

Macroeconomics: The Big Picture

Macroeconomics: The Big Picture

BETTINA BERCH



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Preface

BETTINA BERCH

Consider this



Ann Rosener, 1942. War workers, inspectors of airplane motor parts.

Photos like this were meant to encourage women to work in war factories, even though neither woman is looking at the viewer or looking particularly cheerful. Do you think it was more effective that way?

ACCESSIBILITY STATEMENT

Knowledge should be available to everyone, so the creation of free, open, and accessible educational resources is important.

The web version of Macroeconomics: The Big Picture has been designed to try to meet current accessibility standards. For instance, we use headings in each chapter to make navigation easy. Screen-reader-users can access content using a keyboard. Links, headings, and tables are formatted to work with screen readers. There is a way to change font size.

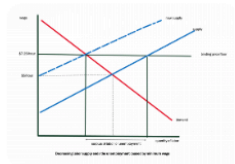
The real challenge are the illustrations, which screen-readers can't manage. In this book, any image that's giving you necessary information, also has "alternate text," usually a sentence or two explaining what others are seeing. The question of how to "explain" a graph forced me to think about the role of graphs in modern economics textbooks and classrooms. Did the "father" of economics, Adam Smith, use graphs in The Wealth of Nations? No! As I re-examined this manuscript, I realized I had mostly been using graphs as a visual summary of what I had just been explaining in the text. The graphs repeat the point in a different way. I do think this text could stand without graphs.

In the end, I decided to include my graphs, both for the benefit of visual learners (for whom text can be challenging) and for all of us who believe more is better!

Also, readers relying on screen-readers could submit these graphs to an artificial intelligence program and ask for a description. When I submitted a random graph from the text to Gemini, I received this response:



Can you describe this graph:



Show drafts



The graph you sent is about labor supply and demand, with a minimum wage set at \$7.25 per hour. The minimum wage is shown as a horizontal line intersecting the labor supply curve.

The supply curve in the graph is upward-sloping, which means that the quantity of labor supplied increases as the wage rate increases. This is because higher wages incentivize people to enter the workforce and work more hours.

The demand curve in the graph is downward-sloping, which means that the quantity of labor demanded by employers decreases as the wage rate increases. This is because employers have to pay more for each unit of labor, so they tend to hire fewer workers.

The intersection of the supply and demand curves determines the equilibrium wage rate and quantity of labor demanded in a free market. In this graph, the equilibrium wage rate is somewhere between \$5 and \$7.25 per hour, and the equilibrium quantity of labor demanded is represented by the quantity demanded at that wage rate.

The introduction of a minimum wage of \$7.25 per hour creates a price floor above the equilibrium wage rate. This price floor creates a surplus of labor, where the quantity of labor supplied is greater than the quantity of labor demanded at the minimum wage. The surplus labor is shown by the horizontal distance between the supply curve and the demand curve at the minimum wage.

The graph suggests that a minimum wage can lead to unemployment because it creates a situation where more people are willing to work for the wage than there are jobs available at that wage.

This is a simplified model of how a minimum wage can affect the labor market. In the

Gemini's AI agent can give a verbal description of a graph

Clearly there are knowledge-enhancing aspects to artificial intelligence! Ultimately, it would be great to incorporate [tactile graphics](#) to make the graphs physically readable to people with visual disabilities.

But nothing's perfect. If there are problems, reach out to the people running the platform.

ACKNOWLEDGEMENTS

I have so many people to thank. I have had great technical and aesthetic counsel from Rachael Nevins. My first OER mentor, Jean Amaral, still inspires me in this work. Andrew McKinney and the whole CUNY-OER team have given me the encouragement to make this book happen. My BMCC students are a constant reminder that economics shouldn't be so over-complicated that no one can understand anything.

Any errors in this book are my own responsibility.

Writing a book is a marathon, so having friends is a big help. Many thanks to Tamara and Martin Green, Ellen Tucker, Ellen Rockmuller, Donna Tapper, Barrie and Jerry Raik, Jane Head, Doris Ullendorf, Jill Goodman, Mel Bukiet, Charlie Davidson, Rachel Theilheimer, Carla Cappetti, Moe Imerukaj, Alan Rosenstein, Ken Gorfinkle, Atina Grossmann, Margo Singer, and Paul and Mark Berch. My apologies in advance to anyone I've omitted.

This book is dedicated to Seferina Berch.

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Mathieu Stern, Money, 2020

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PART I

PART ONE: THE TOOLBOX

CHAPTER 1

Introduction

BETTINA BERCH

WARNING to Readers—

Strange to say, the book you are about to start was written by a well-educated but sometimes-wrong human being (not unlike your professors, if you are a student). So if something you read here seems terribly wrong—look into it. If I’m wrong and you’re right, we can correct the text and go forth smarter.



thethreesisters, Money

SOME BASIC PRINCIPLES

Expect the unexpected

We take classes and read books to learn things we didn't know before. Otherwise, it's a waste of time...and money. To learn anything, means starting out with an **open mind**. Having an open mind doesn't mean cancelling our previous beliefs and turning our brains into blank slates. It means that when we read or hear about something we **THOUGHT** we knew, but now we're being told is different, that we 'suspend disbelief.' We give it a chance and see what we think, once we understand what is being said.

Keeping an open mind is one of the hardest steps to learning

anything, but it is particularly hard in an area like economics, because there are so many things we THINK we know already.

You should not owe money to people.

The richest country in the world should not have such high unemployment.

Inflation is bad.

It is dangerous for governments to print a lot of money.

Gold is 'safe.'

Let's think about this list of common beliefs for a moment. If you never read a newspaper or listened to someone running for office, some of them might be pretty new to you. But others, like not being in debt, you may have heard from someone in your family. Regardless of how—or whether—you've heard these ideas before, there's something else they have in common. They use words like 'should' or 'bad' or 'dangerous' or 'safe'. Ask yourself, what do such words really mean? Do they have the same meaning for each person, in all circumstances?

Take 'dangerous.' We might all agree that running into traffic is dangerous—you could get injured. But if someone said to you, 'eating butter is dangerous,' you might argue that too much butter might be harmful, but you wouldn't want to call butter itself, dangerous.

Positive versus normative statements

But let's say we agreed on what all our terms meant. Can we then say these statements are true or false? Let's take the first statement, that you shouldn't owe people money. Is it true or false? Could you prove it?

Or take the second statement: The richest country in the world should not have such high unemployment. Could you ever prove that a country should not have so many unemployed people?

No, you cannot prove these statements true or false, even if you

agree with them. These statements are about what you feel. They are value judgments, what we call **normative** statements (your 'norms' are your values). Compare that second statement about how much unemployment we 'should' have, with this:

The unemployment rate in America is 7%.

Could you prove this statement true or false? Well, you might want to clarify the specifics, but you could definitely look up America's unemployment rate and find out if it were 7% or not. When we can prove a statement true or false, it's called a **positive** statement.

When we identify a statement as normative or positive, it has nothing to do with whether it's saying something good or bad, it simply refers to whether it is an expression of our norms/values, or a provable/disprovable statement. An unemployment rate of 7% may be very bad, but the statement itself is positive, i.e., provable.

In economics, we work with positive and normative statements all the time. Typically, we might start with a normative statement:

'Unemployment is way too high'.

Then, in order to DO something about it, we'd search for a positive statement, like:

'Youth unemployment is twice as high as adult unemployment.'

If we discovered that this positive statement were true, then we could begin to design an economic policy to address youth unemployment.

Just because we are distinguishing between normative and positive statements, doesn't mean one kind is better than the other. Many people think that when you are doing science, you have to leave the normative statements outside the door, and just work with positive propositions, things you can prove true or false. In economics, however, we would not have much to offer the world if we abandoned our norms. Instead, we stay very clear about what's normative and what's positive and work with them both to find something meaningful to say.

Now, some basic *economic* principles.

Economics is the study of the allocation of scarce resources among competing ends

Every discipline you might study—psychology, history, whatever—has an organizing principle, a characteristic point of view on the world. Sociologists focus on community. Political scientists emphasize consensus. Well, economists have a keyword, too: **scarcity**. Specifically, our resources in this world are scarce, limited. Economics is the science of using our scarce resources in the best possible way. For example, we are all aware that supplies of oil are limited in the world. This limited or scarce resource can be used in a variety of ways—to fuel cars, heat homes, or run factories. It's the job of economics to figure out how to use this scarce resource efficiently, which means having the correct amount allocated to the correct use.

This sounds very sensible, right? After all, we do not live in paradise, some Garden of Eden where we just pluck food from trees when we are hungry, or lay down on soft grass when we are tired. Food and shelter—like oil and minerals and other resources—are limited, scarce. Economic analysis shows how these scarce resources can be used in the best possible way. (You may be thinking, “best possible way” according to me? To you? As we shall see when we get to the “production possibilities frontier” model, there are many efficient production options for an economy, so social decisions will have to be made.)

This way of looking at the world, as a scarcity situation, seems pretty reasonable, until you think about the REAL basics of life, air and water. Is air scarce? When was the last time someone told you to wait in line for your next breath? Is water scarce? Didn't you just take a drink from that water fountain down the hallway? If these two essential-for-human-life resources are so limitless that we don't even think before we consume them, how can economists claim that scarcity is the organizing principle of the world?

The answer is probably obvious to any student who comes from

a village in the developing world or from a neighborhood around a major bus depot. The UN estimates that some 780 million people in the world do not have access to clean water. It is estimated that some 11 million American children live in areas with such high air pollution that they are at significant health risk from asthma and worse diseases. So, if we go back to that scarcity question and redefine our resources as 'clean air' and 'drinkable water,' we CAN agree that these, too, are scarce—and vital—resources. People in some parts of the world spend most of their working day going to a place with clean water and bringing it back home. Battles over access to diverted rivers cause wars between countries, not to mention legal battles in the American southwest. In America, disputes over where to build transportation depots or garbage transfer stations (both of which create enormous air quality problems) have fueled whole political campaigns. Clean air is a scarce and vital resource. Clean water is a scarce and vital resource. And yes, economics has a lot to say about how they are allocated in this world.

People prefer more to less

If you asked a random person on the street what economists believe, they might say something like, "Economists think everything comes down to money, that people are greedy."

Now, that's an interesting pair of thoughts. The first thought is that economists believe money is at the core of most issues, a characterization of how economists analyze things. The second part, about greed, is more of a statement about human nature.

So, do economists believe that 'everything comes down to money'? Yes and no. Economists would say that there are many things in this world that are NOT about money—your personal faith, your love for certain people or things, your kindness, your anger, etc. Should you become a Buddhist or a Catholic? Are you really in love with that person you just met? These are not

economic matters, so economists have little to offer. Perhaps a theologian or a psychologist might have insights on these issues, but the economist has nothing to offer. On the other hand, there are many issues in this world that CAN be analyzed by economists—the relative advantages of different jobs, cost-efficient ways to handle different types of pollution, the value of patent protection, to name a few. If there is an identifiable economic motive in an issue, economic analysis has a lot to offer.

So, economists do not believe that EVERYTHING in this world boils down to money, but for matters that DO involve economic goods, they certainly have a lot of analysis to offer.

Do economists believe that people are basically greedy? When Gordon Gekko said “Greed... is good” in the film, *Wall Street*, was he speaking for the economics profession? And greed is such a nasty little word, isn't it?

Economists like to put it differently. We say that **‘people prefer more to less.’** If someone offered you \$10 in one hand and \$20 in the other hand, you'd take the \$20, right? As obvious as it might seem, that a person would always prefer having more to having less, this IS one of the basic principles of economics.

But as obvious as this principle seems, it is not *entirely* true. There are people in this world who prefer to have less. Certain monks and nuns or other religious people willingly take oaths of poverty, swearing to give up worldly goods. *They* prefer less to more. Even ordinary people may prefer less to more. Have you ever met one of those people who say they're trying to ‘leave a smaller footprint’ on earth? They want to consume less, not more. They feel that the less they use up during their lifetimes, the more is left for future generations.

You may think that religious folks and ecologists are pretty minor exceptions to worry about, but our next principle has some serious problems.

People act rationally to maximize their happiness, given their

resources

Does this even need to be said? But wait—what does rational *mean* in this context? When we say rational here, we are saying that people act in a deliberate, systematic way to achieve their objectives. In other words, if they are hungry, they don't just flip a coin and see if lunch will be on the table, they go the fridge and fix a sandwich, or get on the phone and call for some take-out.

Indeed, they will decide, given their resources (money, ingredients on hand, their skills) whether preparing the food themselves or calling a restaurant would maximize their satisfaction or happiness. (How they will act when they have NO resources at their disposal is a question some economists try to answer with “the economics of crime” but they still assume rational behavior, which is pretty unlikely). Rational people buy the goods or services that maximize their happiness, given the resources at their disposal.

But is this true? Do we have a way to prove or disprove it? In the language we used previously, is this proposition normative or positive? Let's try some examples. If you buy some music that I don't like at all, I have no problem accepting that you bought that dreadful noise because it maximized *your* satisfaction. If you used your scarce resources to buy something that actually harmed you, like cigarettes, I might still agree that you were maximizing your satisfaction, given your resources. Perhaps your 'given resources' did not include the information that this was a harmful product. Or, more likely, satisfying your addiction maximized your present satisfaction, which was more valuable to you than your future satisfaction from prolonging your lifespan.

So we accept that incomplete information or different present-versus-future evaluations might make one person's rational decision look irrational to someone else. But the economist has a stronger way to defend the presumption of rational, satisfaction-maximizing behavior. Instead of trying to evaluate your tastes and

how well you are shopping to satisfy your tastes, we slip on a metaphorical blindfold and turn-the-tables on you! We say that *if* you bought that music or that meal or that pack of cigarettes, it was because it gave you more satisfaction than any other use of your resources. The technical term for this is **'revealed preference.'** By making this purchase, you revealed your preference for this item. After all, no one put a gun to your head and forced you to make this purchase, so if you bought it, it must be because it gave you more pleasure than any alternative purchase. In economics, we use this kind of after-the-fact reasoning a lot, especially when we examine the benefits of world trade.

While revealed preference solves a lot of problems with this rationality principle, it does not solve *all* of them. In recent years, a new field of 'behavioral economics' has been developing, focused on field-testing our economic behavior with actual experiments.

For example, if we pass a table with a bowl labeled 'free candy'—how many would we take? If the same bowl were labeled 'candy-\$1 each'—would we buy more or less candies than we took when they were free? From the rationality discussion we just had, you might predict that we would take more of the free candy than the \$1 candy, since the \$1 candy uses up our scarce resources.

Not so! When researchers have tried different versions of this experiment, they have found that we act very differently—perhaps irrationally— in response to the word 'free.' In many experiments people took fewer candies when they were free, and bought more when they were actually paying. Maybe they were embarrassed to take too many free candies. Maybe the whole set-up encouraged them to feel considerate of others.

In other experiments, people preferred a higher-priced version of a medication to a cheaper one. They said they believed the higher price tag indicated that it was better, even though the actual medications were identical. Sometimes, when a series of purchase options are set out (buy a 1-year print subscription for \$20, 2-years print and digital for \$45, or 5-years of both for \$90) we tend to pick

the middle option, simply because it is positioned in the middle. There is nothing rational about always choosing the middle option, but it's been proven that we often decide that way.

Here's another of our irrational decision-making habits: a company advertises an item—an elliptical exercise machine, for example—by first telling us it retails for \$899. Then they tell us that *they're* selling this machine for only \$299! If we had no idea what such machines normally cost, and they just presented us with a \$299 price-tag, we might have ignored the ad altogether, thinking that \$299 was a lot to pay for a machine we would never use. But when we are given information on what something *might* cost, before being shown our 'special' price, that earlier price quote *anchors* our price expectations. Suddenly, it looks like a bargain!

What these behavioral economists have found, is that we are more **irrational** in our economic decision-making than economists have assumed. This is not big news to the folks in marketing—they've been researching our irrationality for a long time. But it's only recently that economists are exploring the impact of irrationality on conventional economic analysis.

Rational economic decisions are made at the margin

The margin is not important in many disciplines, but it is key to decision-making in economics. The idea here is something like how you act at a restaurant, when you finish your main course and the waiter asks if you'd like to order dessert. After you've eaten a couple of courses, you're probably full; dessert would be a little extra, a marginal choice. When it's final exam time, we make a number of marginal decisions. We don't decide to spend zero time studying for our economics exam and 100% of our time studying for the sociology exam. No, what we're usually deciding is how to spend the extra hour we have, that marginal hour. Should we study a little more economics or a little more sociology? If we're trying to lose weight, we don't decide never to eat food again. We decide

which marginal foods—late-night snacks, desserts, carbs—we can give up.

We use the same logic when we analyze market behavior in economics. A market price indicates how much the marginal buyer—the one extra buyer—is willing to pay for an item; the amount the marginal seller—the one last seller in the market—is willing to sell this good for. The economist's marginal approach is key to understanding how the economist explains the famous diamond-water paradox.

Here's the paradox. Water is vital to human life. According to the famous 'rule of threes,' you can only survive three minutes without air, three days without water, and three weeks without food. Diamonds, on the other hand, while they may be pretty and even industrially useful, are not essential to human life. You can survive a whole lifetime without owning a single diamond. But water, which is totally essential to human survival, may be totally free at the water fountain down the hall, or sold fairly cheaply at most stores. Many cities have laws that require restaurants to offer customers free tap water with their meals. Diamonds, on the other hand, are very expensive. Why is water cheap but diamonds costly?

There are many sensible answers to this question. You might point out that it's very expensive to mine and to process diamonds. You might want argue that diamonds, like champagne and caviar, are luxury goods, so they *ought* to be expensive. And what makes an item a luxury good? Perhaps it is more tasty than other foods, like lobster or caviar, or more alluring than other jewelry, like diamonds? But perhaps it goes back to that initial conversation we had, about scarcity. One might argue that daisies and orchids are equally beautiful to different people, but orchids are more expensive because they are more rare, more scarce.

Now, if we add marginal analysis to the scarcity principle, we may have a solid answer to the diamonds-water paradox. Imagine you've been wandering lost in the desert with NO water at all, and an economist came up to you and offered you a choice: a bottle

of water or a pair of diamond earrings. You'd definitely take the bottle of water. Now imagine you're on your way to class, and your professor stands outside the room offering you diamond earrings or a bottle of water. You'd take the diamonds! In the desert, dying of thirst, one more unit of water was very valuable to you. One more unit of diamonds was pretty worthless. (as my mother used to say, 'a shroud has no pockets'—less poetically, you can't take it with you). In the classroom situation, you've come to class after drinking water at home, you're well-hydrated. The bottle of water the professor offers you is worth very little. But since you don't have any diamond earrings, an extra unit might be pretty valuable to you. This is the power of marginal analysis: *at the margin*, an extra unit of water might very well be less valuable than an extra unit of diamonds. It all depends on how many units you already have.

In our daily lives, we rarely find ourselves having to put a value on an extra sip of water. But marginal pricing surrounds us. When we get on an airplane, we know that our fellow passengers have all paid different prices for their tickets. Much of the difference is due to marginal pricing. Passengers who purchased seats two-weeks in advance will often pay less than last-minute ticket-buyers. Why? airlines figure the last-minute customers' 'willingness to pay' must be greater, as they have fewer options once they are at the airport. On the other hand, empty seats mean lost revenue to airlines, so they may institute cheaper pricing for 'stand-by' customers, people who have made it clear that they are indifferent to when they leave. Not all decisions are made at the margin—but a surprising number *are*, once you understand the principle.

Economic decisions can influence our decisions

An incentive is anything that encourages us to do—or not do—something. Biologists believe that things that help the organism survive—food, warmth, sex—are important behavioral

incentives. Sociologists have their own lists of key incentives—need for companionship, respect, etc. Economists also focus on key incentives causing us to act in different ways, the primary one being price. If an item becomes cheaper, we have an incentive to buy more. If it becomes more expensive, we buy less. This is one reason why policy-makers often put a tax on something they want to discourage us from buying, like cigarettes. When ‘bad’ things are taxed, they become more expensive and we buy less of them.

Sometimes, economic incentives are added to a situation where other types of incentives have failed to stimulate us to action. For instance, we all know that it is great to donate blood to a blood drive. We are told all the time about the lives we can save doing this good deed. But sometimes blood donation organizations, like the Red Cross, run low on supplies. Since the Red Cross cannot legally pay for blood used in transfusions (although plasma can be bought) local groups sponsoring blood drives may occasionally offer another type of economic incentive, like a free Starbucks card to every blood donor.

Economists are not arguing that economic incentives are the *only* incentives that will move people to act. But we believe that money can be a powerful incentive in many situations.

CETERIS PARIBUS (pronounced kimageimagerimages p imagerimageimage-bimages)

This is a Latin phrase that translates roughly to “with all other factors remaining the same,” or “holding other things constant.” Economists and other social scientists rely on this concept when analyzing the impact of some change on a situation. We might be analyzing the impact of increasing the tax on beer, *ceteris paribus*, holding other things constant. What other things? Perhaps we think that wine is a good substitute for beer. When beer is taxed more, it becomes more expensive. Some people would switch to buying wine, so—*ceteris paribus*—beer sales would decline with a tax

increase. But if all other things were *not* held constant—let's say the tax on wine was *also* increased—then we wouldn't expect beer sales to decline after all.

We don't really believe that there is any way in the world that when one thing is changed, that nothing else is affected. We know that our decisions on most things are interconnected, and that nothing in the real world ever “stays the same,” or “stays constant.” Yet, when we work with economic models, we find it useful to imagine that nothing else is changing but the one thing we are trying to study. Once we see what that isolated change might look like, we *then* go on to analyze how realistic our *ceteris paribus* assumption has been. Have we ignored something huge, like the probability that another type of liquor is also being taxed? Or have we ignored something irrelevant, like changes in the price of tea?

If our *ceteris paribus* assumption means we have ignored something important, we don't just throw up our hands and give up! No, we just take the model a step further, by considering the impact of this other change on our original model. In general, our model will be stronger—more robust, more useful—the more we have considered and reconsidered the realism of our *ceteris paribus* assumptions.

Any economist might add or subtract various principles to this list. Still, we have enough here to get started, so let's put them to work.

Some Useful Materials

We think incentives are effective...but they can have unintended consequences:

The New York Times reported on a [traffic ticketing situation](#) in China. Then they reported on a different traffic ticketing situation, right in [New York City](#)!

Professor Ariely talks about [situations where offering money is *not* a great incentive](#)!

Professor Thaler discusses a different type of incentive, [the Nudge](#).

If rationality interests you, [try this](#) (open source) book.

On water scarcity, see [this artwork](#) by Congolese artist Cheri Samba!

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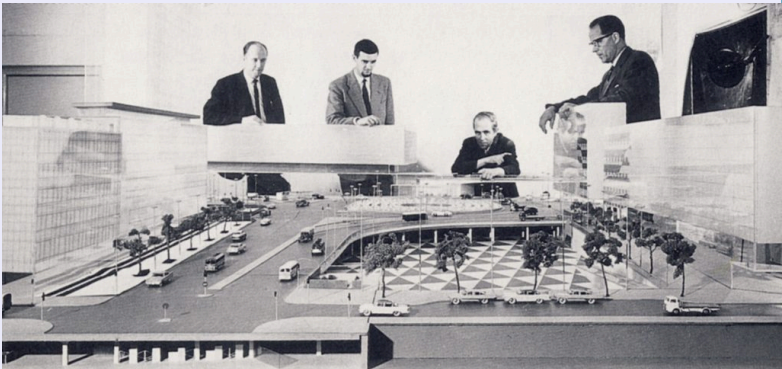
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CHAPTER 2

Economics is a Social Science: We Use Models to Analyze Real Life

BETTINA BERCH

Consider this



David Hellden, 1965. Swedish architects examining architectural model

Many sciences use models to test their ideas. Are models just smaller versions of things, or do they allow us to see more?



Scale model of town of Munster for visually impaired visitors, 2010

Sometimes a tactile architectural model is provided for visitors—useful for everyone!

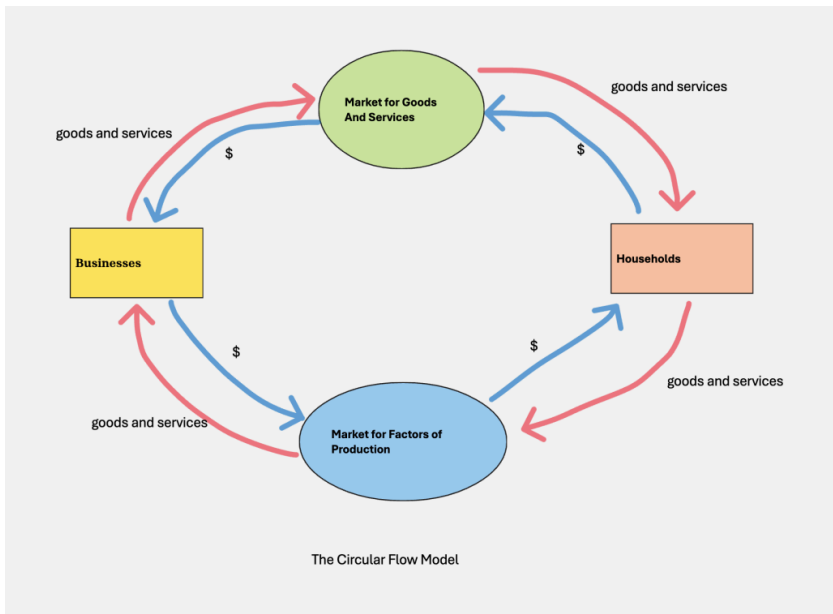
Unlike physical sciences like biology or chemistry, economics is a social science. We study human behavior under a variety of circumstances—how we react to a change in market prices, how we decide to save or spend, etc. Because it's human behavior we're studying, it's not always possible to set up laboratory experiments and see how people react to certain situations (like lack of money, or food and shelter). Sometimes, we can examine historical data, like changes in worker wages in the 19th century, for example, and see how that correlates with unemployment rates in the same period. But such historical work may be of limited usefulness.

Instead, economists, like other social scientists, rely on models.

The art of model-building—and it is an art—lies in identifying the important variables driving the action and leaving out all the unimportant stuff. Once we feel we have captured the essence of the situation, we can go and test our model and see if its predictions are accurate and useful. We may then go back and refine the model so it pays attention to the issues we want to focus on and ignores the irrelevant stuff.

THE CIRCULAR FLOW MODEL OF THE ECONOMY

Let's try out the modeling process by looking at a very basic model we use in macro: the circular flow model of the economy. Here's how it might look:



The Circular Flow Model

We have two major operators: **businesses** or firms, and **households**. Businesses are any units that produce goods and/or services, for example, a record company that produces records, or a university that produces education/training for people. Households are consumer units, like me living alone, or you with your family, for example. Households include various kinds of factors of production—workers who bring in wages, landlords who bring in rental payments from the properties they own, or capitalists who gain interest on the capital they lend out.

We have two kinds of markets. The **market for factors of production** is where inputs into production—land, labor, capital—are bought and sold. The **market for final goods and services** is where the things the economy produces are sold (tables, chairs, fridges, etc), and where services are sold (doctors, police, teachers, etc). The model is showing you that these four things are connected.

Let's see how by following the red outer loop, and start with a business. Let's say this is a business that produces vinyl records. They send those records to the **market for final goods and services**, in this case, maybe an actual record store. Someone from your **household** buys a record and brings it home. And someone from your household goes and gets a job at a **market for factors of production** and goes to work at a **business**. So far, we're following the movement of real things—a record moving from a factory to your apartment, someone from your apartment getting a job and going to work for a business.

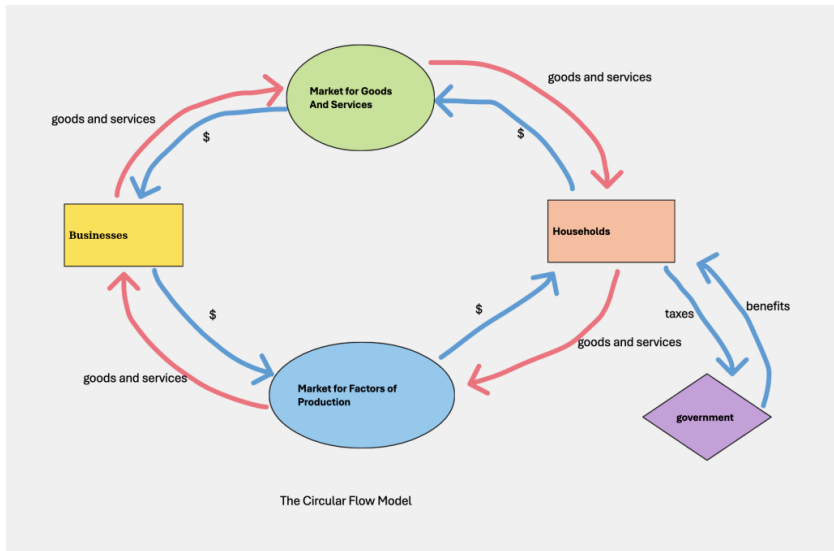
Following the blue inner loop, there's a flow of money going in the opposite direction. Money from the sales of vinyl in the **market for final goods and services** flows back to the record company, which uses these revenues to hire workers in the **market for factors of production**, wages, for example, which flow into a **household**. The **household** uses such money flows to buy consumer goods in the **market for final goods and services**.

By showing the actors and their interconnections this way, the

model encourages you to focus on interconnections, the reliance of households on businesses, of businesses on households. For example, if households don't have enough money to spend on things, businesses will receive less revenue, which might mean they cut back on hiring factors of production, which will lead to households having less purchasing power again. This can be an important argument by economic policymakers to raise unemployment benefits, for example. Increasing household spending can translate to increased business revenues and increased hiring. Later on, we will use this circular flow model to make other points, like adding up our GDP by using income or expenditures, but even here, you can see how a simple model can drive home a point of view.

MAKING THE CIRCULAR FLOW MODEL MORE COMPLEX

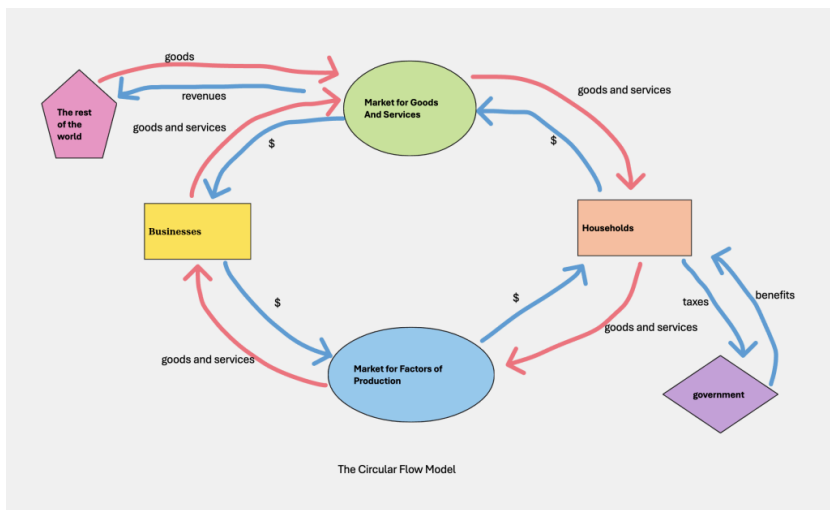
But you may be thinking, this model is SO simple it leaves out a lot of things we need to think about. For instance, where would we locate those unemployment benefits we just mentioned? And where's grandma's social security check? Where are taxes? Turns out, this model is so simple, it left out the government altogether, and we need it in here if we want to show certain things. But no problem, we can add it in:



We add a government sector to the basic Circular Flow model

Once we add in government, we can connect it to businesses and households, recognizing that each sectors sends money to the government in taxes and receives money back in subsidies or income support payments. This would be an important addition if you wanted to focus on cutting taxes or raising various payments.

Likewise, you might look at the simple model and complain—the stuff the average household buys, isn't made in that factory on the other side of the circular flow diagram, it's made in another economy altogether. You can give an American household a big bump up in income, and it's not going to flow to an American business, it's going to go to a foreign country! The simple story we told about stimulating our businesses by increasing our households' spending power might not work! So, first step would be to improve our model by adding in "the rest of the world":



Adding in Other Countries to the basic Circular Flow plus Government model

Once we do this, we can decide how much to embed the role of other countries—is it just going to be an import-export situation as shown here, just sending and receiving final goods and services, or will we make it more complex? It really depends on what we're trying to do with the model. But just talking about it, we begin to see relationships—which models help us focus in on.

THE PRODUCTION POSSIBILITIES FRONTIER MODEL

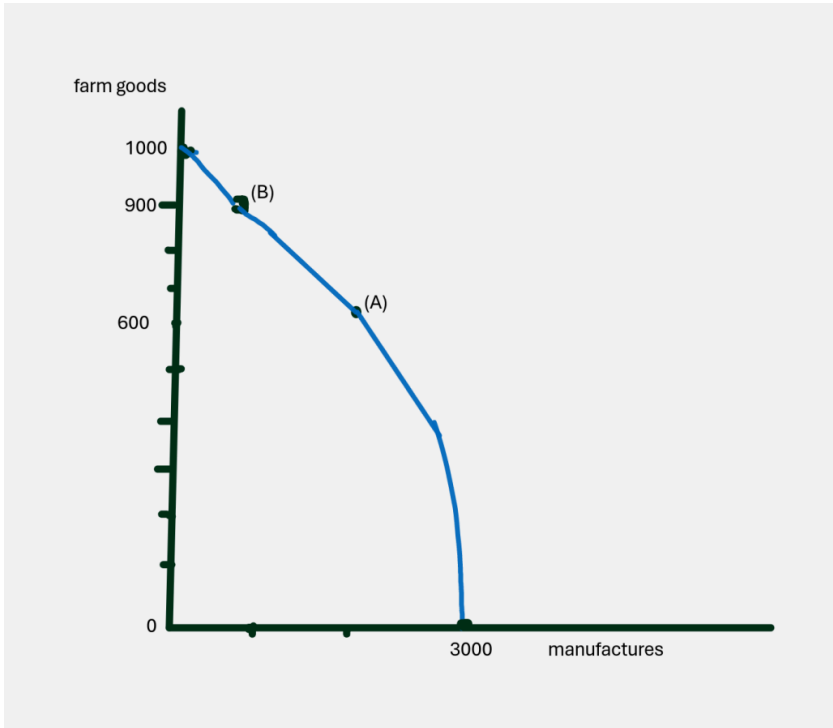
Now let's examine another model we use in economics, the production possibilities frontier model. This model starts with a basic question: How much stuff could our economy produce—given our state of technology—if we used all our resources as efficiently as possible? You can see how useful the answer might be, as it would give us a real sense of how strong our economy is—either relative to how it used to be, or relative to other economies.

The first issue we'd have to address is a practical one—even a simple economy produces a huge number of different goods and services, using even more different sorts of inputs. How can we possibly capture that in two-dimensional space—on a piece of paper? The answer? We **simplify**! Imagine our economy has two types of output possible—let's say, farm goods and manufactured goods. How much of each output could we produce, with the technology we've got, if we used our resources efficiently?

To create a reasonable data table, let's imagine if all our resources were used to produce farm goods and we produced no manufactures, or the other extreme, all manufactures and no farm goods. Then let's fill in two intermediate positions, where we produce some of each output. And while we're making up these numbers, they have to be sensible—to get a little more manufactures, we're going to have to give up some farm output. Let's look at this data on what our economy could produce, given our resources and our level of technology:

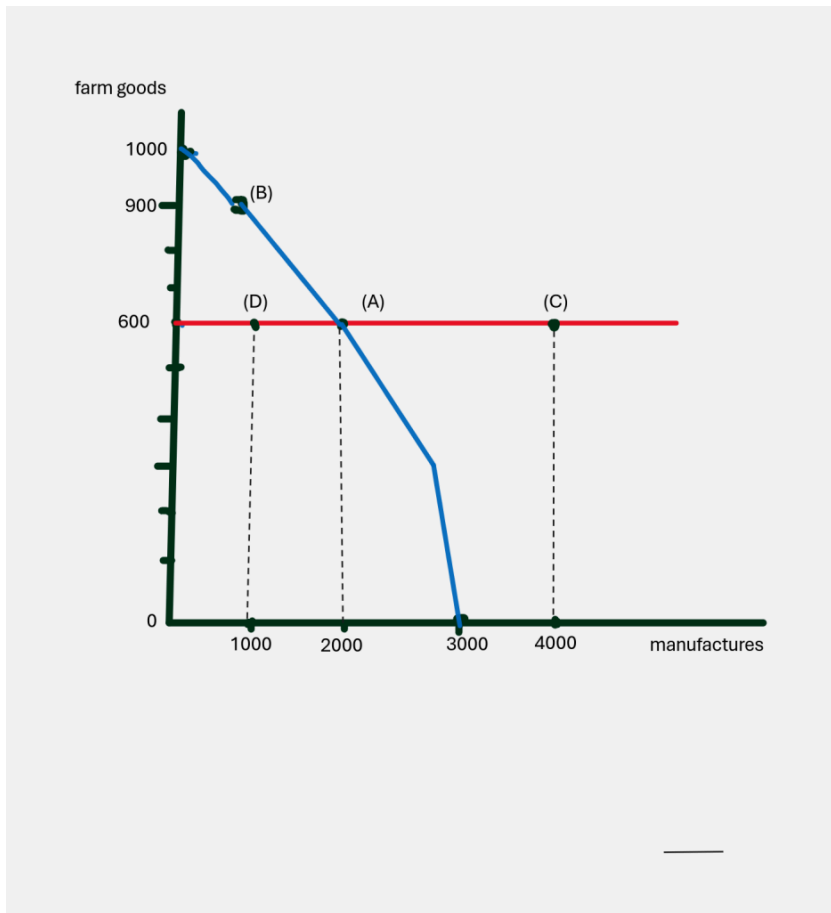
Farm goods	Manufacturing
1000 units	0 units
900 units	1000 units (point B)
600 units	2000 units (point A)
0 units	3000 units

If we produce ONLY farm goods, we can produce 1000 units (whatever those units are), but then we produce no manufactures. Likewise, we can produce 3000 units of manufactures if we are ok with having no farm goods. Intermediate output mixes like A or B allow us a bit of both. Now let's graph these points, by putting farm output on one axis and manufactures on the other (it makes no difference which is which):



Production Possibilities Frontier

All four of these points—indeed, all the points on the curve—show us the amount of output we could get if we used all our resources efficiently, which is why we call it the **production possibilities frontier**. Now let's talk about some of the points that are NOT on the frontier. Let's consider an output mix of 600 farm goods and 1000 manufactures (D), or 600 farm goods and 4000 manufactures (C). How would we characterize those outputs? Well, let's draw them and see how they look:



How Do We Characterize points (C) and (D)?

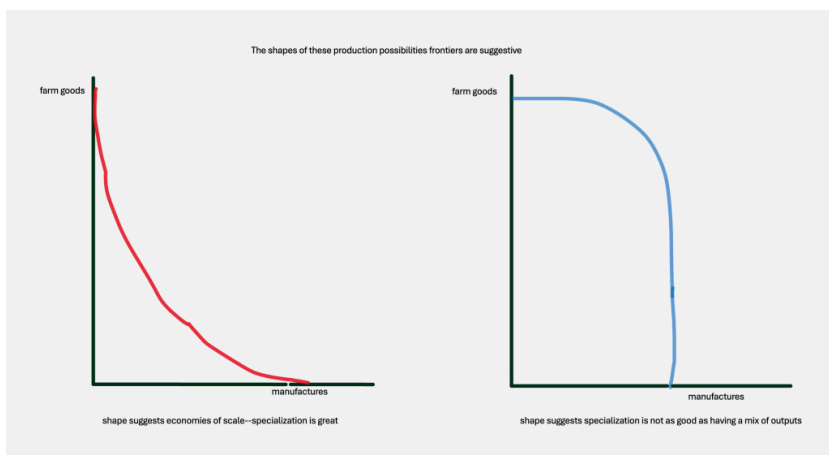
If we are at point D (600 farm goods and 1000 manufactures), someone should ask us why we're not getting 2000 manufactures with the 600 farm goods, instead of 1000? Point D might happen, but it is NOT efficient—we are supposed to be able to produce more manufactures than that. If we look at point C (600 farm goods

and 4000 manufactures) we have to say it's just not possible yet, given our state of technology and our resources.

So: All the points *on* the frontier are efficient. All the points *inside* the frontier are inefficient. All the points *outside* the frontier are not possible.

Are any points on the frontier 'better' than others? This is a social question. Everything on the frontier is great, but society must decide what kind of mix of output we want, and how we want to use our resources. Consider one extreme—0 farm goods and 3000 manufactures. This describes a country dependent on others for basic foodstuffs. It also means that all of us are working in factories—when some of us would really prefer to work the land.

Now that we understand the model's basics, let's explore its shape for a moment. We've drawn it as a curve—not a straight line—which indicates that the trade-offs of farm vs. manufactures change along the curve. But consider these two different curved shapes:

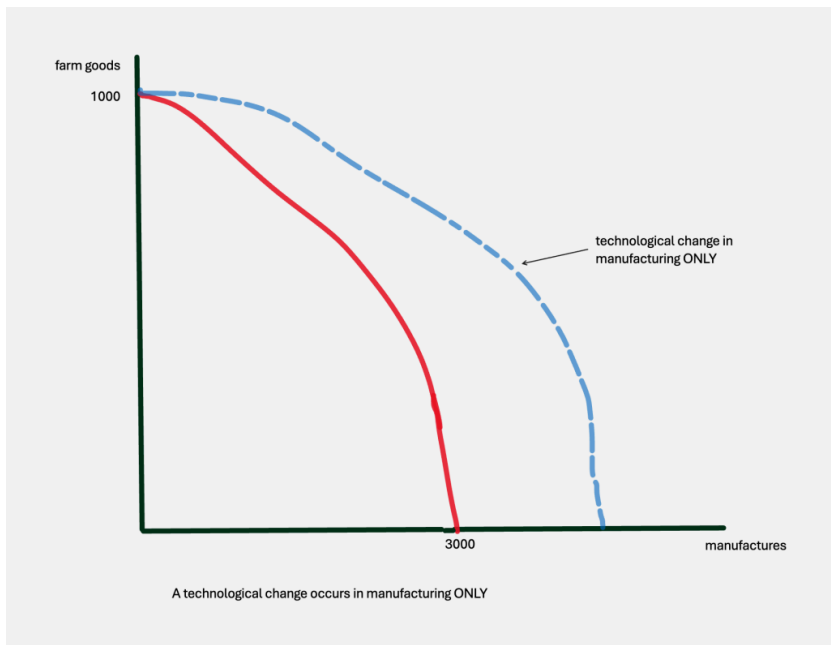


The shapes of the production possibilities frontiers are important

The frontier on the left suggests there may be economies of scale from specializing in farm goods or manufactures. The second graph

(bowed outward) suggests that it's more efficient to produce a mix of outputs rather than extreme specialization.

When we started with this model, we said it showed how much we could produce with our current resources, at the current state of technology. What if technology improves? What if we have some change in technology that increases the output of manufactures, although it doesn't help farming? No problem:



Technological change that impacts ONLY manufacturing will shift out the curve for manufacturing output, but no change in farm output

The whole curve will move outward, EXCEPT that point with 1000 farm and 0 manufactures—because at that point, no one is producing manufactures, so all that lovely technological change in manufacturing is not increasing output.

Maybe by now you are wondering what use this model could

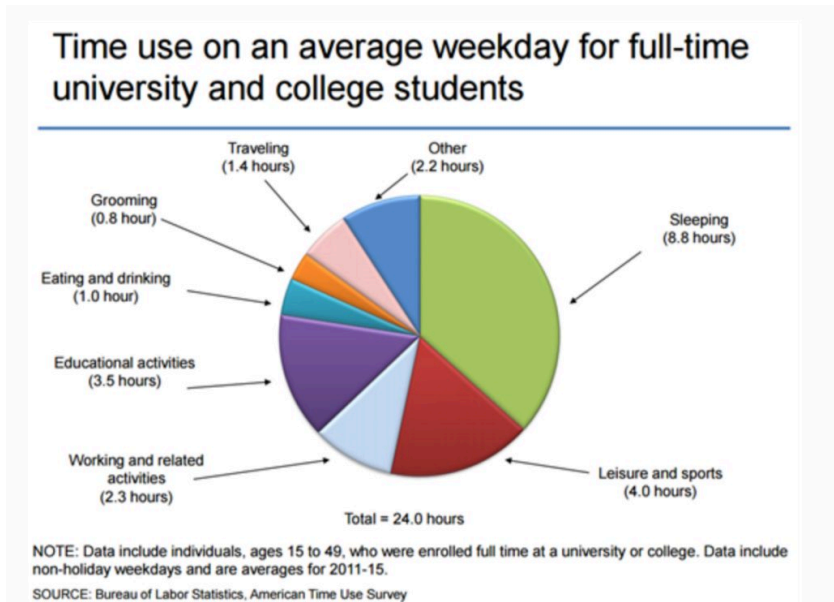
possibly have, since we don't live in a world with just two outputs, and no one would ever know if they were operating inside or outside some hypothetical frontier. But being able to visualize an economy in terms of the *tradeoffs* in what we could produce is actually a good reminder that there are choices. Furthermore, when we get to the topic of economic growth, we will come right back to this model, since one way to depict economic growth is exactly the *pushing out* of the production possibilities frontier. And later, when we get to international trade, this model comes back again, as countries with production possibilities frontiers of different shapes may benefit from specialization and trade with each other.

The takeaway here? These two very simple models—the circular flow model and the production possibilities frontier model—offer us a way of visualizing dynamics and interconnections in an economy. They give you a lens for looking into how an economy functions that can be quite useful.

GRAPHING

As you might be noticing, we use graphs in economics. When some people see graphs in a book, they blink their eyes and keep reading the text, figuring a graph is like a picture or illustration they don't really need to look at. Right and wrong. A graph *is* visual material—and if you consider yourself a 'visual learner,' you might even get more out of a graph than a whole paragraph of words. But—at least here—graphs are an important part of the story that you can't just skip.

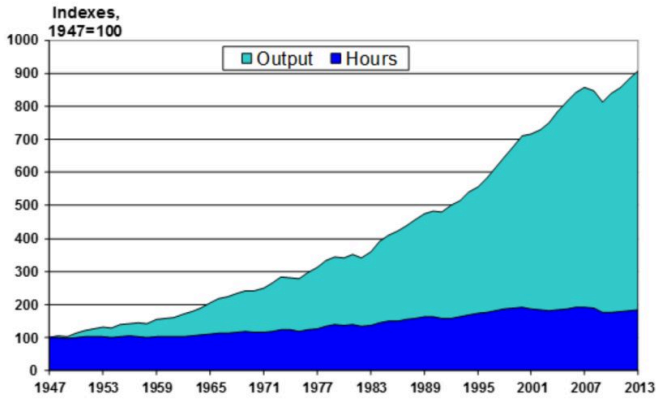
The first rule of graphs, is to pick the right kind of graph to make your point. If you want to show the relationship of parts to the whole—like how much of a day you spend in different types of activities—a 'pie chart' is often a good choice:



Time Use Pie Chart, College Students

Bureau of Labor Statistics, American Time Use Study

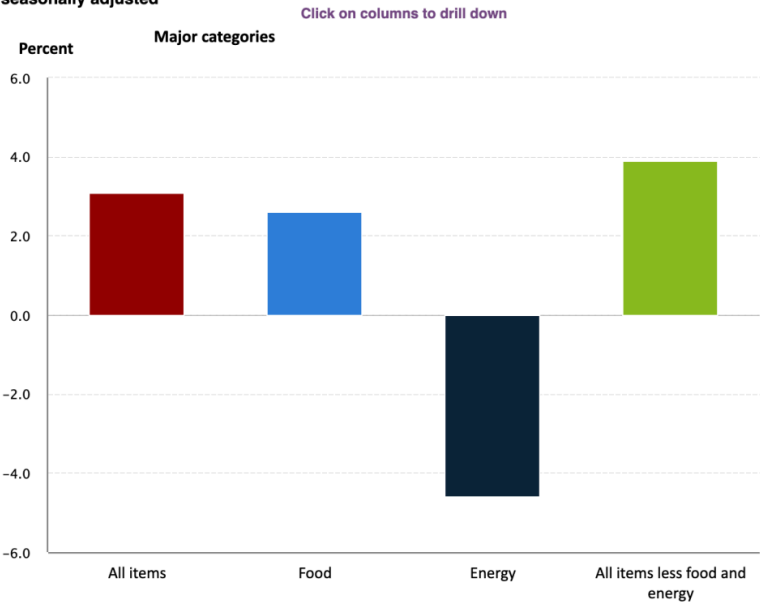
Sometimes the relationship we are highlighting is something that's changing over time, like productivity in our economy:



U.S. Output has Grown at a Higher Rate than Hours Worked, over time

Suppose, instead, you wanted people to see how various components affected a whole—like which categories of our price index had risen and which had fallen. A simple bar chart could make the point:

12-month percentage change, Consumer Price Index, selected categories, January 2024, not seasonally adjusted

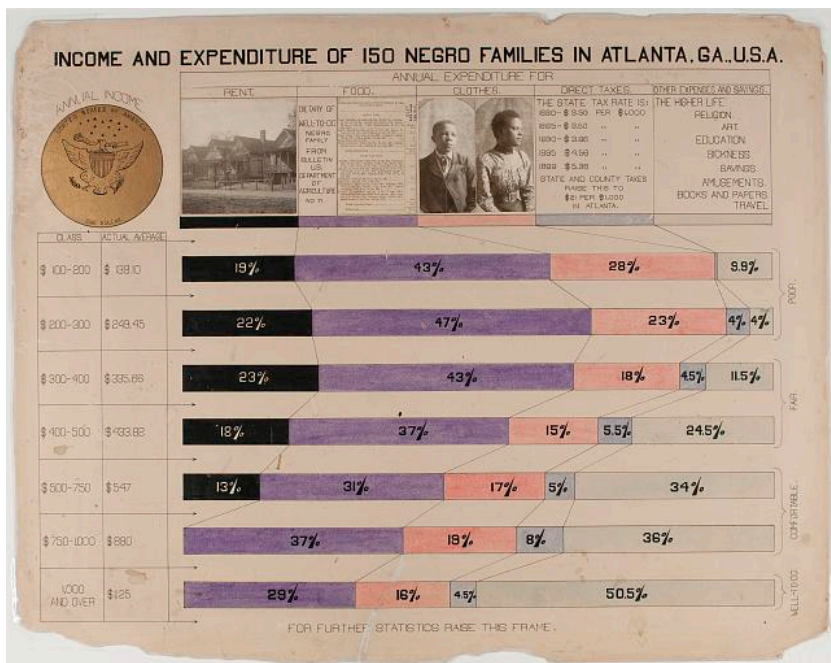


Source: U.S. Bureau of Labor Statistics.



Changes in the Consumer Price Index for different components

Sometimes a bar chart can get more elaborate, if the designer wants to add as much information as they can. Consider this bar chart that was shown at the World’s Fair in Paris in 1900, part of an exhibition on the conditions of African-Americans in Georgia:



W.E.B. DuBois, "Income and Expenditures of 150 Negro Families in Atlanta, GA, USA," 1900

The two big takeaways here on graphs:

1. Pick the type of graph that gets across the point you want to make, whether it's changes over time, relationships of the part to the whole, or comparative sizes of things.
2. Stop and take a good look at any graphs presented to you. See if you can figure out the point being made.

In the next chapter we explore another kind of graph, one that relates price and quantity. These supply and demand graphs are like the crown jewels of economic modeling!

SOME USEFUL MATERIALS

This [video](#) on the circular flow model switches around the placement of the markets (from the way we've put them) but explains things very clearly.

This simple [video](#) introduces the production possibilities model.

One of the best sources of data for economics is the St. Louis Federal Reserve. In this [video](#) and subsequent ones, they introduce their resources.

Economists [spin fables and call them models](#), explains Ariel Rubenstein. They're really the same thing...

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CHAPTER 3

How Markets Work: Supply and Demand and Equilibrium

BETTINA BERCH

Consider this



Carol M. Highsmith, 2019, Fishmonger, Philadelphia

In our modern economy, it can be very hard to find examples of supply and demand in a perfectly competitive market, so maybe this example of a fishmonger in a food hall works? But then you think, don't I always go to my favorite seller when I go to the greenmarket? That's not really perfect competition then. Can you find examples of perfect competition in your own day-to-day life?

The crown jewel of model-making in economics might be the supply and demand model! Draw a few little lines that cross in the middle of a half box—and that's a powerful tool for understanding the price system! Since this model is fundamental to many areas of modern economics, we'll walk it through slowly.

PERFECT COMPETITION

Let's imagine we're going to analyze the marketplace for some simple, ordinary item. This item has no brand name attached, nothing that makes it any different from the other ones for sale—it's completely generic. Let's say our item is a single rose stem, the kind they sell at your corner market or even in a grocery store, depending where you live. Furthermore, there are many sellers of these stems and there are many buyers. No one buyer or seller can influence the market price. If one seller tries to raise the price by a dollar, people will walk to the next shop. If one buyer tries to argue the price down, the seller will refuse.

This kind of market situation is what economists call '**perfect competition**.' The item being sold can be very nice or very basic but it is completely generic. It's the same item everywhere. Buyers *and* sellers are what we call '**price takers**.' We go to the market or store and we accept what the price is, we don't try to argue about it. We 'take' this price as a given. If we like the price, we buy. If we don't like the price, we walk away. Our only decision is how many units of this item we wish to buy. If we're selling this product, we are also '**price takers**.' We see the price in the marketplace, and we accept it as given. We do not try to scheme about how we could push that price up. We see the price, and decide how many units we want to supply, at that price.

