

CHAPTER 2: MODEL BUILDING AND GAINS FROM TRADE

- Models are simplistic, but they emphasize key concepts
- If we change only one variable at a time and hold other things constant, this is known as *ceteris paribus*
- Judge a model by how well it works in real life
 - Endogenous model – variables inside the model
 - Exogenous model – variables outside the model
- Watch out for faulty assumptions.

When people trade, both sides “normally” win

It's only common sense that trade benefits both parties. After all, if it's voluntary, both sides must be getting something out of it; we can quantify the extent to which the trade makes each side better off. We do this by how much more productive a person can become through trade, given that trade allows people to specialize in what they're good at.

Example #1:

Consider the interaction between a contractor and an architect.

They each have a vital role to play in the building process; the architect designs the plans to the buyer's specifications and the contractor is an expert at bringing the architect's design to fruition by organizing the equipment, supplies, and labor to complete the project on time. The architect is the creative genius and the contractor is a genius at managing the construction workflow; the architect understands how to design plans that pass engineering tests and meet building codes. The contractor understands the supply chain; by specializing, each become more productive and gets their part of the project done faster, trading their expertise and time for monetary payment.

To help understand how trade works, we will develop our first economic model, the production possibilities frontier, so we can explore the more nuanced reasons why trade creates value.

Core Questions:

- *How do economists study the economy?*
 - Economists design hypotheses (proposed explanations) and then test them by collecting real data. The economist's laboratory is the world around us.
 - A good model should be simple, flexible, and useful for making accurate predictions. A model is both more realistic and harder to understand when it involves many variables. To keep models simple, economists often use the concept of ***ceteris paribus***, or “all else equal.” Maintaining a positive (as opposed to normative) framework is crucial for economic analysis because it allows decision-makers to observe the facts objectively.
- *What is a production possibilities frontier?*
 - A production possibilities frontier (PPF) is a model that illustrates the combinations of outputs a society can produce if all of its resources are being used efficiently. An outcome is considered efficient when resources are fully utilized, and potential output is maximized. Economists use the PPF to illustrate trade-offs and explain opportunity costs and the role of additional resources and technology in creating economic growth.

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- *What are the benefits of specialization and trade?*
 - Society is better off if individuals and firms specialize and trade on the basis of the principle of comparative advantage.
 - Parties that are better at producing goods and services than all their potential trading partner (and thus hold an absolute advantage) still benefit from trade. Trade allows them to specialize and trade what they produce for other goods and services they are relatively less skilled at making.
 - As long as the terms of trade falls between the opportunity costs of both trading partners, the trade benefits both sides.
- *What is the trade-off between more now and having more later?*
 - All societies face a crucial trade-off between the consumption in the short run and economic growth in the long run. Investment in capital goods today help spur economic growth in the future. However, because capital goods are not consumed in the short run, society must be willing to sacrifice how well it lives today in order to have more later.

How do economists study the economy?

Economics is a social science that uses the scientific method to develop **economic models**. To create these models, economists make many assumptions to simplify reality. These models help economists understand the key relationships that drive economic decisions.

The Scientific Method in Economics

Economists use the scientific method to answer questions about observable phenomena and to explain how the world works. The scientific method consist of four steps:

1. Researchers observe a phenomenon that interests them.
2. Based on these observations, researchers develop a *hypothesis*, which is a proposed explanation for the phenomenon.
3. Then they construct a model to test the hypothesis
4. Finally, they look for opportunities to test how well the model (which is based on the hypothesis) works. After collecting data, they use statistical methods to verify, revise, or refute the hypothesis.

The economist's laboratory is the world around us and it ranges from the economy as a whole to the decisions made by firms and individuals. As a result, economists cannot always design experiments to test their hypotheses; often they must gather historical data or wait for real-world events to take place – such as the Great Recession (economic downturn) of 2007 – 2009 or the Coronavirus pandemic of 2020 – to better understand the economy. When real-world events meet the criteria of an experiment designed to test a hypothesis, we have what's called a **natural experiment**.

Positive and Normative Analysis

To be **objective** as possible, economists deploy positive analysis. A **positive statement (analysis)** can bet tested and validated; each positive statement can be though of as a description of “what

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is.” For instance, the statement *“The unemployment rate is declining”* is a **positive statement**, because it can be tested by gathering data and shown to be true or false.

