average income. If, however, we determine that she cares only about the well-being of the worst off (known as a “Rawlsian”), then she will choose to enact the policy because it increases the minimum income. Economics may study how different preferences lead to different outcomes.

How is Economics Practiced?

Although economics is traditionally defined as the study of choice under scarcity, other social sciences often grapple with issues related to scarcity. A politician deciding on an electoral strategy must for example, choose to how to allocate scarce campaign resources (*e.g.* bribes and hush money) in order to maximize their objective (*e.g.* winning and then cashing in as a lobbyist). Here, political science and economics enjoy considerable overlap.

Economics is also characterized by a methodology that has evolved over the years. While there are exceptions, it is usually more formal and mathematical than the methodologies most commonly employed by the other social sciences. The two primary methodologies are economic theory and empirical economics.

In the social sciences, there are two main theoretical methodologies. One is the narrative approach which usually entails writing articles with little math. Mainstream economics has largely rejected the narrative approach.¹ Instead, it relies on another approach, the use of formal models. An economic model is a mathematical simplification of the real world. Critically, it is not intended to be an exact representation of the world. There are countless factors that impact economic decisions. The goal is not to include all of them in an economic model. Doing so would make any model too complex to be useful. Instead, the aim is to approximate the real world by including only the most important or interesting factors. We want to write down a model that explains much, but not all, of the real world but that is also simple enough that we are able to understand how and why it infers what it does.

The process of writing down a formal economic model might take the following form:

Step 1: Make some assumptions. The goal is to write down assumptions that approximate how people really behave. Suppose, for example, that our model includes firms. We will usually assume that firms are reasonably intelligent and correctly make decisions that maximize their profits.

¹There are, however, non-mainstream, also known as “heterodox” approaches which are more open to narrative approaches. Examples include Marxist economics and Austrian economics.

A model is really just a set of assumptions. To determine if a model is appropriate for a real world economic question, we must thus evaluate whether the assumptions are good approximations of actual behavior. In most cases, we do think that firms are trying to maximize profits. Suppose, however, that we are modeling charitable organizations. Because these firms tend to be non-profits, our assumption of profit maximization would be much more dubious. In this case, the model would not fit the question well. The same model can be appropriate for one economic question, but inappropriate for another.

Step 2: Use math to solve the model. Solving the model means going from the assumptions to being able to show how one variable affects another. The type of math we use depends on the context. In this class, we will use some graphs and simple algebra. In a graduate class, we might use differential equations, dynamic programming, and a boatload of calculus.

Step 3: Make inferences. Once we have solved the model we can examine how changing one variable affects others. Our first model will be the classic model of supply and demand (a microeconomic model). In this model, we will be able to ask how a change in people's preference for beer affects the price of soda.

We can often use a model to analyze how different policy changes affect the model. Would raising taxes impact economic performance and the budget deficit? Does printing more money lead to more inflation?

Often, there is a tension between simplicity and completeness. Simplicity is a virtue of a model. But we are often tempted to add another variable to a model in order to increase its explanatory ability. This reduces its simplicity. The right balance is often hard to obtain. In this class, we place an extra high value on simplicity because it is probably your first or second exposure to economic models. In more advanced classes, however, we tend to add complexity.

An example: a simple consumption function

One macroeconomic variable that we will be interested in later in the course is household

consumption. This is a variable that adds up all households' purchases of goods and services. It is important because these provide households with utility.

Consider a simple model of consumption (C). Let's assume that households' consumption depends only on disposable income, which we will define as total income (Y) minus the taxes that they pay (T). We can mathematically represent this assumption:

$$C = a + b(Y - T) \quad (1)$$

This model states that if households receive an extra \$ 1 in after-tax income, they will spend b on additional consumption (b is known as the "marginal propensity to consume").

This model is not intrinsically good or bad. Its usefulness depends on the context. It is a reasonable model to act as a first introduction to consumption. But it excludes many other factors that probably impact consumption (*e.g.* interest rates, beliefs about future income, etc.). So it probably is too incomplete for policy makers such as the Federal Reserve to use when modelling the U.S. economy. But it is a reasonable model to start with in this class.

Empirical Economics

Empirical economics is that which is based on observation. It is thus fueled by data. Unlike much of the natural sciences, most economic data does not result from experiments (although experimental economics is a growing field). Instead, data is collected on variables such as national output, inflation, and unemployment. Statistical techniques, known as *Econometrics* which are extremely important but beyond the scope of this class, are then employed to analyze economic data to answer the same types questions addressed by theory.