Of course, this is **not** the usual situation in the real world. It's the opposite! We are surrounded by items that may have been generic at one time, but now they've been made special. Tennis shoes used to be ordinary—they were white canvas with rubber soles, with no visible brand name. You could buy them anywhere and they were more or less the same. Today, 'athletic shoes' are so particular, so collectible, so expensive, that people buy them and never take them out of their boxes. Apples used to be red or yellow, that's it. Now every apple has a sticker identifying its variety, brand, and origin. Even eggs are branded. All this branding activity

is a result of sellers trying to move their products out of the world of perfect competition, into the world of 'imperfect competition,' in order to raise prices. If you take more economics classes, you will be examining how imperfect competition works. But first things first—perfect competition. If buying roses seems too strange to you, imagine buying a quart of 2% milk, an ordinary black umbrella on a rainy day, or a cup of coffee from the stall on the corner by your school. These can all be items that we buy without paying attention to a brand name, items we might buy from a wide range of sellers. Likewise, sellers can imagine selling these generic items to a huge, anonymous marketplace of buyers. Every seller would be aware that they were just one among many sellers, with no special tricks that would bring them more buyers.

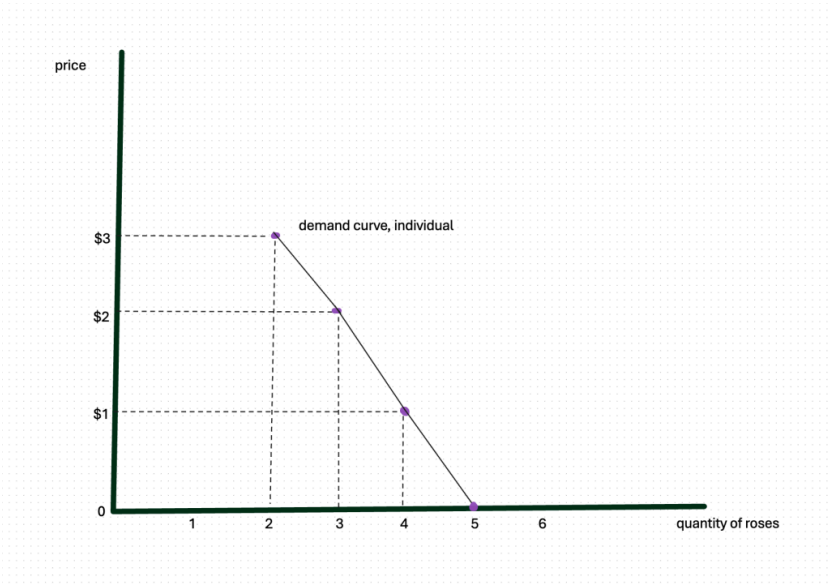
DEMAND

We'll start by analyzing demand under perfect competition, because we are all familiar with demanding, or buying things. Let's say you are on your way to dinner at a friend's house and you decide to bring her a rose. You may see several stores on your way selling very similar roses for very similar prices. If you saw a shop offering roses for free, you might grab 5, one for everyone invited! If they cost \$1 each, you might decide this was still very cheap, and buy 4. If they cost \$2, you might buy 3. If they were \$3 each, you might only buy 2. (If they cost more, you might not buy any roses, but look around for some ice cream to bring instead.) When things cost more, we buy less; when things cost less, we buy more. In other words, there's an inverse relationship, a negative relationship, between price and quantity. This might seem like second nature to you, but economists call it the Law of Demand.

Let's put our information in a table:

Price	Quantity Demanded
\$0	5
\$1	4
\$2	3
\$3	2

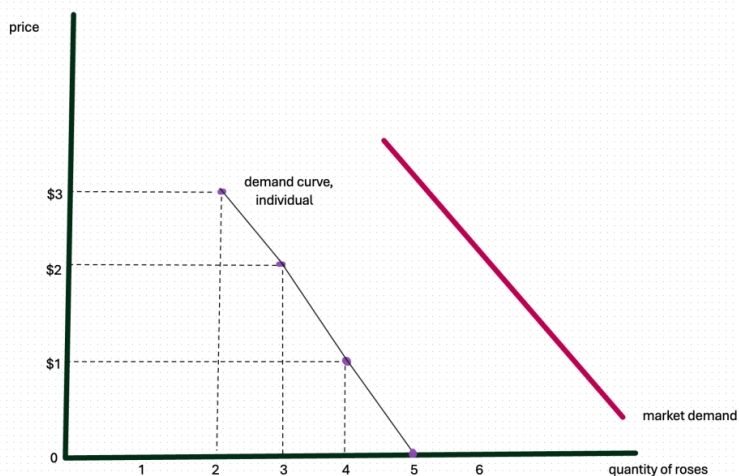
With this data, we can construct a very simple demand curve for a rose stem as a function of price. *In economics, we do this in a particular way: we always put price-type variables on the vertical axis and quantity-type variables on the horizontal axis.* This is arbitrary—there’s no particular logic involved. But since we all agree to do this, it makes it easier to read other people’s graphs. So call it a rule, and let’s graph this information:



Demand curve for roses, individual

What could we notice about this demand curve? It’s not a

perfectly straight line—or even what we might call a curved line. Demand curves take whatever shape the data gives them—straight, smooth, rounded. But if they follow the Law of Demand, and if you have put price on the vertical axis and quantity on the horizontal axis as you are supposed to do, they will be what we call downward-sloping, so that when price is lower, the quantity demanded increases. This demand curve is one person's demand curve. Since we're in perfect competition, we know we have to have a lot of buyers. To get a market demand curve, we add up all the individual demand to get a market demand curve, which sits to the right of any individual's curve.



Demand for Roses

SUPPLY

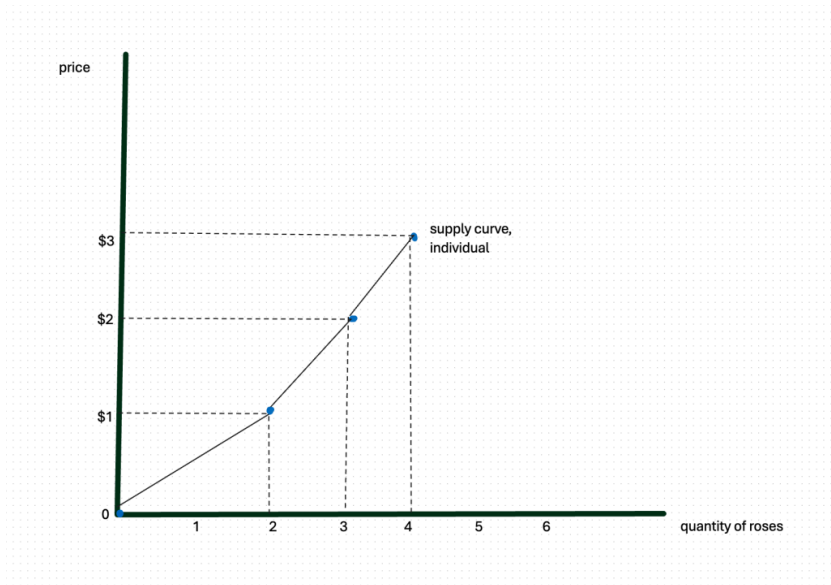
Now, let's look at the rose market from the point of view of a rose-

seller, a rose-supplier. Imagine you run a corner fruit-stand and you see other shops nearby selling roses. Why not give it a try? You make a phone call to your wholesaler to find out what they'd charge you for roses, you make a few calculations, and you look around at what neighboring shops were charging for roses. If someone was giving them away (charging zero) you'd decide selling roses was a bad idea and offer none. If the neighboring shops were selling stems for \$1, you might order 2. If the neighborhood price were \$2, you'd order 3 to sell. If the neighborhood price were \$3, you'd try to sell 4. The higher the market price, the more stems you'd want to be selling, since you'd be making more money on each sale.

Again, let's make a table:

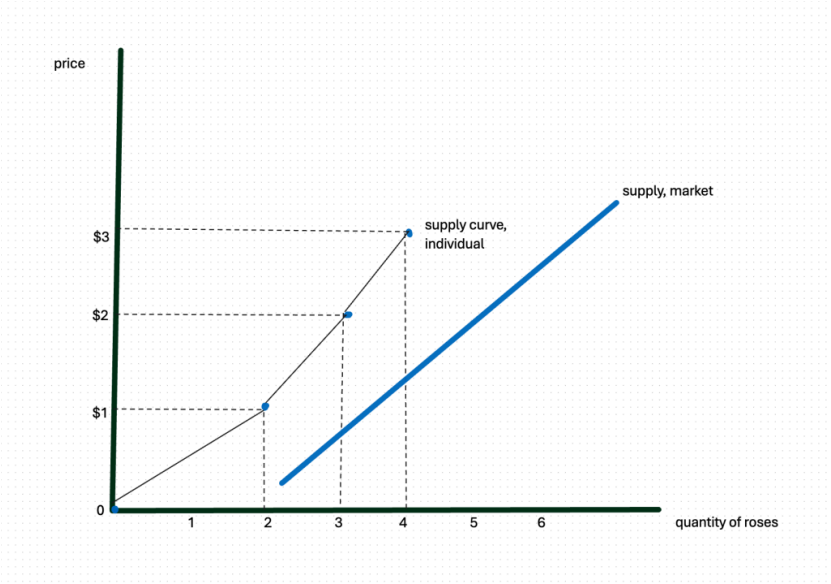
Price	Quantity Supplied
\$0	0
\$1	2
\$2	3
\$3	4

From this individual seller's supply data, we could draw a curve:



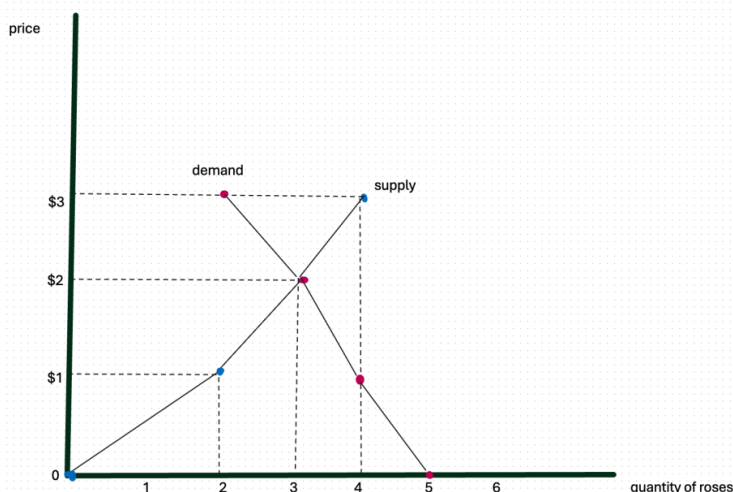
Supply of roses: Individual

Again, in perfect competition, we'd have a lot of sellers, giving us a market supply curve to the right of the single seller:



Supply of Roses: Individual and market

Now let’s put together our market demand and our market supply curves:



The rose market

Looking at our graph, we see that if the price in this area had been set at \$3 a stem, supply would be much greater than demand. There would be roses unsold. What would sellers do, seeing unsold roses as the night went on? They'd cut the price! When they cut the price down to \$2, supply would exactly equal demand.

On the other hand, if they priced their roses at \$1, they'd see a line forming outside the flower stall. They might realize that they had priced their roses too cheaply, and raise the price. When they raised the price to \$2, supply would exactly equal demand.

In this situation, we would call \$2 the equilibrium price. At \$2, the amount supplied equals the amount demanded. **Market equilibrium** is a lot like how equilibrium is defined in physics—a body is at rest, with no tendency to move in either direction. We would call \$2 the **market clearing price**, since the market is cleared of shortages or surpluses. Changes in price move buyers or sellers to act, and it is this *signaling function* that the famous

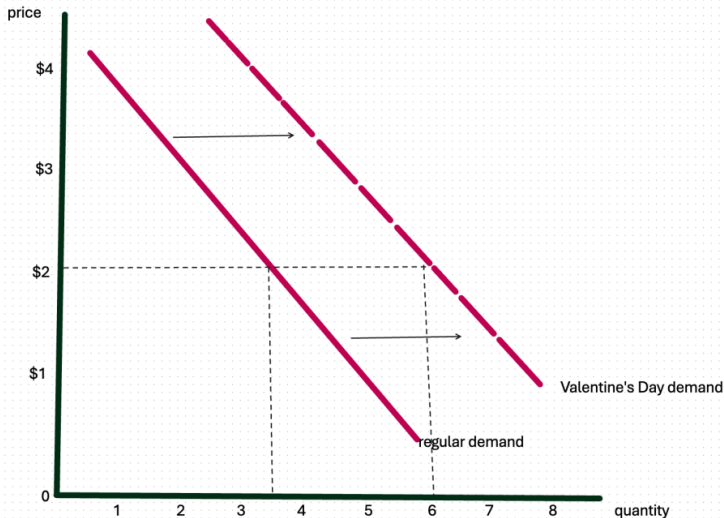
economist, Adam Smith, called the Invisible Hand of markets. In perfect competition, no one tells anyone they must buy or sell more or less; everyone sees the price and acts in such a way, that markets clear themselves.

SHIFTING CURVES

We laid out our data for market supply and demand under the assumption of *ceteris paribus*, that all other things going on in the world should be held constant. Realistically, we know that many things are changing in the world, and many of them could be relevant to the market for roses. Certain holidays, like Valentine's Day or Mother's Day, increase peoples' demands for roses. Hot weather months decrease the supply of roses. A newspaper story on roses causing allergies could impact this rose market. It is time to see how to incorporate relevant changes in the world into our market model.

Let's say it's the day before Valentine's Day, a time when a lot of people who never buy flowers normally, go out to buy flowers for lots of people. How do we show this?

First, let's consider the impact of Valentine's Day on demand. At any given price, there might be twice as many people as usual trying to buy roses.

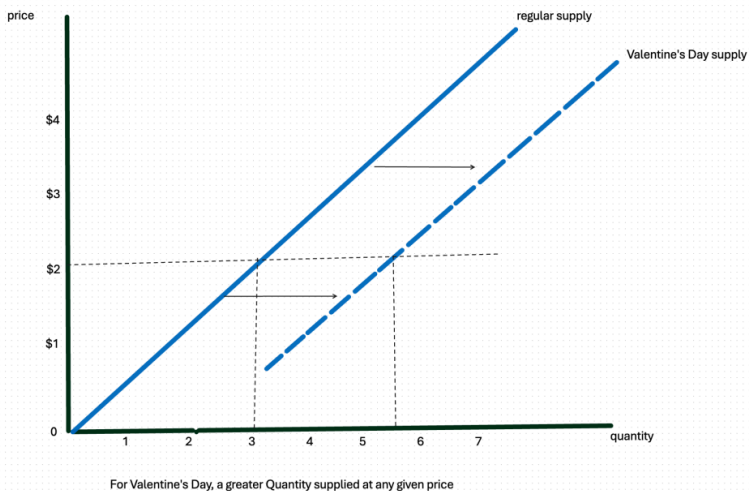


On Valentine's Day, there will be more Quantity demanded at any given Price

Demand for Roses: Regular and Valentine's day

Our new market demand curve for Valentine's Day has shifted to the right (or we could also say, moved upward). At any price, more roses are demanded. If nothing else changed, this shift in demand would result in a higher market price.

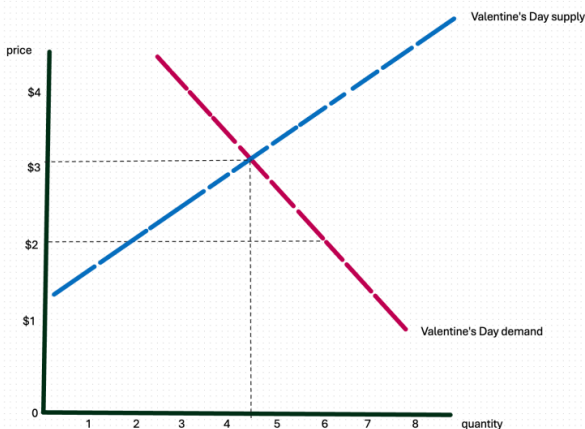
It is also possible that market supply will shift in response to the holiday. Flower suppliers may time their harvesting so they can supply more roses at any given price, as the holiday approaches. Let's graph it:



Supply of Roses: Regular and Valentine's Day

As we can see, the new supply curve has shifted to the right (or moved downward). More units of roses are being supplied to the market at any given price.

Now let's put our demand and supply situations into one graph:



On Valentine's Day, increased Demand at any given price, and increased supply at any given price has resulted in a higher Price and a greater quantity

Rose Market, Valentine's Day

The new market equilibrium price for roses during the Valentine's Day holiday is higher than it was on a non-holiday—due to increased demand. But because suppliers have also anticipated the holiday and supplied more roses at any given price (our shifted supply curve), the price increase is not as high in the end, as it would have been if suppliers had not responded.

Many things can shift demand and supply curves. But not every change in the world will shift a curve. In particular, a change in the price of roses will NOT **shift** a demand or supply curve—and this is something students sometimes find confusing. You may think to yourself, if the price of roses goes up, I'm going to demand fewer roses...so wouldn't that shift the curve? NO! If the price is higher, we will move along our same old demand curve to see how many units we will demand at that price.



The difference between moving along a curve and shifting a curve

To keep from being confused, whenever a change is proposed, ask yourself three things (the ‘three-step process’):

1. Is this proposed change (a holiday, new tastes, etc.) relevant to this market?
2. If it is relevant, is this change represented on either axis of the graph? If the proposed change is not the actual variable on either axis, we will have a shift of one or both curves.
3. Now, which curve is shifting? Listen carefully to the language describing the change. Does it involve “demand talk”—‘I’m shopping,’ ‘I want to buy’. Or does it involve “supply talk”—‘it’s gotten more expensive to produce this thing,’ ‘we had technological change in producing this.’

The Three-Step Process

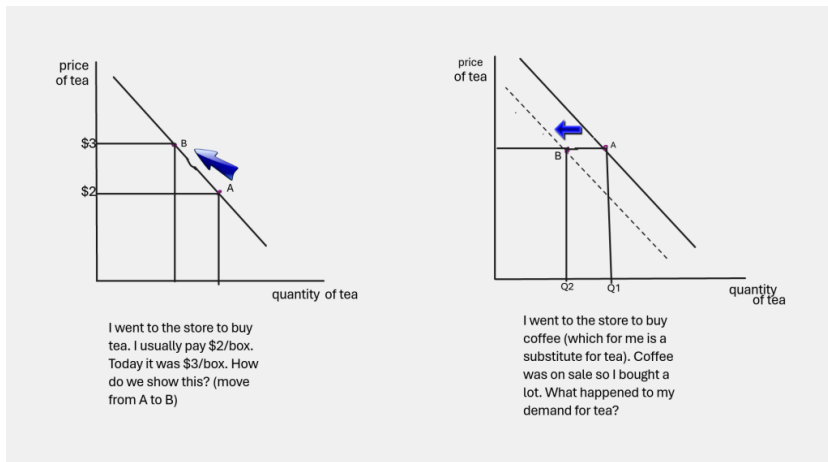
1. Is the Change We're Discussing Relevant?
(yes? Ok, keep going!)

2. Is the Change We're Discussing a Variable on the Vertical or Horizontal Axis? (yes? Then we're **moving along a curve**. no? Then we're **shifting a curve**)

3. Decide whether it's the demand curve or the supply curve that's involved and which direction it must go

A summary of the Three-Step Process for deciding whether you move along a given curve, or shift it.

In the first example in the graph below, I've gone to the market to buy tea, which is usually \$2 a box. Today it's \$3 a box. How do I graph this?



When to move along a given curve and when to shift a curve

The first question—‘is tea being more expensive than usual today’ is that relevant? Yes. Is ‘tea going up in price’ a variable on either axis? Yes it is, it’s the variable on the vertical axis. So I will move along the demand curve I’ve already got, from point A to point B.

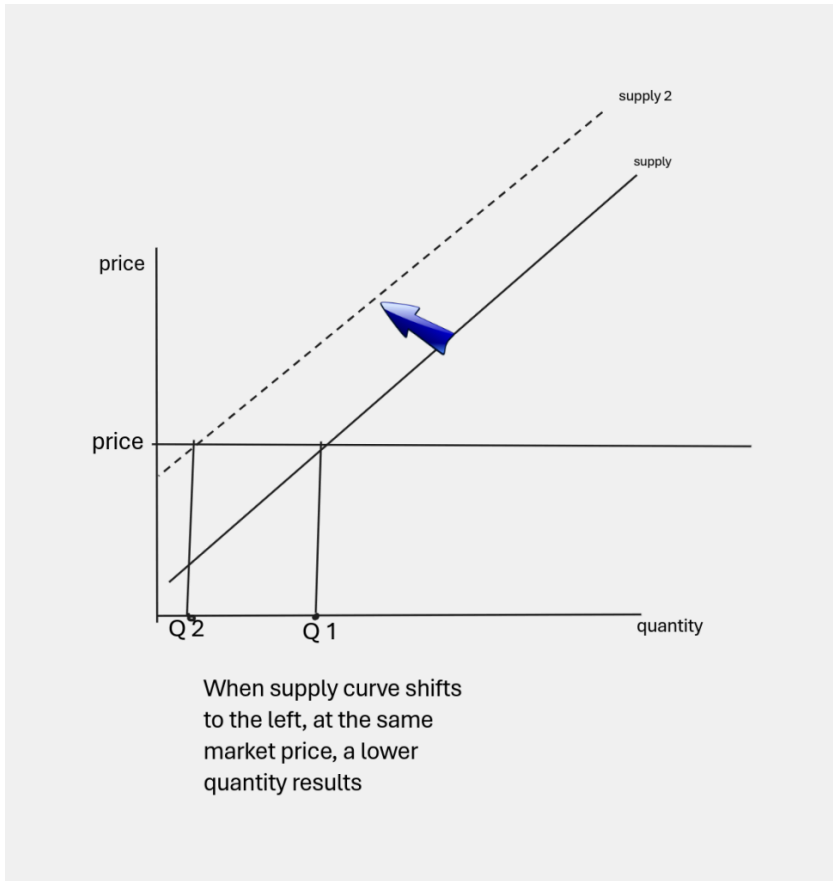
Consider the second graph above. It’s showing me my demand curve for tea, but now there’s a new situation. I’m going to the store to buy COFFEE, which I consider a substitute with tea. (That language just established relevance!) At the store I see that coffee is on sale, so I put a lot of coffee in my cart. What happens to my demand for tea, which was also on my shopping list?

Again, the 3-step process. Is coffee-on-sale relevant to my demand for tea? Yes. Is lower-price-for-coffee a variable on either axis? No! So I will shift my demand curve for tea downwards or to the left, because I will want less coffee at any given price.

SHIFTING SUPPLY CURVES

Now let’s consider some typical things that shift curves. Let’s start

with supply curves. Look first at what difference it makes, in general, shifting our supply curve upward, or to the left:

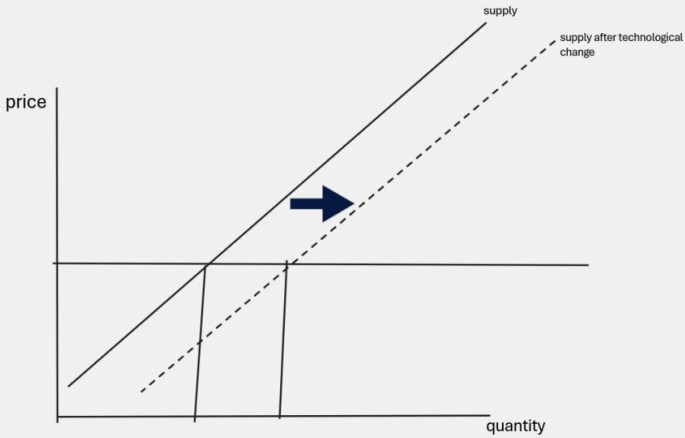


When a supply curve shifts (in this case, production became more expensive): at the same price a different quantity will be supplied

It shows us that when input costs go up, for example, I will supply less of that good. Let's look at some specific things that shift supply curves.

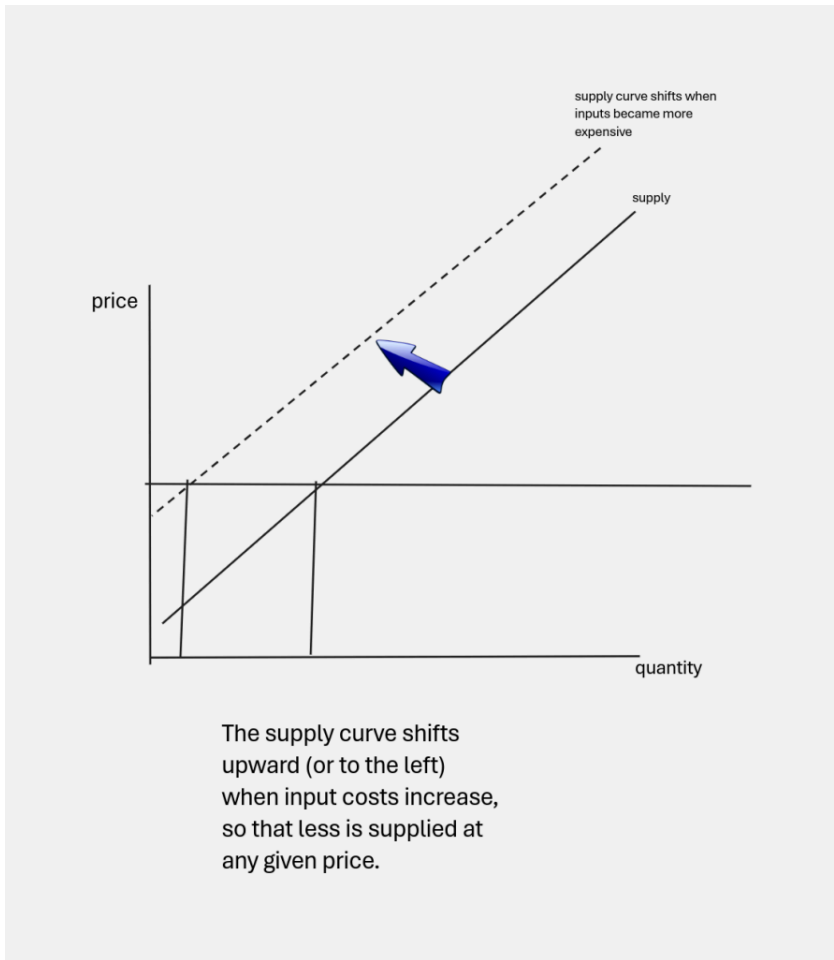
Typically, supply curves for various goods can shift from **changes**

in the costs of their inputs. When the price of oil goes up, the cost of producing anything that uses oil inputs (like plastics) goes up, shifting the supply curve for Legos, for instance upwards, or to the left. If the product has a big transportation component, like some farm goods, an increase in the cost of fuel will shift the farm goods supply curve upward or to the left. The supply curve for many types of home computers has shifted to the right over time thanks to the lowered costs of components, like the cost of computer chips. **Technological change** often makes the cost of production of modern goods decline, shifting their supply curve to the right.



Technological change
shifts supply curve
downwards, or to the right,
so that at any price, more
quantity is supplied

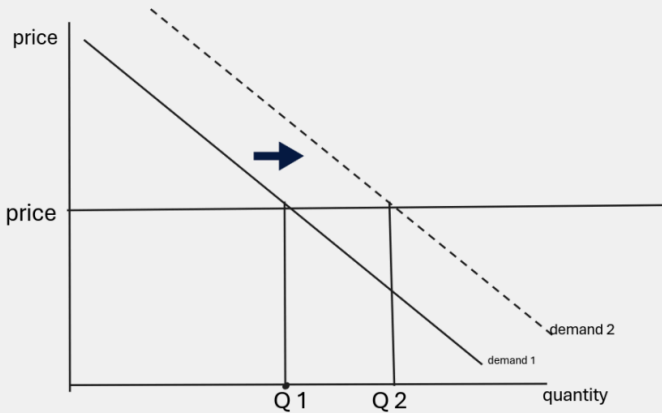
The supply curve shifts downward (or to the right) with technological change or anything else making production cheaper



Supply curve shifts upward, or to the left, when input costs increase

SHIFTING DEMAND CURVES

Turning to the demand side, let's see what will shift our demand curves, resulting in greater or smaller quantities being desired at any given price:



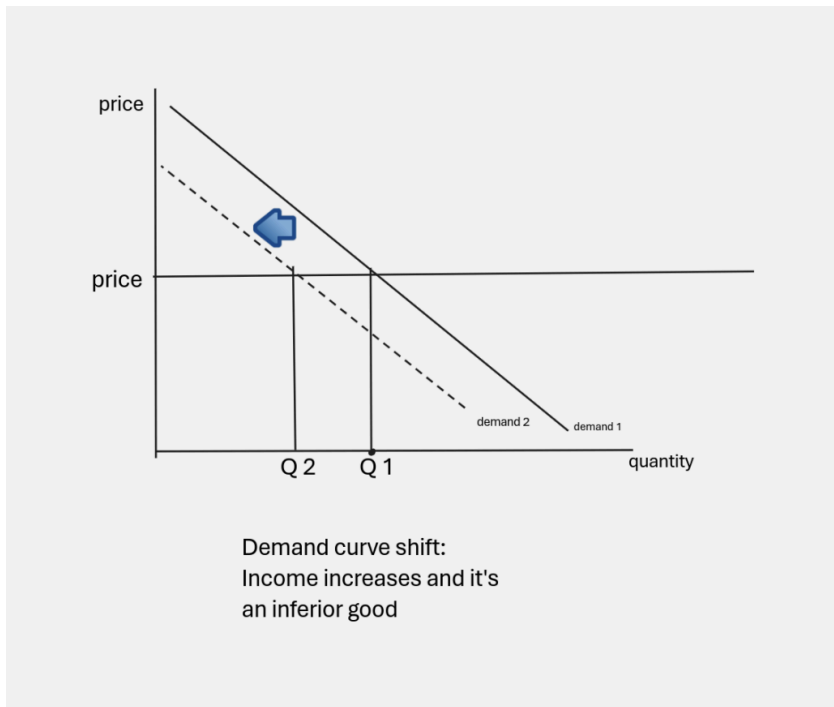
When a demand curve shifts (here, upward) a greater quantity is demanded at any given price

When a demand curve shifts, a different quantity is demanded at any given price

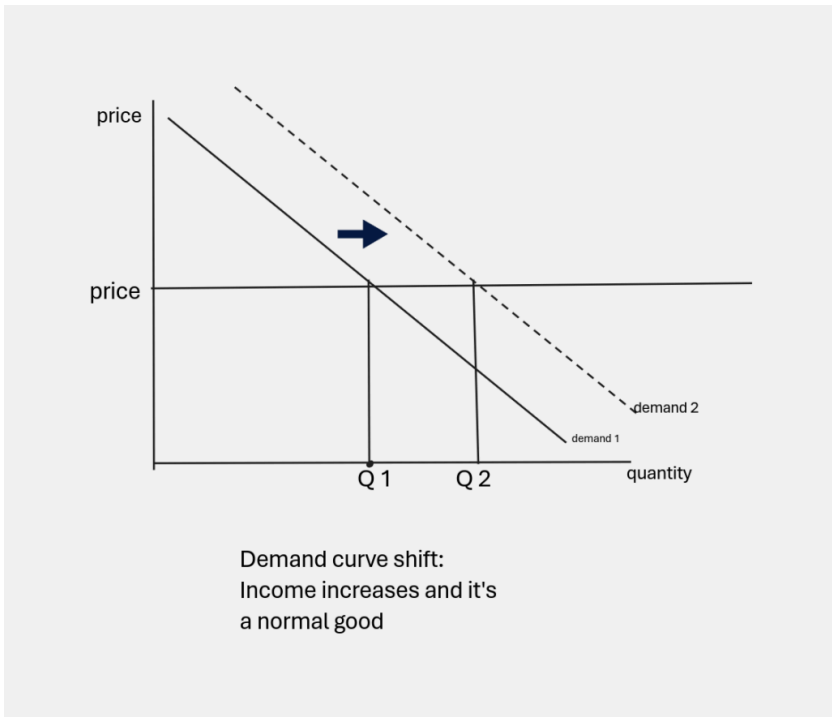
First, **changes in consumer tastes** (our new passion for dark chocolate, or our suspicion of foods with trans-fats) are always shifting curves. The weather (snowstorms, rain, heat waves) shifts demand for many goods, from rock salt for melting driveways to air conditioner sales. News about unsafe products decreases demand for them. When we think about shifts of our demand curves, there **are** a few particular situations that account for many curve shifts: **changes in our income**, and **changes in the prices of related goods**, particularly substitutes and complements.

CHANGES IN INCOME MAY SHIFT DEMAND CURVES

First, let's consider **changes in our incomes**.



Demand curve shift: Income goes up and it's an inferior good



Demand curve shift: Income increases and it's a normal good

When someone wins the lottery, news reporters always ask, 'What are you going to buy now that you're rich?' While there's often a front page article on the winner who wants to give a chunk of money to a charity, there's the occasional winner who declares he's buying a year's worth of cheeseburgers! However wacky the stories get—and they're great reading—we expect that an increase in income will mean a change in shopping behavior. So, how do we evaluate the impact of a change in income on our demand curve for something? Usually, it's relevant. So we go to the second question—is the change in our income the variable on either axis? No—the price and quantity of a good or service is on the axes, not our income. So, we believe we will shift our demand curves for some particular good or service.

Now the big question: which direction do we shift our demand curve? If you were suddenly rich, you can imagine wanting to buy more of many things: computer gear, jewelry, restaurant meals, gym memberships, good dental work, cars...the list seems endless. If your income increases and you decide to buy more of some good or service, we call this a **normal good**. For normal goods, an increase in income will shift our demand curve upward, or to the right.

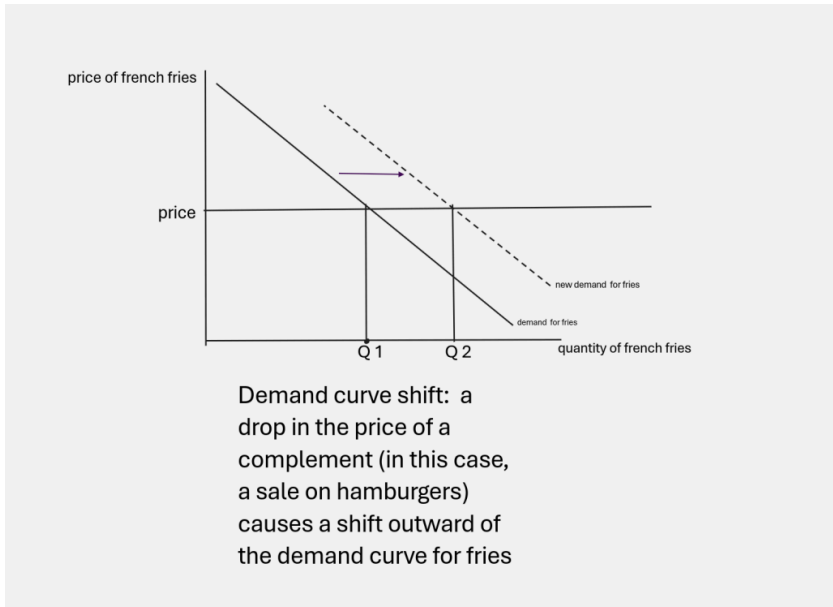
It is also true that if we were suddenly rich, there are some things we would never want to have to buy again. When our incomes go up, there are things we'd buy less of, or avoid altogether. Some people say they would quit taking public transportation. Others decide not to drive to their vacation destinations anymore, but to fly instead. Maybe we haven't won the lottery, but we've had that moment in the grocery store when we've got a little more money than usual, and we walk away from the aisle with the ramen noodles. Ramen noodles can be delicious, but if they remind us of being broke, we might buy less of them when we have more income. Goods or services that we buy less of, when our income goes up, are called **inferior goods**. Our demand curves for inferior goods or services shift downward, or to the left when our incomes increase.

CHANGES IN THE PRICE OF RELATED GOODS—SUBSTITUTES AND COMPLEMENTS—CAN SHIFT DEMAND CURVES

Our demand curves can also shift from changes in the prices of another good—something that is either a **substitute** or **complement**. Let's first consider complements, goods that go together. If you can't enjoy French fries without ketchup, then fries and ketchup are complements. If you always buy buns when you buy burgers, then burgers and buns are complements.

Imagine you go to the grocery store and you see there's a sale on

burgers. You put a lot of burgers in your cart and then you think, I am buying all these burgers, I need more French fries! They go together! How do I show a change in my demand for fries when there's a sale on burgers?

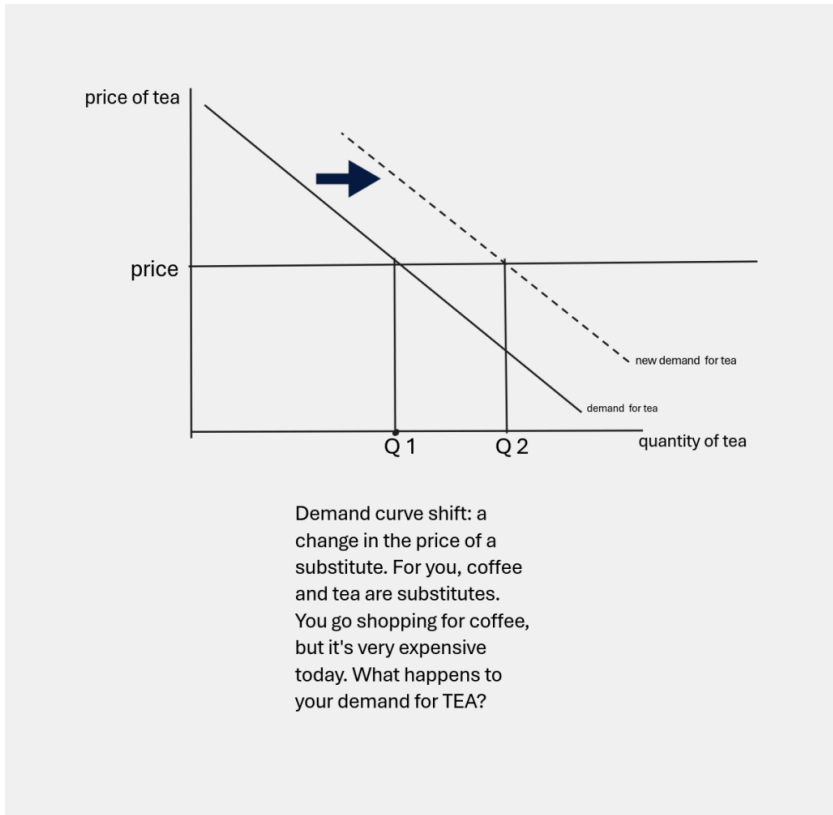


Demand curve shift: from a change in price of a complement

I use my 3-step method. Is a sale on burgers relevant to my demand for fries? Yes, to me they go together, they're complements. Is a sale on burgers on either axis? No. So I'm shifting a curve. And I'm shifting a demand curve, because all the talk is about shopping, which is demand behavior. If I shift my demand curve for fries downward, it means I demand LESS fries at any given price...but I know I want MORE fries at any given price, so I am shifting my demand for fries curve upward, or to the right.

Changes in the price of a substitute will also shift a demand curve. Let's go back to our substitutes, coffee and tea. This time we

are going to the store to buy coffee, but coffee has gone *up* in price! How will that impact my demand curve for tea? Let's use the 3-step method. Is an increase in coffee prices relevant? Yes (because I said I consider them substitutes). Is coffee price increase on either axis? No. So I will shift a curve. Which curve? All the talk has been about my shopping—and that's demand-side talk. So I know I am shifting a demand curve. And since I will now be buying more tea at any given price, I am shifting my tea demand curve upward, or to the right.



Demand curve shift: from a change in the price of a substitute

So, changes in tastes, changes in income and changes in the prices

of related goods may shift demand curves in either direction. Supply curves may also shift, from changes in technology, or from changes in input costs. When the supply and/or demand curves shift, we may see a new equilibrium market price and quantity. This is actually one of the advantages of a market system over a 'planned' economy—changing prices allow resources to flow to where they will be valued the most. Changing prices guide the flow of goods and services to those who are willing to pay the most for them (we used to say, prices guide goods to those who need them the most, but they're really going to the highest bidder, which isn't the same thing). In some situations, however, our society may decide to over-ride the market system and allocate resources and goods according to our social values. We'll explore "price controls" in a later chapter. There's still more to explore in our basic supply and demand model.

SOME USEFUL MATERIALS

A few short videos to help supply and demand come alive:

[Demand Curves](#)

[Supply curves](#)

[Equilibrium](#)

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CHAPTER 4

Diving Deeper Into the Curves: Elasticity and Welfare Analysis and What They Offer

BETTINA BERCH

Consider this

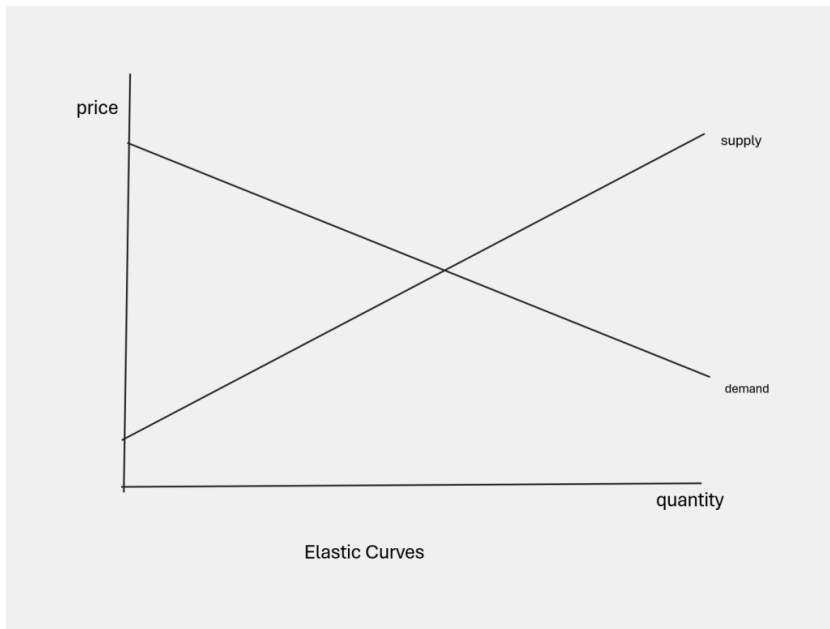


Arthur Rothstein, 1939, *Tombstones*.

Why are we looking at a photo of tombstones on sale? Do you think sales went up after “this week’s special”? Or, in the terms of this chapter, are we “price elastic” when it comes to gravestones?

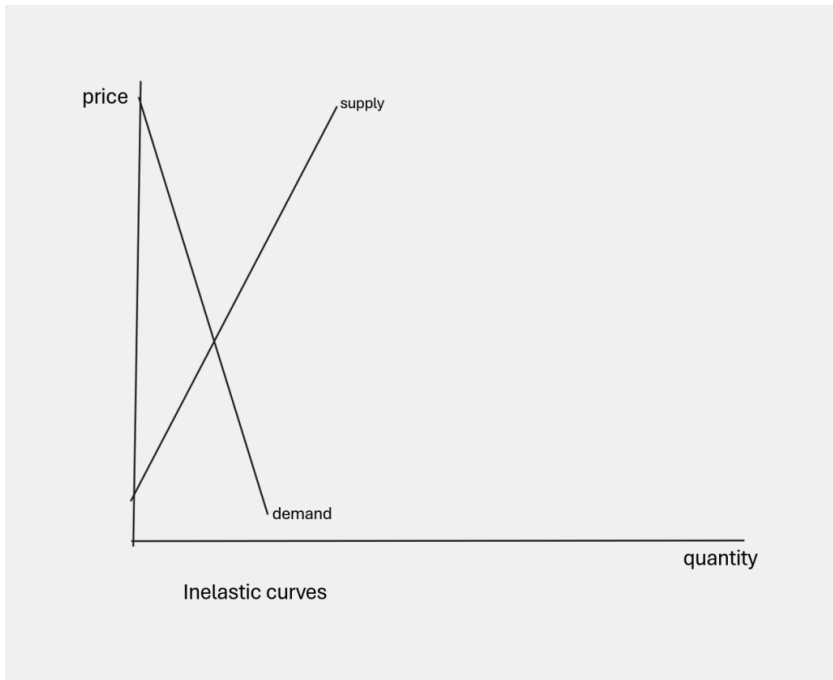
THE SHAPES OF CURVES (ELASTICITY) AND WHAT DIFFERENCE IT MAKES

Now that we’ve drawn our supply and demand curves with the information in our supply and demand schedules, it’s a good moment to step back and think about the **shapes** of these curves. Flat curves and steep curves mean completely different things. First, let’s see some relatively flat curves:



In the graph above, both our demand and our supply curves are relatively flat. A small change in price will produce a big change in the quantity demanded or supplied. These curves indicate that demand and supply are VERY price-responsive, very price-sensitive.

In the graph below, both our demand and supply curves are relatively steep. Even a big change in price won't change very much the supply or demand for this good. Demand and supply are not very price-responsive, not very price-sensitive.



While in math we refer to the steepness of curves by talking about their slopes ($\Delta \text{ price} / \Delta \text{ quantity}$, with the symbol delta, Δ , meaning 'change'), in economics we refer to the **elasticity** of our curves, which is defined as the **$\Delta \text{ quantity} / \Delta \text{ price}$** , expressed as an absolute value (meaning we drop the positive or negative sign). As you see, it's the inverse of slope. Elasticity tells us how much change in quantity we'll see from a change in price.

PRICE ELASTICITY ON THE DEMAND SIDE

What kind of things will have relatively flat, or price-elastic demand curves? These will be the sort of things we are eager to buy if their price goes down, and things we won't buy if their price goes up a bit. We're price sensitive. When my usual cereal goes on sale, a

small price cut makes me buy quite a few boxes. I don't have to go on fancy holidays, but if I saw a 'good'(meaning LOW) price, I'd consider it. If apples are more expensive than usual, I'll buy pears. To me, they're a good substitute.

In general, our demand for goods is price-elastic if

- a) we have good substitutes for the item.
- b) it's an optional purchase, not a necessity.

Our demand for goods is price-inelastic if

a) very few good substitutes exist (You buy your child the cereal they love or it's a total pain at breakfast. You buy the school uniform no matter what it costs to avoid trouble).

b) it's a necessity (the doctor prescribes a particular medicine so you buy it and complain about the cost later; you buy salt and toilet paper when you run out even if the store is overcharging for it).

c) it's an addictive substance (like cigarettes or narcotics) so when the price goes up you keep paying.

Now and then, elasticity makes the headlines. During the high inflation after Covid-19 receded, producers wanted to raise their prices on a lot of consumer goods, but knew there was a lot of 'resistance' to higher price tags (price *elastic* consumers.) So they decided to shrink the size of the carton or bottle instead. (On some products, like breakfast cereals, it has worked over and over.)

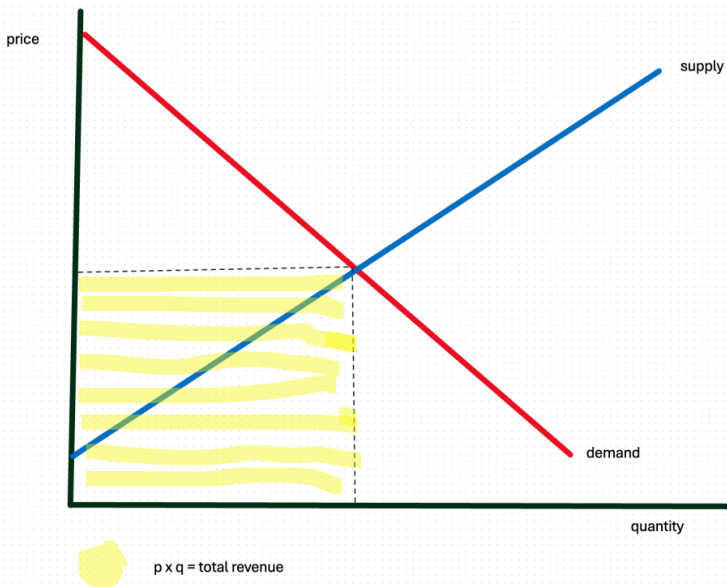
PRICE ELASTICITY ON THE SUPPLY SIDE

While we are used to thinking about demand elasticity, supply curves can show price elasticity or inelasticity as well. In general, supply elasticity is a function of the time dimension. In the short run, an increase in market price can't produce a big increase in supply. In the long run, there's time for a lot of new manufacturers to enter the market. Likewise, if there's a decrease in market price, many suppliers will stay in the market and see what happens,

rather than leave. In the long-run, if they're not able to cover costs at a lower price, they will leave.

Understanding the elasticity of curves can help business-owners understand when they should and when they should NOT raise prices to generate more revenue. It can also help policy-makers when they are trying to decide which programs, regulations, taxes, or tax credits will nudge people in the direction they want.

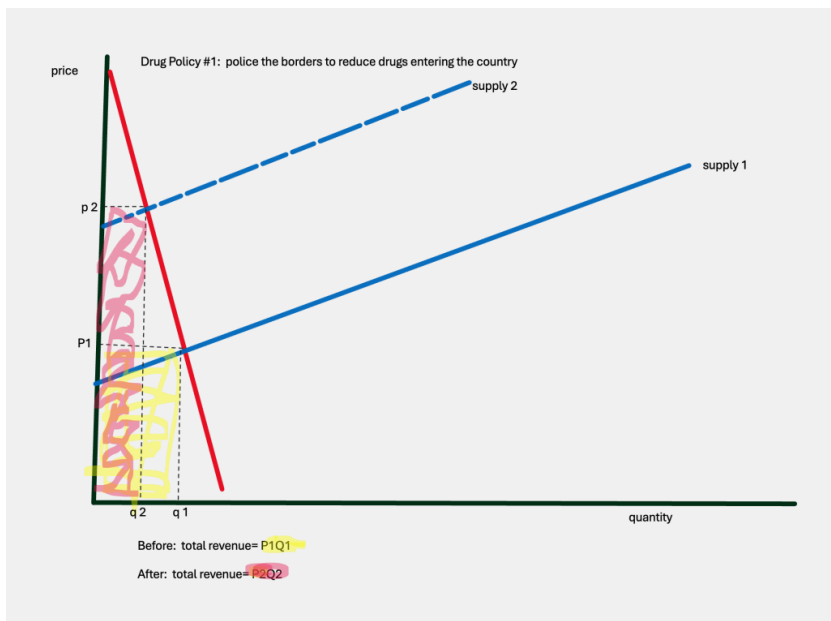
To see how elasticity plays into this, let's look at one of the most basic consequences of a price change in a market—its impact on total revenues. The total revenues from any market are the price of the item times the total quantity sold— $P \times Q$. On a graph, this is the shaded rectangle:



Total Revenue equals price x quantity

KNOWING ABOUT ELASTICITY CAN IMPROVE POLICY

Now, let's imagine a market situation where total revenue and elasticity might be very important: the illegal drug industry. Imagine our initial supply and demand curves were for heroin. Since heroin is an addictive drug, we could assume its demand curve is price inelastic—people will buy it even when it goes up in price. Its supply curve is probably of normal elasticity. Now suppose the government spends its anti-drug funds on cutting down the supply of heroin—policing airports, border patrols, coast guard interception programs. We would draw our supply curve shifting upward, or to the left (S_2):

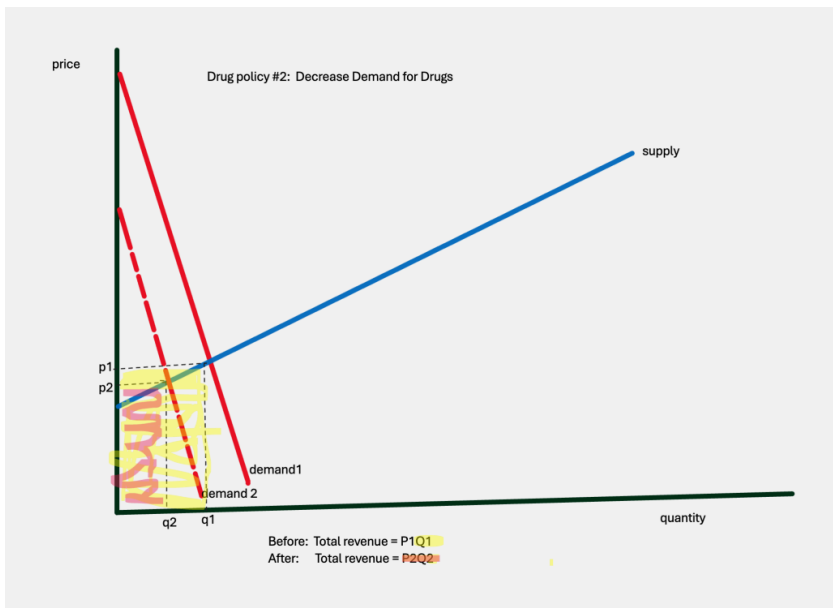


Government anti-drug efforts, by shifting our supply curve to the left, raises the price of heroin...but also increasing total revenues to the industry! This is NOT good. Increased revenues in

the heroin industry will only make it more attractive to new drug suppliers.