In contrast, a statement about “what ought to be” is a **normative statement (analysis)** that cannot be empirically tested or validated. For instance, the statement *“An unemployed worker should receive financial assistance to help make ends meet”* is a matter of opinion. One can reasonably argue that financial assistance to the unemployed is a socially beneficial “anti-poverty” measure. However, some argue that financial unemployment assistance provides the wrong incentives; if the assistance is enough to meet basic needs, workers may end up spending more time unemployed than they otherwise would.

Policy decisions eventually have to be made by somebody, one way or the other. Just remember that when we talk about what is “best” or what “should happen,” we are in the realm of differing viewpoints, based on values, beliefs, and opinions.

Economic Models

Thinking like an economist means learning how to analyze complex issues and problems. Many economic topics, such as international trade, Social Security, job loss, and inflation, are complicated; to analyze these phenomena and to determine the effect of various government policy options related to them...economists use models which are simplified versions of reality. Models help us analyze the components of the economy.

Ceteris Paribus

Changing one variable while holding everything else constant involves a concept known as “ceteris paribus”, from the Latin meaning “other things being equal” or “all else equal”. Economists start with a simplified version of reality; they build models, change one variable at a time, and ask whether the change in the variable has a positive or negative impact on performance.

$$W = f \left(\begin{array}{c} \text{Education (positive)} \\ \text{Age (positive)} \\ \text{Experience (positive)} \\ \text{Skills (positive)} \\ \text{Pleasant conditions (negative)} \\ \text{Female (negative -discrimination)} \end{array} \right)$$

Endogenous vs. Exogenous Factors

Models must account for factors we can control (endogenous) and factors we can't (exogenous). Factors that are accounted for inside the model are **endogenous factors**; factors beyond our control – outside the model – are **exogenous factors**.

We need to be mindful of three factors:

1. What we include in the model
2. The assumptions we make when choosing what to include in the model.
3. The outside conditions that can affect the model's performance.

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If we add more exogenous variables, or factors we cannot control – for example, wind and rain – to test our model's performance, the test becomes more realistic, but at the same time, the outcome becomes less predictable.

The Importance of Assumptions

When we build a model, we need to make choices about which variables to include; ideally, we would like to include all the important variables inside the model and exclude all the variables that can be safely ignored. Then we have made reasonable simplifying assumptions; excluding the wrong variables, on the other hand, can lead to spectacular failures, so can making false assumptions.

An excellent example is the financial crisis and Great Recession that began in December 2007:

In the years leading up to the crisis, banks sold and repackaged mortgage-backed investments under the faulty assumptions that real estate prices will rise. This assumption seemed perfectly reasonable in a world where real estate prices were rising annually; unfortunately, the assumption turned out to be false. From December 2007 into 2008, real estate prices fell dramatically, because of one faulty assumption, the entire financial market teetered on the edge of collapse. Shocks, be the financial or pandemic-related, often defy the usual logic; contrary to conventional wisdom, the real estate market did not crater during the pandemic, but instead it skyrocketed in 2020 – 2021 as the pandemic caused people to hunker down and invest some more in their homes.

Through this textbook we will assume that firms and households are rational benefit-maximizers who both respond to incentives predictably and thoughtfully consider the costs and benefits of their actions. Rationality is a cornerstone of most economic theory (it's a simplifying assumption).

What is a Production Possibilities Frontier?

The PPF shows the maximum amount of any two products that can be produced from a fixed number of resources. The PPF is non-linear, this is known as the law of increasing opportunity cost.

Graphs are a key tool in economics because they display the relationship between two variables. Your ability to read a graph and understand the model it represents is crucial to learning economics.

A **production possibilities frontier (PPF)** is a model that illustrates the combination of outputs a society can produce if all of its resources are being used efficiently. An outcome is considered **efficient** when resources are fully utilized, and potential output is maximized. To preserve *ceteris paribus*, we assume that the technology available for production and the quantity of resources remain fixed, or constant. These assumptions allow us to model trade-offs more clearly.

Whenever society is producing on the production possibilities frontier, the only way to get more of one good is to accept less of another. Because an economy operating at a point on the frontier will be efficient, every point on the frontier represents full-capacity output; but a society may favor one point over another because it prefers that combination of goods.