Important: Do not think of theory and empirical work as substitutes. They are complements and carefully answering an important economic question usually requires both. You have probably heard the somewhat tired, but true, statement that "correlation does not equal causation." If two variables tend to move in the same direction (think temperature and ice cream sales), it is said that the two variables are "positively correlated." But this does not imply causation (higher ice cream

sales surely do not cause warmer weather). If two variables tend to move in the opposite direction, they are said to be “negatively correlated.”

Empirical economics has minimal ability to disentangle correlation and causation. It thus needs theory to convincingly make the case that one variable causes another. Empirical evidence is used to test among theories that make competing predictions and inferences.

Empirical economics is often used to help judge the validity of a model’s assumptions. Suppose we want to model the effect of raising taxes. Should we assume that higher taxes, which reduce after tax income, have only a small effect on a household’s desire to work or should we assume that the effect is large? The answer is not obvious but it is important to what the model will predict. To determine which assumption fits better, we could rely on empirical work that attempts to estimate whether actual changes in after tax wages have induced small or large effects on employment. Sometimes, the empirical evidence is clear, sometimes it is not.

If we make appropriate, empirically plausible assumptions, then our model will make useful predictions about the economic problem that we are examining. If, however, our assumptions are inappropriate, then the model’s predictions will not be useful. Don’t blindly accept the assumptions that we will make in this course. Think carefully about whether you think they make sense.

How economists study the allocation varies both by the type of questions they ask, and the methods they use. The former results in the division between microeconomics and macroeconomics. The latter results in the division between theory and empirical work.

Microeconomics vs. Macroeconomics:

A *market* is a collection of buyers and sellers who collectively exchange a good, service, or other item. *Microeconomics* is the study of individual markets, or a small number of interconnected markets. The unit of analysis is thus often the firm, an organization that exists to sell good or services, or households who typically purchase good and services. Microeconomics often studies how particular policies can impact specific markets.

There are many different subfields of microeconomics. *Labor economics* studies how households make decisions about supplying labor, and how firms make decisions about how much labor to employ. *Public economics* studies how the government interacts with markets, for example, by taxing and subsidizing markets. *Industrial organization* considers how firms are organized to maximize profits or achieve some other objective. There are many other subfields within macroeconomics (international trade, law & economics, and environmental economics are three more examples).

Macroeconomics is the study of an entire economic system, such as that of the United States, Eurozone, or even the global economy. Because an economic system is the sum of all the people in it, macroeconomics may also be thought of as the aggregation of microeconomics. For this reason, students usually (but not always at Bates) study microeconomics prior to macroeconomics. And for this reason, we will begin this course with a quick foundation in simple microeconomics that is crucial for understanding the macroeconomic heart of the course.

Another important distinction between microeconomics and macroeconomics is who studies them. Macroeconomists are almost invariably dashing individuals who rank among the brightest lights of humanity. Possessed of near superhuman strength and intellect, they are also noted for their kindness and ability to dunk basketballs. Most microeconomists, on the other hand, can barely read.

There are also some practical distinction between microeconomics and macroeconomics. These are not rigid rules, exceptions do exist:

1. The two fields usually look at different variables. Microeconomics usually look at prices for specific goods or services, or for the wage for specific types of labor. Macroeconomics instead looks at a price level which is a type of average of prices throughout the economy. They are especially interested in inflation, the rate of change of the price level. Microeconomics usually looks at the quantity of a specific good or service. Macroeconomics instead usually looks at aggregate output (most often measured as Gross Domestic Product) which is the aggregation of all microeconomic production throughout the economy.

2. Macroeconomics tries to explain a broader set of variables than microeconomics. Prices are a good example. In microeconomics, a firm may often be assumed to be solving its profit maximization problem taking wages and prices as given. Often, it is not stated where some of these prices are coming from. In macroeconomics, however, we usually try to explain where all prices come from.²

Some Key Economic Ideas

We conclude this introduction by discussing some foundation economic concepts, and some of the misconceptions that surround them.

#1: People are rational. This simply means that people have preferences and use their available information to make choices that are consistent with these preferences. A household makes choices that maximize its utility. Most firms make choices that maximize their profits, although there are cases where firms have some other objective. A non-profit, like Bates seeks to achieve something besides a profit. A criminal syndicate like the New England Patriots, is mostly interested in committing crimes.

There are some misconceptions about what rationality means. It does not mean that people have all the information or that they never make mistakes. Consider, for example, a household that is deciding whether to buy a home. One of the many factors that they would want to consider is what will happen to the value of the house in the future. If they expect its price to rise, then they will likely be more interested in buying it. But housing prices are hard to predict. Economics assumes that the household will make a reasonable estimate of future housing prices when making its choice, but this estimate may turn out to be inaccurate.