Given our inelastic demand curve, what other options for spending its funds does a well-meaning government have?

Imagine the government spent its anti-drug funds on reducing DEMAND for drugs—education programs in the schools, rehab programs for users, incentive programs for keeping clean. Let's see how that graph might look:

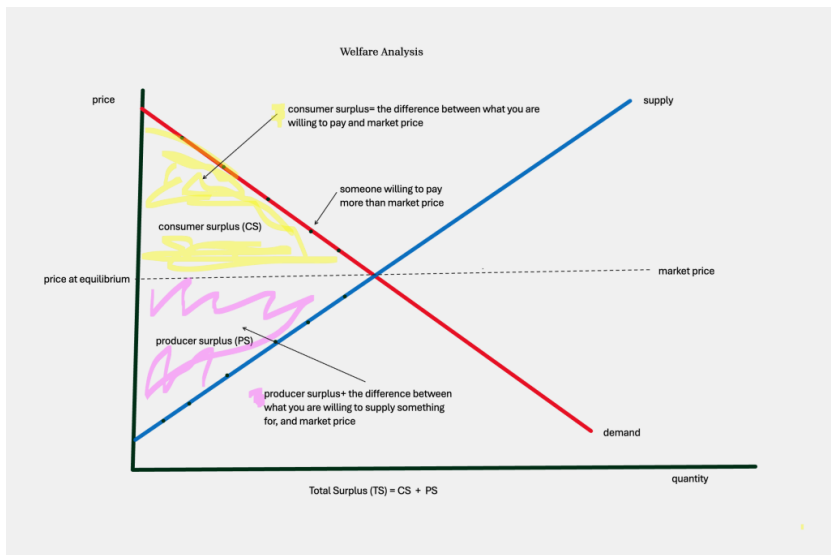


By reducing demand at any given price, we have also reduced total revenues in this industry. So, by knowing the elasticity of our supply and demand curves, we can design more effective social policies.

WELFARE ANALYSIS: MORE INSIGHTS INTO THE MEANING OF MARKET EQUILIBRIUM

Welfare analysis, in economics, is NOT about what happens when the government sends out welfare checks to people. Welfare analysis examines some of the hidden benefits and costs of market pricing.

Let us go back to our basic supply and demand graph and consider that demand curve in a different way: all along the demand curve, there are people willing to pay different amounts for some particular thing. If this is a market for dog-walking services, there are people willing to pay hundreds of dollars for their dog's walks, and people willing to pay only \$10 or \$20—or even \$0. But because the market determines the price, you may have been willing to pay \$75, but you get the dog-walking services for perhaps \$50—whatever price the market has determined. The difference between the \$75 you were willing to pay, and the market price of \$50 is \$25, which is your **Consumer Surplus**.



Likewise, on the supply side, there are start-up dogwalkers out there—maybe they're new to big city prices—and they're willing to walk a client's dogs for \$10 a week. Others are willing to walk dogs for \$20, \$30, \$50, or \$100 a week. All these 'suppliers of dog walking services' are represented by points on the supply curve.

The intersection of the supply and demand curve might give a market price of \$50. Maybe you'd been willing to walk them for \$10, but now the market is paying you \$50. You are getting \$40 of **Producer Surplus**.

On the graph above, all the area below the demand curve but above market price is defined as Consumer Surplus. All the area above the supply curve and below the market price is Producer Surplus. If we add together consumer surplus and producer surplus we get **Total Surplus**, which is at its maximum when the market price is at equilibrium.

While economists really like all this surplus and love it being maximized, you might find it a weird way to think about happiness. To get some understanding of what's going on, let's imagine a situation where prices are *not* determined by the market forces of supply and demand...but something else. Imagine you are walking around a souk or marketplace somewhere. There are no prices posted. Maybe you're in a bazaar in Istanbul and a beautiful carpet catches your eye. The shopkeeper notices your interest, chats a bit, offers you a coffee, and then asks, "How much would you pay for this superb carpet?" In effect, he's asking about your "willingness to pay." (Maybe he would like some of your "consumer surplus" for himself!)

At this point, most people accustomed to shopping with price tags on everything (aka "market prices") start feeling very nervous. Should I be honest, tell him how much I love his carpet? ? Should I lowball him like my friends advise? Many will simply thank the man for his coffee, walk away, and look for a "fixed price" store. And this is not necessarily a bad idea. Marketplace bargaining takes a lot of skill and experience. At the fixed price store, you will see

price tags again—these prices might be higher than necessary, but they are definitely prices that these shopkeepers are willing to sell their carpets for.

There are many places in our modern economy where suppliers have decided to focus on extracting some of your consumer surplus. We are all familiar with “surge pricing” on car services like Uber, or airlines on high demand holidays. They know your “willingness to pay” is different at different times and they have collected enough data points on consumers to price their product accordingly. This is something in the real world we are all familiar with—now we have a name for it—trying to capture more of our Consumer Surplus.

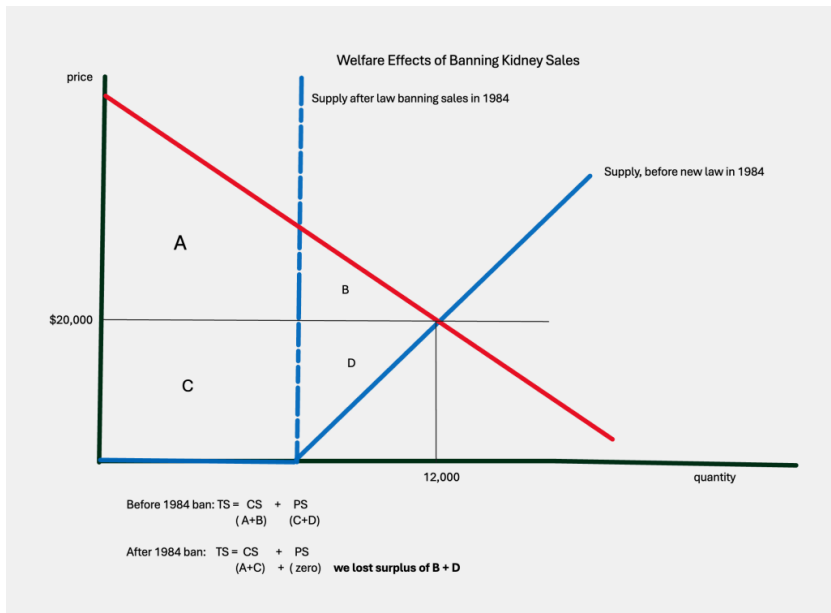
SOME WAYS TO USE WELFARE ANALYSIS

Welfare analysis is good for more than just putting a name on something we all suffer. As we will see later on, when we examine the impact of taxation, or the gains and losses from world trade and tariffs, welfare analysis can clearly point out winners and losers from various policies. But there are a few more areas we can mention where this way of looking at the world can give us insights.

First, let’s talk about “free” things. You go online, you search the internet, you get lots of great information—and you don’t pay a cent. Maybe you’re looking up how to treat some skin rash, or whether to stand at the front or the back of the subway platform for where you want to go. Since the invention of the internet, we have all had access to information and experiences that, a long time ago, we would have been willing to pay a lot of money for. There are economists who have tried to estimate the value of all this “free” information we are constantly gathering—because even if it’s free, it often gives us great value, which we could quantify as “what we were willing to pay for that information minus what we had to pay.” And this is value that really *ought* to be included in our

estimates of our GNP, right? Well, hold that thought until we get to measuring the GNP.

But let's take the issue of "free" to another area, that place where things can't be sold, they can only be donated. We are not allowed to sell our blood, just our plasma, so periodically we hear frantic appeals from the Red Cross urging us to donate more blood. In effect the ban on selling our blood means it has a price of zero—we must donate, not sell. We are also not allowed to sell, since the National Organ Transplant Act of 1984, our spare kidneys (most of us are born with 2 kidneys and only need one to function). Before this law passed, the equilibrium price of a kidney was \$20,000. At that time, approximately 8,000 kidneys were donated per year, another 4,000 were purchased. After the 1984 law, no sales were allowed—so we have a zero price. This might please some people, who dislike the idea of people selling their body parts for money. But using welfare analysis, we can see who gains and who loses when we move from a market price of \$20,000 to a market price of \$0.



The Impact of Banning Kidney Sales: Reduced Welfare

Before the 1984 law: Total Surplus = consumer surplus of A + B and producer surplus was C + D.

After the law: Total Surplus = consumer surplus of A + C and producer surplus of 0 (zero).

We lost areas of surplus B + D. Why? Because there are people not willing to donate a kidney, but willing to sell one. Because we are not allowing those transactions to take place, society is losing some welfare, some benefit. If you're like me, you hear this argument in favor of legalizing the sale of body organs, and your head starts spinning! I always thought it was more moral, more ethical to be opposed to the marketing of human organs. But welfare analysis made me wonder. Maybe it is more ethical to ensure the maximum number of transplants take place, and maybe that's more important than preventing people from selling their spare parts.

It is important to notice—and it's especially true here—that

when we use a model, we simplify. We don't take into account everything going on in the world. You could argue that banning the sale of organs encourages more people to donate a kidney, since this gift has become even more precious. Or you could argue that banning anything just drives sellers to the black market, increasing risky outcomes for all parties. In any case, it's welfare analysis that helped us see who was gaining and who was losing from a change in the law—so it has its uses!

SOME USEFUL MATERIALS

In inflationary times, we start thinking hard about price elasticity! For example, read [this article](#) from the *New York Times*.

Understanding elasticity helps you sort out the impact of cutting gas taxes. Listen to this [NPR program](#).

This video helps you see [the impact of a tax](#) from the point of view of welfare analysis.

When you understand consumer surplus, you can understand [Uber's pricing strategies](#).

Ever wonder about the crazy pricing of concert tickets? "[Surge pricing](#)" comes from elasticity analysis!

More [arguments](#) over [kidney sale legalization](#).

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CHAPTER 5

Roles of the Government in the Economy: Price Controls

BETTINA BERCH

Consider this



Howard Liberman, 1942. Price Controls.

As we'll be exploring in this chapter, one legitimate role for the government in a free enterprise, market economy, could be setting up price controls. Why do you think our government (represented by "Uncle Sam") partnered with business to control prices when this photo was made in 1942?



Roger Smith, 1943. Schoolchildren learning about price Controls and Rationing

Successful implementation of price controls, in the days before the internet, took a lot of well-placed propaganda. Here, we see elementary school students (at a segregated D.C. public school, as this was pre-1954) learning to shop with rationing. Why would goods be rationed when you have price ceilings?

Markets, we have seen, are efficient at allocating goods to those who have the desire and the means to buy what's for sale. Sometimes, however, societies want to allocate goods to people who do not have the money to buy them. Or they want to prevent people from buying those goods. Or they want to provide extra income to the people who are supplying these goods. Governments do these things by various means—laws, special prices, and taxation are key methods. We will look first at the economic tools involved, then see what happens in these markets when they are used.

PRICE CEILINGS AND PRICE FLOORS

A **price ceiling** is an upper limit on how high a price can go: it says the price for something—an apartment, a loaf of bread, an organ for transplant—cannot go above some stated price.

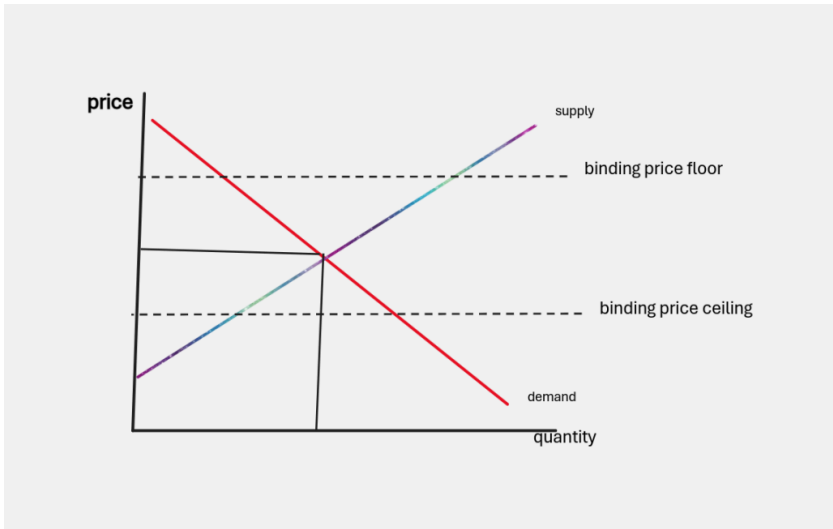
A **price floor** is a lower limit on how low a price can go: it says the price for something—an hour of work, a ton of wheat—cannot go below some stated price.

Since it can get confusing when you start working with these price controls, remember one basic rule—you can't go above a ceiling, you can't go below a floor.

Governments can decide to set ceilings and floors at any price levels they choose—above or below what they would have been without a law. So we introduce the concept of a **binding** price ceiling or floor to describe whether the law is having any impact on the marketplace. When a price control is binding, it's like some piece of clothing you are wearing that's binding—it's tight, it's something you feel, it's having an impact. A binding price ceiling is a price set **below** market equilibrium; the market would want to take that price higher, but the price ceiling prevents that price from going there. A binding price floor is a price set **above** market

equilibrium; the market would want to bring that price down, but the price floor won't let it go there.

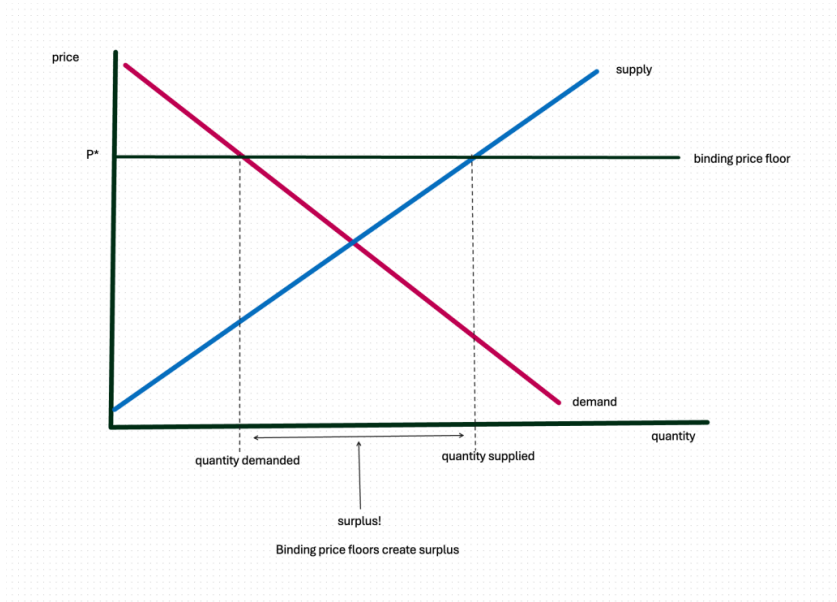
In the graph below, we see a binding price ceiling and a binding price floor:



Price Controls

Students are often confused to see that the binding floor sits ABOVE the binding ceiling on the graph, but if you think about what it means that each price control is BINDING, you understand why they sit where they do. When the price floor is above equilibrium, the price would want to fall down to equilibrium, but it is prevented by the price control—so this is a binding constraint. Likewise, when the price ceiling is set below equilibrium, the price would want to go higher, but it is prevented from rising by the price ceiling—so it is binding.

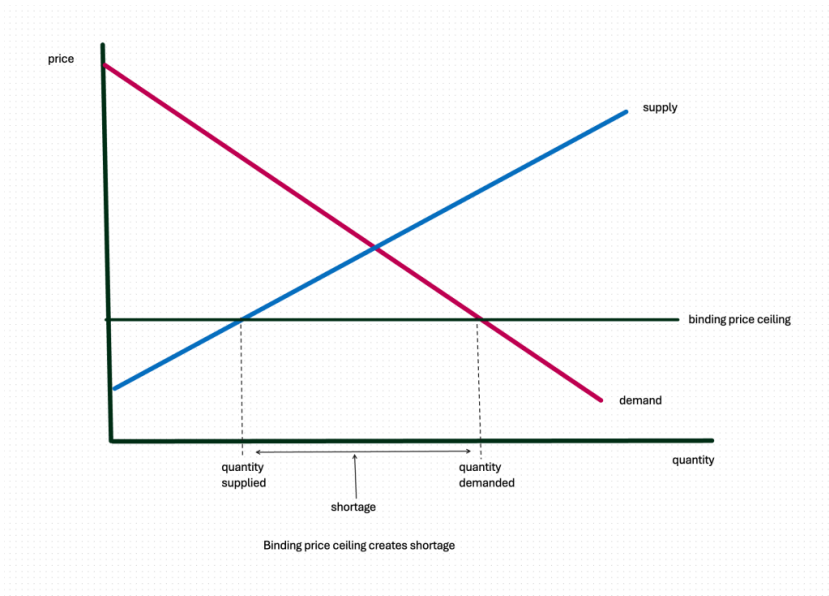
Looking at the graph, we see that demand and supply are not equal at the ceiling and floor prices. Let's examine a binding price floor first:



A binding price floor creates a surplus

This binding price floor creates a surplus.

Likewise, we can draw a binding price ceiling:



A binding price ceiling creates a shortage

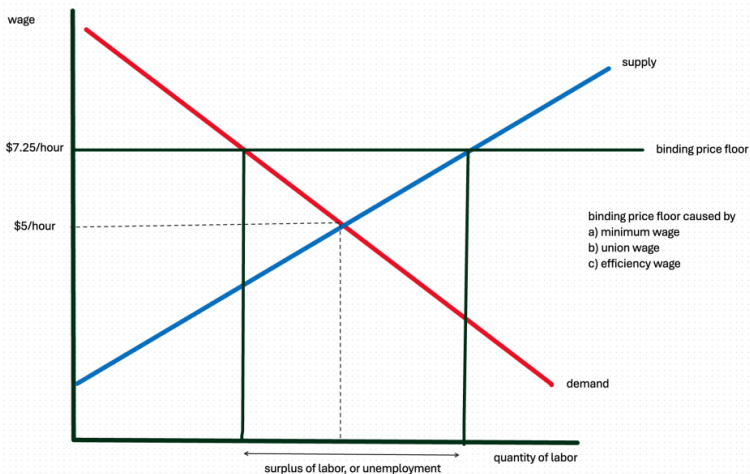
This binding price ceiling has created a shortage. This is the normal impact of binding price ceilings and floors—they produce shortages and surpluses.

REAL-LIFE PRICE FLOORS: THE MINIMUM WAGE

Now that we have the basic tools of analysis, let's see how they help us analyze some situations in our economy today. Let's start with one popular real-life price floor, the minimum wage. In 2009, the Federal government raised the minimum wage to \$7.25 per hour for all covered workers. (This is up from \$0.25 per hour in 1938). The Federal law specifies which categories of workers are covered under the law, and this is a 'nominal' wage rate, meaning it does not go up when inflation eats away at its purchasing power. This minimum wage was designed to put a floor under the wage rate for the lowest paid workers—no one should be paid less than

this. Wages could always go higher—and if a state has a higher minimum wage in its laws, then an employer doing business in such a state has to obey the state’s minimum. (As of January 2014, 21 states and the District of Columbia have minimums higher than the Federal rate, and many states index their minimums to the cost of living.)

Let’s try graphing the minimum wage price floor with the tools we’ve just learned. First, we are going to have to decide if the minimum wage is binding—without the law, would the market wage be lower than the Federal \$7.25? Or New York State’s \$14.20 per hour? Since there’s so much employer opposition to raising the minimum wage, we might assume the law is binding, since otherwise, why spend good lobbying dollars opposing it? Let’s assume the market wage might be \$5 per hour if there were no laws in effect, and graph it out:



A binding price floor in a labor market can create unemployment

A binding price floor in a labor market can create unemployment

Our minimum wage of \$7.25 per hour is binding when we assume a market equilibrium rate of \$5 per hour. At \$7.25 per hour, the supply of labor is greater than the demand for labor—we have a surplus of labor, which we could call ‘unemployment.’ Indeed, this simple graph is the basis for many arguments against having a minimum wage, or raising the minimum wage. People opposed to the minimum wage argue that it causes unemployment.

Do you agree? Should you agree?

(And did you notice that we just shifted from a ‘positive’ analysis to a ‘normative’ analysis?)

Let’s start with the positive analysis—is this graph a factual portrayal of the labor market in the United States? We know the minimum wage line is accurate, but we certainly don’t have the space here to examine all the details of the supply and demand curves. But there is one issue that we could—and must—nail down: the question of whether the minimum wage is binding. For if the minimum wage is not binding, then there will be no labor surplus caused by the minimum wage. This brings us back to one of our original assumptions when we drew the graph, that the equilibrium wage would have been \$5 an hour without a minimum wage law.

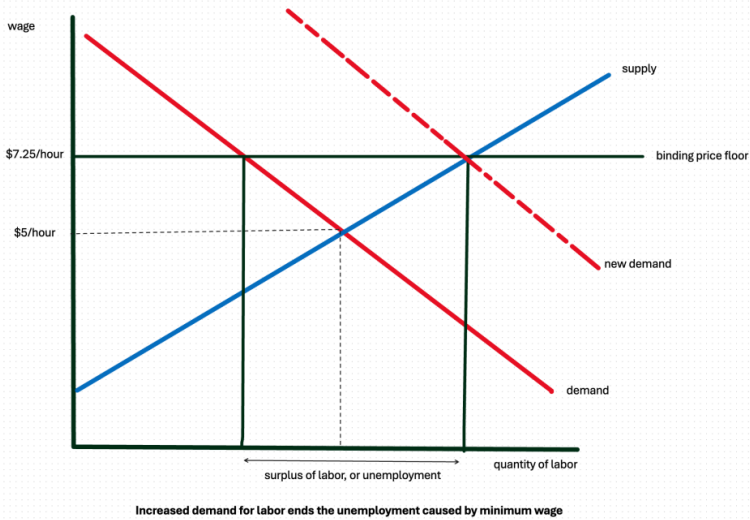
Is this true? Of course, it is hard to decide what a market wage would be if we did not have a wage law—it’s a counterfactual proposition. Who knows what it *would* be? But we can make some educated guesses. Consider the fact that most big cities have areas where people hire day laborers, often people with no skills and no documents, people who will work for the day for cash wages. No one invokes the minimum wage law in these marketplaces. Data from California, a large market for day labor, [shows](#) an average wage of \$18 per hour for day labor. This is substantially higher than the Federal minimum of \$7.25 per hour or the California minimum, at the time, of \$9 per hour (in 2023, California’s minimum wage is \$15.50/hour). Similar findings exist for other areas. So it may be

very hard to argue that the Federal minimum wage is binding, in which case, it is probably not 'causing' unemployment.

Of course, a person could argue that the rate for day laborers is not entirely comparable, since these workers are not hired for 40-hour work weeks. So let's move on to the normative question—if we agreed that the minimum wage 'caused' some amount of unemployment, should we eliminate it? Or at least not raise it?

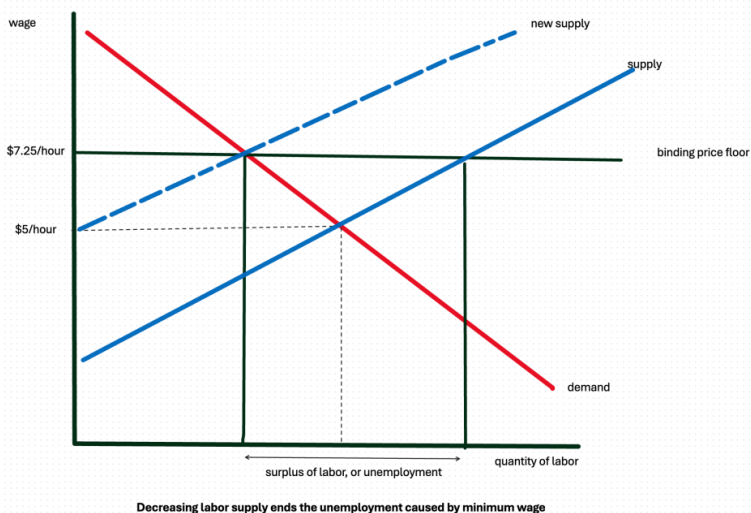
This again is too large an issue to answer here. But we might take a different approach. What if we kept the minimum wage and did something to reduce or eliminate the labor surplus (unemployment) that it caused?

How? Well, remember that we are policy-makers, so we *could* design some programs to **shift** the labor supply or labor demand curves to eliminate the labor surplus. Suppose we created some ['economic opportunity zones'](#) that gave businesses tax credits to open new companies in areas with high unemployment. This would shift our labor demand to the right and close the labor surplus:



Increased demand for labor ends the unemployment caused by the minimum wage

Alternately, we could shift labor supply to the left, by various policies. Tightening up labor documentation, so that workers could not be employed by anyone without paperwork, would certainly shift labor supply to the left. Or, we could take a more progressive approach, and require all young people to stay in school until age 21, or allow retirement from the labor force with full benefits at age 60. Both would reduce labor supply:



Decreasing labor supply to end unemployment caused by the minimum wage

The point is that with our economic tools, we can analyze an economic situation from both a positive point of view (what are the relevant facts?) and a normative point of view (how do we get the outcomes we would prefer?).

REAL-LIFE PRICE CEILINGS: THE USUAL AND THE UNUSUAL

All around us there are price ceilings—maximum prices set by law. In New York City, there is a maximum price of \$75 for taxi rides to JFK airport. There are also maximum rents/rent increases for rent-controlled and rent-stabilized apartments. With each of these price ceilings, the idea has been to make some common item affordable to most people. When this price ceiling is binding, it creates shortages. These shortages may mean there are long lines

of people waiting to get the artificially cheap item, or bribery to cut the line, or even forms of discrimination. If you were a landlord with a rent-controlled apartment to rent out, you would know there's a long line of people outside your door eager to rent it. You could take an illegal bribe. You might decide not to fix the place up before re-renting it, since there are plenty of people eager to take it just the way it is. Or you might decide that as long as you can't get much rent for it, you will at least refuse to rent to people who give you headaches, like noisy college students or people with children. Or you might decide to rent to your own ethnic group, or your own racial group—in other words, discrimination. Most of these choices would be illegal, but that might not stop you.

Some price controls hide behind other social arrangements. For example, most countries have armies, but not a lot of money to spend on them. The below market, low wage offered to military recruits is effectively a binding price ceiling—which creates a labor shortage. How can a country close that gap? They can require military service, institute a draft. Of course, a draft can be socially unpopular, so a country might switch to what is sometimes called a “volunteer army,” which does NOT mean they are not paid—it just means a market wage is offered for military service, and people apply for this work as they might apply for any other labor market job.

A special price ceiling occurs when the law bans sales but allows donations: the situation with human organ transfers in the United States after 1984. The sales ban effectively puts a price ceiling of zero on kidneys, eggs, and other body parts. While this decreases the supply of organs for people in desperate need of a transplant, it satisfies many peoples' moral qualms. Remove payment and you can be sure that economic desperation is not the motivation for donation. We also ban blood sales as a way of [screening out potentially unhealthy donors](#), while allowing plasma sales. Women may not be paid for donating their eggs to a fertility clinic, but they may be paid large amounts for medical care, housing, or other

kinds of ‘compensation.’ People who ‘donate’ blood when supplies are very low, may be offered a ‘free’ Starbucks card.

SHOULD WE HAVE PRICE CONTROLS?

The market price may seem unfair (a normative judgment), because it allocates things to the people who can pay, the people who have the money...but that might be less unfair than what happens when the market mechanism is removed and price controls rule allocation. In France, there used to be [a maximum price for the standard baguette](#), the loaf of bread most people ate with every meal. I can remember going to France in the old days (before 1987!) and trying to buy one of those lovely, price-controlled baguettes. I’d walk into a bakery, the owner would know I was not one of her ‘regulars,’ and she’d tell me they were all sold. I would point to the toasty loaves in the bin, and she’d tell me they were already ‘reserved’—for her usual customers. I was welcome to buy another sort of loaf (more expensive, of course).

When you study economics, you gain a little insight into some of these transactions!

SOME USEFUL MATERIALS

Watch a video on [price ceilings](#).

Try a video on [price floors](#), focusing on the minimum wage.

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CHAPTER 6

Roles of the Government in the Economy: Market Failures (Public Goods and Externalities) and the Criminal Justice System

BETTINA BERCH

Consider this



Diego Delso, 2014. Lighthouse in Iceland

Whenever economists try to explain a ‘public good,’ they almost always use the example of the lighthouse, even though most of us have rarely seen one. We probably know next to nothing about [how they work](#). Can you see why the lighthouse has become the ‘poster child’ for a public good?

Price controls set by the government can be controversial, because they favor some and harm others. Even worse, you can’t argue that they make markets more efficient—because they don’t! Sometimes they mess things up. The people you wanted to help, can end up unemployed. Landlords can feel free to discriminate against potential renters. But don’t lose hope—there *are* ways the government can intervene in the economy that *improve* market efficiency. When the free market produces too much or too little of something, we call this a **market failure**, and these situations can be fixed when government steps in. We will discuss two important situations of market failure—when we have **public goods**, and when we have **externalities**.

PUBLIC GOODS

What do lighthouses, AM-FM radio, and toll roads have in common? They are all varieties of **public goods**. A public good is something a lot of people might want, but no one's willing to provide, because they know the outcome: 'Once I provide it, everyone's going to use it and no one's going to pay!' In economics, we have a special term for freeloaders. We call them "free riders." Imagine we're a city by the sea and we decide to build a lighthouse to mark the dangerous sections of the coastline, something that people have been doing from ancient history to modern times. Lighthouses are expensive to build, and once they're there, many benefit from them. And they benefit quietly, by *not* crashing their boats on the rocks. Is there any way the builder of a lighthouse could charge any of these users? No, they're "free riders."

Another example—AM-FM radio. We can all turn on the radio and listen to whatever station we want, and no one can charge us for the pleasure, we're "free riders." You might argue, that programming on most stations is paid for by the advertisers, so the market has found a solution. But what about "public radio," where there's no advertising (but a lot of begging during pledge drives)? Likewise, you could consider "the internet" a public good. Like lighthouses—and Wikipedia, perhaps—we need government to provide these desirable products, since once they're available, there's a world of free riders.

The military of a country is another public good—once it's standing, it protects everyone, even those who aren't paying for it. Basic research on the origins of the solar system is a hugely expensive public good, which benefits many businesses doing more applied, commercial projects. No one company could justify spending billions on the Big Bang, even though they *do* pay to have pharmaceutical experiments shot into space. All over the economy, we have projects that the government needs to fund because they are desirable, but they have a "free rider" aspect that

makes it hard for private enterprise to supply the product through the marketplace.

How do economists describe the special features of a public good? We say it is a good that is **non-rivalrous** and **non-excludable**. Non-excludable is easy to understand—you turn on your radio when you please, and orient your ship by that lighthouse when you pass. No one can exclude you; no one can stop you from using that thing once it's been provided. Non-rivalrous is trickier—it means that just because I am using it, doesn't prevent you from using it too. I can go enjoy the park today, and so can you. When you think about it, most *market* products are rivalrous—if I buy that particular necklace, you can't. Public goods are largely non-rivalrous.

In the world of public goods, things are rarely pure. Some public goods can be non-rivalrous but also excludable, like a toll road—you *can* be kept off that road if you don't pay the toll. Some public goods can be non-excludable but also rivalrous, like if I go camping and I scavenge all the twigs and fallen branches for my bonfire. They were available to all (non-excludable) but when I gathered and burned them no one else could use them (rivalrous).

Once you get the flavor of public goods—that we can all use them once they're here (non-excludable), and my using them doesn't prevent you from using them too (non-rivalrous)—it's no mystery what a headache they become for a market economy, where everything is supposed to be excludable and rivalrous for the market to provide the optimum amount of that thing. In that light, you can understand why so many things have been moved from public goods to private goods. Consider radio stations...and the rise of subscription radio like Sirius XM, which is only available to customers who have paid for it. Consider the British Enclosures laws in the 1700s, designed to turn public grazing land into private "enclosed" areas for the landlords' livestock.

The bottom line with public goods is that if we left them to the free market, we wouldn't get them, or we wouldn't get enough of

them. We need government (aka the will of voters) to decide an appropriate quantity and to provide the financing.

EXTERNALITIES: WHAT THEY ARE

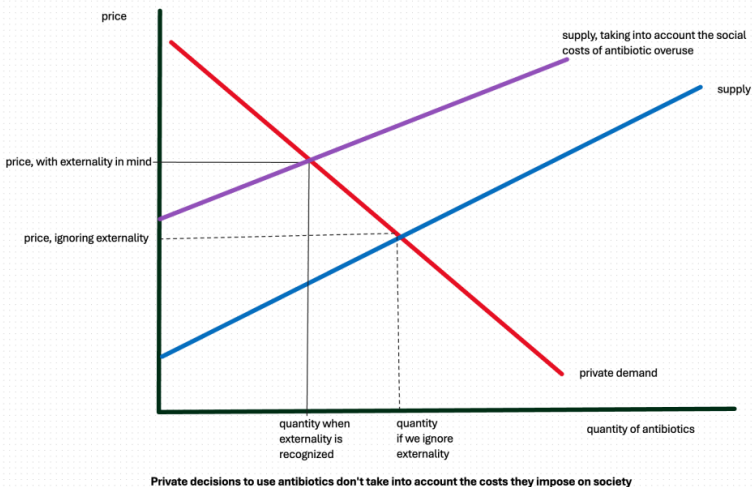
An **externality** refers to a gap between private costs or benefits (the focus of market participants) and social costs or benefits (which markets usually ignore). Imagine I own a frisbee factory in Hackensack, New Jersey. I make a good profit producing these frisbees, especially since I can easily dump all our toxic sludge (a by-product of plastics production) into the handy Hackensack River. I can ignore the pollution I create, but people in the towns downriver can't use the river anymore. To me, doing my private cost calculus, that sludge is a non-issue. It's outside my concern. It's an "externality." My private production costs are *less* than the social production costs.

Consider some real life examples. In 2020, the ferry company, New York Waterway, was accused of emptying ferry toilets directly into the Hudson River, instead of using a more expensive, [environmentally-safe disposal system](#). Try a global example—climate change. While there are 'green' businesses out there, most are not. Factories small and large continue to emit globe-warming carbons, because it's cheaper for their own company than using greener technologies. The costs imposed on the planet are *external* to their private cost calculus.

Externalities can be non-monetary as well—like the guy in the apartment next door, who practices his clarinet (badly), just when you needed a quiet evening to get some work done. The fact that you can't work is a cost he imposes but doesn't think about—for him, it's external!

What all these negative externalities have in common, is that their social costs are higher than the private costs. Let's take the example of antibiotic overuse, which is cancelling the effectiveness of antibiotics and leaving the world with fewer weapons against

infection. A person who has a cough might ask for an antibiotics prescription, thinking it's a cheap option that might be effective. The social cost of that prescription—weakened antibiotics effectiveness—is a lot higher. If we included these extra social costs in a more inclusive supply curve, the new curve would shift upward, or to the left:

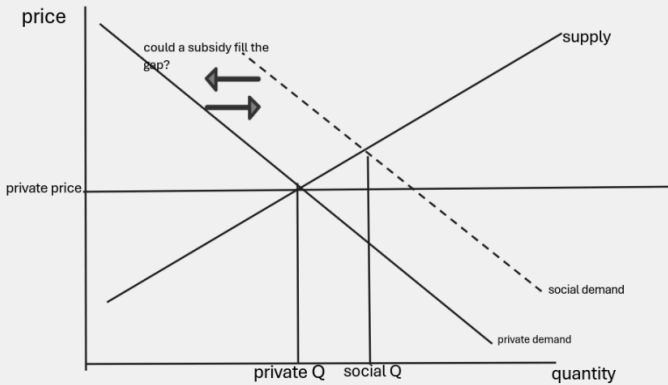


The social cost of antibiotic use is higher than the private cost

Once the social costs are taken into account, market quantity goes down and price will be higher.

Not all externalities are negative, however. If I walk to work instead of driving, I get personal benefits (health, saving on care expenses) but I give benefits to society (less pollution, less traffic on the road) as well. If I walk instead of taking the subway there are positive externalities—less crowding on the subway trains. If I get a vaccine shot, there are benefits to me, but also benefits to the community around me. Thinking in terms of graphing it, when there's a positive externality on the demand side (it's a demand

issue because we 'consume' a vaccine shot) we could see a shift of the demand curve upward, or to the right, when we include the *social* benefits.



Vaccination is an example of positive externalities, where social benefits are greater than private benefits

When there are positive externalities, the private calculus will produce too few vaccinations, so we might need to reward people for vaccinating!

Some externalities are either positive or negative depending who's on the receiving end. If someone's lip-syncing in the subway for spare change, it's a positive or negative externality to me, depending on whether it's Motown or not.

EXTERNALITIES: HOW DO WE HANDLE THEM SO THE

OPTIMAL AMOUNT OF A GOOD OR SERVICE IS PROVIDED?

With externalities, the free market does not provide the optimal amount of the good or service. When we're dealing with negative externalities in particular, people often look for government intervention. If it's toxic sludge fouling our favorite rivers, we might want to pass a law banning that pollution outright. Or pass a law with big fines and jail time for offenders. If you're a libertarian type, you might not like having more laws on people, so you might suggest a **tax** on polluters. A tax would supply a market incentive to stop bad behavior. Sounds like the way to go, right? Think twice. Let's say we make the people buying gas-guzzling, pollution-dripping cars pay a huge purchase tax. That would stop most of us from buying those big polluters, right? But it won't stop some very rich person from buying the polluting car, because 'money's no object' to this guy. If we let the rich buy the right to ruin the environment, is that a positive outcome?

Let's take a less catastrophic negative externality situation. What if it's your next-door neighbor learning saxophone (badly) at dinnertime? In a situation like this, laws and taxes seem like overkill. Maybe I could bribe my neighbor not to practice when I'm home? Or he could pay me for the inconvenience I cause him? All this bribery sounds cold, but we could go lighter, like he could offer me some nice headphones?

When the government steps into a *positive* externalities situation, this is sometimes called **industrial policy**. Imagine a firm would have liked to provide chip production training for its workers, but the externality problem makes them change their mind. The training is expensive and the firm can't capture the benefits of that training if those trained workers leave the firm and start their own company. When the government steps in and offers to pay the costs of worker training, the quantity of training increases, reflecting the real social benefit it is generating.

In the vaccine example above, the government could offer people some treats for getting a shot. New York City did this in July 2021, when the City offered people \$100 to get a Covid vaccine at a city-run facility. And maybe New York decided to do this because a prominent conservative economist, Greg Mankiw, [endorsed a plan](#) in September 2020 to pay every American \$1000 to get a Covid vaccine! (With what you know now, do you think that plan would have been a good use of our resources?)

With public goods we need the government to step into the economy and provide the good, regardless of how it's financed. For goods with externalities, we need the government to push people towards providing (or consuming) more (or less) of the good.

SOMETIMES GOODS AND SERVICES ARE PRODUCED /ADMINISTERED BY THE GOVERNMENT ITSELF: THE CRIMINAL JUSTICE SYSTEM

In some cases, a government goes beyond providing a single public good, and undertakes to run a whole industry themselves. Think of public schools, the U.S. Postal Service, and local/state/federal detention systems (aka, the criminal justice system). Historically, some of these industries, like the mail or schools, were mostly government-run for a long time, until private sector competition (UPS, FedEx, charter schools) took hold.

The situation with the criminal justice system is more complicated—and more consequential. If you watch the film [13th](#) (on Netflix or [youtube](#)) you can learn about the slave origins of our mass incarceration situation today. Even today, the criminal justice system in many parts of the United States operates so-called “restitution centers” that keep the formerly incarcerated in a kind of indentured servant status for decades after their sentences were served, as reported by [The Marshall Project](#). Sometimes LFO’s (“[legal financial obligations](#)”) keep people indebted for the rest of their lives. Hand in hand with the huge numbers of people of color

incarcerated in America, has been the growth of private enterprise in the incarceration industries. Yes, we had private prisons in states like Louisiana before the Civil War. But the modern prison industry really got going in the 1980s, when companies like CoreCivic were offering lowball incarceration services to cash-strapped state legislatures or immigration detention authorities. The proportion of inmates in private prisons in America, relative to the total, keeps rising—it was 14% in 2020 (see this short but useful [report.](#))

While you could argue that competition from UPS forced the U.S. Postal Service to be more efficient, or that charter schools have forced traditional public schools to improve, could you also say that private prison operators have forced the criminal justice system to improve? From the terrible state of U.S. prisons, it would be hard to argue that privatization has had a positive impact. The reasons may lie in the cost structure of incarceration. Providing low quality room and board is cheap. Providing prisoners with education and rehabilitation services so they can live successfully in the outside world after release, is expensive. Companies in the for-profit sector can low-bid by hiring less-qualified staff, passing the cost of expensive services (medical, for instance) to prisoners, and eliminating expensive rehab training.

Are there alternatives to the competition-downwards that for-profit companies offer? Is there any way to imagine that the private sector would have any incentive to provide a higher quality/more expensive incarceration situation? If we kicked out the private sector completely, the government, like most monopolies, might have little incentive to keep its costs down or do a better job (measured by recidivism rates in the community). Would the charter-school model (publicly-financed but privately-operated school systems) work better for the criminal justice system? Maybe not, since one reason charter schools keep up their quality, is the ability of parents to monitor their performance. Who monitors the quality of life in prison?

One of the most serious problems with the entry of for-profit

businesses in the criminal justice system is their drive to expand the need for their services. Companies like Geo Group spend a lot of money urging state legislatures to criminalize more offenses for longer sentences. Most for-profit companies try to expand demand for their product, we're used to that. But in the incarceration business, this drive to expand means more Americans spending more of their lives incarcerated.

Government industries, like other monopolies, can be inefficient, expensive, and cruel. But the private sector can also act badly, for different reasons. Be careful what you wish for!

SOME USEFUL MATERIALS

[A video on externalities from MRU:](#)

[Read about pollution from ferryboats](#)

[A podcast on requiring police liability insurance in Minneapolis](#)

[A short update on private prisons in the United States](#)

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CHAPTER 7

Roles of the Government in the Economy: Taxation and Reducing Inequality

BETTINA BERCH

Consider this



Fred Palumbo, 1950. Picketing Use of Tax dollars to pay for hydrogen bomb

There's a long tradition in the United States of going out and marching against injustice. These marchers in 1950 were protesting the development of the hydrogen bomb. Why do you think they took the approach of saying "YOUR TAXES pay for the H-BOMB"?

Have you ever noticed that if you just buy a dozen bagels, there's no sales tax on it, but if they're sliced or schmeared, they're taxed?

Did you even know there was such a thing as an 'edible gummy drinking glass' —and also that it's taxed in New York as a 'confection,' not as an (untaxed) foodstuff?

I've just heard that people over 100 years old don't pay state taxes in New Mexico—which is one you might want to discuss!

Taxation is so unpopular, you'd think they'd have gotten rid of it already. But taxation is a basic function of government. Governments collect taxes to finance their operations, and redistribute some of those tax revenues to address inequality. That makes it sound pretty simple, when it's anything but. To begin with, the American government in its early years financed itself with revenues from excise taxes and tariffs it collected on goods coming into our country. (That elegant building at the tip of Manhattan, currently the National Museum of the American Indian, was formerly the [Alexander Hamilton US Custom House](#), where government agents would go out and inspect the cargos landing in New York harbor and levy tariffs.)

After 1913, the federal government started receiving revenues from an annual income tax on citizens. We would call the income tax a tax based on your **ability to pay**. The other kind of taxes are **user fees**, based on your use of some good or service. If you go camping in a national park, you pay the government for that service. If you never camp, you don't pay. Most people feel like the "user fee" tax is fair, since you're only charged for what you use. And while that's certainly true, and sometimes they go a step further and tell you the fees you paid will be used for the actual upkeep of that service—it's not enough to cover anything else. Rarely would a user fee generate a surplus, much less enough extra

money to do some income redistribution. For this, we need the income tax, with its marginal tax rates rising as incomes rise.

HOW DO WE EVALUATE TAXES?

Understanding that we have two basic types of taxes, we want to know how to evaluate them. We have several ways. First, you need to consider ‘tax incidence’—who’s supposed to be paying the tax. Is it supposed to be ‘progressive,’ so the higher your income, the higher the tax rate you pay? Is it supposed to be ‘proportional,’ with a constant tax rate for all income levels? Or is it ‘regressive,’ so when incomes are lower, the tax rate is higher? If you fill out your own income tax returns every April 15, you may notice that higher tax brackets pay higher tax rates on their incomes above a certain amount. People below a certain income bracket may actually receive money from the IRS if they can file an earned income tax credit. These are features of progressive tax schemes.

Sometimes a tax seems to be proportional—the same rate for everyone—but really isn’t. Consider the sales tax. You figure, everyone pays the same tax rate at the cash register, so it’s a proportional tax. But while everyone may pay the same 8.75% tax in New York City, spending on taxed purchases takes a bigger bite out of my (lower-income) budget than it takes out of Elon Musk’s billionaire budget. This *unequal impact* of a sales tax (or consumption tax, VAT, or any ‘flat tax’) is why they seem proportional but are actually regressive. Few taxes are explicitly regressive—the incidence issue only comes up when you look deeper at who is consuming the thing you are taxing. Almost three times as many low income people smoke cigarettes as high income people—so the cigarette tax might look proportional, but its impact is regressive.

Finally the *effectiveness* of various tax schemes needs to be evaluated. Are the people who are supposed to pay this tax actually paying it, in full? Or are there a million ways to avoid paying? Do

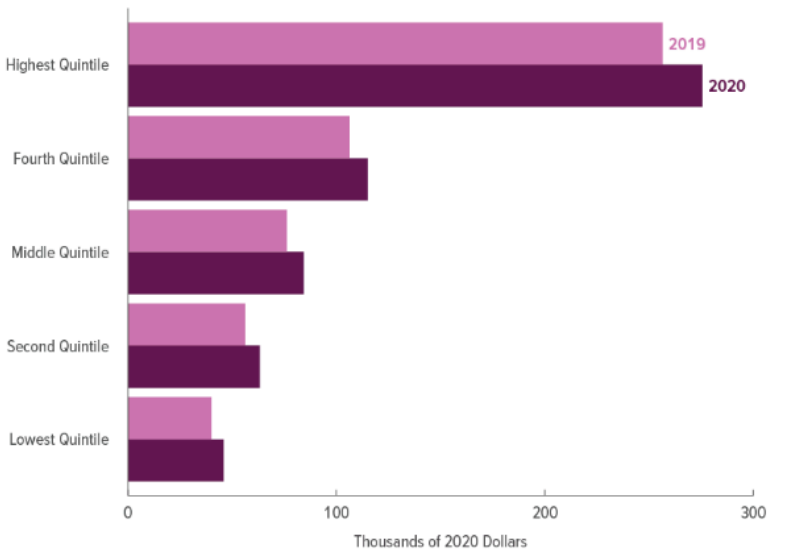
you live in Vermont but drive over to New Hampshire to buy your cigarettes, where there's no state tax?

Finally, economists ask us to think about the *distortions* this tax might create in the marketplace. When we tell New Yorkers we're going to start an extra tax on all sodas with sugar—it makes headlines in the papers. People run for office promising to defeat this tax. Clearly the sugary-beverage lobby was determined to make this an issue, whether any of us cared or not. The formal way of determining if people will change their buying behavior when there's a price increase (which is what a tax becomes) is our old friend 'elasticity.' If buyers and/or sellers of some good are very price inelastic, when you impose a tax on that good, they don't change their behavior much at all, which means fewer market distortions. This is why economists often suggest taxing necessities (lots of price inelastic demand there) even though it seems unfair.

HOW UNEQUAL IS THE INCOME DISTRIBUTION IN THE UNITED STATES?

One way to answer this question is to line up all Americans according to their incomes, from high to low, divide them into five equal-sized groups (quintiles), and then compare the average income each fifth receives:

Average Income After Transfers and Taxes in 2019 and 2020, by Income Group



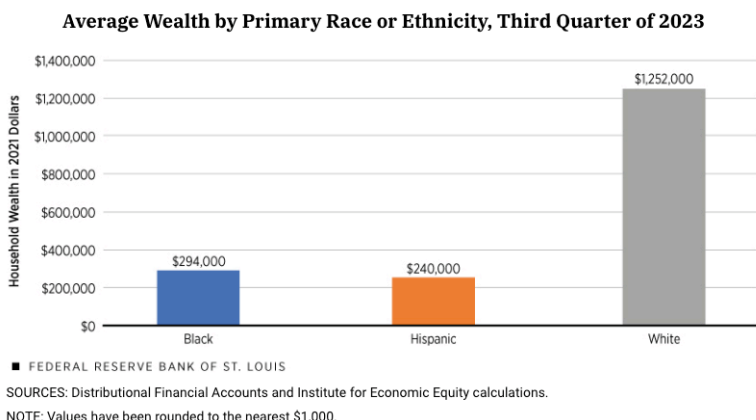
Even including various transfer payments (welfare benefits, unemployment checks, etc) and the extras like the earned income credit that low-income people receive from the tax system, the U.S. remains very unequal. As the bar chart also shows, each quintile received more income in 2020 compared to 2019. It's also true that the lowest income group had a greater percentage increase—but starting from a low baseline.

When the Pew Research Center compared income inequality in 31 OECD countries, the U.S. had the [second highest inequality](#) of all—with Chile coming in first (and that's after including transfer payments and taxes).

INCOME ISN'T EVERYTHING—THERE'S THE WEALTH DISTRIBUTION TO CONSIDER

To see the whole picture, we need to go beyond the income

distribution, and examine wealth distribution. Think of wealth as all the assets you've got that didn't come from your paycheck—maybe it's something your grandparents left you when they died, maybe it's a bank account, or a box of cash in the closet. Generational wealth, assets passed down from the ancestors, builds more wealth...and more inequality. If we look at some current data for average wealth in the U.S., broken down by race, the graph makes the situation clear:



Average wealth by race/ethnicity

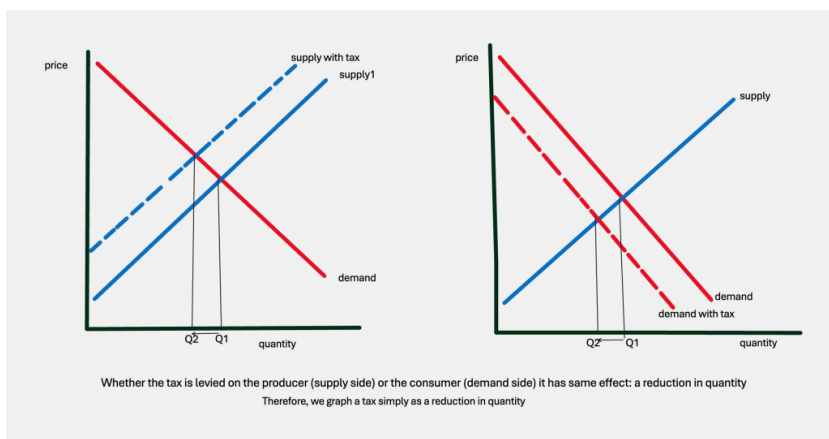
What can be done about such dramatic wealth inequality? There are financial coaches and on-line communities that urge people of color, in particular, to make financial decisions *after* asking the big question: “will it build generational wealth?” So buying a big house and scrimping on daily spending to afford it—that’s building wealth that can be handed down to the next generation. Don’t spend on frivolous stuff, but buy solid assets!

There are others who look at the present-day racial wealth gap as an argument for financial [reparations for slavery](#). Were it not for a history of enslavement, people of color today would have accumulated more wealth, throughout the generations. Society has

offered other parties reparations for sufferings imposed on them—Holocaust payments to concentration camp survivors, payments to Native American tribes from the U.S. government, etc. While the amounts are rarely considered suitable, they are often better than nothing, since they represent an acknowledgement of guilt and responsibility, something African-Americans in America have never received.

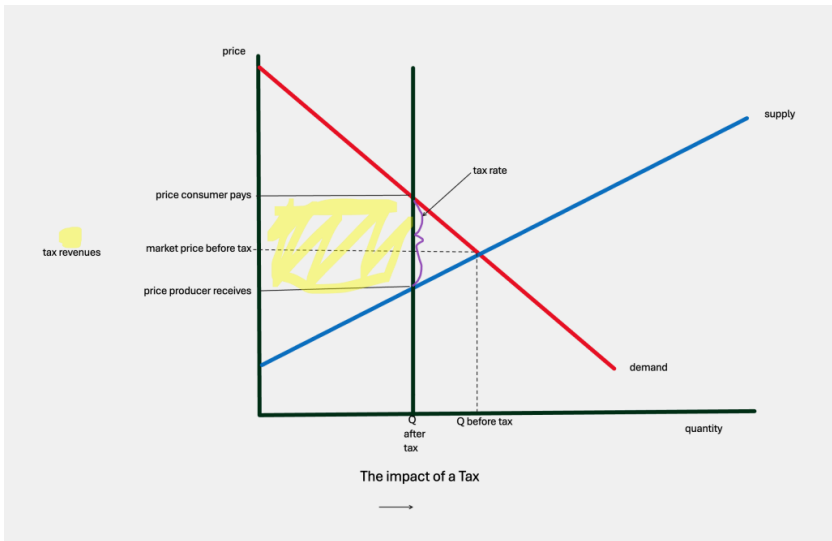
HOW WE GRAPH A TAX

We can use some of the tools we have learned to see what happens when a tax is placed on some good in a marketplace. The first basic insight, is that it doesn't matter if it's the shopper paying the tax at the cash register (demand side) or the manufacturer paying the tax on all units leaving the factory (supply side)—either way, the burden of the tax is going to be shared by both sides. And either way, there's going to be *less* economic activity taking place, a reduction in quantity sold.