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The Production Possibilities Frontier and Opportunity Cost

The trade-offs that occur along the production possibilities frontier represent the opportunity cost of producing one good instead of the other; **an opportunity cost is the highest-valued alternative given up to pursue another course of action.** A bowed-out production possibilities frontier reflects the increasing opportunity cost of production. **Figure 2.2** illustrates the **law of increasing opportunity cost**, which states that the opportunity cost of producing a good rises as a society produce more of it. Changes in relative cost mean that a society faces a significant trade-off if it tries to produce an extremely large amount of a single good.

The Production Possibilities Frontier and Economic Growth

So far, we have modeled the production possibilities frontier based on the resources available to society at a particular moment in time. However, most societies hope to create economic growth. **Economic growth is the process that enables a society to produce more output in the future.** We can use the production possibilities frontier to explore economic growth; for example, we can ask what would happen to the PPF if our two-good society develops a new technology that increases productivity.

What are the Benefits of Specialization and Trade

Trade creates value and depends on specialization and comparative advantage

We have seen that improving technology and adding resources make an economy more productive. A third way to create gains for society is through specialization and trade. **Specialization is the limiting of one's work to a particular area (industry).** Determining what to specialize in is an important part of the process. Every worker, business, or country is relatively good at producing certain products or services.

In the next section, we explore why specializing and exchanging your skilled expertise with others makes gains from trade possible.

Gains from Trade

Absolute Advantage refers to one producer's ability to make more than the another producer with the same quantity of resources.

Comparative Advantage

We have seen that specialization enables workers to enjoy gains from trade. The concept of opportunity cost provides us with a second way of validating the principle that trade creates value. Recall that opportunity cost is the highest-valued alternative that is sacrificed to pursue something else. Applying the concept of opportunity cost helps us see why specialization enables people to produce more.

What is the Trade-Off between having more now and having more later?

So far, we have examined short-run trade-offs; but both individuals and society as a whole must weigh the benefits available today (**the short run**) with those available tomorrow (**the long run**). In the **short run**, we make decisions that reflect our immediate or short-term wants, needs, or limitations; consumers can partially adjust their behavior. In the **long run**, we make decisions that reflect our wants, needs, and

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limitations over a much longer time horizon. In the long run, consumers have time to fully adjust to the market conditions.

Many of life's important decisions are about the long run; we must decide where to live, whether and whom to marry, whether and where to go to college, and what type of career to pursue.

Consumer Goods, Capital Goods, and Investment

We have seen that the trad-off between the present and the future is evident in the tension between what we consume now and what we plan to consume later. Any good that is produced for present consumption is a **consumer good** (are produced for personal satisfaction); these goods help to satisfy our needs or wants now. Food, entertainment, and clothing are all example of consumer goods. **Capital goods** (are used to produce other goods) help in the production of other valuable goods and services in the future. Capital goods are everywhere; roads, factories, trucks, and computers are all capital goods.

Education is a form of capital. The time you spend earning a college degree makes you more attractive to future employers. When you decide to go to college instead of working, you are investing your human capital. **Investment** *is the process of using resources to create or buy new capital*; because we live in a world with scarce resources, every investment in capital goods has an opportunity cost of forgone consumer goods.

The decision between whether to consume or invest has a significant impact on economic growth in the future, or long run. ***What happens when society chooses to produce many consumer goods than capital goods?*** When relatively few resources are invested in producing capital goods in the short run, very little capital is created, because new capital is necessary ingredient for economic growth in the future, the long-run production possibilities curve expand only a small amount. ***What happens when society chooses to plan for the future by producing more capital goods than consumer goods in the short run?*** With investment in new capital, the long-run production possibilities curve expand outward much more; all societies face the trade-off between spending today and investing tomorrow.

Conclusion

The simple, yet powerful idea that trade creates value has far-reaching consequences for how we should organize our society. Since we all win when voluntary trade takes place, creating opportunities for more trades take place between consumers and producers and across countries enriches all of our lives.

We have developed our first model, the production possibilities frontier; this model illustrates the benefits of trade and also enables us to describe ways to grow the economy. Trade and growth rest on a more fundamental idea – specialization. When producers specialize, they focus their efforts on those goods and services for which they have the lowest opportunity cost, and they trade with others who are good at making something else. To have something valuable to trade, each producer, in effect, must find its comparative advantage. As a result, trade creates value and contributes to an improved standard of living in society.