Another misconception is that rationality implies that all people are selfish assholes. This is not the case. Rationality assumes that people maximize their utility, a term that just means the total benefit of their economic decisions. But we are free to assume that utility depends on different

²For those of you with a more extensive mathematical background, the former is known as partial equilibrium while the latter is known as general equilibrium. I am trying to avoid this language in this class however.

things. A person's utility surely depends on their own consumption. But a parent's utility surely depends on their kids' well-being as well. A household's utility can also depend on the overall well-being of society.

#2: People respond to incentives. If the circumstances of an economic problem change, then we expect people's economic behavior to change as well.

Consider the following example, Currently, average income per person in the U.S. is about \$60,000. There is, however, considerable income inequality that has been rising for the past several decades. For the sake of argument, let's suppose that we decide that a major policy goal should be to completely eliminate income inequality.

One solution would be to require that all income be shared equally. We might then expect that everyone would have income equal to \$60,000.

This policy, however, fails to think about incentives. Under this system, any dollar I earn is to be shared with the entire U.S. population of over 300 million people. So I essentially keep none of my income. My incentive to work has now been reduced. We would thus expect people to collectively work much less, which would reduce average income well below \$60,000. The policy (which is similar to communism, where the state owns all production and distributes it) will almost surely fail. This example illustrates why significantly reducing income inequality without providing bad incentives is hard and overly simplistic solutions are likely to backfire.

#3: Optimal decisions are made on the margin. Suppose that I am deciding how many cups of coffee I should drink this morning (the correct answer is "a lot") and that each cup costs \$2. Utility refers to the benefit each cup of coffee provides to me:

Table 1 illustrates three measures of utility. The first is marginal utility. This is the additional utility that I get from each additional cup. Total utility adds up all the marginal utilities. Average utility is total utility divided by the number of cups. Most economic decisions are made based on marginal considerations (in this case, marginal utility), instead of looking at the total or average.

Table 1: Utility of Coffee

Cups	Marginal Utility	Total Utility	Average Utility
1	\$10	\$10	\$10
2	\$5	\$15	\$7.5
3	\$3	\$18	\$6
4	\$1	\$19	\$4.25
5	-\$4	\$15	\$3

Should I buy a first cup of coffee? I should because the marginal benefit (\$10) exceeds the marginal cost (\$2). So I come out \$8 ahead.

Should I buy a second cup? If I do, I obtain the marginal (additional) utility of \$5 which still exceeds the cost \$2. The marginal benefits and marginal costs are the only things that matter. It would make no difference to my decision if the marginal utility from the first cup of coffee were \$5 instead of \$10. The average utility also is irrelevant.

By the same reasoning, I should buy the third cup. For the fourth cup, however, the marginal utility (\$1) is less than the \$2 marginal cost. I should not buy this cup.

In the end, I buy three cups. I obtain the total utility of \$18 and pay \$6. The \$12 worth of net benefit that I receive is known as *consumer surplus*.

There are some cases, however, where total cost does matter. Suppose, for example, that I must pay a fixed cost (I have to buy a coffee maker) in order to buy any coffee that day. I will do so if and only if it costs less than \$12, the net benefit I get from buying my three cups. (This assumes that I only use the coffee maker today).

#4: Most economic choices involve tradeoffs.

Tradeoffs are an inevitable result of scarcity. Because resources are scarce, consuming or producing more of one goods requires that we consume or produce less of another.

Households face tradeoffs when making their choices about how much food to purchase. Each dollar spent on food requires that they spend one dollar less on something else. To optimize they must weigh the benefits of the extra food against those offered by the next best alternative.

Policy makers often face tradeoffs as well. Few policies offer only benefits and economists are skeptical of commentators that promise otherwise. Consider government spending during a recession. As we will discuss later, most economists think that increased spending during a recession reduces unemployment (although there is considerable disagreement over by how much). This benefit must be weighed against the cost of increased debt, which most economists think is a bad thing. There is a tradeoff.

Another common tradeoff frequently occurs between efficiency and equity. Generally, efficient policies will result in higher levels of per capita national income. Such policies will result, however, in some amount of inequality. Most policies that reduce inequality will, because they change incentives, reduce efficiency, in most cases resulting in a lower average per capita income.³ The tradeoff is often that more equality reduces efficiency. People disagree on how best to balance this tradeoff.

³Average per-capita income and efficiency are not exactly the same however. A policy requiring 100 hour work weeks might increase average per capita output but would not be efficient.