Graphing a Sales tax: it makes no difference if tax is levied on demand side or supply side, it results in less quantity

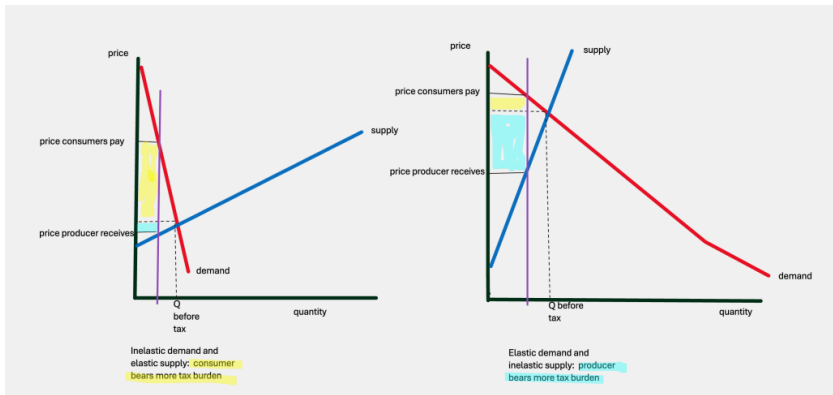
In the example above, you can draw the impact of the tax on the supply side or the demand side and either way, you have a smaller amount sold. For simplicity, we can skip shifting either curve and just draw a new vertical line at the lower quantity:



The Impact of a Tax

We then label the higher price the consumer pays, the lower price the seller receives, and we can highlight (in yellow) the rectangle of tax revenues going to the government (size of tax \times number of units being taxed). Before we figure out the welfare implications of a tax, let's stop and look for a moment at what difference supply or demand elasticity makes, in a taxation situation.

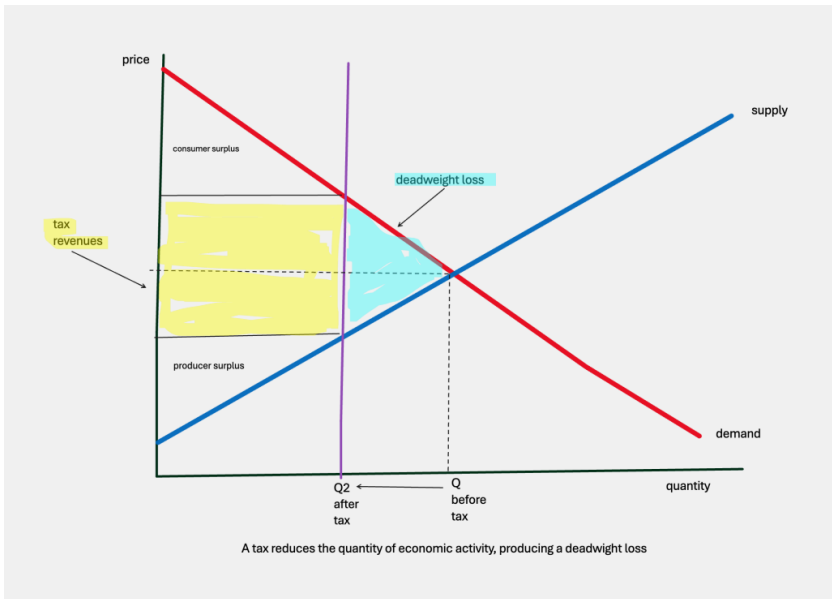
Let's just look at the different impact a tax has, in a market with an elastic and inelastic curves:



The more inelastic party bears more of the tax burden

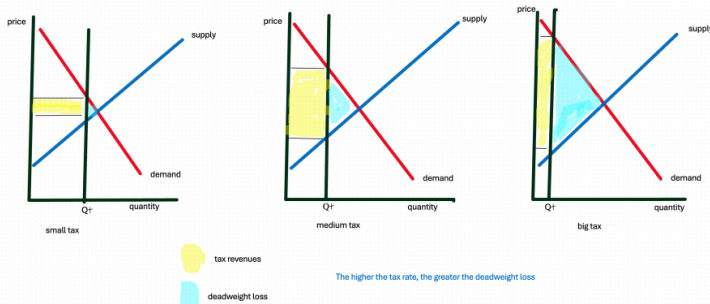
When demand is price inelastic (that steep demand curve), the buyer bears most of the burden of the tax. The price the consumer pays goes much higher, while the suppliers receive slightly less. In the second graph, the suppliers are price inelastic and the demand side is more elastic, and so the supply side bears more of the tax burden. This should make sense to you. If demand is not very sensitive to price increases, and a big tax is imposed (which becomes a price increase), inelastic demand means shoppers keep buying it, even with the tax.

If we look at taxation with a welfare analysis, we see immediately that reducing the size of the market means we are cutting off some social surplus—in the graph below, it's the blue area labelled “deadweight loss.” This triangle represents economic activity that *would* have taken place before the tax arrived, but now isn't happening. That's an outright loss, transactions that won't happen. We also see that both consumer surplus and producer surplus have decreased, and we have a new type of surplus highlighted in yellow—tax revenues. We still think of tax revenues as a benefit to society, part of Total Surplus, since tax revenues come back to benefit us in the form of new schools and roads.



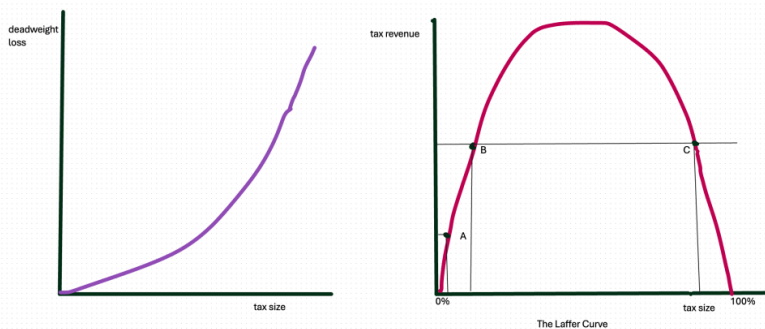
CAN YOU CUT TAX RATES AND STILL GET MORE REVENUES COMING IN? THE SUPPLY SIDERS!

Welfare analysis is going to help us untangle a very thorny tax question: is it possible to “cut taxes” (meaning, reduce tax rates) and still get more tax revenues? This is the basic idea of ‘supply-side economics,’ and in particular, the **Laffer curve**, named for Professor Arthur Laffer, an advisor to President Reagan. The logic behind this curve rests on the idea that when tax rates increase, deadweight losses grow, because you are taxing smaller and smaller numbers of economic activities.



The higher the tax rate, the greater the deadweight loss

Look at the three graphs above, where we start with a small size tax, then a medium tax, then a very high tax. The yellow rectangle representing tax revenues might get larger when we go from a tiny tax to a medium size tax, but it goes down to a small area when the tax rate is very high. A high tax rate on a small number of transactions is *not* going to result in much tax revenue.

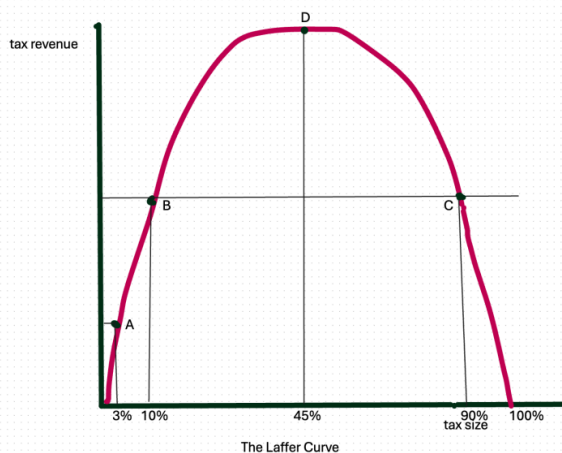


As the tax size increases, the deadweight loss increases exponentially, producing the Laffer curve

Above, we are plotting deadweight loss against tax size, seeing the

geometric growth of deadweight loss. Finally, on the right, we have the Laffer curve, plotting tax revenues against tax rates or tax size. Laffer's basic proposition was—let's cut tax rates from C to B and look, you'll get just as much revenue! This was welcome news to many in the tax-cutting world, especially Governor Brownback of Kansas, who decided in 2012 to cut tax rates in half and to remove some taxes altogether. Kansas barely survived.

Why, you might ask? Let's look closer at this Laffer curve:



If Laffer says, let's cut tax rates in half and increase tax revenues, that's fine if you are starting at C and moving to D. If you are starting at D (45%) or at B (10%) cutting the tax rate in half will produce less tax revenues. It all depends on which side of the Laffer curve you are on—left or right of center—and you never know this!

The problem with cutting taxes to get more revenues: not knowing your start point

If you started at point C, cutting tax rates to D would be fabulous—your lower tax rates would be bringing you more tax revenues. But suppose you are at D and you cut tax rates down to B—then you will see a big *drop* in tax revenues. It all depends where your starting point is, on this curve. Do you have any way of knowing? No, not really, because this is a hypothetical relationship, not one derived from actual data. Of course, after the Kansas disaster, we could definitely say that the actual numbers on

Brownback's tax cuts turned out to be a bad idea. But it hasn't stopped people from continuing to claim that tax cuts 'pay for themselves' or other versions of the Laffer story.

In this brief look at taxation, we have seen how a couple basic tools—elasticity and welfare analysis—can give us useful perspectives on who's bearing the burden of a tax, and the relationship between tax rates and tax revenues. We have seen that the United States has a very unequal distribution of both income and wealth; redistribution through our tax system has a long way to go. Keeping in mind the tools of economic analysis we've been learning, it's time to start building our macroeconomic model.

SOME USEFUL MATERIALS

A video on [tax incidence](#)—who's paying most of the taxes in America?

What would the [optimal tax rate](#) be, to keep people working but still generate enough to redistribute?

Read Robert Reich on [myths about taxing the rich](#)!

Compare [inequality around the world](#).

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PART II

PART TWO: THE BUILDING BLOCKS

CHAPTER 8

GDP: What It Is...And What It Isn't

BETTINA BERCH

Consider this



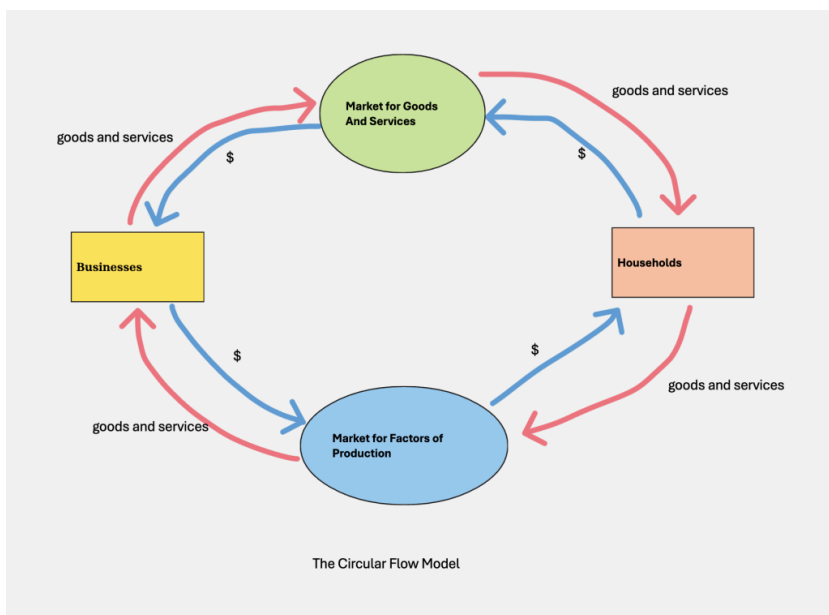
Berenice Abbott, photographer, 1938. Harlem Street: II. 422-424 Lenox Avenue, Manhattan.

Gross Domestic Product, or GDP, includes both goods and services. How many different sorts of goods and services can you spot in this photo?

So far, we've been learning some basic tools of economics that we might use in micro or macro—they're so useful, they're in every toolbox. Now, in part two, we want to take a macro focus, and analyze the economy as a whole. We want to see the big picture! We start by taking a deep dive into the basic concepts at play—things like GDP, CPI, employment, growth, financial instruments. We will use these, in part three, to build a model of

the economy as a whole, so we can understand the policy tools that model has to offer.

Remember earlier on, we looked at the Circular Flow model of the economy?



The Circular Flow Model

At the time, we emphasized how it showed the interconnection of households and businesses. Now we can focus on another feature of the model—the way one person's spending was also another person's income. Since income and spending are two sides of every transaction, they should be equal...which also means we could estimate the size of our economy by adding up all the *spending* in the economy, or all the *income*. They should both give us the same figure, more or less. Actually, we use *both* approaches in the U.S. national income accounts.

Before we add anything up, we have to make some decisions about what's included.

GDP IS THE MARKET VALUE OF 'ALL'...

GNP or **GDP**: the market value (price x quantity)
of "ALL"

FINAL goods and services

produced within an economy (GDP)

produced by the citizens of a country (GNP)

in a given period of time (usually 1 year)

The basic definition of Gross Domestic Product (GDP) is: the market value of all final goods and services produced within an economy in a given period of time, usually one year. Let's break down that definition completely, so we know what's really counted and what's not. (Do you know that old saying, 'if it's not counted, it doesn't count?'—think about it.)

Start with **market value**. The opposite of this might be 'personal value.' We will value that really cute teddy bear at the price that's on his ear, not by how much we absolutely *love* it. The same is true of things the economy produces that we think are really nasty, like cigars. You'd want to put a *negative* price on those, if you could. But if they're produced by our economy, we price them at exactly their sticker price. We multiply those sticker prices of everything produced by our economy by the quantities sold [the sum of all (P x Q)s] and we get market value.

Or next problem is **all**. We would like to be finding the market value of *all* production, but we can't. Consider types of work like gambling or prostitution or dealing illegal drugs. They are immensely rewarding (or why else would people risk jail to get involved) but we leave them out of the GDP accounting. Why? Imagine opening your front door to a person from the government wanting to know how many illegal drugs you'd bought last week. Your answer would be zero, correct? (Many states have recently begun selling recreational cannabis. They could get a low estimate of industry size pre-legalization from the revenues post-legalization, and retroactively adjust data. Admittedly, unlikely.) So we leave out these industries because we can't get trustworthy statistics.

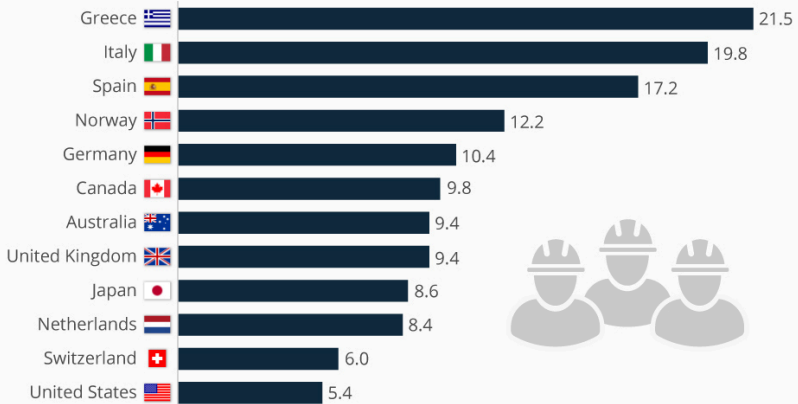
We leave out of the accounting **things we make or do for ourselves**. When I make dinner at home, that's high quality production taking place, but none of my cheffy expertise enters GDP. If I bought the same meal at a restaurant, a *lot* of \$ gets added to GDP. If I do my neighbor a favor and babysit her kids, that adds nothing to GDP. If my neighbor called an agency to hire someone, she'd be adding a lot to the GDP. You might argue that these are small amounts of money we're discussing, but it can be an important point when we are looking at historical data. The twentieth century saw a big increase of women's participation in the paid economy. When *some* women took paid jobs, they may have hired people to do housework and childcare, monetizing some of women's previously unpaid work. Those paid caregivers and housecleaners added extra to GDP.

We also leave out of the accounting **quality of life issues**, which seem pretty hard to measure. But we know they're there—just think of someplace you'd go for a vacation. That's a place with a better quality of life than your day-to-day, none of which is reflected in GDP accounts. We also leave out of GDP the **leisure** we enjoy, even though leisure is a major **normal good** (your income increases and you want more of it).

Another huge category we leave out of GDP is ‘off the books work,’ or the **‘shadow economy,’** the **‘informal economy,’** or the **‘underground economy.’** If you live in a big city in America, there’s probably a street or place where people gather to get hired for day labor. They’re paid cash at the end of the day, with no records kept. None of that labor is included in the GDP. People who’ve studied how much off-the-books work happens in different countries, have come up with some shocking figures. They [estimate](#) the proportion of ‘off the books’ work to all non-farm work is as high as 94% in Uganda, 74% in Guatemala, 73% in Honduras, and 54% in Mexico! Those examples make it sound like developed countries don’t have much ‘off the books’ work, but that’s not true at all.

Where Shadow Economies Are Well Established

Shadow economy as a percentage of GDP in selected countries (2017)*



@StatistaCharts

Shadow economy is the part of an economy involving goods and services which are paid for in cash, not declared for tax and therefore not actually part of the GDP

Source: IAW

statista

Looking at Greece, Italy and Spain’s informal economies, they’re quite large. In fact, the United States is at the bottom of the chart, meaning we have a relatively small informal sector, compared to other countries. The larger the informal sector, the less tax revenues to the government, which means during natural disasters, for example, the government can’t help victims very

much. We can notice that some governments with generous safety nets (Norway, Germany, Canada) have unexpectedly large informal sectors. Can you imagine why? (Tax rates have to be higher in countries covering a lot of social services. Anyone working 'off the books' avoids the high taxes but still gets the services.)

Finally, while it is true that the informal sector is larger in Sub-Saharan Africa and Latin America/Caribbean, the importance of the informal sector has steadily decreased all over the world.

image

[Data](#) on Shadow Economies (averages, by percentage of GDP)

...FINAL GOODS AND SERVICES PRODUCED WITHIN A COUNTRY IN A GIVEN PERIOD OF TIME

Returning to our definition of GDP, we have seen there's a lot we leave out, even if we say it's the market value of *all* goods and services. When we say **goods**, we refer to durable goods (tables, fridge, rug) and nondurable goods (my breakfast coffee, the carton of milk). Services refers to value delivered in the doing—my teaching, your doctoring, lawyering, child care services, etc. But we only count **final goods**, not intermediate goods. Intermediate goods are items like seatbelts. All the output of seatbelt factories is used by car factories, where those seatbelts are installed in cars that are sold for a sticker prices that *includes* the value of the already-installed seatbelt. If we added to GDP the output of the seatbelt factory and the output of the car factory, we'd be double-counting the value of seatbelt production.

When we add up all the output produced within a country's borders, it's GDP, gross domestic product. (The root of domestic is 'domus,' or home, so, the home borders.) If we add up all the output of the citizens of a country, no matter where in the world

they are producing it, that's GNP, gross national product. (It's the product of 'nationals,' or citizens.) We use both of these measures (and more, GDI, NNP, etc) because they measure different things, so one might be more useful than the other, especially in more advanced courses. For our purposes, it's enough to know what each term means.

We are measuring the GDP or the GNP for a given period of time, usually a year. And it's the year the good or service was *produced*. So if you go to some retro store and buy some cool (and expensive) Fifties sunglasses, that purchase does not go into this year's GDP. Why not? Because those glasses were already counted in 1957 when they were produced. Adding them in again, would be double-counting them. Which means, for example, that a country embracing the 'reuse-don't waste' way of life, might see a decline in GDP, even though people's standard of living was holding up fine. What happens if something was produced this year, but isn't selling? It's considered an unplanned inventory investment.

So we've seen that the simple definition of GDP (the market value of all final goods and services produced within a country in a given period of time) is not so simple to get right—and there are more issues ahead. Before we go there, let's stop looking at GDP from the statistical point of view, and see it as economists do.

THE COMPONENTS OF GDP

To break down GDP into categories, economists have found it most useful to do it like this:

$$\begin{array}{l} \text{Aggregate Demand, or} \\ \text{Total Output} \end{array} = \text{Consumption} + \text{Investment} + \text{Government} + \text{Net Exports}$$
$$C \qquad + \qquad I \qquad + \qquad G \qquad + \qquad NX$$

Components of GDP

Y is the output of the whole economy, or GDP. C is your **consumption**, what you buy. **Investment** is business spending to buy capital goods, or a consumer commissioning the building of a new home—both are activities that produce a value stream over many years into the future. Notice that among economists, investment means something different than it does on the street, where your friend might tell you to invest in some Apple stock. To economists, buying Apple stock is a financial transaction, not Investment. G is **government spending** (local, state, federal). NX is **exports (X) minus imports (M)**. (These particular letters are standard in economics, so you may as well learn them now.) By breaking down GDP this way, we can focus, later on, on how each of these parties reacts to changes in the price level in our economy. Right now, it's enough to know what they are.

How is GDP calculated?

There is a four-part formula: $C + I + G + NX = GDP$

Personal C onsumption Expenditures	Also called consumer spending : the goods and services people buy, such as groceries, clothing, cellphone service and health care.
+ I nvestment	This is business spending on fixed assets such as land, buildings and equipment, plus investment in unsold inventory; also includes purchases of homes by consumers.
+ G overnment Spending	Spending by federal, state and local governments to provide goods and services, such as schools, roads or national defense.
+ N et E Xports	Also known as exports minus imports (X – M) : the value of exports to other countries minus the value of imports into the United States. <i>Why are imports subtracted? Consumers, businesses and governments spend some of their money on imports. U.S. production would be overstated if the formula didn't remove imports.</i>
= GDP	The total market value of the goods and services produced within the United States in a year.

GDP categories

If we look at actual data on the U.S. economy in the chart below, we can see the actual size of each component. C (Consumption) is huge at 68%. I (Investment) is 18% and G(Government) is 17%,

roughly similar in size. And NX (Net Exports) is -3%—which means we import more than we export. Up until the mid-20th century, the U.S. was a net exporter. We will think about that further when we get to the international trade chapter later in the book, so hold that thought!

[Components of U.S. Gross Domestic Product, 2023, in billions of dollars; also, proportional share](#)

Gross Domestic Product	\$27,944 billion	100%
**Personal Consumption (C)	\$18,901	67.6%
**Gross Investment (I)	\$4,955	17.7%
**Government spending (G)	\$4,866	17.4%
**Net exports (Exports - Imports, or NX)	-\$ 778	-2.8%

U.S. GDP, 2023, in billions of dollars

Adding up all the components of the U.S. GDP, as of the end of 2023, it comes to around \$28 trillion dollars...and I don't even know how to think about that number. Is it large? As large as it should be?

We need some tools to evaluate our GDP numbers.

SOME USEFUL MATERIALS

Listen to a podcast on the [invention of the GDP](#).

Watch a great video on [real versus nominal GDP](#).

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CHAPTER 9

Evaluating GDP: Does It Measure What We Want It To?

BETTINA BERCH

Consider this



Mike Coghlan, 2011. Rich and poor

If having a big GDP is great, then a GDP that gets bigger and bigger every year must be fabulous. Or is it? Sometimes bigger GDP just means adding more to the landfill.

In the last chapter, we said that GDP was the “market value of ‘all’ final goods and services produced within a country in a given period of time.” And we found out, that when you do the calculations, the U.S. GDP was valued around \$28 trillion dollars, a huge figure. How can we even use such a number? One idea would be to

ask ourselves, is that GDP of \$28 trillion dollars bigger than it was a decade ago? (i.e., did we grow?) At what rate did we grow? These seem like simple questions to answer—but they're not.

THE PROBLEM OF NOMINAL VERSUS REAL

When we defined GDP as the “market value” of everything, we said it was the sum of all (market “P” multiplied by market “Q,”). We could write that as

$\sum(P \times Q)$, with the Greek letter sigma being math shorthand for adding up all these $P \times Q$ s. This is what we call a **nominal** figure, a figure that hasn't been adjusted for a possible change in prices.

The opposite of **nominal** is **real**, which means the figure *has* been adjusted for some change in the price level.

If we compare the GDP figure for 2010 to the GDP for 2020, we might see an increase. An increase in GDP sounds great, since it should mean that we had more stuff in 2020, that we were living better, that our standard of living increased. Now, every part of that sentence is a problem—but we'll take on the nominal versus real problem first. If

$\sum(P \times Q)$ in 2020 is greater than

$\sum(P \times Q)$ in 2010, it *could* be good news—if P didn't change, because that would mean Q went up. Q going up means more stuff, higher standard of living. But what if

$\sum(P \times Q)$ increased because P went up, and Q stayed constant? Or maybe Q even decreased? Then our nominal GDP has gone up, but our standard of living, the quantity of goods and services we get, goes down. In other words, the nominal GDP can go up or down, but that won't really reflect our actual standard of living until we adjust it for changes in the price level over time.

THE GDP DEFLATOR

We have two main ways of adjusting for changes to the prices level. The first method produces what’s called a **GDP deflator**, a tool for evaluating GDP year after year using a fixed set of prices. (Essentially it ‘deflates’ the hot air of rising prices out of the GDP figures.) To see how such a deflator is built, let’s imagine three years of an economy that only produced two goods, hot dogs and burgers. The nominal GDP for this economy would be the sum of the $P \times Q$ for hot dogs and burgers each year:

Building the GDP Deflator

Year	price of hot dogs	quantity of hot dogs	price of burgers	quantity of burgers	NOMINAL GDP
2008	\$1	100	\$2	50	\$200
2009	\$2	150	\$3	100	\$600
2010	\$3	200	\$4	150	\$1200

Then we could pick one of those year’s prices—say 2008’s prices and call that our base year. We could then go ahead and compute the **real GDP** for each year by multiplying those years’ quantities by the base year (2008) prices:

Real GDP (2008) = $(\$1 \times 100) + (\$2 \times 50) = 200$

Real GDP (2009) = $(\$1 \times 150) + (\$2 \times 100) = \$350$

Real GDP (2010) = $(\$1 \times 200) + (\$2 \times 150) = \$500$

Building the GDP Deflator

Year	price of hot dogs	quantity of hot dogs	price of burgers	quantity of burgers	NOMINAL GDP	REAL GDP (at 2008 prices)
2008	\$1	100	\$2	50	\$200	\$200
2009	\$2	150	\$3	100	\$600	\$350
2010	\$3	200	\$4	150	\$1200	\$500

From that Real GDP column, we can develop a GDP deflator using the definition,

$$\text{GDP deflator} = (\text{Nominal GDP} / \text{Real GDP}) \times 100$$

So:

$$\text{GDP deflator for 2008} = (\$200 / \$200) \times 100 = 100$$

$$\text{GDP deflator for 2009} = (\$600 / \$350) \times 100 = 171$$

$$\text{GDP deflator for 2010} = (\$1200 / \$500) \times 100 = 240$$

.With the figures we've used, you can see our own little GDP deflator rises from 100 to 171 to 240. We could then take any year's nominal GDP, divide it by this deflator, and get real GDP.

HOW TO USE THE (ACTUAL) GDP DEFLATOR

Fortunately, the U.S. government saves us a lot of work by publishing [GDP deflator data](#) that we can use:

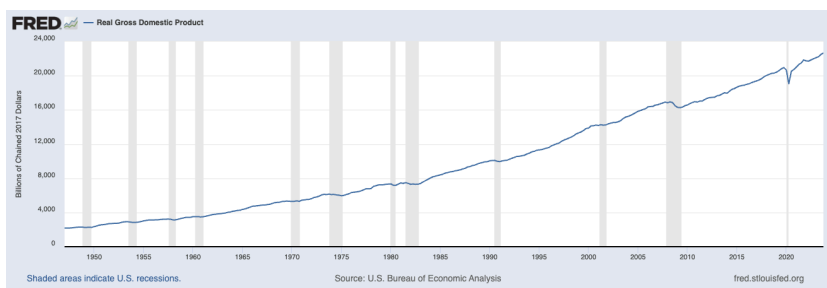
Year	Nominal GDP (billions of dollars)	GDP deflator
2017	19,479.6	108
2018	20,527.2	110
2019	21,372.6	112
2020	20,893.7	114
2021	22,997.5	118

We can now translate nominal GDP into real GDP by dividing the nominal GDP by the deflator and multiplying by 100. So for 2020, for example, real GDP would be: $(\$20,893.7 \div 114) \times 100$, or \$18,328 billion.

REAL GDP (NOMINAL GDP ADJUSTED FOR CHANGES IN THE PRICE LEVEL) STILL MAY NOT TELL US WHAT WE WANT

With our GDP data adjusted for changes in the price level, we could now look at real GDP growth in the U.S. over time. Not so fast! *What if* our real GDP is increasing, but our population is growing two or three times as fast? This is the case in many developing countries. In this case, rising GDP won't mean the average person has more stuff because there are more people 'eating at the table.'

On the other hand, GDP may be constant with a falling population size (this happens in some developed countries). In this case, slow GDP growth still produces a higher standard of living. For these reasons, we usually divide real GDP by population size, to get real **GDP per capita** ("per head," or "per person"):



U.S. [real GDP per capita](#) over time

As you can see, real GDP per capita has been rising steadily over time, except for the shaded years, marking drops in growth or **recessions**. This might not be a big 'aha' moment, since you know the U.S. is a strong economy. Maybe you're wondering, how does U.S. growth compare to growth in France? Or Germany?

COMPARING GDPS OF TWO COUNTRIES

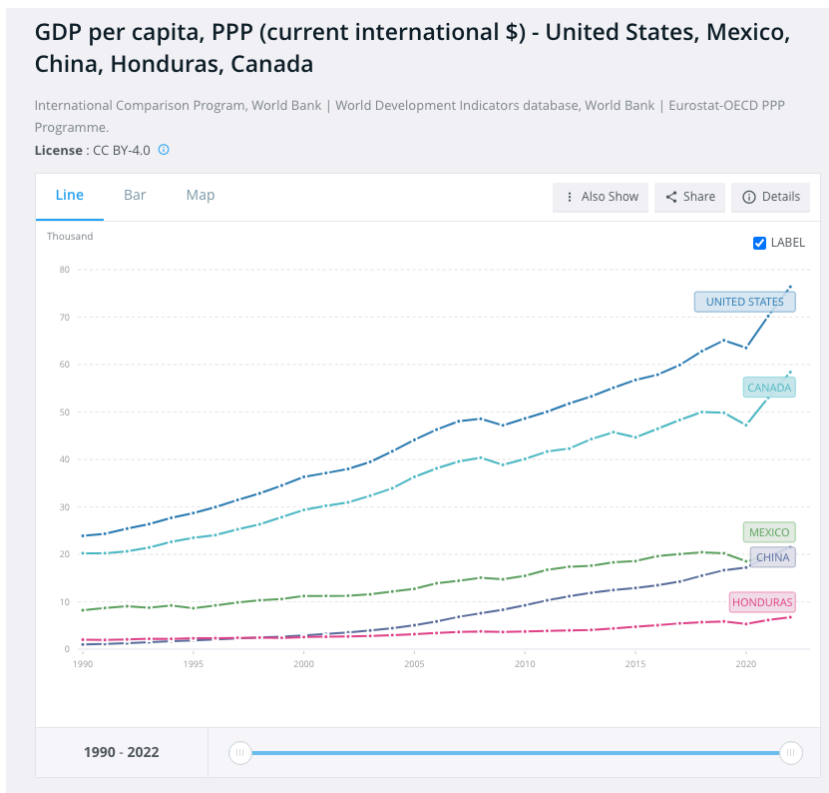
Let's go through the steps of making such a comparison. First, we'd have to convert currencies, since Germany's GDP is reported in Euros, and the U.S. GDP is in dollars. Let's convert Germany's real GDP to dollars:

German's real GDP in dollars = (Germany's GDP in Euros) / (exchange rate of Euros to dollars) ...or 2737billion Euros/.753...which equals \$3636 Billion U.S. dollars.

If we compare Germany's \$3636 billion with the U.S.'s \$16,768 billion, the U.S. economy seems like it's five times bigger than the German economy. But these are countries of very different sizes (more people means more production). The U.S. is much bigger than Germany. China is much bigger than the U.S. As we just saw, we need to divide real GDP by population size. If we do that in the example we started, Germany comes out to \$46,241 per capita and the U.S. at \$65,474 per capita. So the average German doesn't have as much stuff as the average American—but it's nowhere near that factor of five!

Now, it might be bothering some people—especially people who have actually lived in other economies in this world—that the official exchange rates of currencies, which this whole process started with, might be more than a little off. Some countries purposely undervalue their currencies (which we'll explore in a chapter on world trade). When we use that undervalued exchange rate, that will skew the \$GDP conversion, which will then throw off comparisons of well-being. For this reason, economists like to adjust GDPs by the **PPP** (purchasing power parity), an index that takes into account the purchasing power of different currencies. It's worth trying out the [interactive tool](#) developed by the World Bank to make comparisons of different countries' GDPs per capita adjusted for PPP.

[Here's an example](#) comparing the U.S., Canada, Mexico, Honduras, and China:

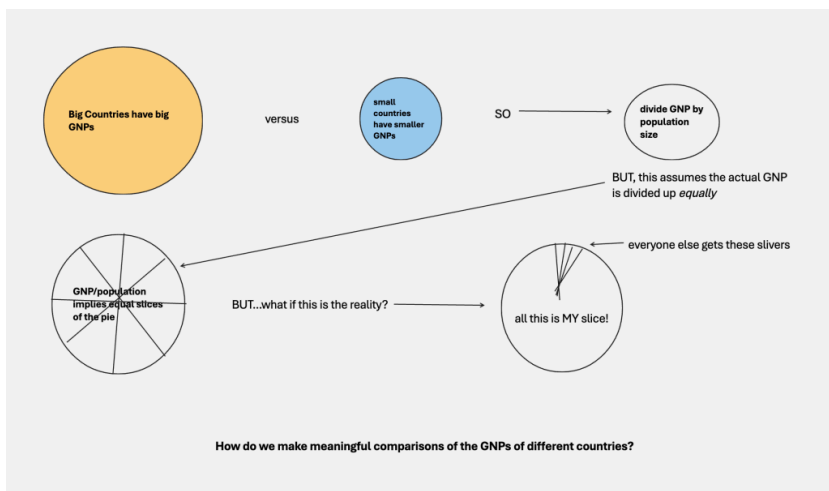


The chart shows you trends in real GDP growth over time in a few countries, which should tell you something about relative standards of living in these countries. But is that really what you are seeing?

'AVERAGE LIVING STANDARDS' CAN BE MISLEADING

Remember the definition of 'real GDP per capita': it's real GDP divided by population size. It's a straight average. But suppose everyone in the country is *not* getting an equal slice of the economic pie. Suppose I'm the dictator, and I take 95% of the GDP for myself and my families, and I leave 5% for everyone else to divide up. The

standard of living of each citizen will be very low, compared to an economy that's divided up more equally. Per capita comparisons cover up differences in the **distribution of income**.



How DO we make meaningful comparisons of the GNPs of different countries?

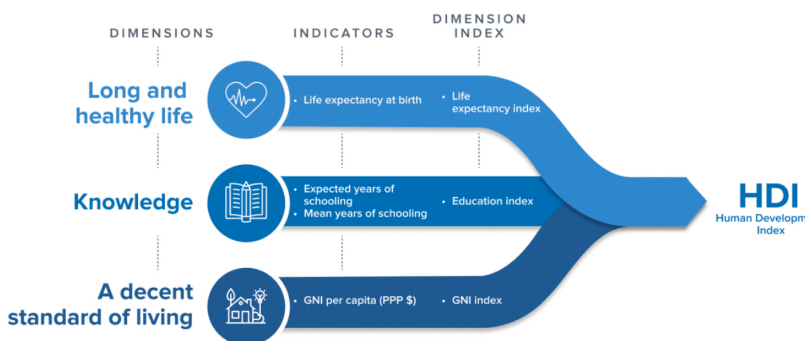
As you could imagine, it's not going to be as easy to make this adjustment! Before we try, let's step back and evaluate what we're measuring. We started by converting real GDPs to a single currency, then dividing by population size, so we were comparing real GDPs per capita. Then we realized that per capita comparisons might be very misleading, since some societies divide up their income more equally than others. Even if we adjusted for inequality, we have to stand back and question what we are comparing when we base everything on GDP. Is GDP a good proxy for well-being? What might work better?

Better Measures of Well-Being

A country's GDP might include a whole lot of negative things (extra locks for the doors because of high crime means a higher GDP

but lower quality of life). It might leave out a lot of good things (my homemade bread, your music sessions with your buddies, long walks by the sea). To find a better measure of quality of life, some UN economists developed what they call the **HDI**, or [Human Development Index](#).

HDI Dimensions and Indicators



Real GDP per capita is only one component of any person's standard of living. HDI also includes measures of education, length of life, and health. The U.N. Human Development report collects data and ranks the countries in the world according to 1) their human development index and 2) their [human development index adjusted for the degree of inequality](#) in that country. In the table below, the column to the farthest left shows the HDI ranking of the country and the column to the farthest right shows you how many positions in the ranking– up or down –that country would move if you took into account the inequality in that country.

Human Development Index (HDI) Data for

2021

HDI rank	Country	HDI index	inequality-adjusted HDI	change for inequality-adjusted rank
1	Switzerland	.962	.894	-3
2	Norway	.961	.908	0
3	Iceland	.959	.915	2
4	Hong Kong	.952	.828	-19
21	United States	.921	.819	-5
110	Jamaica	.709	.591	5
137	Honduras	.621	.479	4

You can visit the [full listing of countries](#) if there's a country you want to check. From the data selected, you can see that the U.S. only stands at #21, and would fall to #26 if the inequality in the U.S. were taken into account. Hong Kong, at #4 in HDI, would fall to #23 if its inequality were factored in.

BHUTAN PROPOSES AN ALTERNATIVE TO GDP: GROSS NATIONAL HAPPINESS (GNH)

While HDI is a good measure of well-being, it still gives huge importance to GDP, which might not be ideal. One small country, Bhutan, decided in 1972 to invent its own measure, Gross National Happiness. **GNH**, as it's called, includes a lot of things that might be surprising: respect for cultural heritage, community vitality, time use, and more. There are 9 of these 'domains' and 33 indicators used to measure progress.



Felix Mueller, Gross National Happiness (Bhutan)

It might sound like a lot—and it certainly includes a lot of things that are difficult to measure—but there’s an old saying, ‘what you count, is what counts!’

THE MATERIAL WORLD APPROACH TO STANDARDS OF LIVING AROUND THE WORLD

Another, very different approach to the ‘wealth of nations’ was taken by [Peter and Faith Menzel and their team in 1994](#), when they visited 30 countries to take a look at what typical people in those countries owned and valued. When his team located a co-operating family in Iceland or Mali or Mongolia, for example, they would move all the family’s worldly possessions outside their home for a photograph and inventory, followed by some discussion of their belongings. Menzel’s team visited [some families a decade later](#), so you can see what they bought when they got more money. In general, you can see vast differences in the amount of goods

families own—one American family has so much stuff it doesn't even fit into a single portrait. Sometimes you realize a family has no electrical appliances. Some hold up important possessions, like a family bible, with obvious affection. What's striking, is how much people really do value their own possessions, however meager they might seem to someone else. We like our stuff.

Some Useful Materials

Watch [a video explaining Real vs. Nominal](#) GDP and more.

Read about some [better ways](#) to evaluate national well-being.

See how 'Dollar Street' looks at [comparing living standards](#) around the world.

Watch a video on [how to compare GDPs of different countries](#).

Read [more about GNH](#), Gross National Happiness, and don't miss the video at the end!

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CHAPTER 10

Measuring the Price Level: The Consumer Price Index

BETTINA BERCH

Consider this



Warren Leffler, photographer. *BLS Workers Graphing the CPI, 1963*

Imagine what it must be like gathering the data for our Consumer Price Index. Then imagine what it was like when no one had computers! Are you surprised to see women workers in this office?

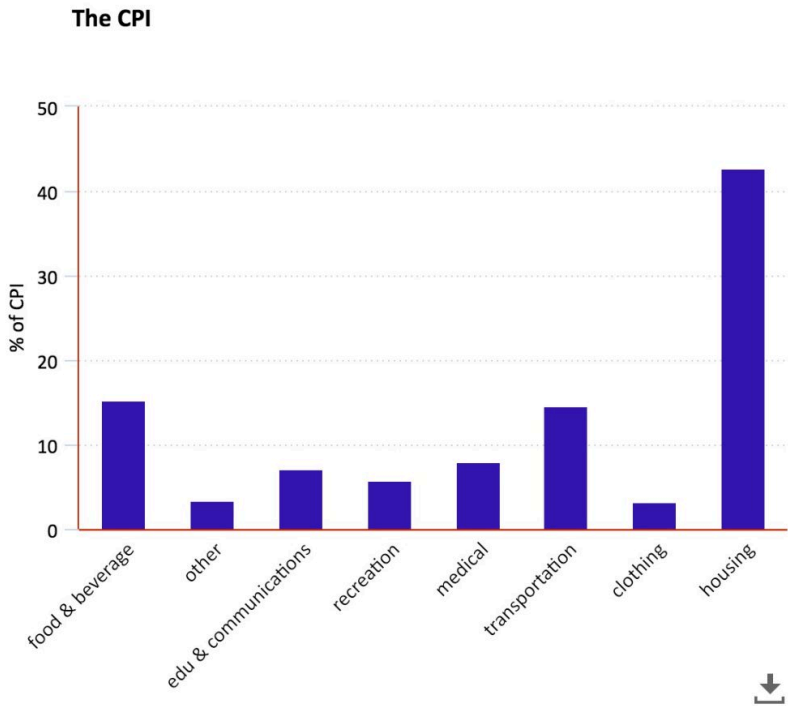
As we've just seen, measuring the size of our economy, our GDP, may not tell us what we really want to know. Probably the actual size isn't as important as whether it's growing—and how fast? And as we've just seen, we could do a better job including more meaningful components. We still have the problem of sorting out changes in prices. If our GDP in 2020 [$\Sigma(P \times Q)$] is 5% higher than it was the year before, does it mean we produced 5% more goods and services? Or, did we produce the exact same amount from one year to the next, but the **price level** went up by 5%? We'd be cheering if **real** growth was 5%. We'd be very unhappy if output (Q) stayed the same—or even fell—and all the increase in ($P \times Q$) was due to prices shooting up. We already looked at one way of

dealing with changes in prices—the GDP deflator. Now we’re going to develop another method, the Consumer Price Index, or CPI.

A SECOND TOOL FOR DEALING WITH PRICE LEVEL CHANGES: THE CONSUMER PRICE INDEX (CPI)

Suppose we could put together a totally typical market basket for the totally typical American consumer, a long list of the goods and services most people buy in a month. This market basket might be filled with milk and eggs and tee-shirts and socks and teeth-cleaning visits—not necessarily high value items or crazy interesting things, just typical things that typical people buy over and over. Then imagine we priced-out this same basket, month after month, year after year, to see how prices for that basket of typical things were changing. Suppose we then converted that price series into index numbers, which we could use to evaluate a range of important things, like a proposed wage hike, or the annual increase in rent control. The process we’ve just described is what the Bureau of Labor Statistics actually does, when it produces the Consumer Price Index, or the CPI.

What goes into the CPI



Eight basic categories in the CPI and their relative importance

The bar chart above shows the relative importance of different categories of goods and services in the CPI. We see that housing is huge, transportation and food are both about equal, and only then come medical services. You might find that surprising, since medical care is notoriously expensive. This is why we use data (that's been gathered by an unbiased agency) rather than our own opinions when assessing reality. With the relative weights of different things in the typical market basket established, the BLS will price the basket over time, developing an index of changes in the price level that people can use for a variety of purposes. Since that sentence just papered over the question of 'how *do* they do it' we can stop for a moment and create our own simplified CPI, with only two products and three years and see how it's done.

OUR SIMPLIFIED CPI

Let's start with an economy in 2008, 2009, and 2010 that only produces hot dogs and hamburgers. We do consumer research and discover that the typical shopper buys 4 units of hotdogs and 2 units of hamburgers. We decide these will be the quantity weights in our index. We price out the basket each year keeping the 4 units of hot dogs/2 units of hamburgers as our weights:

YEAR	PRICE OF HOT DOGS	QUANTITY OF HOT DOGS	PRICE OF BURGERS	QUANTITY OF BURGERS
2008	\$1	4	\$2	2
2009	\$2	4	\$3	2
2010	\$3	4	\$4	2

We can then add a “cost of market basket” column in our chart:

YEAR	PRICE OF HOT DOGS	QUANTITY OF HOT DOGS	PRICE OF BURGERS	QUANTITY OF BURGERS	COST OF MARKET BASKET
2008	\$1	4	\$2	2	\$8
2009	\$2	4	\$3	2	\$14
2010	\$3	4	\$4	2	\$20

Now we are going to compute the CPI for this little economy. Let's start with the definition of CPI:

$$\text{CPI} = \left(\frac{\text{the cost of the basket in the selected year}}{\text{the cost of the basket in the base year}} \right) \times 100.$$

So, let's set 2008 as the base year, and fill in:

the CPI numbers for 2008: $(\$8 \div \$8) \times 100 = 100$

the CPI numbers for 2009: $(\$14 \div \$8) \times 100 = 175$

the CPI numbers for 2010: $(\$20 \div \$8) \times 100 = 250$.

YEAR	PRICE OF HOT DOGS	QUANTITY OF HOT DOGS	PRICE OF BURGERS	QUANTITY OF BURGERS	COST OF MARKET BASKET	CPI (base 2008)
2008	\$1	4	\$2	2	\$8	100
2009	\$2	4	\$3	2	\$14	175
2010	\$3	4	\$4	2	\$20	250

Now we have CPI figures for our little economy. Maybe you are thinking—who cares? Let's take this information and transform it into something people *do* care about: the inflation rate.

First, let's define the inflation rate: **Inflation rate = $[(CPI_{\text{new year}} - CPI_{\text{former year}}) \div CPI_{\text{former year}}] \times 100$.**

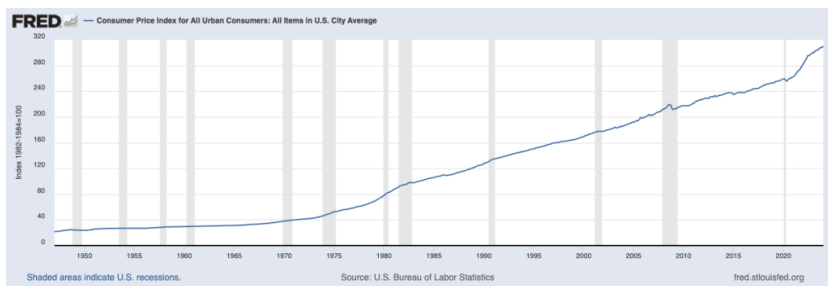
Using this data, we can compute some inflation rates, something people *do* care about:

inflation rate for 2009, compared to the previous year = $[(175 - 100) \div 100] \times 100 = 75\%$ inflation rate

inflation rate for 2010, compared to the previous year = $[(250 - 175) \div 175] \times 100 = 43\%$ inflation rate

THE ACTUAL CPI OVER TIME

We created a tiny CPI for a couple years, to see how we could get from something unfamiliar, like the CPI, to something we cared about, like the inflation rate over time. You might be wondering how the actual U.S. CPI has moved over time. This graph shows the movements of our (urban) CPI over time, where the grey vertical bars mark recession periods:



The Consumer Price Index (CPI) over time

You see a definite drop around 2008 (the crash of financial markets) a jump upwards after 2020 but less volatility in general in the modern age—maybe because economists have gotten better at using policy tools? In any case, now that we know what the inflation rate is, where it comes from, and how it's been moving over time, we need to ask ourselves 'what difference does it make'? What is the meaning of the CPI going up, and what kind of costs does it impose on society?

THE COSTS OF INFLATION

First, when the CPI goes up, it means that the typical things consumers spend money on—rent, food, transportation, etc.—have gotten more expensive. Unless we are also getting more money in wages or other income, our standard of living is falling. We aren't able to get as much stuff. That's the pain of inflation that we think about most often, when we are buying groceries, and they're 2-8% more expensive each visit. But imagine you lived in a country with 80% inflation or 200% inflation—what's sometimes called **hyper-inflation**. Hyper-inflation brings a new set of problems. First, imagine you're working in Argentina or Venezuela or Zimbabwe, countries which have had super-high inflation in recent years. When you got paid on Friday, what would you do? You'd take your paycheck right to the bank and cash it so you could spend the rest

of Friday buying up necessities before they went up in price. You might have spent most of Friday planning your spending, instead of thinking about work. All of this—the planning, the rushing around—is very unproductive for the economy as a whole. Economists, being very ‘retro’, call these ‘**shoe leather costs**,’ as they imagine you wearing down the soles of your shoes spending your cash quicker. Another ‘retro’ cost of inflation is called ‘**menu costs**,’ when prices change so fast that restaurants and other retail units have to constantly paste over the prices on menus to keep them updated. While many price lists these days are not real life paper menus that have to be expensively updated, but virtual prices on the internet that can be updated electronically (or even ‘dynamic prices’ that update via algorithm) the fact of price lists changing can imply some expensive decision-making. Imagine you produce furniture. You see the prices of furniture in the market rising fast. You now have some expensive decisions to make. If you decide that furniture prices are going up because *everything* is going up (general inflation), you will just increase your prices to match and keep going. But suppose you see furniture prices rising and decide—wow, there’s a lot of new demand for furniture out there! I better open a new factory and start producing more furniture! Which do you choose? As a manufacturer, you are not sure how to interpret a price change in your business—and this can be costly. Consumers can also wonder when they see certain prices going up rapidly—is that increase particular to dairy products, let’s say, or to all food? Depending on which it is, you will make different choices, but it isn’t easy to know for sure.

INFLATION CAN IMPACT SOME PEOPLE MORE THAN OTHERS

Inflation can also be costly for particular groups of people in society—even though inflation means a general increase of the price level. It still hits some particular folks more than others. First, let’s

think about people whose paycheck does *not* go up with a rise of the price level: people earning the minimum wage. The Federal minimum wage was raised to \$7.25 an hour in 2009, although many of us live in states with much higher minimum wage laws. As inflation increases, that \$7.25/hour buys less and less groceries. Because the Federal minimum wage is fixed in **nominal** terms, its purchasing power goes down as inflation goes up. There are other people on fixed income—retired people receiving Social Security benefits, for example. Every January, Congress announces how much that check will increase or decrease, and grandma gets that set amount all year long, even if terrible inflation starts in February and rages for the whole year. Grandma will have to get by until the following January, when her check may increase. (Whether seniors can keep up with the cost of living is a tricky question, since the seniors spend a disproportionate amount on health expenses, which may not be reflected in the CPI averages.)

Another specific group impacted by inflation are people who hold onto a lot of their savings in cash. Many people don't trust banks. Many people feel safer hiding cash in their homes. Many people don't live in the U.S. but keep a stash of dollars in their bedroom in case their own country's currency goes bad. Whatever their reasons—inflation eats away at the purchasing power of those dollars.

A final group impacted by inflation are lenders, either individual, institutional or governmental. They feel a special impact if they have lent someone money and there's *unexpected* inflation before it's paid back. Let's take a simple example. Suppose you lend your friend \$100 to buy 3 textbooks. He says he'll pay back your \$100 next year—and you are ok with that, because he's your friend and you wouldn't charge him interest. But imagine during this year, we have huge inflation. Prices go way up on everything. Your friend comes back to you a year later with his \$100 to pay you back. Now you, the lender, are upset. Why? Because that \$100 he is giving you has less purchasing power than when he borrowed it. Maybe

that \$100 will only buy 2 textbooks now. If you had expected that inflation, you would have factored it into the deal. You would have told him how much inflation you expected to occur, and reset the amount he owed you to maybe \$125. Obviously, your debt issues with your friends may not be a big deal. But in the U.S. in the late nineteenth century, fierce political campaigns were fought by a big borrower class (farmers) against the lender class (big banks) over the gold standard and the status of silver. And in the modern day, when countries like China hold a lot of U.S. debt, signs of high inflation in the U.S. are very worrisome to Chinese policymakers. The bottom line: unexpected (or unanticipated) inflation hurts lenders but benefits borrowers.

OTHER MEASURES OF THE PRICE LEVEL

In an earlier chapter we developed the GDP deflator, which dealt with inflation puffing up our nominal GDP year after year, by creating an index with fixed prices, and adjusting GDP figures by this index. Why have a CPI *and* a GDP deflator? We have them both because they include different things. The GDP deflator is based on the total of goods and services produced by our economy in any given year. The CPI is based on what typical shoppers buy. Some things are included in one and not the other. For instance, our GDP deflator includes some very high-ticket items—like satellite systems and military weapons—that typical shoppers never buy. But typical shoppers buy imported goods—my breakfast mango, my tee-shirts made in Cambodia—goods that were not produced by our economy, so they are not in our GDP. Understanding this, you can see why the CPI is used for a lot of average-person applications: adjusting wages with a COLA (cost of living adjustment) clause, or adjusting Social Security payments. The GDP deflator is used more for national income accounts and measures which look at the growth of our economy overall.

That said, we *do* have other indices. We have one index (and its

variations) that's called the **core inflation index**. This index leaves out elements of the CPI that economists know are very volatile and can sometimes throw things off, like food and energy costs. If there's a war, or rumors of war, the price of oil may shoot up, even if other elements of our price index are fairly constant. Coffee prices can go up after a bad harvest, but they don't represent a change in overall prices, so they're not included in the core index either. Of course, for many of us, leaving out fuel and food means leaving out most of what we buy, so the core index might be something we ignore. But imagine an index that told us how consumer prices would look in a few months? That could be useful, right? We have a version of that, called the **Producer Price Index (PPI)**, which tracks wholesale prices—which usually *become* our retail prices in a little while.

Finally, we have the '**personal consumption expenditures price index**' or **PCE**, which the Federal Reserve considers its go-to measure for evaluating inflation. This measure is designed to be more inclusive, so spending done by institutions on the behalf of consumers, like Medicare and other social services, is also included. Its methodology also corrects for some of the substitution bias of the CPI, and allows the market basket weights to change over time as consumers move away from some goods. As with the CPI, there's also a 'core' version which leaves out spending on groceries and energy.

PROBLEMS WITH THE CPI

While the CPI is an extremely useful tool, it has a couple problems we need to consider. The rotary dial phone of your grandparents is nothing like the smart phone you're carrying. The grandparents would be surprised to bite into an Impossible Burger and find out it wasn't meat! The world is full of new things to buy. Some are improvements on an old model, others are completely new. If our market basket weights stay constant, we need ways to take into

account improved features of existing products, and find room for totally new products, while still keeping the basic structure of the CPI, so it's meaningful. To deal with new or changing products, the BLS makes what it calls **hedonic quality adjustments**, that evaluate how much those product tweaks are worth.

There's another CPI problem that we all know is there: the substitution problem. When we go shopping, we might bring a list. But if something on our list is very expensive this week, we might substitute something cheaper. *We* substitute if we can, but the CPI doesn't substitute—it will keep including the more expensive item because it's keeping the basket contents constant. This means the CPI will *over-estimate* our cost of living—we are busy substituting cheaper items, while the CPI is keeping them in. This problem is so well-known, that we just accept that the CPI over-estimates changes in the price level, and we leave it at that.

LET'S TRY USING THE CPI

Now that we know what the CPI is—and isn't—let's try using it. Here's an example from real life, in 2008, when I was riding the subway in NYC. It was just before a proposed subway fare increase, and the MTA, who run the subway, put up an ad in the subway car, reading:

"In 1986, the subway fare was \$1. That's \$1.89 in 2008 dollars! Believe it!"

I decided to check into this very convincing ad—and to take a deeper look at whether subway fares were really going up by a lot, or what. To do this, I started with the basic equation for converting prices from one period to another using the CPI:

price in today's dollars = price in an earlier time x (price level today/ price level in earlier time).

I then looked up the subway fare over recent decades, [and the CPI figures](#) so I'd have the 'price level' for those years. I called 2008 the base year, a comparison suggested by the MTA's ad. Then I did the arithmetic to convert the nominal fare in the selected years

(the price you paid at the fare booth) into a price in constant 2008 dollars:

Year	nominal fare	CPI in this year	Calculate fare in 2008 dollars	fare in constant 2008 dollars
1970	.20	38.8	$.20 \times (215.3/38.8)$	\$1.09
1986	\$1.00	109.6	$\$1 \times (215.3/109.6)$	\$1.96
2008	\$2.00	215.3	$\$2 \times (215.3/215.3)$	\$2
2010	\$2.25	218.3	$\$2.25 \times (215.3/218.3)$	\$2.22
2013	\$2.50	230.28	$\$2.50 \times (215.3/230.28)$	\$2.34
2015	\$2.75	233.71	$\$2.75 \times (215.3/233.71)$	\$2.53
2023	\$2.90	299.17	$\$2.90 \times (215.3/299.17)$	\$2.09

We see that the fare went from an equivalent of \$1.09 in 1970, to \$1.96 in 1986, to \$2.00 in 2008. The point in the MTA's ad—that the 1986 fare was almost the same as what they wanted to raise it to in 2008 constant dollars—was pretty true! They were raising the nominal fare but the real fare was not changing that much since 1986. For fun, I continued the chart to include more modern increases. My own takeaway, was that the big jump in fare actually happened in 1986, when the real fare nearly doubled from its level in 1970. The fare increased to \$2.90 in 2023 but inflation was so high that this increase didn't keep up with the general rise in the cost of living.

So the next time grandma looks shocked at how much money

you stick in a vending machine for a coke.....well, you can do the arithmetic!

SOME USEFUL MATERIALS

Watch a good video on [measuring inflation and the CPI](#).

Learn about how [“hedonic adjustments”](#) address quality changes in elements of the CPI.

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CHAPTER 11

Employment, Unemployment and How They Are Measured

BETTINA BERCH

Consider this...



E.F. Joseph, c. 1943. Skilled women workers helped build the SS George Washington Carver

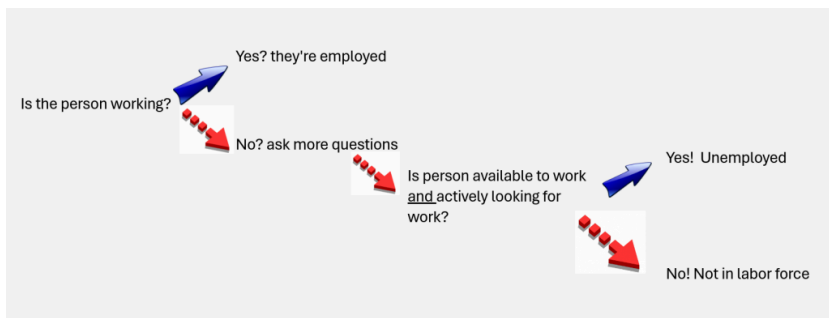
Big social/cultural changes can impact labor force participation rates, which we will examine in this chapter. What social change led these women to pick up welding gear? Have you ever heard people talk about [African-American 'Rosie the Riveters'](#)?

Discussing employment and unemployment involves a lot of talking about numbers, but the experience of unemployment is about more than these numbers, about more than lost paychecks—it can also involve our self-respect, our sense of accomplishing things in this world, and our ability to relate to others. Watch this former Poet Laureate of the United States, Philip

Levine, reading his poem, [“What Work Is.”](#) Sometimes poetry tells it so much better than economics ever can!

HOW ARE EMPLOYMENT, UNEMPLOYMENT, AND THE LABOR FORCE DEFINED?

Keeping the human dimension in mind, let's look at how unemployment is defined (which is different from how people talk about being 'out of work'). For economists, people are **unemployed** if they do not have a job, are able to work, and are actively searching for work. All three conditions must be satisfied! You can break down that definition with a flow chart like this, if it makes it simpler:



How to Determine if Someone is Unemployed

Let's consider the other possibilities. If people *have* jobs, they are **employed**, whether they like the job or not, whether it's giving them the hours they want or not. If people don't have jobs, but they are not actually available to work—maybe they have to care for someone at home— they are **not in the labor force**. If people don't have jobs but they are not actively looking for jobs—maybe they have gotten discouraged after searching for so long—they, too, are **not in the labor force**. It might seem like these definitions are overly picky, but the distinctions are useful for guiding economic

policy. If you worked for the BLS (Bureau of Labor Statistics), and you had to focus your time and energy on one group, which would you pick? You might want to start with people who were available to take jobs and were actively looking for work, since you could be most productive, fastest.

Central to labor market analysis is another complicated term, the **labor force participation rate**, LFPR, defined as the percentage of the adult population that's in the labor force. How do we figure that out? Start with **adult population**, defined as the civilian (non-military), non-institutional (not in hospitals or incarcerated) population over 16 year old. The **labor force** is defined as the number of people who are employed plus the number unemployed. Putting all these terms together, we get a definition of the labor force participation rate:

labor force participation rate (LFPR) =
(the number of people in the labor force / the number of people in adult population) x 100.

the unemployment rate = the number of unemployed / the number in total labor force (expressed as percentage)

unemployed (U) = have no job, but available to work and actively looking for a job

the labor force = the total number of workers, both
Employed and Unemployed

Unemployment rate = the percentage of the labor force that's Unemployed

$$U = \frac{\# \text{ Unemployed}}{\# \text{ total labor force}} \times 100$$

$$\text{labor force participation rate} = \frac{\# \text{ in labor force}}{\# \text{ in adult population}} \times 100$$

* adult population =
civilian, non-institutional
population over 16 yrs old

You might be wondering, why there are so many different terms? Wouldn't it be enough just to look at the unemployment rate? If the unemployment rate goes up we are unhappy and if it goes down we are happy, right? No, not so fast. Suppose someone was unemployed (remember: no job, but actively looking for work). Suppose they finally got discouraged, and quit looking for work. In this case, the unemployment rate would go down, because there are fewer people unemployed. This would be bad news—even though there's a drop in the Unemployment rate! How do we sort this out?

Let's remember that the good news we really want, is for our unemployed person to actually get a job. This would drop the unemployment rate AND the labor force participation rate would stay constant, since our job-seeker would be staying in the labor force, just switching from Unemployed to Employed. This is why we always get LFPR data at the same time as data on the unemployment rate. That labor force participation rate gives us a handle on whether our Unemployed are leaving the labor force altogether, or whether they are staying in the game and getting jobs.

WHO IS MORE LIKELY TO BE UNEMPLOYED IN THE U.S. ECONOMY?

Now that we know how employment, unemployment and labor force participation rates are defined, it's time to look at the numbers. We need to know what groups in the U.S. are more likely to experience unemployment, before we can understand why. The data is collected by the Bureau of Labor Statistics (BLS), and they have their own categories. They use only two sexes—male and female. They routinely gather data on people identified as white, Black or African American, and Asian. They break-out 16-19 year olds, and people 20 years of age and up. From time to time, they

offer data on people they term Hispanic, but they do not have breakdowns for people with multiple identities. They also issue special reports on subsets of the population. Let's look at [BLS figures for October 2023, compared to a year before, October 2022](#), using seasonally adjusted figures, since they are available.

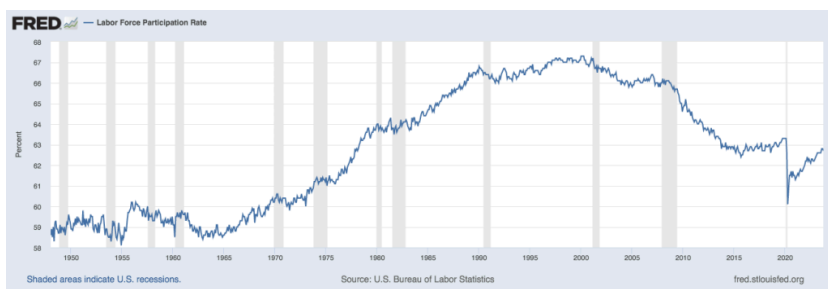
Employment Status	October 2022	October 2023
Labor force participation rate. white workers	62.0	62.3
unemployment rate, white male, over 20 yrs	3.0	3.4
unemployment rate, white female, over 20 yrs	3.0	2.8
unemployment rate, white male and female. 16-19 yrs old	9.6	12.2
Labor force participation rate. Black or African-American workers	62.1	62.9
unemployment rate, Black male, over 20	5.3	5.3
unemployment rate, Black female, over 20	5.8	5.3
unemployment rate. Black 16-19 yrs old	16.7	18.8
unemployment rate, all Asian workers	2.9	3.1
Labor force participation rate. Asian workers	64.8	65.3

We see that the labor force participation rate for whites and Blacks is fairly similar, around 62%, with Asians a few points higher. Asian workers have relatively low unemployment rates, averaging 3%, which is similar to white workers. Black people experience higher unemployment rates than whites, in some cases almost twice the white rate.

What really jumps out here is the unemployment rate for 16-19 year olds, which was 12.2% for white teens and 18.8% for black teens! Almost 1 in 5 black teenagers is unemployed. Keep in mind, we are not talking about 'lazy kids who can't be bothered' or 'teens with attitude.'—remember the definitions. To be classified as unemployed, these teens had to prove they were applying to a certain number of appropriate job openings a week, and getting turned down. So, race matters. Age matters. Gender matters too, but not in ways we can notice from this breakdown of the numbers.

TRENDS OVER TIME

When we look at graphs of employment data over time, we can spot certain trends. First, let's look at labor force participation rates in the U.S. over time:

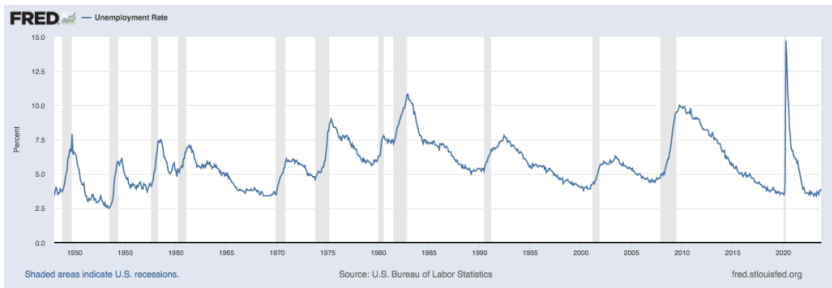


U.S. Labor Force Participation Rate Over Time

The grey vertical bars indicate periods of economic recession, and generally we see a fall in labor force participation in those periods.

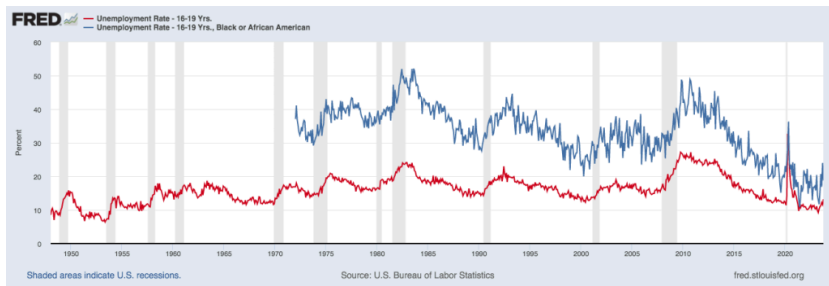
(When no one's hiring, people quit looking for jobs, meaning LFPR go down.) Around 2020, you see a big drop due to the COVID pandemic. But the bigger story is the gradual increase of our LFPR over the course of the twentieth century. In the 21st century, we see a marked decline in LFPR, probably due to people working for themselves—the 'gig' economy.

Unemployment rates also track recessions in the economy, with unemployment rates jumping up with every recession.



U.S. Unemployment Rate Over Time

We also see a marked increase for the 2008 recession and a high spike for the Covid period. When we looked at unemployment data for 2023 in the table above, we noticed that youth 16-19 years old suffered the highest rates of unemployment, with Black or African American youth having the highest rates. We can look at those numbers for the period after 2000:



U.S. Unemployment rates for 16-19 year olds (lower red line) and for 16-19 year old African-American youth (upper blue line)

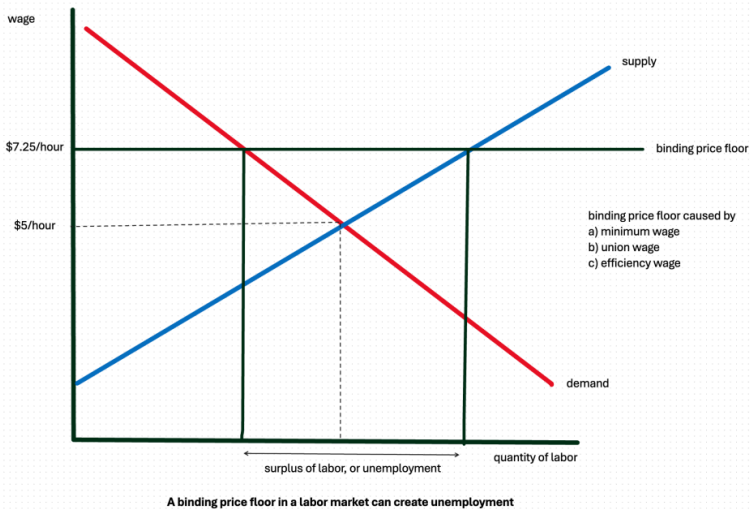
The lower, red line shows unemployment rates for all 16-19 year olds, and the blue line above breaks out the rate for Black teens, which is consistently higher. Sometimes, so much data seems overwhelming...and then you hit upon some numbers that really make their own point! Consider this data on the employment of people with disabilities in the U.S. economy:



Like all workers, there's a big drop in employment during Covid. But look at what happens after Covid! The employment of people with disabilities charts a steady but strong upward trend. Why? Think about remote work. The rise of remote work makes it possible for a lot more workers—people with disabilities, people care-giving in the home, people living outside urban areas—to enter gainful employment.

WHY ARE ANY PEOPLE UNEMPLOYED?

Normally, in any kind of market, we have a supply curve and a demand curve intersecting at some price and quantity that leaves suppliers and demanders satisfied. In a labor market, we would expect that the demand for labor and the supply of labor would intersect at some equilibrium wage, where employers could hire the workers they needed and workers could get the jobs they wanted. But what we saw when we looked at the impact of **price controls** in a market, is that a binding price ceiling or price floor could mean quantity supplied no longer equaled quantity demanded. Let's remember how that looks:



A binding price floor in a labor market can create unemployment

Here, a **binding price floor** in a labor market could produce a surplus of labor, or what we call 'unemployment.' What could explain this binding price floor?

A binding price floor caused by the minimum wage

Thinking about the high youth unemployment rates in our country, the minimum wage comes to mind. Typically, minimum wage jobs go to people who have no job experience, no skill training, and no higher education—which describes our 16-19 year old job seekers, who have just left high school. Employers might decide that paying these unskilled teens the \$15/hour minimum wage is not worth it, when they can buy point-of-sale (POS) software that customers can input themselves.

A binding price floor caused by the union wage

When we join a union at work, there can be many reasons. In rare cases, it's automatic; all workers are automatically part of the union bargaining group. When it's voluntary, we join a union to get better health and safety regulation, protection against unfair dismissal, and other workplace quality of life benefits. We also join unions because unions can get us higher wages than we'd have without a union, now [estimated at 18% higher](#). When a unionized workplace is paying 18% higher wages than a non-union shop, this could explain a binding price floor in those sectors.

A binding price floor caused by an 'efficiency wage'

There are certain employers who are known to pay 'above market' wages with lots of extras—think of Google, for example. While they are secretive about their actual wages, people compete hard for their jobs, one sign that they pay more than the rest of the market.

Or consider the example given by Janet Yellen, former head of the Federal Reserve, followed by her role as U.S. Treasury Secretary. She and her husband, George Akerlof, are both great economists. When she went back to work after giving birth, Yellen said she was determined to pay *over-market* wages to their nanny. When people were scandalized at the idea of economists paying more than they had to for anything, [she explained](#): “It’s a completely rational reason to pay someone more, especially if the job is some of the most intimate work there is, which is caring for children,” Yellen said. “Our hypothesis proved correct, at least in our own home.” Why do some tech companies and some parents (among others) pay wages higher than market equilibrium? It’s efficient! Employers who pay more, may get their pick of the applicant pool. When they hire someone at an obviously above-market rate, this person is not going to spend their time on the job looking for their next job—they know they’re being paid premium wages. This means they are more productive on the job. It also means they are less likely to quit for a better paying job, and **worker turnover** is expensive. Hiring workers is expensive—advertising, interviewing, looking at resumes, running background checks. There are also costs associated with departing workers, especially if they’re being fired. If it’s the nanny or a home health aide leaving—or any worker with personal attachments—the emotional costs of their departure can be huge. If an employer can pay above market wages, and get the pick of available workers and then retain those workers, that’s efficient. So sometimes in a labor market, that binding wage floor might be an efficiency wage.

REASONS WHY SOME GROUPS EXPERIENCE MORE UNEMPLOYMENT THAN OTHERS: DISCRIMINATION

While a binding wage floor, caused by a minimum wage, a union wage, or an efficiency wage, might account for unemployment for certain groups, like 16-19 year olds, the more obvious explanation

for a lot of unemployment is **discrimination**. Employers might decide they don't want to hire people of color, women, LGBTQ people, people with disabilities—and this could explain their higher unemployment rates. This seems like what we live through in the real world, so why don't we start our chapter right there? The reason might be a book, Capitalism and Freedom, published in 1962 by a prize-winning economist, Milton Friedman, of the University of Chicago. Friedman argued that no employer in a competitive market could stay in business discriminating against various groups. Why not? Other employers would hire those higher quality workers the discriminator had refused to hire, and make higher profits, driving the discriminators out of business. Discrimination was un-economic. Friedman's theory (and that's all it was) became popular among economists who wanted to argue against government interventions, like anti-discrimination legislation, since he was arguing that a free market would eliminate discriminatory behavior on its own. This was part of a larger ideology that 'free markets' promoted all sorts of personal freedoms as well. But there's a gap between the theory that competitive labor markets should eliminate discriminatory behavior, and the reality that we experience in our lives. Is it bad theory? Or are markets not competitive enough? What we do know, apart from our own experiences of discrimination, is that government actions can have a big impact on labor market experiences. Consider these 'single unemployed women' marching for the right to jobs during the Great Depression:



"Forgotten Women," 1933.

With so many men thrown out of work in the 1930s, prejudice against the hiring of married women rose: one breadwinner per family, and 'of course' it should be the husband! Single women were often shut out of relief work programs under the assumption that their 'families' could support them. Under the Federal Economy Act of 1932, for example, if married couples worked for the government, [the wife would be the first terminated](#). Decades later, we can see the Congressional Black Caucus working to get legislative support for Black full employment:



Thomas O'Halloran, 1975. NY Governor Nelson Rockefeller shaking hands with Rep. Shirley Chisholm

As we said earlier, there are legitimate roles for the government in the American economy, and addressing employment discrimination is (unfortunately) necessary.

OTHER REASONS WHY SOME GROUPS EXPERIENCE HIGHER UNEMPLOYMENT RATES: SECTORAL DISTRIBUTION

While the employment data offers average rates of unemployment for different groups, for example, the averages hide some important variations. Have you heard the expression, 'pink collar jobs?' Pink collar jobs are traditionally jobs with a lot of women workers—personal service, nursing, teaching, social work, hospitality, etc. Other fields, like finance and construction, for example, are more male-dominated. Sometimes when our

economy experiences an overall crisis—the 2008 Crash, the Covid years—it impacts certain sectors more than others, and this can mean a bigger impact on male or female unemployment accordingly. The 2008 Crash centered on the housing and finance industries, and that meant male employment was hit harder than women's. During Covid, a lot of personal service jobs (nail salons, hotel and restaurants work, for example) where women predominate, were hit hard. Many sectors where men predominated could shift to remote work. Likewise, as many families needed to shift their lower wage earner to supervision of at-home children, women were hit harder than men. Looking at sectoral distribution of men and women's employment can give [insights](#) into these impacts.

SOME USEFUL MATERIALS

A [video](#) on how to read/interpret the government's jobs reports.

A [video](#) focussing on women's job loses during Covid.

A [video](#) on the definition of unemployment.

A [video](#) discussing that definition of unemployment and who is left out.

A transcript of a podcast on [teen employment/child labor](#).

Interesting [findings](#) on discrimination in employment.

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CHAPTER 12

The Future of Work

BETTINA BERCH

Consider this



Simon Kadula, 2022, Automotive Assembly Plant

This is a modern automotive assembly plant. How many humans can you find in the photo? At first, American automotive jobs were lost to cheaper labor in other countries. Now, in many of those factories, that cheaper labor has been replaced by automation. Do you think it's a big loss for humankind? Did assembly line work offer workers more than a paycheck?

In the last chapter, we defined employment terms (unemployment, labor force participation rate, etc) and took a look at the data on employment demographics. We saw that the youngest workers (16-19 years old) of any color experienced the most unemployment, with African-American and Hispanic youth experiencing scary high rates of joblessness. Almost 1 in 5 of these teens of color are actively seeking a job but not getting one. Youth unemployment is also a big problem in many other developed countries (Great Britain, Japan, China, to name a few); largely

because it doesn't end well. An acronym was invented to describe this: NEET (not in employment, education, or training). What are these folks living on? What do their futures look like?

The future of work is not just a problem of unemployed teens. How will increased automation, artificial intelligence, and new pandemics change the way people work in the near future? Will there be fewer jobs to go around? How will we support ourselves if machines are doing so much of the work, that having a job is sort of unusual? Can you even imagine what that would be like?

WE CAN LOOK AT THE PAST FOR SOME INSIGHTS INTO THE FUTURE

While history is rich with insights, let's look at two periods: the Black Death (1347-1351) and the Industrial Revolution in Great Britain (1760-1840). Each of these disruptions offers useful lessons.

The so-called 'Black Death' was a bubonic plague pandemic that swept Western Eurasia and North Africa, killing 75-200 million people, roughly a third to a half of Europe's population, the area hardest hit. The plague was inexplicable for people unaware of virus transmission. Beyond the mass deaths, the countryside might have looked jarring: fields full of grain, trees bearing fruit—but with so many peasants dead, fewer people were left to harvest anything. The upper classes tried to force their serfs to work, [but faced a medieval version of the 'Great Resignation'](#). Peasants revolted, refusing to work or demanding higher wages to afford the higher cost of food. Governments passed stricter and stricter laws forcing peasants to work and punishing those who refused. The uprisings of the late 14th century were increasingly bloody and violent, resulting in a re-balancing of social power.

Britain's Industrial Revolution in the eighteenth century started with innovations in the textile industries, with the mechanization of spinning and weaving. Before these innovations, people spun

wool on spinning wheels and wove it into fabric on handlooms. They worked at home, in the daylight or by candlelight, most days a week, perhaps stopping work for Sunday prayers. They sold their product to a merchant; they were paid 'piecework,' we would say. With the invention of new machines to spin and weave, machines that required more than the foot power of home production, the factory system was born. The factory brought the machines, the workers, and the power source (water wheels, steam) all under one roof, for a set working day and an hourly wage. After production was moved to the factory, the business supervisors got their own roof too—the office. Actually, the modern office of 2020 is surprisingly similar to the office of 1920—rows of workers at their desks, all focused on their machines:



Copyright Office Workers, 1920



Israel Andrade, 2020. Office work

What are our takeaways from the Black Death and the Industrial Revolution? What are the implications here?

1. The shortage of workers after the plague (and maybe the serious brush with death that survivors must have felt) led to peasant rebellions—against being forced to work, against inadequate wages. Flash forward to 2023 and the waning of Covid—many people quit jobs for higher-paying ones, refused to go back to offices, and pointed out the gap between what they were making and what their bosses were making.
2. Before the Industrial Revolution, most of us worked at home. Since our time could be used on a lot of things and no one was supervising us, we were not paid by the hour but by the piece, by our output. Think about the arguments employers make nowadays for moving us back to the office—that people multitask at home, that

people are not as productive working at home. The pre-industrial world solved this problem by paying piecework, for output. Is that even possible for remote workers today?

3. [Office space is expensive](#): in HongKong, it runs \$265 per square foot. In London, it's \$181 a square foot. Businesses that downsize or even eliminate their offices when their leases expire, may have a competitive advantage in their markets. Maybe we will all be working from home in ten years!

HOW WILL INCREASING AUTOMATION SHAPE THE FUTURE OF WORK?

Since the days of the Industrial Revolution, people have been warning that machines will replace people at their jobs. In many cases, it's true. Phone calls used to be routed manually by telephone operators. Customer service desks used to be staffed by people, not computer software generating (frustrating) responses. While it is easy to tell each other horror stories about how we're all going to be displaced by automation, let's stop and look at what's actually happened in the real world.

Let's take the example of bank tellers. When was the last time you asked a bank teller to take money out of your account? Never? In real life, you drop by a kiosk, or even a bank lobby, sometime late at night and get the cash from an ATM. There's no teller needed. You would think the ATM has displaced millions of bank tellers. But you'd be wrong. From 1970 to 2017, the number of [human tellers has increased from about a quarter of a million to half a million](#). And the numbers keep growing. What's the story? Bank tellers don't spend much time dispensing cash anymore. They've become sales people for products banks are promoting (new CDs! ARM-mortgages!) or problem-solvers for customers who can't access their accounts. Economist David Autor also argues that when some

part of your job gets automated, the other parts, the human responsibilities, become more important. Then too, automation may replace some human jobs, but because our consumer wants and needs are always expanding, we're always wanting more stuff, so there's new demand for more workers all the time. This positive outlook comes with some caveats. There's no guarantee that job *quality* won't change; after automation, available jobs in many fields may not be as fulfilling as they used to be. There may be a hollowing out of middle-skill jobs, as AI learns to do them more consistently than we do, leaving just no-skill jobs and very-highly skilled jobs, with nothing in-between. Bottom line—workplace changes will impact some people and some fields more immediately than others.

WHAT IF WE LOSE JOBS TO AUTOMATION AND AI? HOW WILL PEOPLE LIVE WITHOUT A PAYCHECK? COULD THE UBI BE THE ANSWER?

For most of us, our income (what we live on) comes from our jobs. If we are looking at a future that needs fewer people with jobs, where would our income come from? This has led more people to think about cutting that link between income and jobs. What if every person received some fixed amount of money every month from the government that was unrelated to a job (like a paycheck) and unrelated to poverty (welfare)? This kind of payment has been given many names—the most popular might be **UBI, universal basic income**. In some parts of the world, the UBI is loaded onto a monthly debit card, with conditions on where it can be spent. In other places, it's an annual payment. In some areas it's an experiment with a fixed end date. In others, it's only available to people out of work, or for single people raising children.

It's great that there are so many experiments in diverse areas—then policymakers can evaluate what works best and what's definitely a bad idea. Ideally, we don't want the UBI to turn

everyone into ‘couch potatoes,’ only getting up to go cash the monthly check and restock the beer. We want a UBI that supports healthy lifestyles (however that’s defined), that doesn’t disrupt the existing incentive systems in society. For example, if people go to college because they think it’ll get them a better job, we wouldn’t want the expectation of a lifetime UBI to discourage them from bothering with college. You might already suspect that the **size** of the UBI is going to be critical. If it’s too small, it’s not useful, especially if it’s a substitute for a paycheck. Too large, and we wonder if our government can afford to issue it to everyone. Let’s look at some real life examples.

CURRENT, LARGE-SCALE UBI

For over 40 years, full-time residents of Alaska have received an annual PFD (permanent fund dividend), an amount based on state revenues from oil and mining. While the annual amount varies, it averages about \$1600 per person, per year. [Research](#) indicates that the PFD has not depressed employment in the state, although there’s been a small increase in part-time employment, which is hard to interpret. While the PFD is popular with Alaska residents, it’s not a huge sum and because it’s paid annually in a variable amount, it might feel more like a bonus than a regular income.

Gyeonggi Pay, in South Korea, is large scale UBI program with some interesting twists. The Gyeonggi province started making UBI payments to 24-year olds in 2016, with a series of variations on the amounts and eligibility. It expanded in 2018 to all residents, with payments reaching the equivalent of \$430 per month. The most interesting feature they included was a mandate for local spending; Gyeonggi Pay, disbursed as a debit card, could *only* be spent with local merchants. So during Covid, New Yorkers, for example, avoided local shops in favor of big-box-store deliveries, leading to the collapse of small businesses. But small Gyeonggi merchants saw a [54% increase in sales](#), thanks to people spending

with their Gyeonggi Pay cards. Governor Lee Jae-myung, who has actively promoted this UBI, says it's not a welfare plan but an economic policy to address what he calls the Fourth Industrial Revolution, the end of the 'labor era.' If you're wondering how the province (or the country, if it were expanded) would pay for this, Jae-myung is bold—he calls for a 'robot tax.' If the home province of manufacturing giants Daewoong and Hyundai and Samsung proposes a tax on robots, maybe we should be listening!

The promise of UBIs

Small UBI experiments, set-up to see if participants can improve their quality of life with a monthly stipend, are operating in cities across America, in countries around the world. When an American presidential candidate like Andrew Yang in 2020 makes a national UBI a plank in his platform, it starts to sound like it *could* happen! The idea of a check from the government, once a month, covering our basic needs, sounds revolutionary...but remember, in 1935, when the U.S. government instituted Social Security, mailing out checks to millions of Americans once a month, that also sounded radical.

SOME USEFUL MATERIALS

The [Black Plague pandemic](#) and parallels to our Covid experiences.

Experts from [The Economist](#) [discuss](#) the past and future of work.

Economist Autor [talks](#) about the impact of Chat GPT and other AI on middle class jobs.

Autor on why [human jobs increase](#) and upgrade with automation, and the O-ring principle.

[Wait](#)—are we going to have a labor **shortage**?

[Video](#) on South Korea's UBI experiment.

[Podcast](#) on UBI experiments around the world.

A short but provocative [column](#) on whether we will be replaced by A.I.

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CHAPTER 13

*Production and Growth*BETTINA BERCH

Consider this

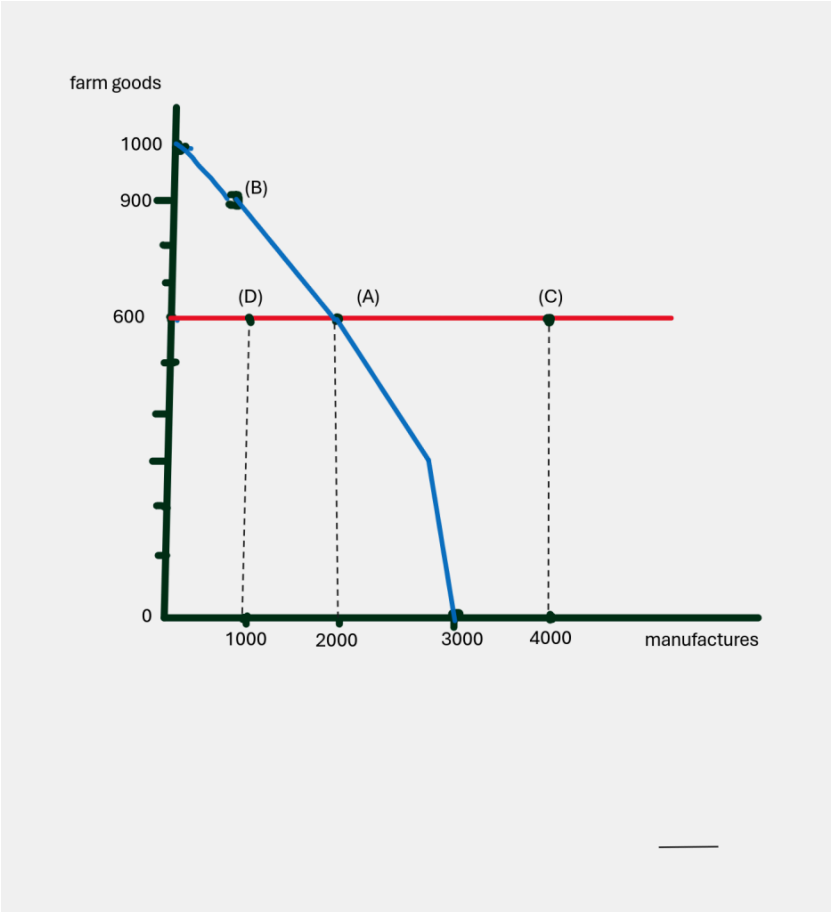


Katsushika Hokusai, 1830-32. The Waterwheel at Onden

In the “golden age of capitalism,” 1950-1973, [Japan had a growth rate of 8%](#), one of the highest in the world, in spite of having hardly any natural resources! Indeed, before Japan’s industrial revolution, they relied on water wheels as their [primary power source](#), and even their water wheels were largely imported. So what’s their ‘secret sauce’? How did Japan achieve such high growth rates? How does any economy do it?

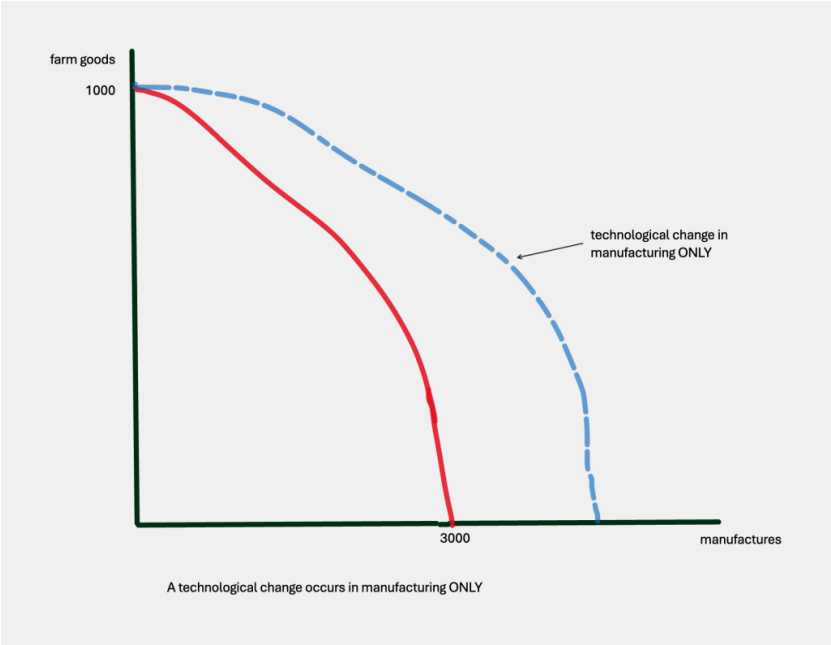
WHAT IS ECONOMIC GROWTH?

Do you remember back in chapter 2, when we introduced the production possibilities frontier? We said this line described all the potential output our economy could produce, given our resources and our level of technology. Inside the frontier, all the points were inefficient. Outside the frontier, all the points were not possible, unattainable.



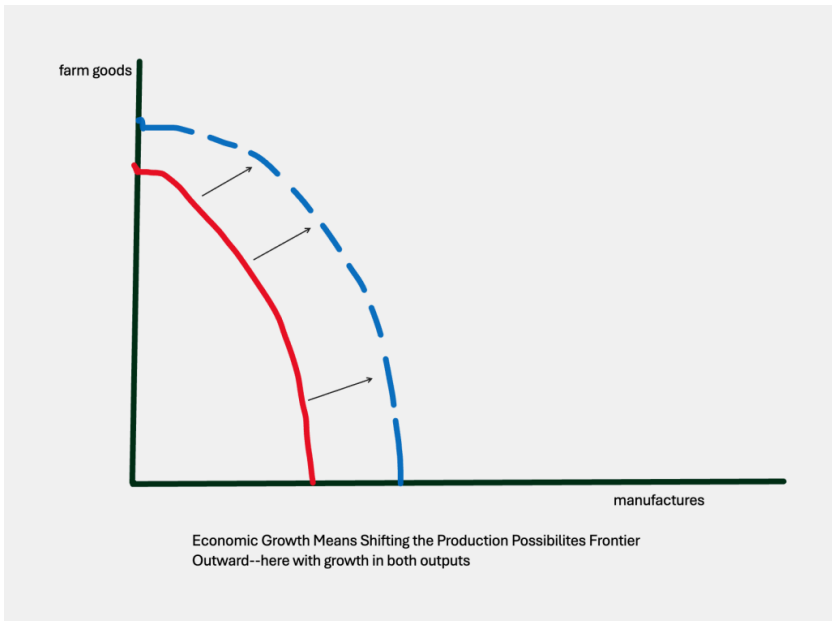
Point (D) is inefficient and point (C) is not possible

Now, when we talk about economic growth, we can go back to this model and draw in a new production possibilities frontier that shows economic growth: getting more of one or both of our two types of products, farm goods and manufactures.



Technological change that impacts ONLY manufacturing will shift out the curve for manufacturing output, but no change in farm output

More generally, we could picture the production possibilities frontier shifting outward from both axes, indicating improvements in producing farm goods *and* manufactured goods:



Economic growth

In the real world, there are many ways we could quantify growth, and we often use the annual growth rate of real GDP per person. According to the World Bank's 2021 data, some of the [fastest growing economies in the world](#) are the Maldives at 39.8% and Libya, with a 29.8% GDP growth rate per capita. At which point, you might be thinking, where???? by how much???? The problem with those figures, is that countries starting at a low point can score high growth rates with a few small improvements (part of what the [catch up effect is about](#)). An already developed country would have to work very hard just to show a small increase. Not only that, a one year short term increase might not be as meaningful as a steady growth rate over a long period of time. If we take [average growth rates over a long period, like the twentieth century](#), we might have something more meaningful. Now we'll see Japan topping the charts with a 2.65% annual growth rate over the course

of the century, followed by Brazil at 2.43%, Germany at 2.06%, China at 2.15%, the U.S. at 1.77% and Bangladesh at .96%. This gives you an idea of the range of growth rates that are realistic (2.65%–.96%) and also how a few decimal points difference in growth rates can make a huge difference in living standards on the ground.

WHAT DETERMINES HOW MUCH AN ECONOMY CAN PRODUCE? THE PRODUCTION FUNCTION!

We call the relationship between the inputs into production and the amount of output, the **production function**. We write it like this:

$$Y = t^* f(K, H, L, N) \text{ where}$$

Y = real output of the economy

t^* = the level of technology the economy is operating at (like analog, digital, nuclear tech, etc)

K = physical capital (like machinery and other ‘capital goods’)

H = human capital (like education, nutrition, skills, the ‘enhanced human’)

L = the number of workers (the number of people working, regardless of their skills)

N = natural resources (energy sources like fossil fuels and renewables, minerals)

The production function says that if we combine our inputs (K , H , L , and N) at the current state of technology t^* , and do this efficiently, we can produce the amount Y of goods and services. You can think of this Y defining the maximum capacity of our economy, or what we will be calling ‘full employment.’

THE PRODUCTION FUNCTION IS A REAL, NOT A NOMINAL RELATIONSHIP

One important aspect of the production function, is that it is a real relationship, not a nominal one. This means that *prices of inputs*

and prices of outputs can change, but the if the stated amounts of inputs are combined at the stated level of technology, *we will get the same amount of output* no matter how prices change. One way to understand this, is to think of a production function like a recipe—where certain amounts of ingredients are combined using certain types of technology to get some number of servings of food. Look at grandma's brownie recipe:

Grandma's Brownies

1 stick butter
2 ounces unsweetened chocolate
1 cup sugar
2 eggs
1/3 cup flour
pinch salt

Melt butter and chocolate together.
Cool.
Mix in other ingredients.
Bake at 350 for 40 minutes



Recipe makes 9 brownies

1. When Grandma wrote down this recipe:

butter cost \$1 a pound
chocolate was \$2 a bar
eggs were \$1 a dozen
...and the recipe made 9 brownies

2. Today, all these prices have tripled or more...but the recipe still makes **9 brownies**.

Grandma's recipe is a **real**, not a nominal relationship.

The production function is a real, not a nominal relationship.

Prices of inputs do not change the quantity of output.

Her recipe lists amounts of various inputs, baked in an oven (our technology), resulting in 9 brownies. The prices of inputs can change over time—but you can still use her recipe and you will get 9 brownies. It's a real, not a nominal relationship. Just like our production function.

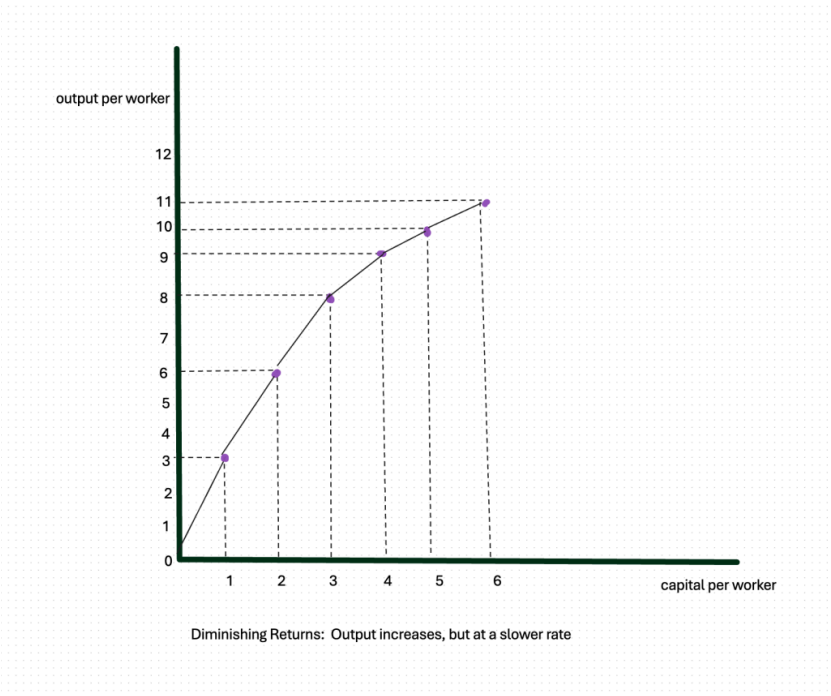
HOW CAN A COUNTRY INCREASE Y (REAL OUTPUT)? LET'S START BY INCREASING K ...

To increase Y , we will have to increase our capital stock, increase our human capital, increase our number of workers, increase our natural resources, and/or improve our technology. Let's consider each in turn.

When developing countries are trying to grow faster, policy makers always used to tell them to increase their K , their capital. Build more factories! And while adding more units of capital can increase output, there are limits. Add more and more units of capital, and something called 'diminishing returns' set in, where output increases, but at a slower rate. How does this work? Imagine I leave the city to go to a cabin by a river, deep in the forests of New Jersey. After I arrive, I go out and look at the river, where I can see fish, but I can't catch any with my bare hands. I need capital, tools! To kill my appetite that night, I look around in the shed, where I find a hand-line. The next day I go out to the river, drop in my line, and by the end of the day, I have caught 3 fish. That night, I go to the shed, find another hand-line, and the next day, with 2 pieces of capital, I catch 6 fish. That night I find a fishing pole, so I go out the next day with 3 tools and this continues until I am trying to use two hand-lines and 4 fishing poles. My output is increasing, but at a slower rate. You know why! I cannot manage 6 lines very well with only my 2 hands.

# units of capital	output (fish)
0	0
1	3
2	6
3	8
4	9
5	10
6	11

We could graph these results:



Diminishing Returns to Capital

WHAT ABOUT INCREASING H , OR HUMAN CAPITAL?

Another typical bit of advice to countries trying to increase their growth rates, is to increase their H , or human capital. Make sure everyone has good health care and basic nutrition. Send children under 16 to school, instead of putting them to work in factories! And while better health and education often improves a country's standard of living, and its productivity, it's not without costs. In many parts of the world, sending children to school involves direct costs (tuition, uniforms, books, transportation, room and board) and indirect costs (the money they would have made working). A family might not be able to afford that for all their children. So maybe the smartest child is sent to school, while the others work harder to cover the extra costs. Maybe this child is so successful they win a scholarship to study in England or America. And after they graduate with many wonderful advanced degrees...are they really going to go home, where there are no jobs for young women with doctorates in nuclear physics? This situation is often called **brain drain**, when the best-and-brightest just can't see a future for themselves returning to their home country. This is not an argument against education, just a warning that improving human capital is not as simple as it looks.

WHAT ABOUT INCREASING L , OR THE NUMBER OF WORKERS?

We can increase L two ways—either by including more of our existing adult population in the labor force, or by bringing new people into the country. If our country discourages women from entering the labor force, and we reversed that policy, we could increase L and not even add 'more mouths to feed.' Opening the labor force to women, would not only increase L but also the K ,

or human capital, that they may have. Or, we could encourage more immigration to the country. And since immigrants are usually ambitious and often quite skilled, they too will bring human capital as well as sheer labor power. At times in history various countries have realized they needed more L and have started programs to bring in foreign workers (German's *Gastarbeiter* program from 1955-1973; America's H2-A farm worker visa program). Political opposition to these programs often comes from xenophobic right-wingers, or from labor unions, so this too is not as simple as it should be.

IS INCREASING N THE ONLY 'SAFE' OPTION TO GET INCREASED Y?

You'd think it would be such an advantage in this world to have lots of natural resources! Then you look at the history of some of the countries that have diamonds, gold, titanium, and other precious metals, and the wars they have endured, either from colonial powers or from eager-to-invade-and-plunder neighbors. It's not just 'blood diamonds' and 'conflict timber,' there's a growing list of important minerals– tantalum, tin, tungsten and others–that spark wars and other problems. Some economists have called this the '[resource curse](#)' and it's in the news every time some impoverished country strikes oil. It has been argued that if the African continent had had no valuable resources, European colonial powers probably would not have invaded and ruled for as long as they did. Not only can natural resources invite war, the lack of natural resources hasn't prevented some countries from achieving high growth–Israel and Japan come to mind. Finally, there's a larger question of what we recognize as a natural resource. For centuries, fossil fuels have been important natural resources–with extensive technology developed for its extraction and refining. Only recently have wind and solar power become important natural resources, and we're still in the early days of

their efficient utilization. (Why? Most likely because the temperate zones have more fossil fuel reserves than the tropical zone, which has access to more wind and solar.) Indeed, focusing on natural resources leads us to considering one term in the production function that we have not discussed—technology.

HOW BIG A ROLE DOES TECHNOLOGICAL CHANGE PLAY IN ECONOMIC GROWTH?

Technological improvements surround our daily life, so much so, that it’s hard to imagine quantifying their importance. But one Nobel-prize winning economist, Professor William Nordhaus, decided to tackle the question. He decided to look at the history of how we make light, since having light makes a lot of things in life possible. After researching the most typical light technologies, from ‘caveman days’ to the modern era, he reproduced these methods in the laboratory, to see how much human labor it took to produce 1,000 lumen hours of light with each technology, where 1 lumen is defined as the light produced by 1 candle. Here, in condensed form, are some of [his results](#):

<i>Time Period</i>	<i>Light Source</i>	<i>Labor Price (hours to produce 1,000 lumen-hours of light)</i>
500,000 BC	open fire	58 hours
1750 BC (Bible days!)	Babylonian lamp (clay version of the Aladdin lamp)	41.5 hours
1800 AD (Middle Ages)	tallow candle (animal fat mixed with ash)	5.4 hours
1900 AD	filament lamp (first light bulbs)	0.2 hours
1990 AD	filament lamp (modern light bulb, not digital tho)	0.0006 hours

This small table shows a remarkable advance of technology in one of the most important features of human life, the ability to make light. But we could also trace the rise in the [production of books](#)

over the course of centuries: from scribes in monasteries, who took some 136 days to copy one book, to the printing press of the 1440s that could crank out 2.5 books per day, to steam-powered printing, producing 25 books a day, to the modern day, where countless books can be issued per day.

Even if there are technological innovations that don't impress us, certainly advances in light and knowledge are important. So we need to ask: what stimulates technological innovation? Why are some countries leaders and others followers—or worse, copiers?

WHAT STIMULATES TECHNOLOGICAL CHANGE?

For a long time, economists have argued that a strong patent system was the best way to stimulate innovation. Did you realize that patent and copyright protection was [written into the U.S. Constitution?](#) It's Article I, Section 8, Clause 8, that says our Congress shall have the power "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." We know that many of our founders (think Benjamin Franklin and Thomas Jefferson) were themselves inventors and writers, but what's the economist's argument for patents?

Consider this situation. You are a business person and you've decided to stake your entire fortune on finding a cure for a terrible disease. Let's say, sickle cell disease. You spend billions setting up laboratories and hiring expensive scientists. After ten years of work, one of your team finds a cure! Let's call the cure, pill XYZ. Information about XYZ is published in the leading journals, and tested by the FDA. If there were no patent system, a whole crowd of manufacturers would now rush to produce and sell XYZ—cheaply. You put billions into the development of the cure, your results became public knowledge, and then you had no way to recuperate the money you spent on development. You decide

never to fund research again! Technological innovation slows down.

Alternately, consider what happens when there's a patent system. You put the billions into research, find the cure, publish the results for verification—and then you get a patent on your discovery. For the next 20 years, if anyone wants to produce XYZ, they have to rent a license from you. And you, seeing a nice return on your money, decide to tackle another disease. Technological change is stimulated.

Patents and copyrights give inventors property rights in their ideas. Their discovery (that cure for sickle cell, that treatment for cancer) became public knowledge as soon as it was tested and verified by others. A patent converts that public good into the private property of the inventor, allowing the inventor to go on to make more brilliant discoveries, more technological innovation. While this is accepted doctrine in the economics profession, it isn't necessarily true—or true for all people. Professor Lisa Cook, studying the [history of patents in the early twentieth century](#), shows that anti-black violence reduced patent rates for African Americans. Just having a patent system isn't enough—the broader legal/cultural infrastructure is critical as well.

In recent years, the doctrine of 'patents promote innovation' has been challenged by the 'open source' movement. Open source argues that by letting others examine the computer code, modify the book, or redesign the product—the original process or product is improved. You may be familiar with Linux and Ubuntu, which are open source operating systems; even this book you are reading is an open source document. Open source rules the world of cocktails, of 'signature dishes' of famous chefs, and even tattoo flash. If you wanted, you could reconfigure some open source materials that others have created, and by doing so, you might be making an even better product. This is where the boost to productivity is supposed to kick in—people tinkering with the product, coming up with something better.

Which system stimulates more technological change? It might depend on the type of product we are considering. Pharmaceutical advances require high overhead costs, which may only be financed by the promise of a patent. Cultural advances may flourish better in the open source world, where the rewards may be more indirect (like fame).

HOW DO WE ENCOURAGE SPECIFIC TYPES OF TECHNOLOGICAL CHANGE?

Apart from patents and personal fame, there are other ways to stimulate technological change. Governments can issue subsidies or grants to university researchers, which can be an effective way of funding the sort of basic research that doesn't result in a marketable products, but furthers our understanding of things which could ultimately lead to products. Research on the origins of the universe, for example, is too abstract for many businesses to fund, but can ultimately lead to findings that a business *might* pursue, like building a viable space station. Another approach to innovation is the 'world prize' route: a world organization might announce a big prize for the first lab to develop an effective malaria vaccine, for example. The prize money would compensate the inventors for their work, releasing the use of the vaccine patent-free to any country that needed it, making it affordable.

Open source challenges, patents, subsidies, and prizes are each ways of stimulating innovation. They may function differently, but once something's invented, it spreads around the world. And as we shall see when we discuss developing countries, technology invented in the developed world (like cellphones and basic computers) often allows developing countries to 'leapfrog' forward, producing what we call a 'catch up' effect, bringing developing countries closer, faster, to the developed world. It's called 'convergence.'

SOME USEFUL MATERIALS

A short [video](#) on patents vs. prizes vs. subsidies.

Patents from the [ancient world to our own](#).

A [podcast](#) on patents and racism.

An argument that patents [stimulate economic growth](#).

An argument in favor of [open source](#).

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PART III

PART THREE: MONEY ENTERS THE PICTURE

3

CHAPTER 14

Tools of Finance: Stocks, Bonds, Mutual Funds, Insurance

BETTINA BERCH

Consider this



Stock Certificate, Black Star Line, 1920.

The Black Star Line, founded by Marcus Garvey in 1919, was a Back-to-Africa shipping line. In later years, Garvey's Pan-Africanism inspired various radical movements, like the Nation of Islam and Rastafarianism. Seeing this stock certificate, might make you wonder—isn't it kind of capitalist to raise money by selling stock? How do you think Garvey's very revolutionary supporters would have viewed buying such a stock certificate in 1919?

Looking at economic growth, we saw that the production function determined how much we could produce, given our inputs. Increasing various inputs (K, H, L, N) is key. Many individual businesses try to grow by expanding their K, or physical capital. Often that means raising fresh funds to buy new equipment or

rent larger factories. They raise this money using various financial instruments, in what's called [capital markets](#), which we can now explore.

BONDS

Sometimes a business—or a government—will raise extra funds by issuing bonds. A bond is like an IOU, a promise to pay back money that's been borrowed. Formally, a bond should have a maturity date, a stated value at maturity, and the name of the issuer. The building of railroads in America, in the late nineteenth century, was largely financed by the issuance of bonds:

CLEVELAND CINN CHICAGO & ST. LOUIS R. CO.

No 10665

CLEVELAND, CINCINNATI

CHICAGO & ST. LOUIS

Authorized Issue, **RAILWAY COMPANY**, \$50,000,000.

General Mortgage Gold Bond, Payable June 1st 1893.

1000

No Value Received. The Cleveland, Cincinnati, Chicago and St. Louis Railway Company, a corporation existing under the laws of the States of Ohio and Indiana, promises to pay to the Mercantile Trust Company of New York or bearer, if this bond be registered as hereinafter provided, to the registered owner, One Thousand Dollars in gold coin of the United States of the present standard of weight and fineness, at the agency of the said Railway Company in the City of New York, on the first day of June, nineteen hundred and ninety three, with interest thereon at the rate of Four per cent per annum from the first day of June, eighteen hundred and ninety three, payable semi-annually in the gold coin at said agency on the first days of December and June in each year on presentation and surrender of the annexed coupons as they shall severally become due. Both principal and interest of this bond are to be paid without deduction for any tax or taxes which said Railway Company may be lawfully required to pay or which may be assessed or future laws, said Railway Company hereby extending and agreeing to pay and all such taxes. This bond is one of an issue of railway bonds to an amount not exceeding in the aggregate fifty million dollars, secured by a mortgage of and of first dated the fifteenth day of May, eighteen hundred and ninety three, executed by the said Railway Company to the Mercantile Trust Company of New York and Theodore A. Humphrey, Trustee, conveying the property therein described upon the terms and conditions therein set forth. This bond is payable without set-off from any extension, stay or suspension laws now existing or that may hereafter be enacted, and it is agreed between the said Company and the holders hereof that no liability herein shall be enforced against any officer, director or stockholder of said Company or against the estate of such officer, director or stockholder by virtue of any law of any State whatsoever, and that such officers, directors and stockholders do not assume any personal liability on this bond. The ownership of this bond may at any time and from time to time be registered at the agency of said Railway Company in the City of New York, the registration to be certified to hereon, and thereafter, no transfer of this bond shall be valid unless made upon the back of said Company and certified, hereon, by its Transfer or Transfer Agent until registration has been made to cover after which this bond shall pass by delivery until the ownership be again registered. The registry of this bond shall not restrain the negotiability of the coupons by delivery, merely, but if the ownership of this bond be registered, the owner of said bond may surrender all unpaid coupons hereon to the said Railway Company for cancellation, such surrender to be noted hereon by said Transfer or Transfer Agent, and there after the interest hereon shall be payable only to the order of the registered owner.

This bond shall not be valid until the certificate endorsed hereon shall have been signed by the Mercantile Trust Company, Trustee, under the said mortgage or deed of trust.

In Witness whereof

The Cleveland, Cincinnati, Chicago and St. Louis Railway Company has caused its corporate seal to be hereon affixed and attested by its Secretary or Assistant Secretary, and this bond to be signed by its President or one of its Vice Presidents, and has hereon attached coupons with the name of its Treasurer engraved thereon the fifteenth day of May, eighteen hundred and ninety three.

The Cleveland, Cincinnati, Chicago and St. Louis Railway Company.

1000

UNITED STATES OF AMERICA

Chicago & Cleveland, Cincinnati, St. Louis Railway Company, 1893 Bond

Certificate

Governments also raise funds to build infrastructure or finance wars by issuing bonds. Here is a bond (with tear-off coupons for interest payments) issued by the Confederate States to finance their side in the Civil War:



\$100 Bond, Confederate States, 1867

War bonds not only raise funds, they raise awareness and support for the war effort among the general population. This photo, of an Asian-American soldier buying war bonds from his officers in 1943, emphasizes that buying bonds is a way to prove loyalty (as if fighting for the team wasn't enough):



Private Jack Y. Oato buying \$2,500 of war bonds, 1943

Bonds differ according to the length of time they're issued for, the riskiness of default, and their tax treatment. Let's consider each. A bond, like an IOU, has a maturity date, the date when the buyer can ask for their loan back. If the date is relatively soon, like 3 months, it's a lot more likely to be repaid than a date in 30 years. The shorter the time horizon, the less risky the bond. When a bond (or any other financial instrument) is less risky, it has a lower rate of return than a bond that's more risky. Which means, other things being equal, a short-term bond will pay less interest than a long-term bond.

But other things are not always equal. If your best friend wants to open a restaurant in the neighborhood and sells bonds to raise funds to get started, that's a very different proposition than Apple issuing bonds to expand its operations. Neighborhood restaurants

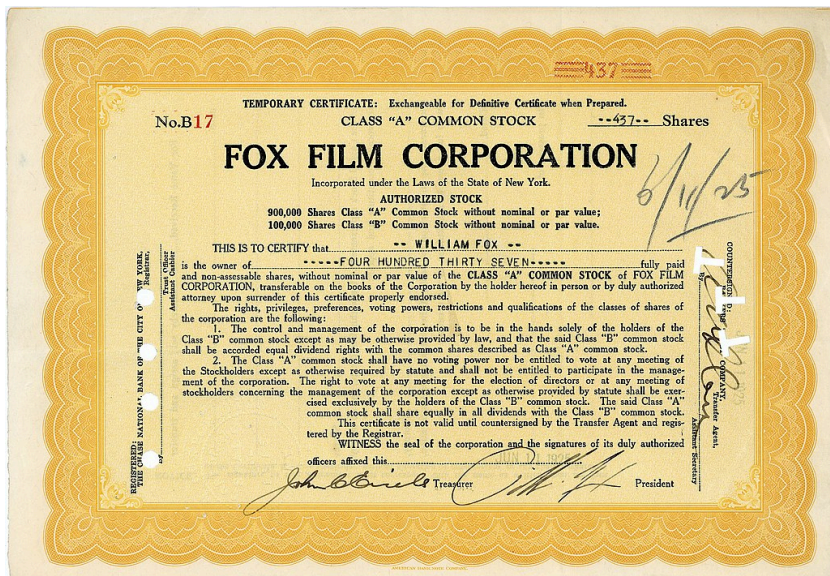
have some of the [highest failure rates](#) in the country, while Apple is pretty safe. Your friend will need to offer a relatively high rate of return on their bonds compared to what Apple's offering, because it's likely they won't be in business when the bond is mature.

Bonds issued by local, state or federal governments usually get favorable tax treatment, which allows them to offer a lower rate of return. How does that work? If I buy a bond from Starbucks paying 10% return or I buy a New York City bond offering 5% tax-return, I have to weigh how much I will get in the end. After I pay income tax on Starbucks' 10% interest, I may have less money than I would have had with the tax-free NYC bond.

So, bonds differ in their riskiness (according to the length of loan and the stability of the issuer) and their tax treatment.

STOCKS

Business can also raise funds by issuing stock in the company. A share of stock represents part ownership in the company. This can mean the right to attend annual meetings of the company, a vote in some elections or referenda, and a share in the company's gains or losses. The bond was just a loan of money; stock is actual ownership in the firm. You're not just loaning your friends money to open a restaurant, you're telling them how to run the place! This 'ownership' aspect, is why this is called equity finance—as a stockholder, you're getting equity in the company. With stocks, the market price of shares indicates peoples' expectations of profitability. Let's look at some stock certificates, starting with this one, issued by Fox Film to the president of the company, William Fox (perhaps another propaganda move):



Stock Certificate, Fox Film Corporation, 1925

These days, stocks are transferred virtually, but last century, paper stock certificates were sent to buyers, so they often replayed the company's logo:



Stock Certificate, Gerber Products, 1971

We have come to understand that 'buying stock' in something is a metaphor for not just being a part owner, but for being a cheerleader for the company's success. Do you think this 'stock certificate' was for real?



Stock Certificate for One Share of Seattle's Municipal Government

MUTUAL FUNDS

Let's say you have \$200 and you want to buy some stocks and/or bonds, but you don't know anything about businesses and you don't want to learn about them either. You figure Apple is a solid company, but your \$200 will buy a little over 1 share of Apple. Suppose Apple goes down for a year? a decade? Putting all your money in one company is risky and you don't like risk. Enter the mutual fund! It's designed so the experts build the portfolio, not you. Each fund's portfolio is composed of stocks or bonds of many companies, allowing you to *diversify* even with your small stake.

There are two basic flavors of mutual funds. First, there's the actively-managed mutual fund. A team of highly-skilled and highly paid stock experts discuss 'the market' and buy and sell according to their wisdom. But wisdom isn't cheap. Your payouts from the mutual fund (your dividends) will reflect the profits or losses of the

portfolio **minus** the cost of running the fund, which includes the salaries of all those MBAs and PhDs they hired.

A second type of fund is the passively-managed fund, or 'index fund.' These funds build their portfolio by selecting some stock or bond index and buying a proportionate amount of each company on the index. After that, the high-paid staff goes home—the fund's holdings are on auto-pilot. While these index funds might miss some fantastic market plays, their operating costs are low, without the geniuses on board.

Both the actively managed and the index funds can specialize in different types of industries, different levels of risk, and even different markets of the world. Which kind of fund does better? It's an issue debated in business schools, with all kinds of clever examples, but [index funds usually win](#), even according to 'stock experts.'

DERIVATIVES

Ever since the 2008 financial crash, people have had bad things to say about derivatives. They blame derivatives for the collapse of the housing market, the instability of the banking system, and the failure of some major finance firms. So, what are derivatives, that they could be blamed for so much disaster? A derivative is really anything that's value is *derived* from the value of something else. In particular, a "financial derivative" is a contract based on an asset. It often comes from a situation with risk, as a means of coping with that risk.

Let's consider a situation that has an unacceptable amount of risk for me—the risk of not eating turkey on Thanksgiving. Every November I have the same problem. I don't want to buy a turkey right away, because maybe my brother will invite me to his house, so I will have wasted money on a turkey I won't eat. But if I don't buy a turkey because I'm waiting for an invitation, and he doesn't

invite me, and then I go to the shop and they don't have turkeys left—I'm in trouble. I'd like to have a way to deal with this risky situation. My butcher has a great idea: a Turkey Derivative:



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.cuny.edu/berch/?p=313#h5p-1>

For \$5, I get the right to buy a 20-lb turkey for \$2/pound, even the day before Thanksgiving! The value of this derivative is *derived* from the costliness of the stress I'd feel, not getting any turkey at all. Of course, the derivatives blamed for the 2008 Crash were not imaginary turkey certificates, they were 'mortgage-backed securities.'

MORTGAGE-BACKED SECURITIES

Going into the 21st century, a lot of people thought the surest way to make money was to buy a house, because a house was 'always' worth more when you sold it. Hadn't the house prices just gone up and up, year after year? People were saying that to buy a house was as good as printing money! The housing market was crowded with these speculative buyers, rather than the traditional buyer who saved up for years and applied for small, safe mortgage loans. The banks wrote more and more mortgages, even to borrowers with poor credit history. They then bundled these mortgages and created a whole new item out of them, a 'mortgage-backed security.' This is the derivative, since the value of

this thing is derived from the value of the mortgages it includes. How was that determined? More or less in the usual way, which means so-called ‘ratings agencies’ like Standard and Poor rate them, gave them a grade. Buyers purchase the mortgage-backed security, the derivative, based on that grade. These derivatives became hard to grade accurately, with bits and pieces of so many different quality mortgages all in one. A bad batch might be worthless. Unraveling defaulted mortgages became even more challenging. The [role of derivatives](#) in the 2008 Crash is more complex than this, but you get some idea.

It’s useful to remember that a derivative represents value *derived* from something else, so it’s only as good as the thing it’s based on.

INSURANCE

The concept of risk has been floating around this chapter—we’ve seen that the return on bonds varies according to the issuer’s riskiness, the risks of stock or bond ownership can be mitigated by the diversification that mutual funds offer, and finally, we saw that derivatives were financial instruments covering risky situations.

There’s one more instrument we need to discuss: insurance. Insurance can cover your home, your car, your health, or your business, against a variety of threats—accidents, weather, floods, death—you name it! **Insurance does not prevent bad things from happening**—the hurricane will still hit, even if you have hurricane insurance. Purchasing the insurance means that the costs of your catastrophe will be spread out over a larger group of people (the others who have bought insurance). Everyone who buys hurricane insurance pays premiums (an annual charge) for their coverage. If a hurricane hits the homes of 10% of the policy-holders, it’s the premiums paid in by them and the other 90% that will pay for rebuilding the homes of the 10% (minus administrative costs, profits for the insurance companies, etc). But you get the idea—the payouts have a direct relation to the premiums paid in. This

might sound obvious, but it's really important, because it affects the affordability, the cost of those premiums.

Adverse selection

Let's stay with the hurricane insurance, and think about who buys it. If you live in Chicago or New York City, you probably wouldn't decide to buy hurricane insurance. Hurricanes are a once in a lifetime experience for these folks. But if you live in Puerto Rico, bad hurricanes can be common, so you'd want to buy the insurance. This might mean that hurricanes will be hitting 90% of the policy-holders. The premiums charged for that insurance are going to have to be high to cover all those payouts. For a long time, before President Obama's Affordable Care Act (ACA), premiums for health insurance in the United States were very high—because most of the people buying insurance were people who thought they really needed it—like the elderly, or people with chronic illnesses. We call this the **adverse selection** problem—the only people who buy insurance are the people who feel like they're going to be needing it badly!

A good analogy is the problem of 'all you can eat' buffets. Who goes to them? Skinny people who 'just want a salad'? No, they go to restaurants where they just order a salad. It's people with big appetites, the proverbial 'football team,' that goes to the buffet. Thanks to this adverse selection, the buffet has to charge a high price per person.

Since adverse selection results in a very high price for insurance premiums—or buffets—people have come up with solutions you might not have recognized as adverse selection workarounds. For instance, many states require all cars to be covered by some minimum insurance coverage. You might be a 100% safe driver, no accident ever, but you will still be required to buy insurance. Having people in the insurance pool who will never draw a payout, allows the insurance to cover a lot of catastrophes. 'Obamacare'

was named the Affordable Care Act because it was going to make the premiums (relatively) affordable by requiring everyone to buy coverage. This so-called ‘individual mandate’ was **not** popular, but it was an important way to address the adverse selection problem. Healthy **and** unhealthy people all have to buy health insurance.

Likewise, have you ever wondered why there are just a few months a year when you can sign up for your required health insurance? That’s also about adverse selection! If people were free to sign up any time, they’d wait till they felt signs of a major disease. If they got through the year with no health scares, they could just pay a non-enrollment fine when they filed their annual income tax returns. Once again, the insured population would be a pretty expensive group of people, and the premiums would be very high. Bottom line—if insurance premiums are going to be affordable, the population paying in has to include some low-risk people who won’t be needing payouts.

Moral hazard

Moral hazard happens when people buy insurance and then act recklessly because ‘they’re insured!’ You buy health insurance and then smoke and drink like crazy—because you’re ‘covered!’ That’s a silly example, but moral hazard can present serious problems.

Did you notice a sign by the front door of your bank, declaring your bank a proud “member of FDIC?” (If it’s not a member bank, keep walking!) The bank has paid premiums to the Federal Deposit Insurance Corporation, which guarantees the safety of your deposits up to a certain limit, and monitors the safety of the bank’s activities. Once a bank joins the FDIC, their calculus for getting into risky propositions changes (that’s moral hazard). If their risky move is successful, the bank does great! If the risky move loses...the FDIC covers it!

Another important situation of moral hazard happens after police departments buy insurance covering their operations. Once

the whole department has insurance coverage, people wronged by bad cops can sue or settle, but either way, the insurance company makes the payout. This means bad actors go on and on, since their costs are paid by the insurance company. This moral hazard situation could potentially be addressed by requiring officers to carry **individual** liability insurance, like doctors and lawyers and other people who can be sued for malpractice. Any officers who kept acting badly would face rising insurance premiums, which could force them to find other kinds of work.

See how economics gives you a different angle on problems?

SOME USEFUL MATERIALS

[Read](#) about what all-you-can-eat-buffets have in common with a typical insurance problem, adverse selection.

[Listen/read](#) transcript of podcast on bad cops and insurance.

[Listen/read](#) transcript of podcast on whether index funds do better than actively managed funds.

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CHAPTER 15

Investment: The Market for Loanable Funds Model and Alternatives

BETTINA BERCH

Consider this



Adeolu Eletu, 2015. *Businessman opening a newspaper.*

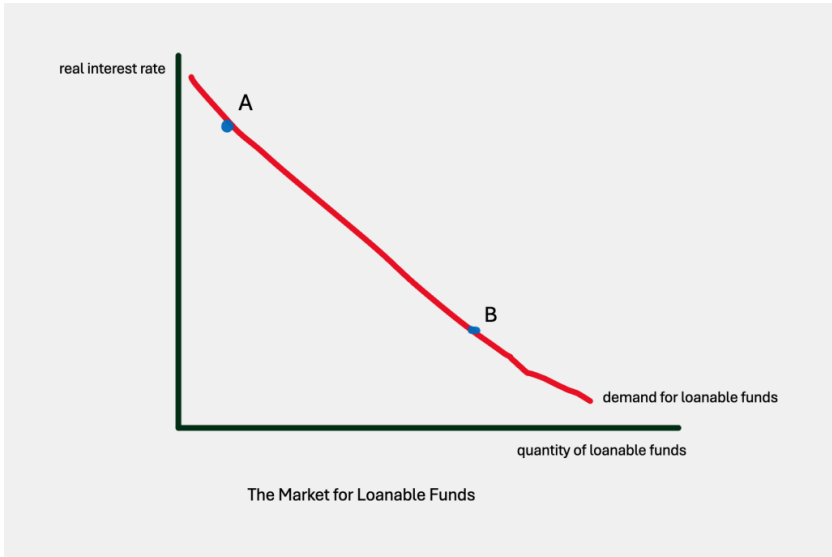
If you search for images of investment, you'll see stacks of coins, little plants being watered, or bar charts trending upwards. At least *this* photo seems to acknowledge that information—gotten from a newspaper, no less—might be necessary for successful investing! After reading this chapter, could you come up with a better sort of image?

In the last chapter, we focused on financial instruments, the actual vehicles of the investment marketplace. Now we are ready to get a little more abstract, by developing the economic model that explains some of the dynamics of the investment market—the market for loanable funds model.

THE MARKET FOR LOANABLE FUNDS

While this market doesn't exactly exist in real life, it gives us insight into some basic dynamics of the economy at large. In this model, the price of borrowing money (the real interest rate) relates to the

quantity of funds available for borrowing (the quantity of loanable funds), and that's how the axes are labelled:

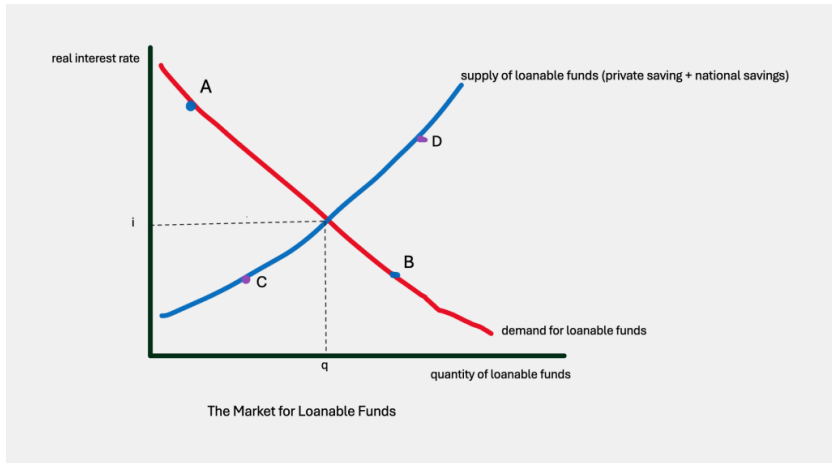


The Market for Loanable Funds

The demand for loanable funds comes from businesses wanting to borrow money and expand—it's investment demand. When it's expensive to borrow money (high real interest rate), there's low demand for borrowing (point A). When it's cheap to borrow money (low real interest rate), there will be a lot of demand for funds (point B). This is essentially defining a downward-sloping demand curve.

The supply of loanable funds comes from two areas—government or national savings (defined as government revenues minus government spending) plus private savings (what you and I have left after we are done spending). How does the amount of savings we generate, relate to the interest rate? Think of it like this: if the banks are offering you 10% interest on a savings deposit, won't you think about the extra dollars in your checking account that aren't earning anything? The spare coins under the

sofa cushion? When interest rates are high, you mobilize as large a quantity of loanable funds as possible (point D). When interest rates are close to zero, can you really be bothered taking the spare change to the bank? Probably not, so low interest rates will result in a low quantity of loanable funds (point C).

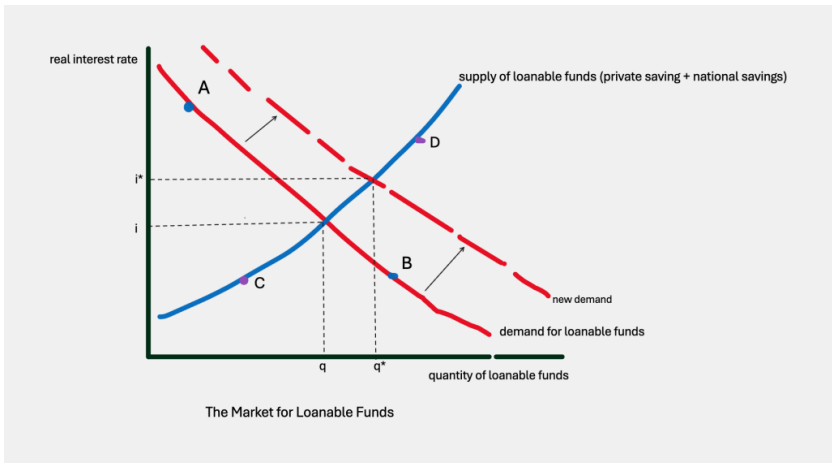


The Market for Loanable Funds

The demand and supply curves together will determine some real interest rate (i) and some quantity of loanable funds (q) in the economy. Now let's use this model! Let's see what happens when policy-makers get involved...

Congress offers business community a tax credit to use greener technology!

You could imagine Congress offering a 10-year tax break for businesses that go green, right? What would that look like for our loanable funds market? Other things equal, you could imagine businesses wanting to borrow more, at any given interest rate! This would shift our demand curve upwards, or to the right:

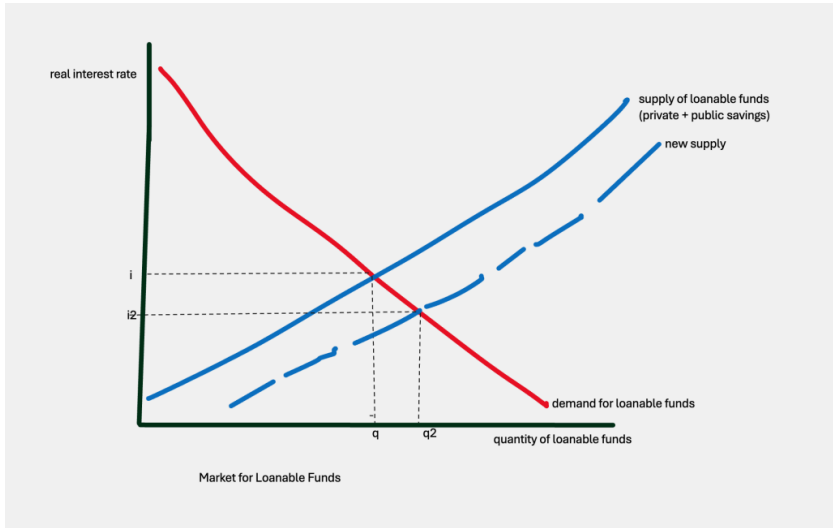


The Market for Loanable Funds

This will result in a higher real interest rate, i^* , and a greater quantity of loanable funds available, q^* .

What if-instead- Congress says people don't have to pay taxes on their savings anymore?

Normally, people pay income taxes on the interest they receive on their savings, which reduces its return. So imagine if Congress said we're cancelling that tax! From now on, whatever interest you get, is tax-free! That would make any amount you saved, more valuable. You'd try to save more, which means a shift of our supply curve downward or to the right:

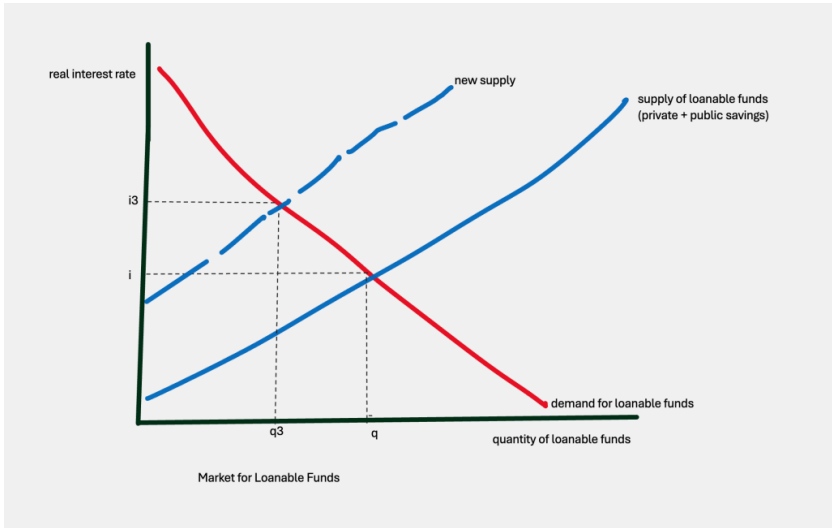


The Market for Loanable Funds

Our new real interest rate would be lower, at i_2 , with a greater quantity available (q_2).

What if the government starts running a budget deficit (or a bigger one than ever before)?

Remember how we defined **government savings**: government revenue – government spending. When government spending is less than its revenue, it has a budget surplus, which here we call savings. When government spending is more than its revenue, it has a budget deficit, and its savings are negative. Negative savings will shift the supply of loanable funds curve upward or to the left, resulting in a higher real interest rate (i_3) and a lower quantity of loanable funds (q_3).



Market for Loanable Funds

When government deficits cause higher interest rates and less funds available for private investment, business people call this **crowding out**, implying that they are being shoved aside by Big Government. However, since this is usually happening in a weak economy, it's not totally clear if private industry would have been interested in borrowing for new projects anyway.

What we have seen with the loanable funds model, is a relationship between the real interest rate and the amount of funds available for investment—at a very abstract level. We need to get back to real life!

REAL WORLD ALTERNATIVE INVESTMENT METHODS

If you're a student—or someone helping a student—you know that in the United States, tuition and fees at even non-elite institutions

can saddle a graduate with crushing debt for decades. The [average student's debt](#) from private loans is over \$50,000, and while there are movements for debt relief, they have not had overall success. Many Scandinavian countries, like Denmark, Sweden and Norway, offer [free college education](#), in some cases, for international students.

Many students entering American universities are young and lack experience with major debt. They're just happy to have 'gotten in,' and perfectly willing to postpone worrying about the bill until after they graduate. Debt and default may twist their career decisions, negatively impacting productivity, as well as mental health. What could be done?

Income-share agreements (ISAs)

Income-share agreements were tried out in various forms for years, but in 2016 Purdue University decided to try them as a substitute for student loans. If you think about it, borrowing for tuition with a student loan is like issuing a bond—you get a chunk of money from the lender that you pay back with interest after you graduate. What about dropping the bond model, and trying the stock model? Suppose when Purdue University accepted your application, they also offered to finance your education by buying stock in your future earnings: something like, “after you graduate Purdue, you pay us 15% of your future earnings for 8 years.” That's the principle—the university (or other funder) paying your tuition in return for a share of your future earnings.

There are more details of course. Students going into high-paying fields—pre-med, STEM—would have to have a lower payback percentage than art history majors, or it would be unfair to the high-earners. People who took off time from the labor force would have to be able to stop their repayment clock. These provisions are not dealbreakers. The big advantages of ISAs are that students

graduate with a manageable debt burden, and schools have an incentive not to offer worthless degrees.

Savings/investment outside traditional banks

Not everyone in the United States can qualify for a bank account. While in 2021, the percentage of Americans who were unbanked reached a new low of [4.5%](#), that's still a lot of people, and it probably misses many. With the consolidation of big banks and the failure of small ones, many rural areas and towns don't have a bank anymore, forcing people to drive long distances to obtain bank services. On the other hand, even small communities usually have a post office branch. Why not revive post office banking, like we had before 1967? Nowadays, if you don't have a bank account, you have to go to a check-cashing business, wait in long lines and pay high fees, just to take care of your monthly bills or buy money orders. Maybe America's big banks are not crazy for the revival of postal banking, but a lot of low income people would save a lot of money and time.

Another savings institution favored in some immigrant communities is the *susu*, or savings club. Members of a savings club meet regularly, putting a fixed amount of money in the pot each meeting. Each meeting, one member takes home the whole pot, in turn, until everyone has gotten a payout. The members—usually women—are bound by mutual trust, so they don't quit as soon as they've gotten a payout. They incur no bank fees or bank paperwork. On the other hand, they build no credit history in the formal banking world, so they're out of luck when they want to get a mortgage or a big loan.

When economists study '[informal finance](#),' they also find many people use a **money guard**, a trusted person who holds their money for them. The money guard might ask why a person wants the money they're safeguarding and discourage them from wasting it or getting scammed. Not only does this system of savings offer

psychological counseling that banks don't pretend to offer, they can be more flexible as well. As with the savings clubs, however, there's no credit history built this way, which might be why households often combine formal and informal finance techniques.

A COMPLETELY DIFFERENT MODEL OF INVESTMENT: ISLAMIC FINANCE

Finally, let's consider another approach to finance that's radically different from anything based on the 'model for loanable funds': Islamic finance. [a caveat in advance: the author is not an expert on Islamic finance] While all three Abrahamic religions—Judaism, Christianity, and Islam—are based on the Old Testament, which restricts the charging of interest almost completely. Over the centuries, only Islam has maintained a ban on charging interest on loans, in effect, setting a zero interest rate. So how do observant Muslims manage to buy homes, build office buildings and highways, if they can't borrow money?

Islamic law forbids certain activities altogether—gambling, eating unclean meat, usury, fraud, slander, etc—so none of these activities can be financed either. Banks in the west are accustomed to loaning money to farmers planting crops, perhaps charging a premium since the future harvest outcome is risky. Such a loan should not be made by an Islamic bank, as it involves gambling on an uncertain outcome, a good harvest. Needless to say, derivatives would be forbidden! But buying a home or building an office tower could be ok. Let's say you wanted to buy a house but lacked funds. You could approach the bank and ask the bank to buy the home. You would pay the bank rent while living in the home over the course of the loan, plus a payment the bank would give to its funders. While this might appear identical to a traditional western mortgage, there are significant differences. With the bank as a partner, rather than a simple lender, the bank has a greater role

insuring that the home or project is a worthwhile investment. Islamic banking is asset-based—there's an actual home or bridge involved. And there's risk-sharing—if it's a bad project, the bank and the borrower will both bear the cost.

Having excluded speculative loans, Islamic banks were relatively unaffected by the world financial crisis of 2008. Indeed, people argue that the 'ethical banking' dimension of Islamic finance is a concept that western banks should embrace, to regain the confidence/support of the general population.

SOME USEFUL MATERIALS

[Watch](#) a video on the market for loanable funds.

[Watch](#) a short video on the basics of Islamic finance.

[Listen/read transcript](#) of podcast on setting up a bank in the U.S. with Islamic-compliant mortgages.

[Listen/read](#) transcript of podcast on a new way of financing college tuition: income-share agreements.

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CHAPTER 16

Money: What It Is and How It Works

BETTINA BERCH

Consider this

Paper money seems so flimsy and worthless compared to copper axeheads:



Copper Axe Money, Mexico, 1200-1550 AD.

Cowrie shells were used in trade from the 14th century onwards, not only in west Africa but across Asia, and in the Americas.



A string of cowrie shells, 1800-1968.

The 19th century King Gezo, of Dahomey (modern day Benin), was said to [prefer cowries over gold](#)! Would you?

We have been discussing finance by describing various financial instruments (stocks, bonds, etc) used to funnel savings into capital investments. It's time we talked about the most basic form of finance, the kind we use in day to day life: money. Our definition of money, however, should give you a clue that it's not just the paper in your pocket: **Money** is the set of assets that people use to buy goods and services from others.

BARTER

There's an old story that scholars from Aristotle to the modern day have told their students—that before we had money, people used barter. Barter is when people exchange actual goods or services with each other, without using money. Father-of-economics Adam Smith imagined a simple community where a baker wanted some meat from the butcher, but the butcher didn't need bread, so the transaction couldn't happen. Barter requires a **double coincidence of wants**: I need to want what you have extra, and you need to want what I have extra—or the deal doesn't happen. In a small village, where we all knew each other's business, barter might work most of the time, since we all knew what each other produced. I could count on getting an extra dozen eggs from you, for a quart of my goat's milk. As the village grew larger and people no longer knew each other's surplus—barter might not work. I wouldn't know who would need my goat's milk or what they might have that I wanted. The solution? Money. I go to the market, sell my goat's milk for some coins, and I use those coins to buy eggs. Money is so simple!

This story of the origins of money in the breakdown of barter is pretty convincing—but it simply isn't true! As anthropologist Humphrey [explains](#), this has never happened anywhere in the world! In many cases, it's the other way around—money gives birth to barter! After the fall of Rome, Roman coins were not as valuable as actual meat and eggs, so barter happened. When hyper-

inflation causes economic break down, exchanging actual goods with others may work better than using paper money that's losing value as you chat. Apart from these disaster scenarios, there are other situations where goods are exchanged but money is not used—gift cultures, [potlatches](#), and [hippie gatherings](#) come to mind!

THE FUNCTIONS OF MONEY

Even if barter might follow after money, rather than preceding it, in the modern world most of us use money. Let's look at the three basic functions of money. First, money is a **medium of exchange**. It's what you give someone when you want to purchase their goods or services. Second, money is a **unit of account**. When companies sell their goods online, they post their prices in money of some kind—dollars, euros, bitcoin, whatever. Third, money also functions as a **store of value**, transferring purchasing power from now to some future time. You get paid on Friday, you can spend some, and put some aside to spend next month. Is money a *perfect* store of value? No. The \$20 bill under my mattress will lose purchasing power if it stays there for decades. But money is a better store of value than many other things—get paid in bananas, for example, and they will rot if you don't eat them quickly.

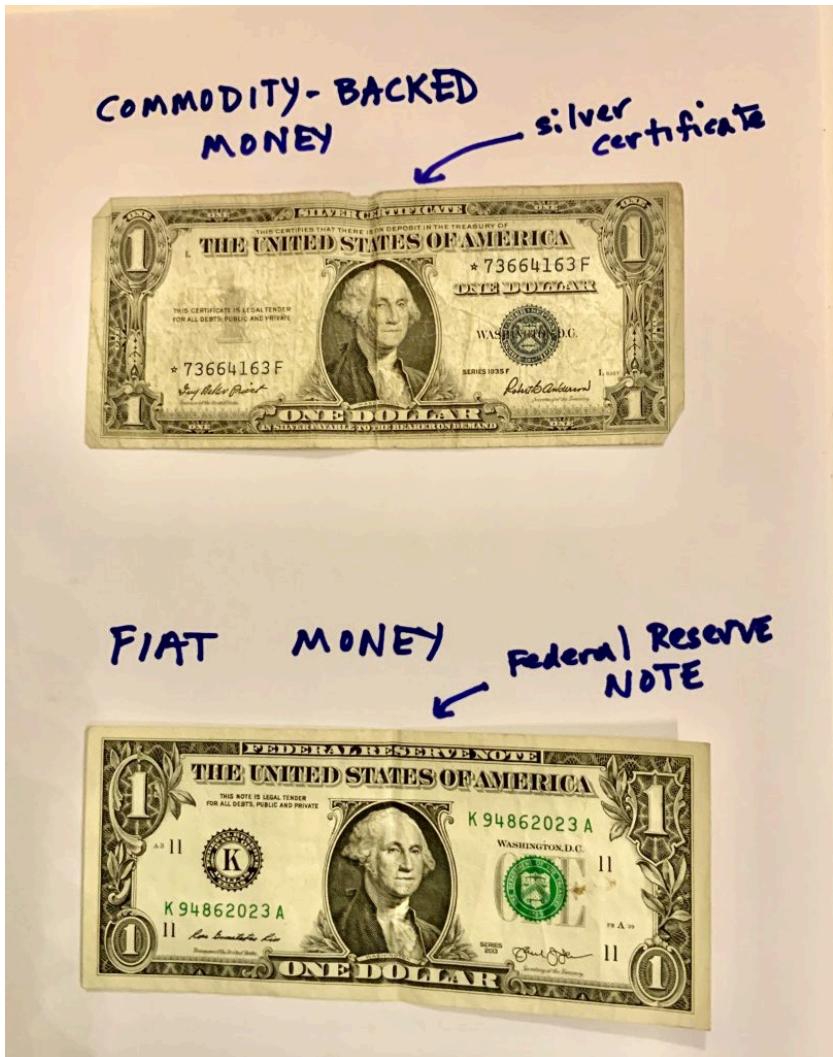
THE THREE KINDS OF MONEY

There are three basic categories or kinds of money: commodity money, commodity-backed money, and fiat money.

When your medium of exchange is something you could actually use, that's **commodity money**. In an exhibition at CUNY in 2019 titled "[Mediums of Exchange](#)," artist Agnieszka Kurant's "[Currency Converter](#)" displayed shelves of items used as money in various parts of the world: salt, tobacco, Tide detergent, postage stamps, vacuum-packed fish, and even sacks of clean urine. In prisons, cigarettes used to be used as commodity money until smoking was

banned. Now vacuum-packed mackerel is a commodity-money (apparently [imprisoned Sam Bankman-Fried](#) traded “macs” for a haircut) and so are ramen noodle packages (made famous in Orange is the New Black). Gold and silver bars or coins could also be considered commodity money.

Commodity-backed money is currency that can be exchanged for gold or silver. In the United States, we called our modern ones ‘silver certificates,’ which we stopped printing in 1964, and stopped redeeming for silver in 1968. Now we have ‘Federal Reserve Notes,’ which is **fiat money**. Fiat money is not backed by anything but the good faith we have in the government issuing it. (“Fiat” means “let it be done,” an edict or a law.)



Commodity-backed money ("silver certificate") and Fiat money ("Federal Reserve Note")

There are many people who think they'd be happier with a pocketful of silver, rather than a wad of Federal Reserve notes—but let's think about that. In 17th and 18th century England, a person

would be hanged or burned at the stake for the crime of ‘clipping coins.’ This capital crime involved taking a gold or silver coin and clipping a bit off the edges of it, saving up a quantity of clippings, melting them down and making new coins. This crime was only possible because the coin edges were rough, so it was hard to tell if the coin you received was full weight or not. All that changed when minters developed a special ridged edge for new coins, sometimes inscribing ‘decus et tutamen,’ Latin for ‘an ornament and a safeguard’ around the circumference:



Milled edge of British pound coin: "DECUS ET TUTAMEN"



Coin with rim inscription

The clipping problem was solved...but it makes you wonder. Maybe King Gezo was right to prefer cowries, which he was able to evaluate, over nuggets of gold, which might be harder to assess.

THE MONEY SUPPLY: ORGANIZED ACCORDING TO ITS LIQUIDITY

Economists divide up and then measure the money supply—all the different forms monetary assets can take—according to how **liquid** that particular form of money is. (Liquidity refers to ease of use, ‘spendability.’) Cash is the easiest form of money to spend. You can pay for a coffee at the corner food truck with cash, no problem. You can spend it at the grocery store, no questions asked. This most liquid form of money is called M0 (pronounced M-zero).

The next-most liquid form of money would be a debit card or a check—neither one is as liquid as cash, but they’re definitely spendable. Look at it this way: the coffee truck will take cash, but won’t take your debit card because they don’t have a machine to swipe it. But if you went to the grocery store, they’d accept your cash and they’d also take your debit card (and even your check if you lived in a small town). So forms of money that draw on your checking account, plus everything in M0, are called M1.

Let’s think about your savings account. The coffee cart can’t accept your savings account statement as payment. What if you handed it to the grocery clerk? They’d tell you to go to the bank, get your money and come back and pay! Savings accounts are less liquid than checking or cash, so they’re the basis for M2.

Finally, we get to M3, which includes M2 and all kinds of accounts that make accessing your funds complicated (an IRA, a 529 college fund, etc) and/or charge you penalties for withdrawing before maturity.

After organizing the money supply into various liquidity tiers, economists track the size of the subset they find most significant, and then argue about policy. We won’t do that here, but let’s try using some actual numbers to understand money better. Let’s take the size of the total money supply and divide it by the number of people in the country. That should give us a rough idea of how much money each of us is holding, on average. If we take a roughly

current estimate of M1 (cash+ checkable deposits) and divide by a roughly current figure on the number of Americans over 19 years old, we'd get [\\$5,742 per person](#). You might find that number a bit high—after all, how many of us are holding almost \$6000 in cash + checking accounts?

Once again, we might be having a problem with a 'per capita' figure— it's an average, and an average can hide the fact that *some* people are 24/7, 100% cash. Some of those are the unbanked, but there are also some high-net-worth folks who are all cash as well—the ones engaged in illegal activity. Another reason you and I don't have \$5,742 of M1, might indicate a problem with the denominator, Americans over 19 years old. There are a lot of people around the world holding U.S. dollars as well—people in countries with hyper-inflation, stashing dollars when they can, people in war-torn countries keeping some getaway money, etc. If we added some of those folks into the denominator, we'd have a much smaller per capita amount of M1.

HOW BANKS INCREASE THE MONEY SUPPLY

As we'll see in the next chapter, the Federal Reserve is in charge of the size of our money supply. They use their tools and work with the banking system to reach the targets they've set. Let's see how that works.

In many countries in the world today, **fractional reserve banking** is the rule. With fractional reserve banking, when you deposit money in your bank account, the bank sets aside, or *reserves*, some percentage of your money, and loans out the rest. In the U.S., it's the Federal Reserve that determines that percentage, and for much of U.S. history, up until 2020, they required 10% of most kinds of deposits to be kept in reserve. This meant banks could loan out 90%. If a bank paid you 1% interest on the money you deposit, and they charged a borrower 15% interest on 90% of your deposit—you can see how a bank

makes money! (That's before they learned they could charge fees for everything, like a fee for telling you how much you had in your own account!) Still, a spread between interest paid on savings accounts and interest charged for loans could be true of any kind of banking. What's special about the "fractional reserve" aspect?

FRACTIONAL RESERVE BANKING: THE WORLD BEFORE 2020

Imagine the Federal Reserve says banks have a 10% reserve requirement, and you deposit \$100 in your account at Wonder Bank (not a real thing). The teller takes 10%—or \$10— and puts it in the vault. The remaining \$90 sit on the desk. Soon, your friend Jan goes to the teller and asks for a loan of \$90 to buy a new copy machine for their business. The bank might loan them the \$90 on the desk. Jan pays Forrest \$90 for a new machine. Forrest goes to their bank and deposits Jan's \$90. Forrest's bank puts 10% or \$9 in the vault, and sets out \$81 dollars to loan out. Stevo comes in to borrow as much as possible to set up a new business. The teller can loan him the \$81 on his table. Stevo pays Izy to start paperwork for the business, and Izy deposits that \$81 ...

You get the picture. The original \$100 deposit has been re-loaned over and over, but each time, that loan's 10% less, because of the reserve requirement. In the end, that \$100 deposit has turned into \$1000 of spendable money. This is why we say that with fractional reserve banking, banks "create" money. It's not that they print money—that's done by the U.S. Treasury. But they create more of this money asset by the re-lending of funds.

If this seems confusing, think of it another way. Imagine we had **full reserve banking**. You'd be taking your \$100 deposit to the bank, and they'd put it in a drawer with your name on it. If you came back for your money, they'd just take it out of the drawer and give it back. The bank would be operating as a safe place for your dollars, or other valuables. While safeguarding was the role

of medieval banks, it also explains why modern banks rent 'safe deposit boxes' to customers. You pay an annual rental and put what you want in safe-keeping. Notice—the pre-modern bank and the modern bank with safe deposit boxes—they both expect *you* to pay *them*. Because our modern fractional reserve banks can make money from the loaning feature, they pay savers interest.

If we assume that banks will try to loan out the full 90% of deposits they get, we can imagine there's more money creation when the reserve requirement is 10% than if it were 50%. With a 50% reserve requirement, a bank would only loan out \$50 of that \$100 deposit. The loaning-out that followed would also be proportionately less. With a 10% reserve requirement our \$100 turned into \$1000. With a 50% reserve requirement, that \$100 deposit would expand to \$200. We call this expansion factor the **money multiplier**, which is defined:

Money Multiplier = $1 \div \text{the reserve ratio}$

In other words, the money multiplier is the inverse of the reserve ratio. The higher the reserve ratio, the less money multiplying will be done through the banking system. Even if we assume that banks will try to loan out the maximum, they don't get to set that maximum—that's the job of our central bank, the Federal Reserve, which we'll look at in the next chapter.

THE WORLD AFTER 2020

In March 2020, the U.S. central bank, the Fed, reduced our reserve requirement to zero! This was partly in response to the beginning of the Covid-19 pandemic. With widespread worries that no one could predict the impact a global pandemic might have on the economy, the Fed's plan was to make sure the banking system had maximum liquidity. No qualified borrower should be turned away because a bank did not have enough reserves to loan out a bit more money. Setting the reserve requirement to zero, effectively cancelled the "money multiplier." But don't worry—the Fed had

already created a few new tools which we'll examine in the next chapter.

Still, you might well wonder, why do you still have to learn about the reserve ratio and the money multiplier, if we're not using them anymore? Just because the U.S. joined a handful of other countries when it set a zero reserve requirement (UK, Sweden, Canada, Australia, Hong Kong, to name a few), there are a [lot of countries](#) that actively use a reserve requirement to this day. China, for instance, has been cutting its reserve requirement in response to a sluggish economy, but as of December 2023, it was still at 7.4%. And the U.S. Fed might re-instate a reserve requirement anytime it sees fit!

SOME USEFUL MATERIALS

[Read](#) about Marco Polo discovering the Chinese use of paper money.

[Read](#) about the myth of barter.

[Watch](#) a video about what money is.

[Watch](#) a short video on what banks do.

[Watch](#) a video on ramen noodles used as commodity money in prisons.

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CHAPTER 17

*The Federal Reserve*BETTINA BERCH

Consider this



Justin Ruckman, 2008. Protests Against the Federal Reserve

From the start of the very first bank in the world, there were probably people who blamed that bank for their problems. Why were the protestors in this photo angry with the Federal Reserve? Could you imagine yourself marching in a protest against the central bank?

Today's fiat money has Federal Reserve Note in big letters across the top. Today's banks don't just do as they please, they follow the Fed's (slang for the Federal Reserve Bank) rules. It's time we focussed on the Fed's history and functions.

BANKING IN THE UNITED STATES BEFORE THE FED

Banking in colonial America was unregulated. The British didn't want their colony to mint their own coins, so most of the coins in circulation came from the Spanish empire, which meant there was little uniformity. Colonial legislatures issued some paper notes, which were also fairly irregular. The issuers of this 1772 shilling

note (worth about 20 cents and described as the size of a playing card) felt the need to caution against counterfeiting, right across the top!



One shilling, printed in Pennsylvania, 1772

Some forward thinkers, like inventor Benjamin Franklin, were researching [how to embed security features](#) into paper money. It wasn't until after independence that the creation of a national currency was possible. Throughout the nineteenth century, there were attempts to create various types of commercial and state banks, even attempts to establish a central bank, but factional politics were fierce. Lobbyists for farming interests fought "tight" money policies, since they regularly needed to borrow to finance planting seasons. Backing paper money with gold or silver was an issue for others. Deposit insurance was tried and rejected. Late nineteenth century immigration added immigrant banks to the panic-ridden private banking landscape. While the major financiers of the 1890s onwards, some of the so-called Robber Barons, worked to eliminate smaller, prone-to-failure banks, they

got nowhere until December 1913, when President Wilson signed the Federal Reserve Act into law.

A very private group of bankers and financiers had studied the central banks of Europe and the weak points of the American financial system over the previous century to design a central bank for the United States, one that would respect state authorities but bring the various states under a single, central governing board. This central bank would be as independent of the Congress and the president as possible, by financing itself, and having its officers serve long terms with re-elections in non-presidential election years. Specifically, there would be 12 regional Federal Reserve banks governed by a national board with 7 members. The chairman and vice chair of the board of governors would be nominated for 4-year terms by the president and confirmed by the Senate. The national board members would serve 14-year terms. Once approved, these people couldn't be fired by disgruntled presidents or members of Congress, so they would be freer to act in the country's interests, rather than always trying to save their own jobs. And unlike most government agencies, the Federal Reserve would finance itself, so it wouldn't face threats of being "de-funded" by an angry Congress. (Actually, the Fed sends any budget surplus to the U.S. Treasury—in 2022 they sent some [\\$76 billion](#).)

THE FED'S FUNCTIONS: REGULATION OF THE BANKING SYSTEM

Given the banking chaos of the preceding century, it's not surprising that the first function of the Fed was to regulate the health and smooth operation of the American banking system. The regional federal reserve banks regularly audit the books of their member banks as well as other financial institutions in their region. As you can imagine, in the digital era this means monitoring key data that could indicate problems. When a red flag

goes up, the regional Fed is supposed to dig deeper and work with the troubled institutions. Mostly, this works well; when it doesn't, as with the recent failure of the [Silicon Valley Bank](#), the Fed takes a lot of blame.

Other Fed functions focus on inter-bank transfers. Do you ever wonder how you can deposit your paycheck drawn on Citibank into a Chase account and there's no problem? This would have been a big headache for pre-Fed Americans, but the Fed ensured that check-clearing between banks works smoothly. Likewise, the Federal Reserve stands as a 'lender of last resort' to member banks, maintaining a discount window, pre-2020, for member banks that fell below their reserve requirements.

THE FED'S FUNCTIONS: SETTING MONETARY POLICY FOR THE COUNTRY

The second big function of the Fed is to create the monetary policy for the country. Let's break that down. First, the Federal Reserve has to do research on economic activity in all regions of the country. What's been going on with housing costs? Unemployment? Prices? Are there clues to future trends from things going on now? Each regional branch adds anecdotal information to the official information in the so-called [Beige Book](#).

All that information has to be discussed and analyzed to get a reading on how the overall economy is doing and which are the weak/strong areas. It's the Fed that puts this picture together. After that, they have to decide what policy is needed to stay on track with their two main goals: keeping price inflation at 2%, and keeping the unemployment rate below 4% for the current economy.

TWO (OLD-SCHOOL) TOOLS THE FED USED, PRE-2020: THE RESERVE REQUIREMENT AND THE DISCOUNT RATE

Traditionally (before 2020), the Fed had three main tools it used to conduct its monetary policy. The first was setting the **reserve requirements** for banks. We mentioned this in the last chapter, when we discussed fractional reserve banking. We said that in the past, our Fed set the reserve ratio at approximately 10%. That figure was always different for different size banks, but in the Covid era that was set at zero, so it went away completely. But when they instituted that 10% requirement, they created another tool—the setting of the **discount rate**, the rate the Fed charges member banks to borrow overnight funds.

Why would a bank need to borrow funds overnight, you might wonder? Think of it like this, although it's simplified. Let's say you manage a bank. Your staff spends the day taking deposits and writing loans. At the end of the banking day, you go over all the books, totaling up the deposits and loans. Suppose you ended up loaning out *too much money* relative to how much was deposited, so you fell below the 10% requirement?

The first thing you might do, is call up other bankers and try to borrow their extra reserves overnight, until the next banking day. If someone had extra to loan, they'd charge you the **federal funds** rate. If no one had extra reserves to loan, you'd have to reach out to the Federal Reserve's discount window and ask to borrow from this 'lender of last resort.' So yes, the Fed will loan you reserves overnight. But it isn't free. The Fed charges the **discount rate**, which *they* set. If they set a high rate, they're leaning on you to be stingy with loans the next day in your bank. You'll cut back on loan-writing out of fear of having to revisit the discount window and get charged even higher rates. On the other hand, if the Fed had set a low discount rate, you'd return to your bank the next day and be generous with loans, figuring if worst came to worst, you'd go by the Fed's discount window and get those

low low rates again! When the Fed sets a high or a low discount rate, they're sending a signal to banks: low discount rates and they want you to be expansive, high discount rates so you'll be cautious, contractionary.

These two tools go together. Meeting the reserve requirement is what would drive you to the discount window, where the signal of high or low rates would shape your loaning behavior going forward. BUT. In March 2020, the Fed dropped our reserve requirement to 0, allowing banks to lend out as much as possible as we faced a period of uncertainty on the brink of Covid. (Again, here's a [useful chart](#) of other countries' current rates.) There's no sign that the Fed intends to raise this reserve requirement above 0 anytime in the future. If you're wringing your hands, saying "I don't get it,"—well, there are a lot of folks who'd join you. By dropping the reserve requirement, the Fed effectively dropped a lot of need for that discount window. What could the Fed be thinking? Partly, the Fed was acknowledging that banks keep enough reserves on hand, anyway, without the reserve requirement, to meet the transactions needs of customers.

ANOTHER OLD-SCHOOL TOOL THE FED USED TO REACH POLICY GOALS: OPEN MARKET OPERATIONS

The third classic tool the Fed used to carry out monetary policy has been open market operations (OMOs). Supposed the Fed decided that the U.S. economy needed some stimulus. The Federal Open Market Committee (FOMC) could invite major bankers to an auction, where the Fed might be buying bonds from the bankers' portfolios for example. Bankers would show up with their portfolios and the Fed OMC would try to buy the bankers' bonds.

Since this is an auction, the FOMC might open with a typical level bid to buy those bonds. The bankers could hold back, seeing if the FOMC would offer a higher bid. The end result? Two things. First, the bankers finally sell their bonds, so they're walking out with extra liquidity for their banks. The next day, there will be a lot of loans written!

How to understand the rate of return on bonds

The second result comes from that higher purchase price on these bonds, when the Fed had to offer more than usual to buy them. Why does this matter? Understand it like this—there's a relationship between the purchase price of a bond and its rate of return. Imagine there's a bond worth \$1000 on maturity. Imagine you're a banker at one of the Fed's OMC auctions, and the Fed's trying to buy your bond from you. What's the implication of the different prices the Fed might pay?

The purchase price of the bond	bond's value at maturity	the return on that Bond (aka "the interest rate")
\$100	\$1000	HIGH!!!
\$500	\$1000	medium
\$900	\$1000	Low

The more that's paid to buy the bond—its purchase price—the lower the return. The lower the purchase price, the higher the rate of return. (If this is hard to understand, just think about the time you got a really expensive pair of sneakers for an incredibly low price—you gained a lot there, compared to paying full price, which wouldn't be such a great deal. When the purchase price is very low, you're 'making more' on the deal, or a higher rate of return.)

The impact of an open market operation on the economy

In this open market operation, the Fed was trying very hard to buy bonds, which pushed up the purchase price. This *lowered* the rate of return, effectively *lowering the interest rate* in the economy, we would say. This stimulates economic activity, as business sees a lower cost to borrowing money (the lower interest rate) and decides to build more factories. That's in addition to the first effect we mentioned, that the bankers, having sold bonds to the Fed, walked out with more liquidity to add to their banks' capacities to loan out funds. Bottom line: When the Fed's open market committee **buys** bonds, they expand the economy two ways: through an increase in the money supply, and by lowering interest rates.

What if the Fed decided the economy was over-heated? The open market committee could invite bankers to an auction, this time warning them to bring lots of cash, because the Fed would be *selling* them bonds! The Fed could open the auction by offering to sell bonds for \$500. The bankers wouldn't say a word! The Fed would have to keep offering their bonds for lower and lower prices, until finally bankers decided to buy them. The lower purchase price means the rate of return on those bonds is very high, meaning a higher interest rate for the economy. With higher interest rates, home builders postpone new home construction, since it's more expensive to borrow money. Factory owners think twice before expanding. Higher interest rates mean lower investment, dampening economic activity. Second, when bankers bought bonds, they went back to their banks with less liquidity.

This open market operation, with the Fed selling bonds, dampened economic activity two ways: it produced a higher interest rate which would depress investment, and it reduced banks' liquidity, so they'd be writing out fewer loans. It has to be pointed out, that this whole auction situation is completely voluntary. No one forces banks to attend or bid or sell. **The profit motive guides behavior, not the iron fist.**

THE FED'S NEW TOOLS: IORB RATE, OR 'INTEREST ON RESERVE BALANCES' RATE, THE REPURPOSED DISCOUNT RATE AND ON RRRPS (OVERNIGHT REVERSE REPURCHASE AGREEMENTS)

After the world financial crash in 2008, our Fed started implementing some new tools. Some replaced mechanisms that weren't as effective in a world with interest rates close to zero, with banks that were flush with ample reserves. As we read in the last chapter, in March 2020, the Fed eliminated the reserve requirement, which also left the discount rate somewhat ineffectual. So what did the Fed introduce instead?

The Fed had been creating a new tool: paying interest on member bank deposits at the Federal Reserve. If you are a bank and you have extra reserves you're not loaning out, you could keep those reserves in your *own* vault—or park those funds at your regional Federal Reserve bank. If the Fed decided to pay you a 5% IORB (interest on reserve balances)—you'd park those funds at the Fed for sure. In addition, that would become the lowest rate of return you would accept for loaning out that money to anyone, because it would be the safest. (If a restaurant wanted to borrow money from you at 4%, you'd say no, I can get 5% from the Fed with no risk at all!) The Fed's IORB becomes the 'ground floor' borrowing rate for the economy, forcing everyone else's rates to be higher than what the totally-safe Fed is offering. A new tool is born!

What about controlling the peak of interest rates, the high end?

Here the discount rate finds a new role. Recall, the discount rate is what the Fed charges banks that want to borrow funds. If the Fed set that rate at 4%, it means other parties couldn't try to charge a bank 5% to borrow—because they could just go to the Fed and borrow at 4%. So with the IORB and the discount rate, the Fed can set lower and upper limits for the interest rate, which is a powerful way for addressing an economy that needs to grow or get slowed down.

There's one problem here. The Fed's upper and lower bounds on the interest rate are effective when they're an option for borrowing or lending for all the major players. But only member banks can deposit reserves at the Fed and earn the IORB, or borrow at the discount rate. What about all the other big financial institutions, like Vanguard or Fidelity mutual funds, or other non-bank players in the financial world? Their financial resources are huge, making it important for the Fed to find a way to make them responsive to Fed interest rate cues. The solution— 'overnight repurchase agreements' (known as 'repos') and 'overnight reverse repurchase agreements' (known as 'reverse repos'). With a 'repo,' the Fed buys securities from a financial institution like a mutual fund, for example, with the understanding that it's going to sell them back soon (overnight!) . The fund might do that to gain some liquidity. It's a lot like a loan, with the Fed holding the securities as collateral. With a 'reverse repo,' it goes in the other direction. The Fed sells securities to the mutual fund, which can now earn some interest on its excess reserves (more or less like a member bank could earn that IORB by leaving reserves with the Fed).

Repos and reverse repos allow non-banks to gain interest by parking excess funds overnight with the Fed, or liquidity by borrowing overnight from the Fed. Since it's the Fed that's setting the rate of return on these activities, these repos extend the Fed's influence to the non-bank world.

We have seen the enormous role of the Federal Reserve in regulating the banking system and in determining/executing

monetary policy. We have seen that the Fed uses its tools—among other things— to raise or lower the size of the money supply. You may be thinking, ‘All my life, I never knew how big the money supply is—why should I start caring now? What difference does it make?’

Good question for the next chapter!

SOME USEFUL MATERIALS

[Watch](#) a video on how the FDIC protects consumers when banks fail.

[Watch](#) a video on why the Fed uses interest rates to control inflation.

[Listen](#) to a podcast on the medieval origins of modern banking—the Knights Templar!

[Read](#) about the Fed’s new tools. This is an important, step by step walkthrough of how IORB and ON RRP rates work.

[Watch](#) a video on the new Fed Tools.

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CHAPTER 18

Monetary Policy and Inflation

BETTINA BERCH

Consider this



U.S. Office of War Information, 1920-1935. German woman lights her stove with worthless money

The German hyper-inflation of 1922-1923 meant German marks

were so worthless, [children made kites](#) with them! People used them to light their stoves. Could you ever see yourself setting fire to money?

We have seen that the Federal Reserve, our central bank, both regulates the banking system and sets monetary policy. If it decides that the economy needs stimulating, it may increase the money supply/ lower interest rates. If it believes the economy is over-heated, it may contract the money supply/ raise interest rates. You may be wondering, what difference does the *size* of the money supply make?

INTRODUCING THE 'NIGHTMARE WORLD' AND THE 'FANTASY WORLD,' OUR WAY OF TALKING ABOUT THE PRICE LEVEL

Instead of using more technical language, when we refer to an economy with a very high price level, we'll call that the 'nightmare world,' since for most of us, the thought of walking around in a world with \$50 cups of coffee and \$25 subway rides is a nightmare! Likewise, we'll call an economy with a very low price level a 'fantasy world,' since for many of us, the thought of walking around and finding coffee for a nickel and subway rides for a dime would be a dream! We'd feel so rich! So we'll use nightmare and fantasy worlds, from now on, so we can understand more easily how we'd react to living in each of these worlds.

How your demand for money changes depending on which world you enter

On a normal day, you might check your wallet before leaving your apartment and make sure you had a \$20 to cover your cash needs for the day.

But let's imagine you left your apartment tomorrow and

discovered you had entered the nightmare world of high prices! Your coffee stand at the corner was charging \$50 a cup! The subway had a big sign announcing it was charging \$25 for a ride! The McDonald's nearby was showing \$75 for a meal! This was all very strange and disturbing—but you knew you had to go back to your apartment and get more cash—a mere \$20 wasn't going to get you through this nightmare world.

Or, let's try another scenario. You get up, you check that you've got \$20 in your wallet and you go out...into the fantasy world!

Coffee is a nickel! The subway costs a dime! Dinner at McDonald's seems to cost 75 cents! Before you start running around, you realize you really don't need that \$20 in your wallet. You go back inside and switch it out for a \$5.

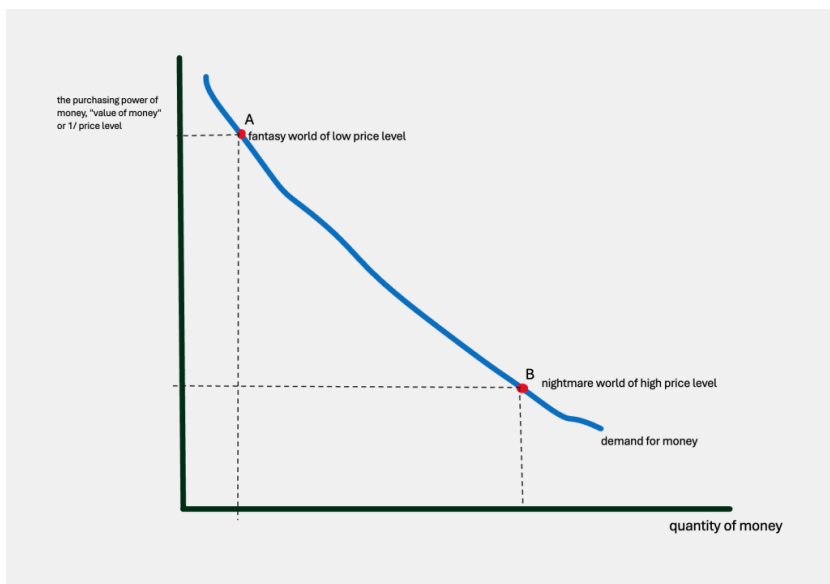
The Nightmare World			The Fantasy World		
coffee	\$50/cup		coffee	\$.05	
subway	\$25/ride		subway	\$.10	
dinner at McD	\$75		dinner at McD	\$.75	
when PRICE LEVEL	is	WAY UP	when PRICE LEVEL	is	WAY DOWN
Purchasing power of your money		WAY DOWN	Purchasing power of your money		WAY UP
(or "value of money")			(or "value of money")		
CONCLUSION: THE PRICE LEVEL and the PURCHASING POWER OF MONEY go in OPPOSITE DIRECTIONS					

The Price Level and the Purchasing Power of Money Move in Opposite Directions

In the nightmare world, with the high price level, the purchasing power—or the value—of your customary \$20 bill is so low, you need to go get more cash. In the fantasy world, with a low price level, the purchasing power—or value—of your customary \$20 bill is so high that you'd decide you need less cash. In other words, in the nightmare world, the purchasing power of your money is so low that your demand for it is high. In the fantasy world, the

purchasing power of your money is so high that your demand for money is low.

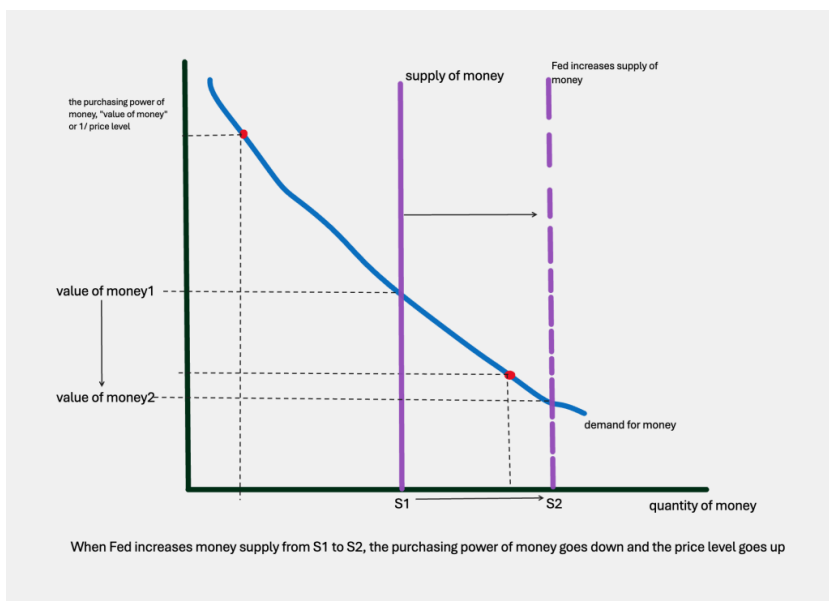
We are describing a **demand for money curve**, determined by Point A, the fantasy world where the purchasing power of money is high, so you demand less, and point B, the nightmare world point, where the purchasing power of money is low, so you demand a lot of it:



Demand for money in fantasy and nightmare worlds

Add a supply curve and see what happens!

As we determined in the last chapter, the supply of money is set by the Federal Reserve. They have their target quantity—some spot on that quantity of money axis— and they use their tools to make that happen. Likewise, they can use their tools to, let's say, increase the money supply. Let's see what impact that has:



When money supply increases, its purchasing power declines

As we can see, if they increase the size of the money supply from S1 to S2, this will result in a fall in the purchasing power of money, or the value of money, from V1 to V2. What is the meaning of this in real life? In exaggerated form it's something like this cartoon from the hyper-inflation of Germany in the 1920s:



Simplicissimus, 1922 . Germany's hyper-inflation, Gutenberg's press is printing money instead of Bibles!

When the central bank increases the money supply, it drives down the purchasing power of money! That paper money buys less and less stuff, until you end up using it to light your stove. And this is the point of view of the classical economists. For them, if the central bank increased the money supply, it just pushed up the prices on everything. It changed **nominal** prices—it did not change anything **real**. Our classical economists saw money as a sort of veil covering the real economy—changes in the money supply just

changed the price level, but didn't impact the amount of real goods and services an economy produced.

Try understanding this Money Veil concept a simpler way

This sounds a bit abstract, so a simple example might help. Have you ever played the board game Monopoly? The outer rim of the [board](#) is lined with various properties you can purchase at fixed prices if you land on them. After you buy a property, if someone else lands on it, they pay you a fixed 'rent,' like \$100. Before starting the game, each player is dealt \$1500 of paper money from the treasury. Each player throws the dice and advances on the board according to the throw. It's a lot of fun.

But let's suppose you start playing with your grandma's Monopoly set, a set that's been used by generations of family members before you. They lost a lot of the original paper money under the sofa and who knows where! Right now, all that's left for each player is \$100 to start the game. After one or two throws of the dice, a problem comes up. To buy most properties, you need \$100 or more. Boardwalk is \$400. After buying maybe one or two properties, everyone is out of cash and can't buy much of anything. The game isn't fun anymore, since you're just rolling the dice and moving pieces without buying or renting, which was the fun part.

Now—since you've taken economics—you propose a solution! You say, let's start over, with everyone getting their initial \$100 stake, but let's reprice all the properties on the board—take a zero off the prices. Buy Baltic Avenue for \$6 instead of the previous \$60, and so on. Now the game is fun again, since people can buy properties and charge others rent and try to win. By reducing the nominal prices on properties, you restored the relationship between the quantity of money in circulation and the price level. The classical economists would have approved!

INFLATION ISN'T JUST A BOARD GAME: SOME PEOPLE LOSE

When you confront higher prices in the grocery store on things you buy every visit, or at the gas station, it's an 'in your face' experience. You don't stand there and calculate how much your wages might have increased at the same time (and maybe they haven't). Inflation is never popular. But it can be damaging to some people more than others—and to economic productivity overall. Let's look at a few of these cases.

Do you tuck away cash in a special place—like a book on your shelf or under your mattress? Your cash savings are losing purchasing power during inflationary periods. If it's just loose change in your piggy bank, it's not a big deal. But many people living in unstable countries hoard dollars—so if the U.S. has an inflationary period, those savings are losing their purchasing power. Any assets that are stated in nominal terms (your granddad's \$10,000 life insurance policy) lose value during inflation.

Do you work at a minimum wage job? The various minimum wages are stated in nominal terms. The Federal minimum wage was set at \$7.25 an hour in 2009 (that's a *nominal* figure, because it is stated in dollars and cents that don't adjust to changes in purchasing power), for most categories of workers. Does \$7.25 an hour still buy as much (or as little) in 2024 as it did in 2009? No! Anyone working for a nominal wage that isn't tied to a cost of living clause, will be losing purchasing power when there's inflation in the overall economy.

Inflation imposes costs on the economy overall

If an economy is experiencing high inflation rates, people start adjusting. If you get paid every Friday, you—and many others—might cash that paycheck right away and go shopping, to convert that money into goods, before it loses even more purchasing power. A

lot of your time and mental energy may be used up, just plotting how to use that cash wisely. Economists sometimes call this ‘shoe leather costs,’ picturing you running around to shops. More than the wear and tear on your shoes, inflation may be taking a toll on your productivity at work.

Another productivity drain are the mixed signals that inflation sends to producers. Suppose you run a factory making high end furniture. All around you, you see the prices on good furniture rising. Normally, you’d think—there’s more demand for furniture, so prices are rising, so I should expand my factory! But what if higher prices on furniture are just reflecting a higher price level in the economy as a whole, i.e., inflation? In an inflationary period, producers have a hard time interpreting the signals they’re getting from market prices. Is there higher demand for my product, so I should produce more? Or is it just the inflation in the economy as a whole, so I shouldn’t expand output?

WHAT ABOUT DEFLATION? GOOD OR BAD?

Deflation is the opposite of inflation, so it means the price level of everything in the economy is falling—groceries, fridges, cars, wages, rents, etc. Often, people imagine it would be fantastic to live in an economy with prices always falling on everything! But let’s take a closer look. Suppose you lived and worked in Japan in the late 1980s, and you decided to get a 30-year mortgage and buy an apartment. The apartment cost the equivalent of \$300,000. You signed a contract with the bank to pay them \$1000/month for the money you borrowed on your mortgage. You did not know that Japan would enter a long-running deflation starting in the 1990s. By the year 2000, what is your situation? Your wages have been falling for a decade—that’s part of deflation. But you still owe the bank \$1000/month because your mortgage is fixed in nominal terms—and it’s getting harder and harder for you to scrape together \$1000/month, when your wages are falling. Even worse, apartment

like yours aren't selling for \$300,000 anymore—they've gone down in price like everything else. You're stuck.

The deflation problem is bigger than your mortgage. Let's think about the economy as a whole. Suppose *our* economy suddenly fell into deflation, so prices were falling all around you, and everyone was talking about it. Let's say you moved into a new apartment and you wanted some new furniture too. So you go shopping at the department store, you look at everything, try out all the cool sofas, and then—nothing! you say to yourself, 'I like that sofa, but next week, it'll be 10% cheaper.' Everybody's looking, but no one's buying! Of course, if it's necessities—diapers for the baby, aspirin for your headache—people will buy now. But for other things, 'deferred consumption' might be everyone's answer. How does that impact the economy? If everyone is just testing the sofas, but no one's buying, the shopkeeper will start laying off staff. Laid-off people will have less money to spend, reinforcing the low consumption trend. The cycle can keep repeating, causing the economy to shrink.

COPING WITH CHANGES IN THE PRICE LEVEL

Most of the problems that inflation or deflation cause for average people can be mitigated. Let's take grandma, living on her social security check every month. Based on the contributions she made during her working years, she knows that this year, she will get a check every month for, say, \$1500. Maybe in January and February, that covers her basics, but if inflation is raging, \$1500 won't buy her much by April. However—by November, Congress will look at what has happened to the cost of living index (our old friend, the CPI) and decide that next year, social security payments might rise by 5%, for example, in the new year. It's after-the-fact, so grandma's always trying to catch up with changes in the purchasing power of her social security—but at least it happens.

Other people have 'cost of living adjustments' (COLAs) written

into their union wage agreements, or other payment contracts. If you have a mortgage, it may be an ‘adjustable rate mortgage’ (ARM) that charges you a higher or lower rate depending on the movement of interest rates in the economy. Or, on the reverse side of things, you might sign a contract locking you into a particular rate—for gas or electricity, for example—so that even if the market price goes up, you charged the price you contracted for, for the length of the contract. Since no one can predict the future, COLAs and ARMs are more common than fixed-rate future contracts, but it also depends on the type of business you’re in.

Bottom line? Economists prefer inflation rates below 2%. Inflation above 4%, economists start talking about tools to address the situation. Deflation makes everyone extremely nervous, in part because we’ve had very little experience correcting it successfully.

But let’s take a break from reality for a moment, and think about the future of money. What kind of money will we be using in another decade or two? Will we still have Federal Reserve notes in our wallets?

SOME USEFUL MATERIALS

[Watch](#) a video about Japan’s deflation experience.

[Watch](#) a video on Venezuela’s hyper-inflation.

[Read](#) about the *deflation* threatening China’s economy.

[Listen](#) to an anti-inflation reggae song from the Jamaica Central Bank.

[Read](#) about Hyper-Inflation in Zimbabwe.

[Watch](#) a short video about how the Fed decided on a 2% inflation target.

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CHAPTER 19

The Future of Money


BETTINA BERCH

Consider this



Phillip Pessar, 2023. Bitcoin ATM, Miami

Advocates tell us machines like this, where you can buy and sell cryptocurrency, will soon be common all over the world. Have you ever seen a Bitcoin ATM?



We've been talking about money as something issued by country that performs three major functions: it's a medium of exchange, a unit of account and a store of value. And although we've discussed how our Federal Reserve controls the money supply and the amount you pay to borrow money (the interest rate), you may be wondering, what about the new kinds of money that people are talking about—cryptocurrency? Or, if you live somewhere like Kenya or Egypt, what about M-Pesa? Are these money? Are they safe? Are they the future?

MOBILE MONEY: WHAT IT IS AND WHY IT'S SPREAD

In many parts of the world—including the United States—there are large areas with no banks or banking-type services. In the U.S. this may be a result of big banks closing down rural services, but on the African continent, for example, many areas have never had banks. When colonial powers ruled many countries, they established banks in the capital cities for the convenience of their diplomats, but saw no reason to establish banking services countrywide. In the modern era, this has meant that someone working in the big city, like Nairobi, for example, might have sent money home to their family by bringing it to their village in person. Being unable to do something as basic as safely sending earnings home, was a real problem. But in the 21st century, with more and more people owning cheap cellphones, people started using cellphone minutes as a way of transferring money from one person to the next. Before long, an African cellphone division of Vodafone, Safaricom, picked up on this practice and in 2002 introduced their own form of mobile money—M-Pesa. In the most basic money transfer, a person enters their password on their phone, indicates whether they are depositing or withdrawing funds, then goes to a Safaricom kiosk

where a person will accept or dispense funds, as ordered. It's like a human ATM. And if you are thinking 'Venmo'—well, it's similar, except Venmo is tied to a bank/credit card, and M-Pesa is not. M-Pesa has become incredibly popular in a number of (mostly) African countries. Another company, Wave, has been introducing mobile money in Senegal and other countries. Economists are generally impressed with the impact of mobile money systems on development— they not only allow individuals to save and transfer money safely, for a low fee, they allow businesses to handle money transactions outside of limited banking hours. That said, such systems require mass adoption—everyone has to be using it, or it's not convenient. And the regulatory environment has to be friendly—which may be the reason why there's no Safaricom kiosk in the typical American mall. Keep in mind, [it's estimated](#) that from 14-20% of Americans are 'unbanked' or 'underbanked.'

AMERICANS DON'T HAVE M-PESA, SO WHAT DO WE DO?

Some 20 million Americans either don't have a bank account or can't access the range of banking services they need. Some live in remote areas that banks have abandoned. Others lack the documents banks require to open an account. Others can't afford the minimum deposit a bank might require to open the most basic type of account. What do people do?

Sometimes they use payday loan businesses, auto title loans and rent-to-own services. Most typically, they pay a check cashing business to cash their paychecks and pay their bills. Not only are the fees high, but a lot of time can be wasted waiting in lines. Lacking a bank account, people sometimes park their cash with a 'money guard,' a person they trust to hold their money safely. This workaround means that even though they might have very responsible money habits, they are not generating any credit history in the formal banking system. If they ever want to borrow money from a bank to buy a car or house, their reliability in the

informal sector wouldn't count. People with roots in the Caribbean or West Africa sometimes form savings clubs (*susu*) where they put a fixed amount of money in the pot every week, and one member takes a turn each time taking home the whole pot, until every member has had their turn. These savings clubs serve people with no access to banks and don't charge anyone fees, but they, too, don't help a person build up a good credit history.

You might be thinking, well, let them use a credit card or Venmo—but without a bank account, there's no credit card. One solution that *could* work, is returning to post office banking. Many countries use their post offices for limited banking services. In the United States, we had post office banking from 1911 to 1967, offering ordinary people readily accessible savings accounts. In modern times, the only banking service most post offices offer is the sale of money orders, mostly used for bill paying. Advocates for rejuvenating postal banking point out that small towns across America may have lost their banks, but they still have their post office, making it the logical place to restart basic banking services. Powerful lobbies from the banking industry are blocking this, so it's probably never happening.

Others have proposed that cryptocurrency—Bitcoin, for example—might be the answer, since (as we shall see) cryptocurrencies are not tied to bank accounts. While this solution might sound reasonable, there may be a cultural-fit problem. The people who line up in the check-cashing storefront because they don't have a bank account, may not be computer-savvy enough to go to a crypto-exchange and open up a virtual wallet. The kind of bills they need to pay—the landlord, the electricity—may not accept crypto payments. With more and more know-your-customer regulation of the cryptocurrency marketplace, a person without the paperwork to open a bank account, might not have the documentation to open a crypto account either. It's an open question, especially as some countries like El Salvador make cryptocurrency legal and encourage everyone to open a wallet.

SOME COUNTRIES ARE MOVING AWAY FROM HIGH DENOMINATION BILLS

There are movements in both wealthy countries and developing countries to either eliminate the use of cash or to eliminate high denomination bills. India, in 2016, declared that 500 and 1000 rupee notes would no longer be legal tender. After 1969, the U.S. stopped printing anything larger than \$100 notes. In 2016, the European Union stopped printing the 500 € note, so the 200€ is the highest being issued now. What is going on here?

Stop printing high denomination currency and reduce (some) crime

In the Eurozone, the argument to eliminate the 500€ note was based on its use in criminal activity—primarily terrorism, money laundering and tax evasion. After all, ordinary shops and businesses wouldn't accept a 500€ note for routine goods and services. Some 300 billion euros worth of those 500€s have been put in circulation—with an estimated half of them remaining in the Eurozone and the [other half in Russia and the Balkans](#). Is anyone there using them for legit economic activity? In the U.S., our \$100 bill isn't as valuable as the 500€, it's still useful in criminal activity. In 2014, the Fed estimated there were, on average, about [30 \\$100 bills for every American](#) —but only 2% of Americans have even one \$100 bill in their wallet.

While the anonymity of cash makes it perfect for criminal activity, low denominations can be [awkward](#). One million dollars in \$20s weighs about 110 pounds, requiring four briefcases. One million dollars in \$100 bills would weigh about 22 pounds and could fit in one briefcase. So the argument for discontinuing the big denominations is made almost exclusively from a crime prevention point of view.

Or, cancel the value of the high denomination bills you've already printed!

It's one thing to stop printing a certain bill, but if the banking system still accepts these bills as legal tender, then it's mostly aimed at future financial crimes. But what about [India's move, in 2016](#), to cancel the value of all 500 and 1000 rupee notes (their highest denominations)? People were given a deadline to take those notes to the banking system and prove they'd paid taxes when they got that money, that these funds were completely legitimate. Anyone who had high denomination rupees stashed at home from illegal or untaxed transactions—they'd have to explain their money or see it become worthless. A big crime purge and a big windfall for the Indian government! Not so fast! Although full research isn't complete, it seems that [stashing ill-gotten gains in big rupee notes](#) was not a 'thing.' Stashes of dollars and gold and other shiny objects were more typical, particularly offshore.

Or, eliminate cash altogether!

Norway's Conservative Party has pledged to eliminate paper money completely by 2030. Cash accounts for [less than 1% of all transactions](#) in Sweden, where most transactions are debit/credit or on Swish, the national payments platform. It's been argued that developing countries could add a good [3% to their growth rates](#) if they'd just go cashless. In the case of Bangladesh's BKash, for example, the savings from transferring funds digitally has been huge. Eliminating cash might also reduce the routine bribery of public officials, since the digital trail would lead right to the corrupt official's bank account.

Digital money transfers may be safer and more efficient, but they have their opponents. In New York City, the ice cream chain Van Leeuwen, [among other retail stores](#), declared their shops cash-free (only credit cards accepted)—in defiance of New York law (and

those little words on our money that declare it 'legal tender'). While banks and credit card companies love the profits to be made from a cashless world, the ice cream shop could also argue that a cashless shop enhanced the customer experience and cut down on cash register crime. Since there's not a lot of armed robbery of ice cream shops, it might occur to you that Van Leeuwen was trying to keep people out of their stores who didn't carry a credit card—which are more likely [people earning under \\$30,000/year, teens, and minorities](#). Another group that's unhappy about a cashless future are folks whose pay is largely in tips, like strippers, although some workplaces report that [digital tipping averages out higher](#) than the 'cash jar' take.

Or, stop using the national currency (whether cash or plastic) and go crypto!

For many people, the future of money is not plastic, but cryptocurrency. We need to talk about what crypto is and how it works, before we can have an opinion about its future. Put simply, cryptocurrency is a decentralized digital currency. Decentralization means there's no government constantly issuing more of it when they want to pump up an economy, for example. (This matters a lot to people who think 'the government' is devaluing the currency by running the money printing presses all night.) The record-keeping for the currency—what account has owned and traded each digital coin—is not in one single party's hands (unlike the records of your bank account, which are only in your and the bank's hands). Instead, there is a public record of every transaction, a so-called 'distributed ledger.' This ensures that every digital coin (or fraction thereof) can only belong to one person, one wallet, at a time.

Let's use [the example of Bitcoin](#), one of the most established cryptocurrencies, to see how things work. When a person initiates a transaction—paying another person Bitcoin, for example—someone will have to verify that the transaction is legit and enter it into

the system. Since the verifier (aka “miner”) who wins will be paid in more Bitcoin, there’s competition to verify. The contest will involve solving a complex mathematical problem, and the person running the high-speed computer that solves it first, gets the job. The original transaction will be given a unique identifier and be entered into the ledger, the blockchain. Done!

You may be wondering what’s so special about all this? A couple things. In the beginning, crypto was the best way for people to pay anonymously for illegal goods—drugs, guns, porn—over the internet. In modern times, it’s been the preferred payment vehicle for ransomware attacks—you want control back of your hospital’s record systems, send x amount of Bitcoin to this wallet number. BUT, law enforcement has become more sophisticated at following that *publicly-available* blockchain and identifying wallets receiving transfers of a matching size. Forensic accounting has made [a lot of progress](#) in recent years. Since another special feature of crypto is the absence of government, either in issuing the crypto or guaranteeing its value, there’s also no government helping out people who accidentally [lose access](#) to their crypto wallets.

BENEFITS AND DRAWBACKS OF CRYPTOCURRENCIES

The benefits of crypto include extremely low transaction costs and faster speeds, compared to credit cards, and the relative anonymity of buyers and sellers. People who are anti-government enjoy being able to do business without any government involvement. The downsides of crypto include its lack of regulation and the environmental damage done by most crypto transaction verifications. Some crypto schemes, [like OneCoin](#), have been multi-billion dollar scams. (To avoid scams, start by finding out if a crypto has a visible blockchain and can be bought *and* sold on the open market.) The environmental cost of the verification of transactions by super-computers burning through electricity (so-called Bitcoin ‘mining’) is terrible. In any given year, Bitcoin mining

consumes more electricity than the whole country of Norway uses. [China, no environmental star, banned Bitcoin](#) mining in 2021. The businesses have simply migrated around the globe, landing in areas with cheaper electricity or with corrupt politicians who will offer them utility rate or tax breaks. Eco-friendly cryptocurrencies [do exist](#), although they're not the industry big names.

THE FUTURE OF CRYPTOCURRENCY: REGULATION?

As crypto moves out of the shadows and into the mainstream—which means into *more* investors' portfolios—its regulation becomes a big question. In the United States, we make a distinction between money and investments. If something is an investment—a stock, let's say—the U.S. Securities and Exchange Commission (SEC) will regulate its issuance and its trading. So, is Bitcoin, for example, a money or an investment? When we defined money earlier, we said it had three main functions: a medium of exchange, a unit of account, and a store of value. At this point in history, very few businesses accept Bitcoin as a medium of exchange and it fluctuates in value so much, it could hardly be called a store of value. This might imply that it functions poorly as a unit of account as well. If we listen to people buying crypto, they talk about buying it because it will appreciate in value—the way they talk about buying various stocks. The more it seems like an investment, the more likely the SEC will increase its regulatory role vis a vis crypto. Furthermore, since American buyers use crypto exchanges to buy and sell their holdings, these exchanges have been brought under the [governance of the Bank Secrecy Act](#), with its various 'know your customer' regulations. It's not the Wild West out there anymore!

THE FUTURE OF CRYPTOCURRENCY: GOVERNMENTS CREATING THEIR OWN DIGITAL MONEY?

While cryptocurrencies began by avoiding governments, governments have been watching certain aspects of crypto with great interest. Central banks around the world are developing their own central bank digital currencies (CBDCs) as a more secure means of transferring monies to and from households and businesses in the future. China, for instance, has already rolled out an [experimental digital wallet](#) to citizens with a free starting balance. Privacy advocates find these CBDCs dangerous—not only could the government know what you were buying with your social security check, but if they decided you shouldn't be buying alcohol or sugary drinks, they'd have the technical capacity to 'turn off' the use of the CBDC for those goods (in the same way that SNAP cannot be spent on certain goods).

In September 2021, El Salvador took a completely different approach to crypto, when newly-elected President Bukele declared [Bitcoin to be legal tender](#) throughout the country. It seemed like a crazy move—many common people had no experience with computers or electronic payments systems. The value of Bitcoin constantly fluctuated—which would mean your rent and wages and bills would also fluctuate. And if there were really *wild* swings in Bitcoin value, a person's savings could be wiped out. But Bukele, a big Bitcoin believer, saw advantages. Many ordinary Salvadorans receive significant transfer payments from relatives working abroad—reduced by huge Western Union fees, for example. Bitcoin's tiny transaction fees and quicker delivery would be great. Bitcoin might also attract tourism...of a special kind: tax evasion tourism. Bukele's government plans to build what they've called "[Bitcoin City](#)," a tax-free crypto haven. They're also floating a plan to give away a passport to anyone investing over \$1 million in crypto in El Salvador. A bargain, right?

SOME USEFUL MATERIALS

[Watch](#) a video on China's introduction of digital currency, and its risks.

[Watch](#) a video on El Salvador's gamble on Bitcoin.

[Watch](#) a video on how cryptocurrencies work.

[Read](#) about the environmental costs of cryptocurrencies.

[Read](#) about stores that won't accept cash!

[Read](#) about what happened when India adopted digital payments, even for small stuff.

Did you believe it when they said crypto would advance financial inclusion by helping unbanked people? [Read](#) this report!

[Watch](#) a video on why investors go for crypto even knowing it's risky.

Central banks around the world are preparing to issue national digital currencies. [Read](#) about what's at stake.

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PART IV

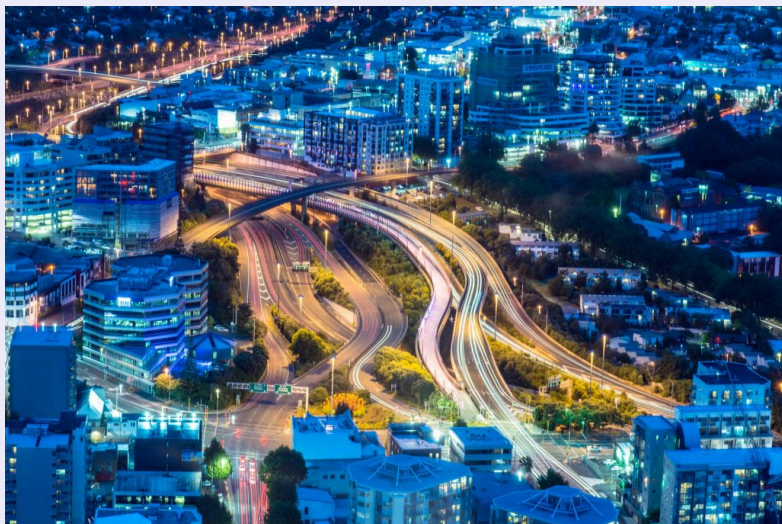
PART FOUR: THE AGGREGATE MODEL AND THE WORLD ECONOMY

CHAPTER 20

The Aggregate Model: Aggregate Demand, Long-Run Aggregate Supply, and Short-Run Aggregate Supply

BETTINA BERCH

Consider this



Patrick Pellegrini, 2019, Aerial view of Auckland, New Zealand.

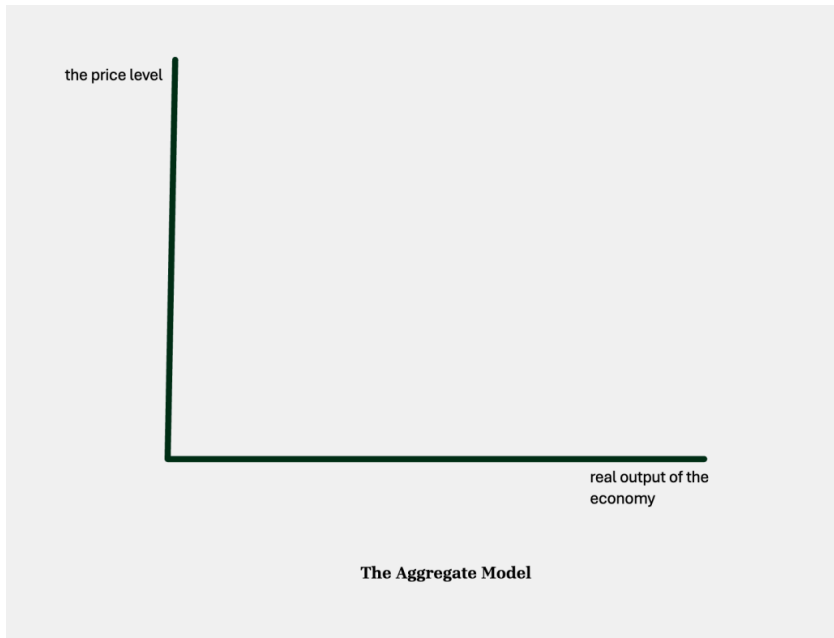
This chapter brings together a lot of intersecting curves, as we build our model of the economy as a whole, the aggregate model. **Do our graphs ever remind you of highways crossings?**

In previous sections of this book, we have learned some basic tools of economic analysis and some basic macro concepts: GDP, the price level, full employment, production, growth, money, and more. Now it is time to build our model of the economy as a whole—the aggregate model. Like all models, this macro-model will abstract from real-life details to focus on the underlying dynamics. It will also give us some policy advice—what to do if our economy needs help. The first things we need to understand, however, is that the aggregate model might *look* like our earlier, simple supply and demand model, but it operates very differently.

THE SIMPLE SUPPLY AND DEMAND MODEL VERSUS THE

AGGREGATE MODEL

As with most economic models, we are still putting a price-type variable on the vertical axis and a quantity-type variable on the horizontal axis.



Labeling the Axes: the Aggregate Model

While we have a price variable and a quantity variable on the proper axes, the fact that these are aggregate variables—the price level, not the price of one thing—has important implications. Previously, if the price of our item went up, we talked about substitutes we might switch to. If coffee got more expensive, we might buy more tea. But here, our variable is “the price level”—when coffee is more expensive, so is tea, so is soda, and so is everything else. The meaning of “the price level” is that prices of everything in the economy are moving in the same direction, up or

down. So when coffee gets more expensive, you can't substitute away and buy tea instead.

Notice also the horizontal axis, "real output of the economy." Instead of one good or service, we are talking about all goods and services that the economy is capable of producing. There will be some point on this axis we will be labelling as "full employment," the amount of output our economy can optimally produce, given its resources. In the chapter on production and growth, we said the amount we could produce was defined by the production function: $Y = t^* f(K, H, L, N)$. We emphasized that Y is *real*, not nominal. It's the actual, physical things produced and services being used.

Just looking at the axes of our aggregate model, we see that we are going to be relating something *nominal*--the price level--with something *real*, real output. The old-school, classical economists wouldn't have done this. They would have said that changes in *nominal* variables--prices--don't change anything *real*. By setting up our axes this way, we are saying, maybe nominal *can* affect real.

The simple versus the aggregate model: the time dimension

Our aggregate model will also introduce a *time dimension* to the supply-demand landscape. Before, we bought and sold coffee without thinking about time. Our aggregate model will be discussing "the short run" and "the long run." You might be hoping for a definition in terms of days or years, but that's not how it works. The short run is now. In the short run, we don't have full information about everything; we may be confused; we may have wrong information. We didn't know the printer would need more ink after printing just two pages, or we wouldn't have bought it. Our expectations may be wrong. We think there's going to be a lot of price inflation this year, but it turns out, there wasn't. In the long run, we have full information; we've corrected all our misperceptions and wrong expectations. If the long run sounds impossibly perfect--it is. As the famous economist John Maynard

Keynes once said, arguing [for focussing on the short run](#), “in the long run, we are all dead.” When we build our aggregate model, we will be using a short run/long run analysis when we build supply curves.

THE AGGREGATE DEMAND CURVE: WHAT HAPPENS TO EACH DEMAND SECTOR WHEN THE PRICE LEVEL IS HIGH (THE NIGHTMARE WORLD)?

In the chapter where we defined GDP, we divided the parties demanding total GDP into sectors like this:

$$\begin{array}{l} \text{Aggregate Demand, or} \\ \text{Total Output} \end{array} = \begin{array}{ccccc} \text{Consumption} & + & \text{Investment} & + & \text{Government} & + & \text{Net Exports} \\ C & + & I & + & G & + & NX \end{array}$$

Components of Aggregate Demand

Now we are going to ask, what happens to aggregate demand from each of these parties when the price level is crazy high, what we called “the Nightmare World”?

First, consumption, C. What happens to your shopping when you walk out of your apartment and everything is very expensive? You get ‘sticker shock’—you try to spend as little as possible. Consumption (C) goes down.

Now, investment, I. When you catch your breath, you go to your broker or bank and decide to sell some bonds, so you’ll have enough liquidity, some cash, to buy lunch! BUT THIS IS HAPPENING TO THE WHOLE ECONOMY! So everyone else is visiting their brokers and trying to sell bonds. When everyone tries to sell bonds, their purchase price has to fall, which means the rate of return on bonds, the interest rate (i), is pushed up. When the interest rate in the economy is pushed up, Investment (I) goes

down. Furthermore, when the interest rate is pushed up, this discourages new home construction, the only 'consumption' component of Investment. So Investment (I) falls a second way.

We will hold Government (G) spending constant as a *policy variable*—later we will be pushing government spending up or down to bring our economy into balance.

Let's move on to Net Exports (NX). Let's start with the fact that interest rates (*i*) in our nightmare economy have been pushed up. When interest rates in our economy are high, bankers in other economies are attracted to buying our bonds. To buy U.S. bonds, they will first sell their Euros, let's say, for dollars so they can buy some U.S. bonds. All that demand for dollars, pushes up the value of the dollar relative to the Euro. (We call this a 'strong dollar.')

When the dollar rises in value, U.S. exports start to look expensive to foreigners, since it costs them more of their currencies to purchase our goods. Our exports fall. Meanwhile, with our strong dollar, goods from other countries look cheaper to American consumers—so we buy more imports. When X goes down and M goes up, NX or (X – M) falls.

Bottom line: in the **Nightmare World** of the high price level, **every component of aggregate demand decreased**:

Real Output (Y)=	Consumption (C)	Investment (I)	Government (G)	Net Exports (NX) or (X – M)
Price Level High (nightmare world)	decrease (from wealth effect)	decrease (selling bonds raises <i>i</i> , which lowers I) (higher <i>i</i> means new home construction falls)	held constant as policy variable	decrease (<i>i</i> goes up, \$ stronger, X falls. M rises, so NX falls)

Aggregate Demand by Components: $Y = C + I + G + NX$ (keep in mind: *i* = interest rate; I = investment; NX = Exports – Imports)

THE AGGREGATE DEMAND CURVE: WHAT HAPPENS TO EACH DEMAND SECTOR WHEN THE PRICE LEVEL IS LOW (THE FANTASY WORLD)?

If we were suddenly in the Fantasy World of a low price level, how would that impact all the components of Aggregate Demand? Let's take them one by one.

Start with Consumption, C . Imagine you leave your apartment and everything outside is so cheap, you don't know what to buy first! In the low price level world, your Consumption goes up, what the economists call "the wealth effect." But maybe you buy everything in sight, and you still have cash in your pocket!

Now we look at what happens to investment, I . With extra cash in your pocket, you head over to your broker and ask her to buy you some bonds! BUT THIS IS HAPPENING TO THE WHOLE ECONOMY! As everyone else also has extra cash, they are there bidding up the purchase price of bonds, causing their rate of return falls. This is equivalent to the interest rate (i) in the economy being pushed down. When the interest rate falls, Investment (I) rises, since it's now cheaper for businesses to borrow money for expansion. Likewise, consumers decide that a falling interest rate makes it possible to borrow money for new home construction. When home construction, a form of Investment rises, Investment rises a second way.

Again, we hold Government spending, G , constant, as a policy variable.

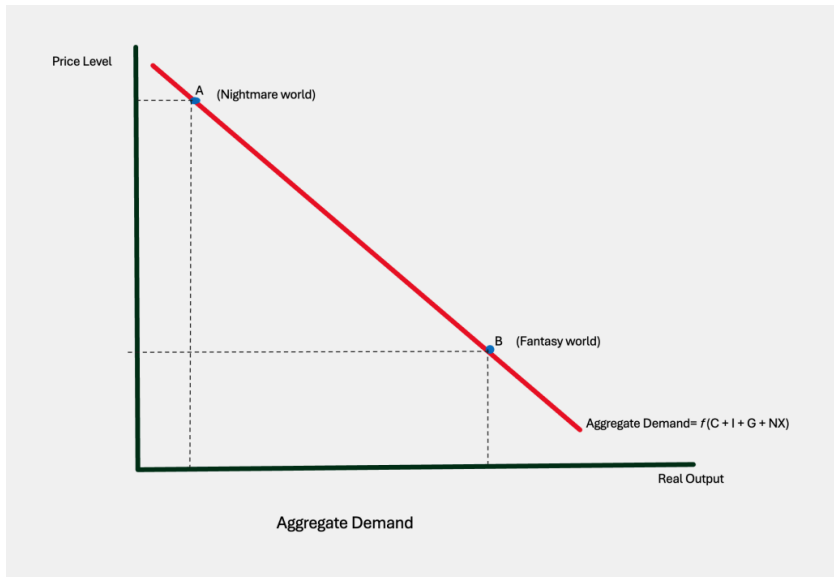
What happens to Net Exports (NX)? We start with that fall in interest rates. When foreign bankers see that lower interest rate, i , in America, they decide not to buy U.S. bonds. Maybe they buy Euro bonds, because they are paying a higher rate of interest. This will raise demand for Euros relative to dollars, producing a 'weak dollar.' American consumers will have to spend more dollars to get a Euro, meaning imports will be more expensive to us, so we will buy less. Imports (M) go down. What happens to our Exports (X)?

With the value of the dollar going down and the value of the Euro rising, American goods will look cheaper to shoppers with those strong Euros, so they will buy more American exports. American exports (X) will go up. When X rise and M falls, Net Exports (X-M) will rise.

To summarize: When the price level was low (**the Fantasy World**), every component of aggregate demand went up:

Real Output (Y)	Consumption (C)	Investment (I)	Government (G)	Net Exports (NX) or (X - M)
Price Level High (Nightmare world)	decrease (wealth effect)	decrease (selling bonds raises i , which lowers I) higher i , means new home construction falls)	held constant as policy variable	decrease (i goes up. \$ stronger, X falls. M rises, so NX falls)
Price Level Low (Fantasy world)	increase (wealth effect)	increase (buying bonds lowers i , which raises I) (lower i , means new home construction rises)	held constant as policy variable	increase (i goes down. \$ weaker. X rises. M falls. so NX rises)

We see an inverse relationship here between the price level and the quantity of aggregate demand, which we can plot:

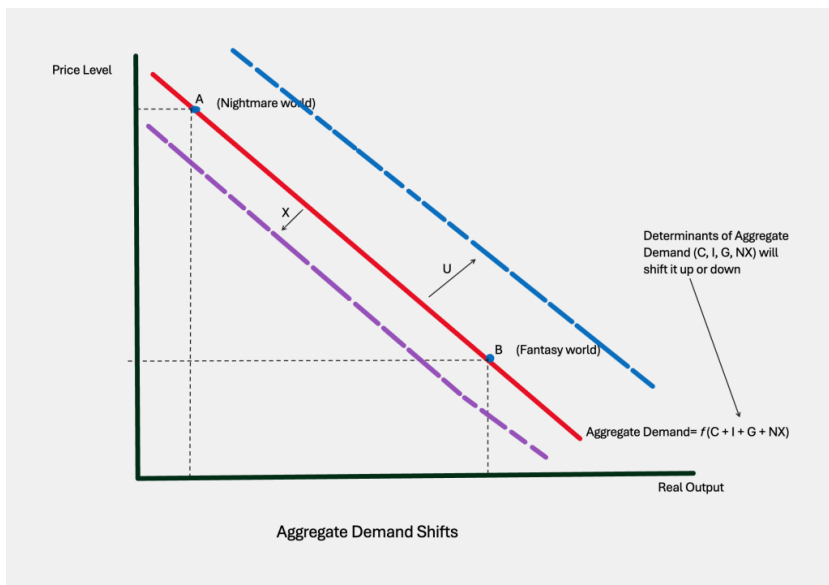


Aggregate Demand Curve

Our Nightmare World (high price level, low aggregate demand) point A and our Fantasy World (low price level, high aggregate demand) point B define a downward-sloping aggregate demand curve. The position of this curve is a function of those components: consumption, investment, government, and net exports. And what determines a curve, is also what will shift it!

What shifts the Aggregate Demand curve?

A curve shifts when any of its determinants shifts, so our aggregate demand curve will be shifted by changes in consumption, investment, government spending or net exports. Let's see how that looks:



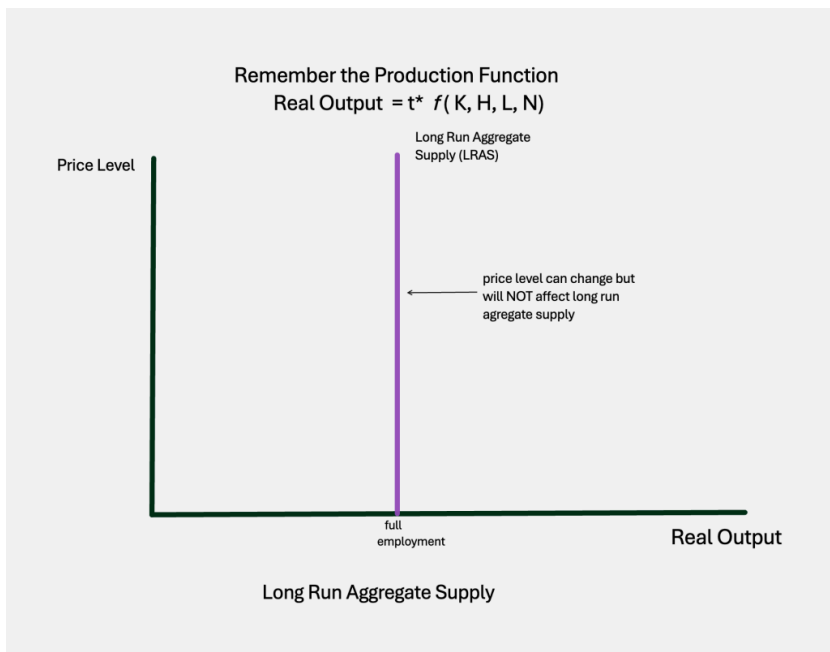
Aggregate Demand Curve Shifts

If people are feeling optimistic about the economy, that might increase Consumption (C) which would shift the curve upward or to the right. If there were a depression in Europe, it might decrease their demand for American exports, so our curve would shift downward or to the left. If Investment (I) in America increased, the curve would shift upward, or to the right.

Once again, you use the 3-step method. When some change is proposed, you decide if it is relevant. If yes, ask if that proposed change is the variable on either axis. For example, if the proposed change is an increase in the price level—ok, that's relevant to aggregate demand, but *it is also the variable on the vertical axis*. This means you *move along* a stable curve and you don't shift anything. But if the change is something impacting consumption, investment, government spending, or the import/export world—you do a shift!

AGGREGATE SUPPLY: THE LONG RUN (LRAS)

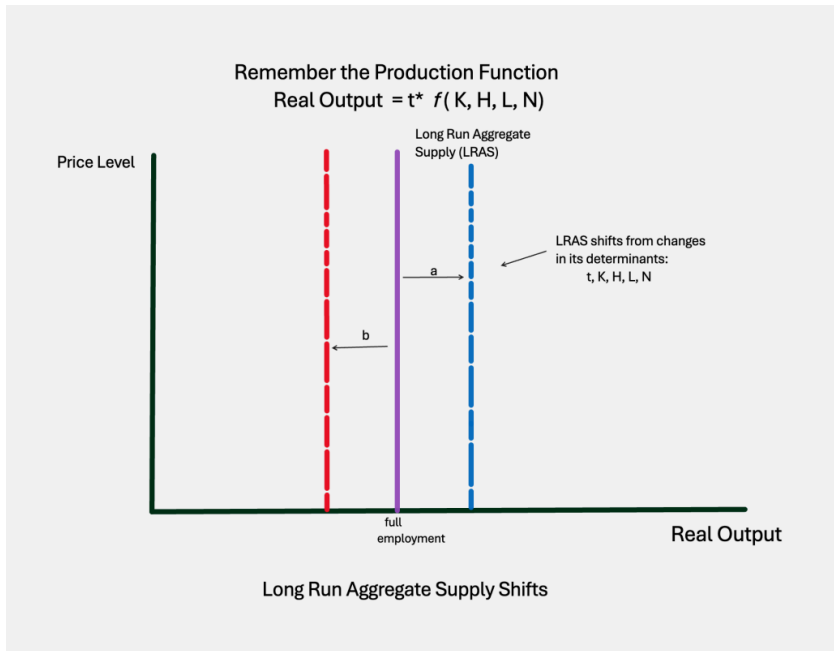
With Aggregate Supply, we now have a *time dimension*—either the short run or the long run. First, let's talk about the long run, when there's enough time for all kinds of mistakes and misinformation to be corrected, and enough time for everything to adjust. In this ideal state, the economy can run at its maximum potential, given its resources. This amount that our economy could ideally produce is determined by the production function: $Y = t^* f(K, H, L, N)$. (The output of our economy is determined by the amounts of physical capital, human capital, number of workers, and amount of natural resources, all combined at the state-of-the-art technology.) As we learned, the production function is a *real* relationship, not a nominal one. Changes in the price of eggs or butter don't change that output of 9 brownies in grandma's recipe, and changes in the price level do not change the amount of our economy's output in the long run. This means our Long Run Aggregate Supply (LRAS) curve will be vertical at that level of output:



Long Run

Aggregate Supply

What will cause the LRAS to shift? Anything that determined where it stands in the first place: t^* , K , H , L , and N :



Long Run Aggregate Supply Shifts

If we improve technology, our LRAS will shift to the right (a). If we shut our borders, decreasing the number of available workers (L) and decreasing the number of ambitious/smart immigrants (H), then the LRAS will shift to the left (b). Even right-wing economists are in favor of immigration!

AGGREGATE SUPPLY: THE SHORT RUN (SRAS)

In the short run, there *is* a relationship between the price level and real output. Since it's easiest to understand this with reference to 'stickiness' in input prices, that's the argument we'll develop here.

Imagine I own a jeans factory. My three big input costs are labor, cotton, and electricity. To make my business easier, I lock in prices for all three inputs in advance. For example, I sign a 5-year labor

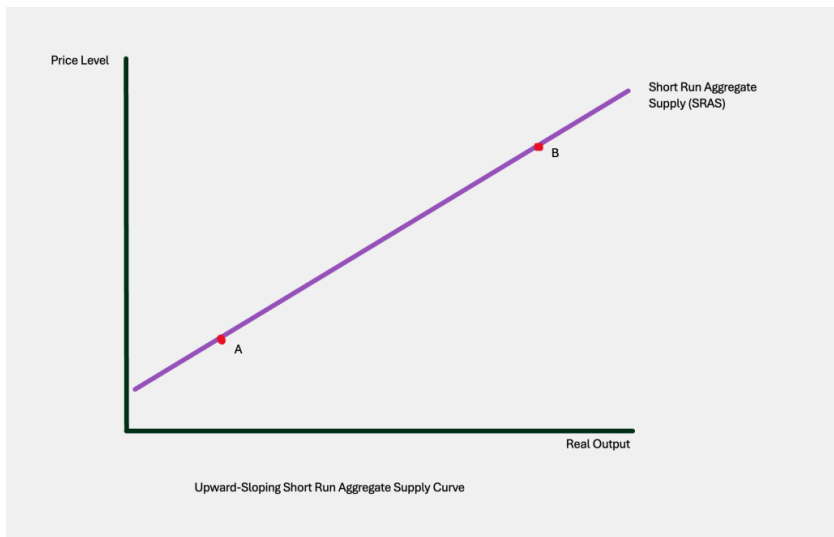
contract with my workers, paying \$30/hour. I lock in a kilowatt price with the utility company, and a yard goods price for my cotton for the next 5 years as well. Based on my costs, I can charge \$60 for my jeans and do fine.

It's all fine until one morning when I walk to the factory and I realize I've entered the **Fantasy World** of low, low prices. Everything's cheap! I'm as happy as anyone else, until I think about my jeans priced at \$60. I can't sell jeans for \$60 when a whole dinner costs \$1-2. I'm going to have to mark down my jeans to \$30. After I cut my prices in the showroom, I go back to the workroom to tell my workers their wage has to go down as well. The workers say yes...in five years, when our contract expires! I go to my office so I can call the utility company and the cotton dealer and get a cost cut-but I get the same answer from them! In five years, when our contracts end, I can negotiate for cheaper input prices. My situation is not good-my jeans are selling for half of their previous price, but my input costs are sticky, they have not gone down. In the short run-for the next five years-my profit margin is so small-to-negative that I want to produce as little as possible.

Let's try a different scenario. Suppose, walking to work, I discovered I'd stepped into the **Nightmare World** of high, high prices. People are paying \$20 for a subway ride. Aren't my jeans worth more than 3 subway rides? When I get to my showroom, I mark up all my jeans from \$60 to \$120. But when I go back to the workroom, everyone is grumpy. They tell me \$30/hr is no longer a living wage, when it costs \$20 for a single subway ride. They want raises! I tell them they'll get a raise-in 5 years! I retreat to my office to escape their complaints, only to hear the phone ringing like crazy. The utility company and the cotton dealer both want to charge me more, which...I'll allow in 5 years! Looking at my spreadsheet, I realize that with a higher market price on the jeans, but no increase in input costs, my profit margin on each pair produced is huge. I want to produce as much as possible.

Bottom line-in the short run, when the price level was low, I

wanted to produce very little (point A below). When the price level was high, I wanted to produce a lot (point B below). This would be true, in this example, for five years. After that, everything could adjust freely, without those contracts preventing changes in input pricing. These legal contracts are a type of “stickiness,” preventing all prices from adjusting instantly, the way they would in the long run:



Short Run Aggregate Supply Curve

There are other explanations for an upward-sloping SRAS—inflation expectations, misperceptions—but one’s enough for us. Now that we have all three of our aggregate curves, it’s time to put them together.

SOME USEFUL MATERIALS

[Watch](#) the first of 2 videos on aggregate demand.

[Watch](#) the second video on aggregate demand, which discusses shifts in the curve.

[Watch](#) a video on the LRAS (long run aggregate supply) curve.

[Watch](#) a video on the SRAS (short run aggregate supply) curve.

[Watch](#) a very British video on the aggregate model, giving a slightly different take!

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CHAPTER 21

The Aggregate Model: Equilibrium and automatic stabilizers

BETTINA BERCH

Consider this

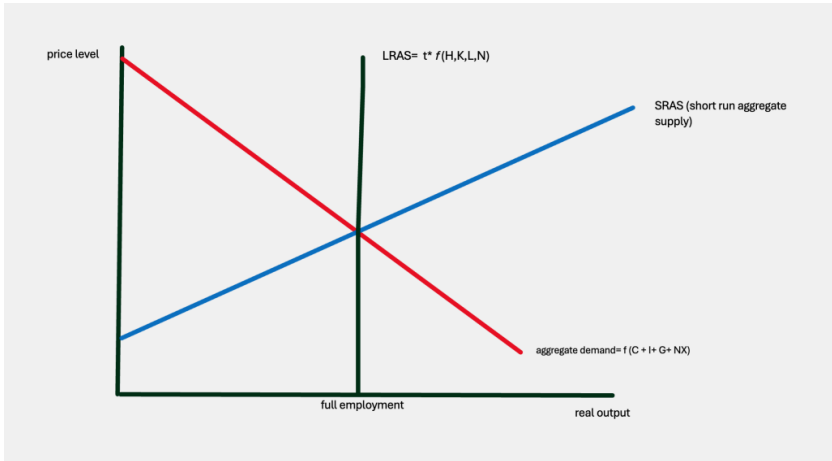


Cindy Tang, photographer, 2015. House on the Edge of Falling

Do you look at this house and think, perfectly balanced? Or do you worry it's one stiff breeze away from disaster? In economics, an equilibrium position means there are no forces moving something away from where it is. It's at rest. Since in real life it's hard to know if an economy is in equilibrium, our aggregate model gives us a way of seeing if our 'house' is falling off the cliff—and what to do about it.

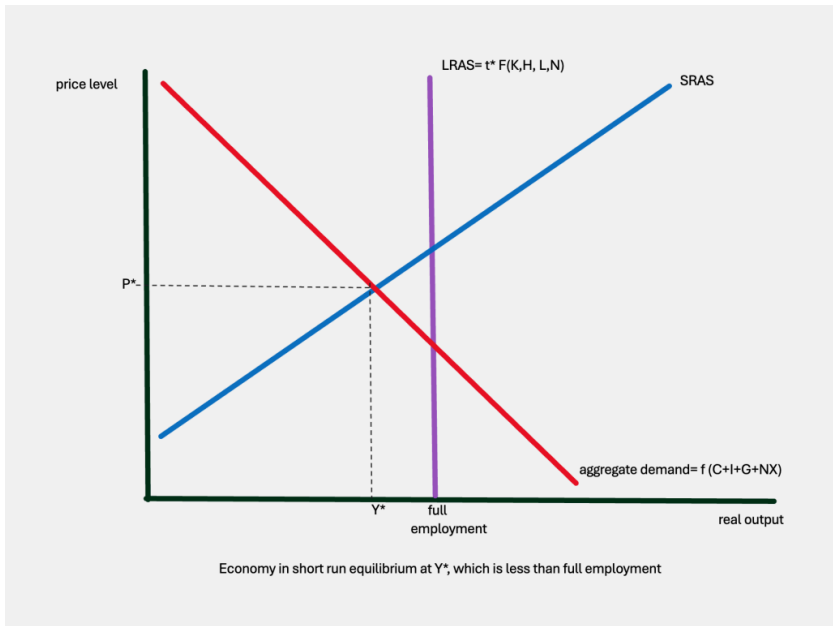
GRAPHING THE DIFFERENT AGGREGATE OUTCOMES

In the last chapter, we developed our aggregate demand curve, our long run aggregate supply curve, and our short run aggregate supply curve. When we put them all together, we might get a graph that looks like this:



Aggregate Equilibrium

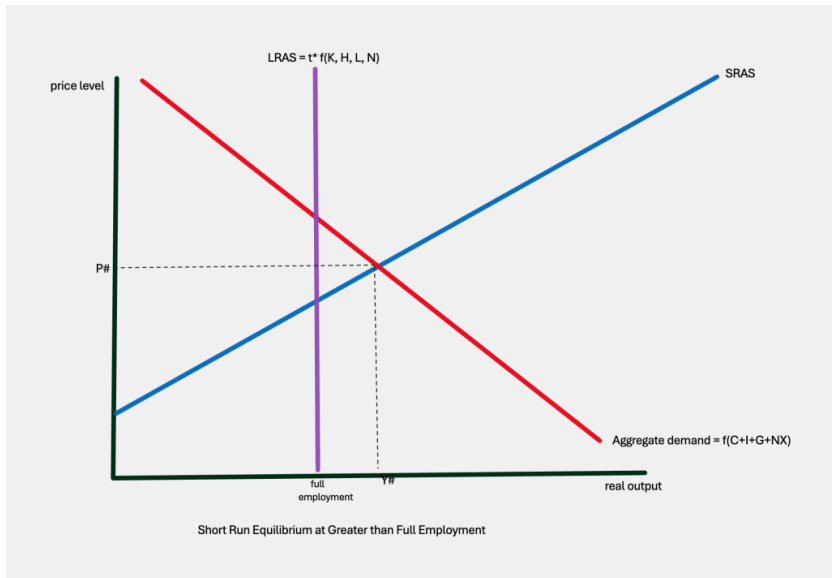
In this graph, all three curves intersect at the same point. We would say this economy is in short run and long run equilibrium, since there are no forces pushing us away from the full employment equilibrium that it has reached. And while this is great, this might not happen. Let's look at two other possibilities:



Equilibrium at less than full employment

In this graph, our aggregate demand curve intersects the short run supply curve at a point corresponding to Y^* , which is less than full employment. This means that in the short-run, which is where we live, our economy is operating at less than full employment. There are people out of work, factories and resources not being used. Our economy is depressed!

We could also have a third outcome:



Equilibrium at Greater than Full employment

In this graph, our aggregate demand curve intersects the short run supply curve at a point corresponding to $Y\#$, which is to the right of full employment. Our economy is operating at a point greater than full employment. People are working 2 or 3 jobs and factories are running 24/7 with no down-time for maintenance. This may sound great—business booming—but an economy can not run at over-capacity for very long. People and machines will wear out. This economy is over-heated.

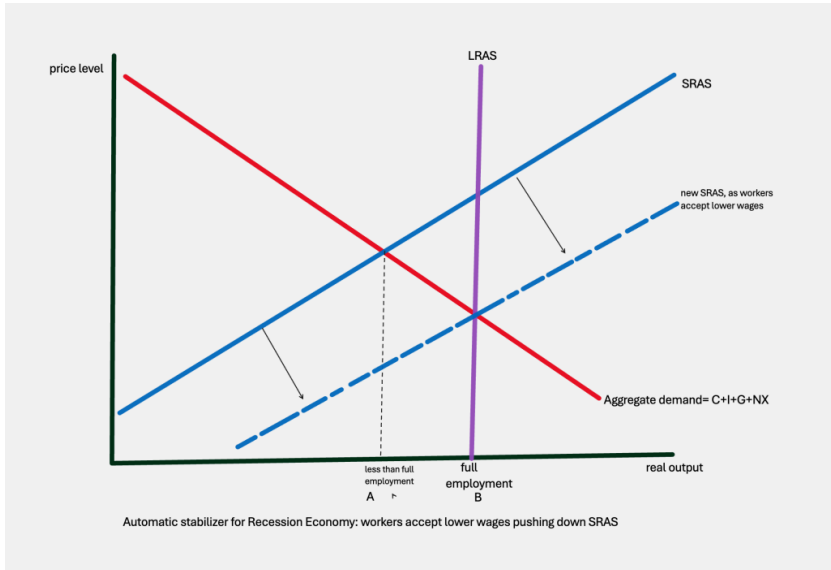
While our first graph showed an economy in long *and* short run equilibrium, the second and third graphs showed an economy whose short run and long run equilibriums did not match up. What happens?

AUTOMATIC STABILIZERS TO THE RESCUE: CURING THE DEPRESSED ECONOMY

An automatic stabilizer is a built in mechanism that will kick in—on its own—to bring our economy into long and short run equilibrium. These stabilizers may not work very quickly and they may be painful. If policymakers are ignorant, some stabilizers may get canceled before they have a chance to work.

Let's examine stabilizers for the depressed economy first. The first operates by shifting the SRAS curve. (Sometimes the stabilizer that operates on the SRAS is called a '[long run self adjustment](#).') Imagine we live in a small town with only one factory employing us. A recession grips the economy and our factory closes. We are all thrown out of work. At first we get unemployment benefits, then we borrow from family and friends. Before long, everyone we know is tapped out, broke. Then one day, there's an ad in the local paper, telling us our old factory has been bought. We're invited to apply for our old jobs immediately. But—they're warning us in advance—the new factory will pay us half of what we were paid before.

Some refuse to even consider working for half-pay. Some say they don't like it, but they could work for a while to pay off debts, get back on their feet. The bottom line? The new factory re-opens, operating with labor costs cut in half. Other things being equal (*ceteris paribus*), this will shift the short run aggregate supply curve downward, or to the right. We end up in short and long run equilibrium at a lower price level and full employment. This stabilizer, driven by input-cost savings that shift the SRAS downwards, can be cruel, and it can take a very long time to take effect—but it should, eventually, get the job done.



Automatic Stabilizer for a Recession Economy: Workers accept lower wages so SRAS falls

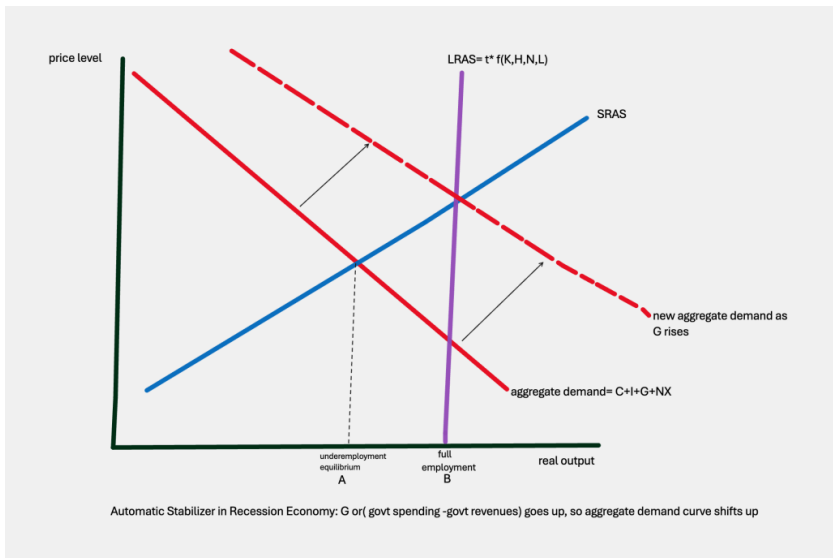
A second stabilizer operates by shifting the aggregate demand curve upwards or to the right. Remember, the position of our aggregate demand curve is determined by its components:

$$\begin{array}{lcl} \text{Aggregate Demand, or} & & \\ \text{Total Output} & = & \text{Consumption} + \text{Investment} + \text{Government} + \text{Net Exports} \\ & & C \quad + \quad I \quad + \quad G \quad + \quad NX \end{array}$$

Components of Aggregate Demand

Now we are going to define G (government) as a 'net' term: $G = [\text{Government spending} - \text{government (tax) revenues}]$. G gets larger when the government is spending more than it's extracting from the economy. So, what happens to G in an economy that's depressed, like that town where the factory closed down?

First, think of all those unemployment checks being sent out and the soup kitchens the government had to open. Government spending is going up. At the same time, government tax revenues will be falling, since the unemployed people aren't paying taxes and the closed down factory won't be sending in business taxes. If government spending goes up and its revenues are going down, G is *increasing*. In our aggregate graph, that means our aggregate demand curve will be shifting upward, or to the right, since G is one of its determinants:

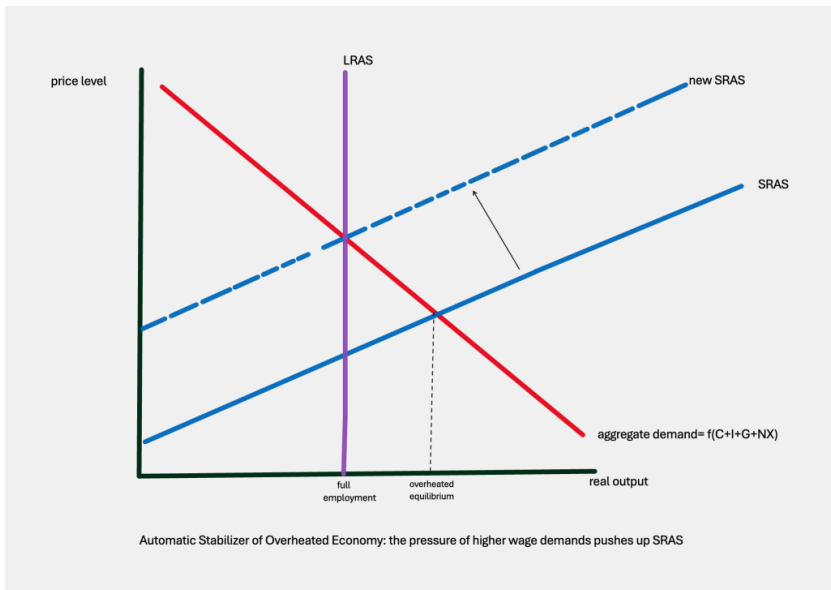


Automatic Stabilizer in Recession Economy: G rises, pushing up aggregate demand curve

We have one automatic stabilizer shifting the short run aggregate supply curve and another stabilizer shifting the aggregate demand curve, moving a depressed economy to full employment equilibrium in the short and long run.

AUTOMATIC STABILIZERS TO THE RESCUE: CURING THE OVERHEATED ECONOMY

In our overheated economy, the SRAS intersects the aggregate demand at greater than full employment. Let's consider first the automatic stabilizer that operates through the short run aggregate supply curve. This time everyone in town is already working 2 jobs, and the employer asks us if we'd take another half-shift? For how much, we'd ask? Someone says they'd work for triple wages, and we all agree. Higher wage demands will shift the SRAS upward or to the left. We end up back at full employment equilibrium at a higher price level:

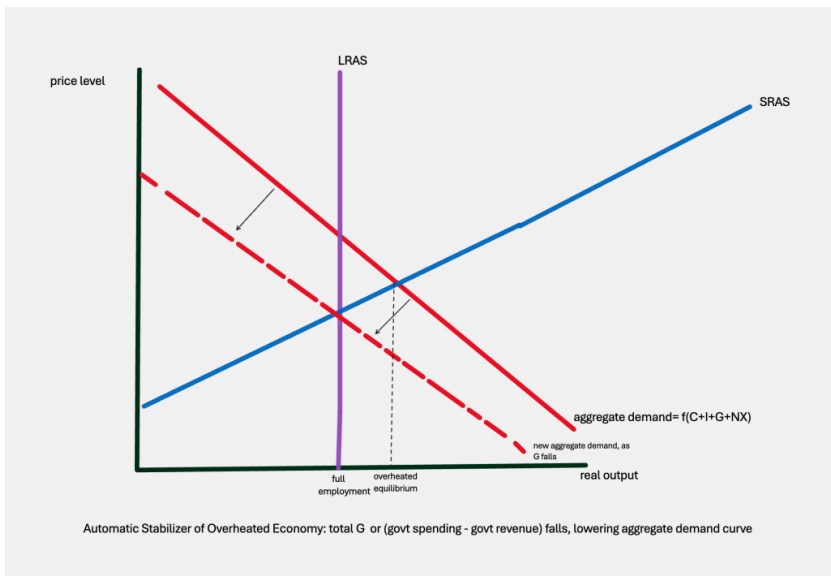


Automatic Stabilizers for Overheated Economy: Wage pressure shifts SRAS upwards!

A second automatic stabilizer will operate by changes in G , a component of our aggregate demand curve. Recall from above:

G = government spending – government revenues.

In our overheated economy, government spending goes down, since government isn't issuing many unemployment checks and the soup kitchens have closed. Government revenues have increased, since we're each paying taxes on a couple jobs now, and factories are paying big taxes too. When government spending goes down and revenues go up, total G goes down, shifting the aggregate demand curve downward or to the left. We have returned to long and short run equilibrium at full employment.



Automatic Stabilizer of Overheated Economy: G falls, pushing down aggregate demand curve

ARE THERE PROBLEMS WITH AUTOMATIC STABILIZERS?

With the first stabilizer, the wage cuts shifting the SRAS downward in the depressed economy, we said it might take a long time to be effective. (When the auto plants left Detroit, people didn't do a quick pivot to different types of work. Many people are [not flexible](#)

about jobs at all.) Societies can only endure so much mass unemployment before the social fabric falls apart.

Another problem comes from people who would like to get rid of the stabilizer that operates through changes in G . Specifically, they push for legislation requiring the federal government to run a balanced budget. They believe such a law would promote government responsibility, arguing that if ordinary people have to balance their budgets, so should governments. A balanced budget law that said government spending always had to equal government revenues, would mean that for the equation:

$$G = \text{government spending} - \text{government revenues}$$

G would be required to be zero. If G must always be zero, it can't shift that aggregate demand curve to the right or left and automatically bring us to full employment. A law requiring the federal government to have a balanced budget would remove one of our two automatic stabilizers. Not a good idea!

Luckily, we have more tools in the kitbag. In the next chapter, we will explore monetary and fiscal policies.

SOME USEFUL MATERIALS

[Watch](#) a video on how the aggregate model reaches equilibrium.

A simple [video](#) featuring unemployment insurance as an automatic stabilizer.

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CHAPTER 22

The Aggregate Model: Discretionary (Monetary and Fiscal) Policy

BETTINA BERCH

Consider this



Estelle Levine, 1936, W.P.A. Sponsors Amateur Piano Contest

The Works Progress Administration (WPA) was set up in 1935 to help revive the U.S. economy during the Great Depression by giving unemployed people jobs. Artists of all kinds were supported, in addition to people working in construction/infrastructure. This poster

and the amateur piano contest it advertises, were WPA projects. In the 2020s, the idea of our government paying to run leftwing theater groups or to archive slave narratives would run into all kinds of culture war objections! While there *were* objections to the government programs of the Great Depression, they were mostly from people who didn't believe they would work. Let's take a look!

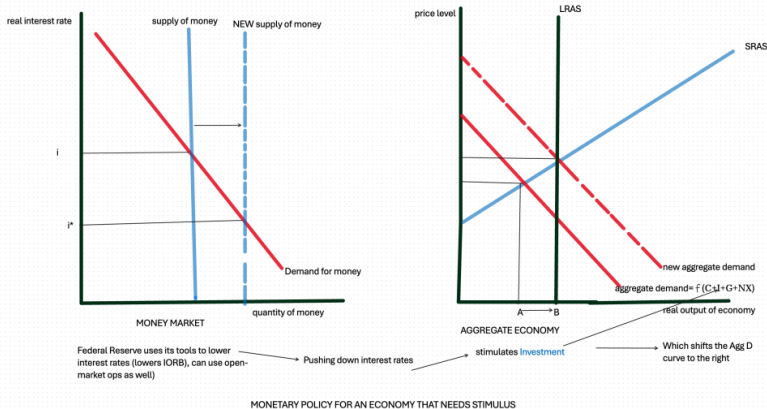
In the previous chapter, we identified three outcomes from the aggregate model: an economy in recession, an overheated economy, and an economy in long and short-run equilibrium. We know that economy in short and long run equilibrium needs no fixing. It's the other two that need help. We also saw that automatic stabilizers *could* kick in and bring an economy into long-run equilibrium, but they might require a socially-unacceptable amount of suffering and a very long time. Economic theory offers two more options: monetary policy and fiscal policy.

MONETARY POLICY TO THE RESCUE!

As we saw earlier, one of the jobs of our Federal Reserve is to create **monetary policy** to steer our economy towards their [goals](#): price level stability (inflation at 2%) and maximum employment (unemployment around 4-5%). Once the Fed has evaluated data on the current economy, they use their tools to move interest rates in a direction that will either push interest rates up or down. Their interest rate changes will either stimulate or dampen Investment activity. Since Investment is a component of Aggregate Demand, changes in Investment will shift the Aggregate Demand curve, producing a new short-run equilibrium—hopefully intersecting the long-run equilibrium as well. We'll walk through the steps.

Monetary policy for an economy in recession

If an economy is in short-run equilibrium at less than full employment, the Fed can use a variety of tools to lower interest rates. It could lower the required reserve ratio—an old tool no longer relevant with the ratio set effectively at zero these days. Likewise, it could lower the discount rate that it charged member banks for overnight loans—again, less relevant these days, when banks hold ample reserves. The Fed could hold open market operations and buy bonds, increasing the money supply and pushing down interest rates. Open market operations, in this case called ‘quantitative easing,’ were important after the 2008 economic crash, but not so much now, when banks have ‘abundant’ reserves. Instead, the Fed lowers the interest rates offered on deposits by member banks at the Fed (the IORB) and/or buys ‘repos’ from other financial institutions. The lower interest rate increases Investment, pushing the Aggregate Demand curve upward, or to the right, so our Aggregate Demand curve now intersects the SRAS and the LRAS at full employment. We move from Output A to Output B.

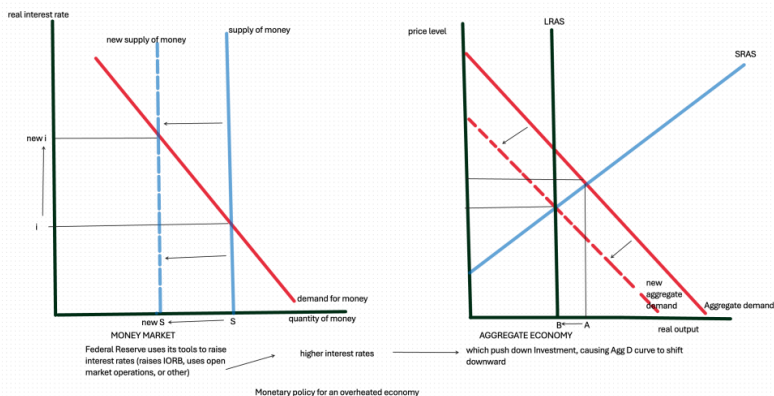


Monetary

policy for an economy needing stimulus

Monetary policy for an overheated economy

If the economy is overheated, running at greater than full employment, the Fed can use its tools in the opposite direction to dampen economic activity. A traditional method—increasing the reserve requirement—is possible, but not likely after many years at zero. They could raise the discount rate they charge member banks for overnight loans. They could run open market operations and sell bonds, decreasing the money supply and pushing up interest rates. Or they could use their newer tools, raising IORB rates for member banks and selling ‘repos’ to other financial institutions. These higher interest rates would discourage private Investment, pushing down the Aggregate Demand curve (since Investment is one of its components):



Monetary

policy for an overheated economy

We would end up decreasing real output from A to B, where we are in long-run equilibrium.

The Fed's monetary tools have some important strengths. First, the Federal Reserve is better-shielded from politics than any other major institution. Neither the president nor the Congress can fire the Fed Chair or its Board of Governors. A president running for re-election might want to lean on the Fed Chair to 'juice up' the economy by lowering interest rates—but the [Fed can ignore](#) the pressure. Another great strength of monetary policy is how quickly it can go into effect. The Fed meets regularly every 6 weeks, but more often if it feels the need. If they agree to raise or lower interest rates by some amount at their meeting, it goes into effect very quickly. Indeed, the Fed often makes its intentions known before they meet, so the impact can be absorbed more smoothly.

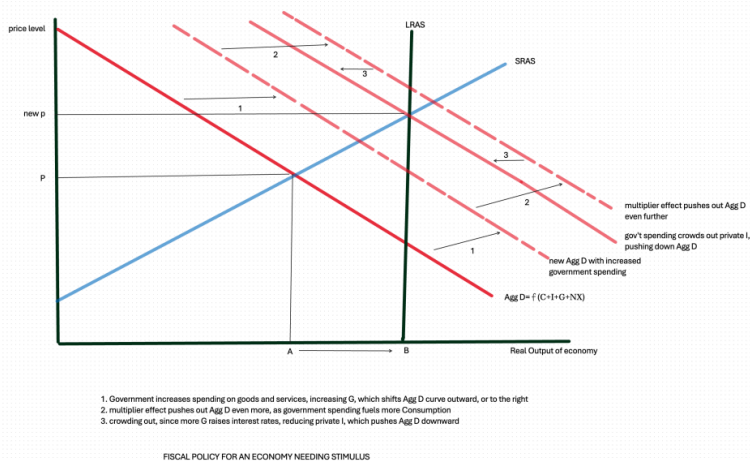
FISCAL POLICY

When Congress passes spending or taxation measures that are signed into law by the President, we call this **fiscal policy**. In our

aggregate demand model, we usually locate fiscal policy in the Government (G) component of the Aggregate Demand curve ($C+I+G+NX$), although it can also show up in the aggregate supply curves.

Government spending pushing out the Aggregate Demand curve: the multiplier effect

When the President signs a bill authorizing a \$10 billion Infrastructure Bill, to be spent on roads and bridges, let's say, the first chunk of money might be spent on engineers writing assessments of current infrastructure (arrow #1 in the graph below). These engineers will take their bigger paychecks and spend maybe 40% of the extra on consumer goods and save 60% of the extra—we would say they have a **.4 marginal propensity to consume** (mpc). Their spending will boost the revenues of a lot of people around them—the florist, movie theaters—wherever those engineers shop. Then those businesses spend more...and so forth. A consumption multiplier will push out our Aggregate Demand curve even further than the first round (arrow #2):

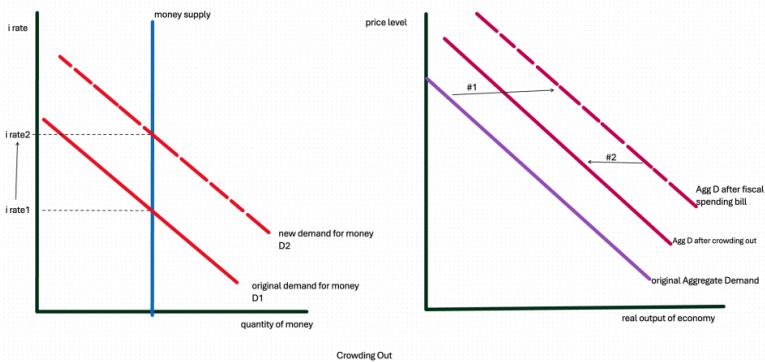


Fiscal Policy for an economy in recession

So far we have had a fiscal stimulus, followed by a further push outward from the marginal propensity to consume. But now we will have a force pulling our Aggregate Demand curve downward, or to the left (arrow #3). This we will call **crowding out**.

Fiscal policy and crowding out

When the government passed this infrastructure spending bill that encouraged the engineers to go out and spend 40% of their increased paycheck, it increased economic activity overall (arrow #1, in graph on the right, below), which increases the demand for money in the economy. In the money market (the graph on the left, below) this means a shift upward of the Money Demand curve, which will now intersect the money supply curve at a higher interest rate. A higher interest rate will push down private Investment. Since this is a component of the Aggregate Demand curve, this will shift our aggregate demand curve back downwards a bit (right graph below, arrow #2).



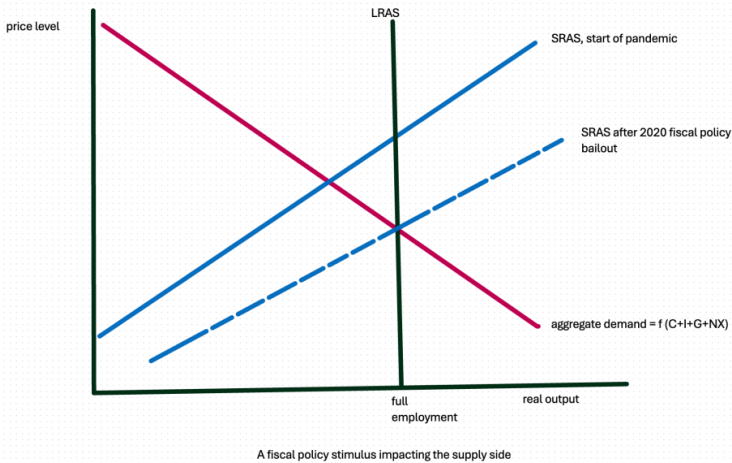
Crowding Out

How much fiscal stimulus is the right amount?

You might wonder, if we're trying to use fiscal spending to stimulate the economy enough to bring us to full employment, how do we know how big the Infrastructure Bill should be, with a consumption multiplier pushing Aggregate Demand outwards and crowding out pushing us back downwards? Well, we think the marginal propensity to consume might be around 40%, although peoples' saving and spending decisions may be a *product* of the economic climate as much as a *determinant* of curve shifts. Crowding out may also be dependent on the economic climate. If an economy is in a deep recession, it's unlikely that fiscal spending will be crowding out private Investment, since the private sector has already sidelined themselves. In an overheated economy, a fiscal stimulus would definitely crowd out the private sector—but no one would recommend giving an overheated economy a fiscal stimulus anyway. As with many of our models, the point is to understand the direction of impact, and hope the actual policy-makers act judiciously.

Fiscal policy on the supply side

Fiscal policy usually impacts the Aggregate Demand curve in our models, but it can impact our Aggregate Supply curves. During the Covid pandemic, for example, Congress passed a number of bills to send money to important [industries](#) that might have collapsed otherwise—airlines and hospitality industries, for example. These short-term subsidies shift the short-run aggregate supply curve downward, or to the right.



Fiscal stimulus to supply side

Hospitals and state and local governments also received crucial fiscal assistance. In general, many businesses qualified for assistance through the Paycheck Protection Program, to keep employees on their payrolls, in spite of declining sales. Since these were all temporary, we graph them impacting the short-run aggregate supply curve.

WHICH IS MORE EFFECTIVE, MONETARY OR FISCAL POLICY?

We found that monetary policy was both quickly implemented and relatively sheltered from the political process. Fiscal policy? It has been a very long time since Congress has been able to pass any legislation at all. The so-called Inflation Reduction Act of 2022 represented a massive achievement by President Biden and his team—but it was exceptional, and not designed as a fiscal stimulus so much as an infrastructure improvements measure. If we really needed a fiscal stimulus bill, because the economy was in a deep recession, and it took Congress 3 or 4 years to pass a final bill—it might not be time for a stimulus anymore! If automatic stabilizers had already taken us to full employment, a fiscal stimulus bill would definitely be coming at the *wrong* time. Business-friendly fiscal spending, like we had at the start of the pandemic, can pass Congress quickly, but sometimes we need schools and road fixing rather than corporate bailouts.

MOVING AHEAD

While there is more we could say about the U.S. economy, it is time to situate our national economy in the world economy. We need to talk about trade, globalization, development!

Some Useful Materials

[Watch](#) a video on automatic stabilizers.

[Watch](#) a video on using fiscal policy to reach full employment equilibrium.

[Watch](#) a video on using monetary policy to reach full employment equilibrium.

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CHAPTER 23

The World Economy: International Trade in Theory and Reality

BETTINA BERCH

Consider this



Christine Roy, photographer, 2017, A World of Trade.

Sometimes tourist shops like to tape small bills or flags from their customers on their wall, or on a world map. What message are they sending?

Throughout human history, tribes and countries have traded with each other, either to get things they didn't have, or to get things cheaper than they otherwise could. While trade may be universal, politicians and economists have often disagreed on how it should proceed. Economists are pretty unanimous: the more trade the better, with as few restrictions on trade as possible. Politicians rarely support trade. Some even flirt with autarky—self-sufficiency with as little trade as possible. Usually North Korea is the textbook example of autarky, although that may have ended, as they now [export munitions](#). But even when politicians have to accept world trade, they can't resist trying to control it, either to favor particular home industries or to chase some national goal. To understand all

this, we need to begin with the economists: why do we love free trade?

COMPARATIVE ADVANTAGE

Comparative advantage is an economic principle that says trade relations are mutually advantageous (meaning, good for both sides) when they are based on the relative opportunity costs of producing things. This [video](#) goes through the arithmetic clearly; we don't need to repeat it here. Anyway, it's a mental computation that most of us make instinctively. If someone moves into your apartment who's a great chef but terrible at cleaning, and you're a horrible cook but a fanatic cleaner—we all know the best outcome. Let each of you specialize in what you have the 'lowest opportunity cost,' and you'll have the maximum output. When one side is better at one thing, and the other side better at something else—we call that **comparative advantage**. Specialization-and-trade seems like a no-brainer when two countries have complementary strengths. But what if one country is better at everything? Should they still trade with anyone?

ABSOLUTE ADVANTAGE

Even if one country is better at producing everything—even if it has an **absolute advantage** in the production of all things—it should specialize in producing its lowest opportunity cost thing, and trade to get higher opportunity cost things. Again, the same [video](#) goes through the arithmetic with two sample countries very clearly. How about a more intuitive example? Imagine Renee is an artist who can produce one \$4000 painting in a 40-hour workweek. To realize those sales, she needs an office person to send invoices, do mailings and pack and ship paintings. Renee hires Jack to do this office work, paying him \$500 per week. All is fine until she goes into the office one day, and watches Jack work. 'He's so slow,'

she thinks. 'I could do what he's doing in *half* the time!' Should Renee fire Jack and do the office work herself? Or should she keep Jack, even though he's slow? (And don't avoid the question by interviewing different office workers!)

If she fires Jack, she'd have to spend 20 hours a week on office work, leaving her only 20 hours to paint. She'd produce only half a painting a week, so her weekly income would be \$2000. If she keeps hiring Jack, her weekly output of one painting would bring her \$4000, minus \$500 to pay Jack, or \$3500 net for the week. Even though she is better at painting *and* better at office work, it still makes sense for her to specialize in the highest value use of her time, and pay Jack to do the other work.

PROBLEMS WITH COMPARATIVE/ABSOLUTE ADVANTAGE TRADE THEORY

While arithmetic and intuitive logic both say comparative/absolute advantage are solid arguments for countries to specialize and trade, there are important arguments against it.

First, it's risky. Economies that are very specialized are left vulnerable to trends they can't predict or control. An economy specializing in growing coffee beans can be ruined after a few bad crops. Countries that specialized in growing tobacco didn't expect world tastes to change. Diversification can be safer than specialization.

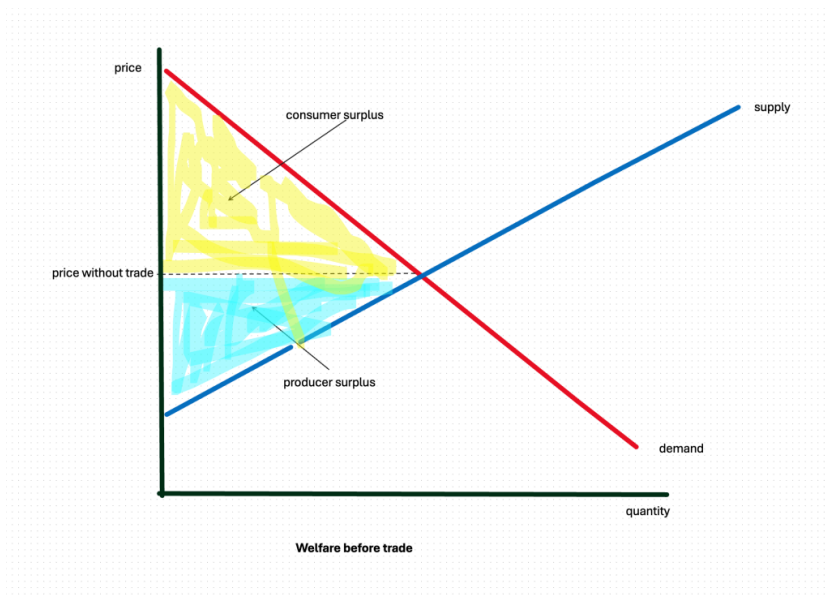
Second, it breeds dependency. If rice is a key cultural staple food, as in [Senegal](#) or [Japan](#), ensuring domestic production—even if it's cheaper to import rice— is essential to the protection of national identity. Or consider guns and tanks—did you ever wonder why some countries keep producing them, even if they are not very high quality? Many countries can't run the risk of depending on a trade partner for weapons, only to find themselves at war with each other. Many countries choose self-sufficiency in key areas, even if it is costly. A variation on this is the 'infant industries' argument—

the idea that a young country might have a few industries that it protects from competition from imports, until home production 'gets on its feet.' Often it's the production of textiles or even wood matches or beer (low tech products, widely used domestically) that ask for import protection in order to grow. Historically, these industries have been protected in various countries...that have also found it extremely difficult to end those protections once the domestic industry is actually competitive.

Third, comparative advantage may cost real people their actual jobs, their livelihoods. If comparative advantage says that Vietnam should produce shoes and the United States produce computer software, we end up with a lot of unemployed shoe workers in the United States, who can't turn around and become software coders. There's an assumption behind the comparative advantage model, that resources will 'flow' smoothly into the industry demanding them, but people aren't flexible, like financial instruments moving to the highest bidder. Sometimes it's the workers—auto workers, textile workers—who have been loudest in opposition to free trade, knowing their own jobs are on the line. Unlike other situations, in world trade, the winners don't compensate the losers.

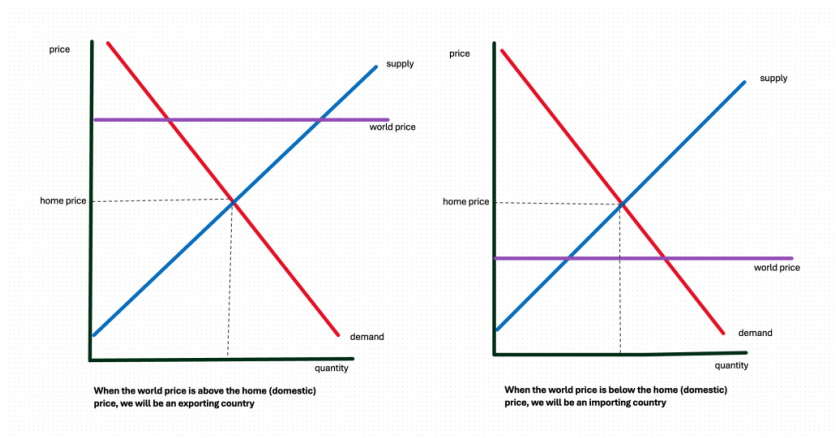
ANOTHER WAY OF EVALUATING THE BENEFITS OF TRADE: WELFARE ANALYSIS

Welfare analysis can be particularly useful in evaluating the gains and losses from a trade policy change. First, let's remind ourselves of the types of surplus and locate the equilibrium price in an economy before trade:



Welfare analysis of surplus before trade happens

Now let's open this country up to trade with the rest of the world. If the world price is higher than the home price (also called, the domestic price), domestic producers will raise their selling price to the world price—for *everyone*. Domestic consumers will either pay that higher world price, or do without. We will be an exporting country of that good.

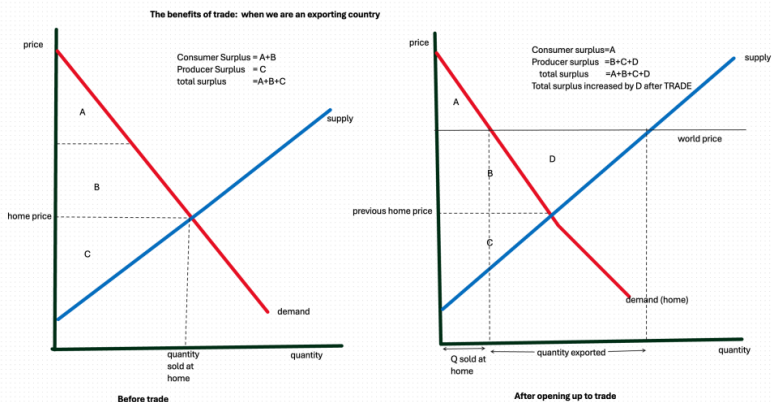


Trade basics: you import or export when world price is lower or higher than the domestic price

If the world price is lower than the domestic price, domestic consumers will now be paying that lower world price. We will be an importing country of that good.

Welfare analysis of trade: the exporting country

Let's consider the situation where we open up to trade and the world price is *higher* than our domestic price. We become an exporter of some good, like wheat or beef:



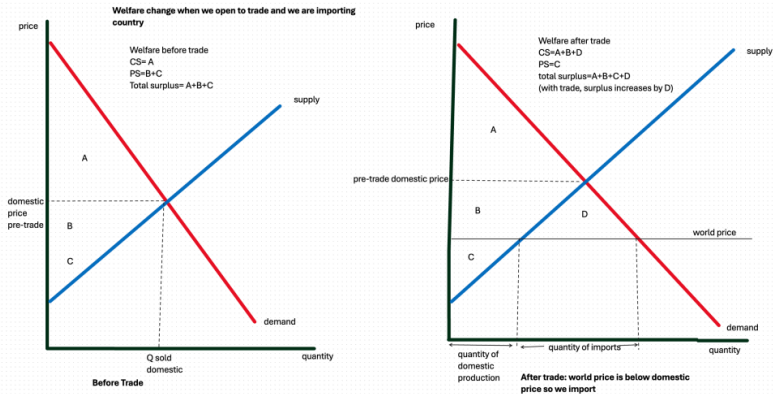
How surplus changes after opening to trade and a country becomes the exporter

Before trade, CS (consumer surplus, the area below demand curve and above market price) is $A+B$. And PS (producer surplus, the area above the supply curve but below market price) is C . TS (total surplus) is $A+B+C$.

After trade, the new CS is just A . The new PS is $B+C+D$. TS is now $A+B+C+D$. Thanks to trade, total surplus in our country has increased by D . However, consumers now have less surplus than before, and producers have taken surplus B from consumers and gotten all of the new surplus D . Doesn't this sound a little more like reality than the comparative advantage model? Yes, there are gains from trade—but there are losers as well.

Welfare analysis of trade: the importing country

If we open our country to trade and the world price is *lower* than what domestic producers had been charging, domestic consumers will now be paying that lower world price:



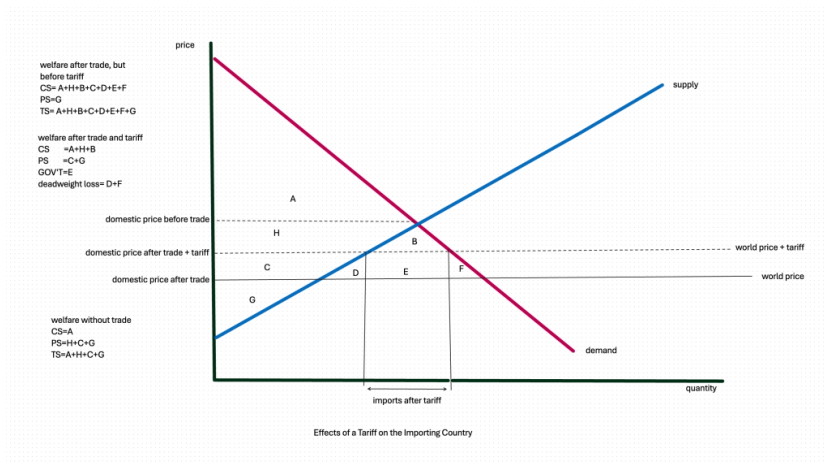
Welfare changes when opening to trade: when a country imports

In the graphs above, CS is A before trade, and PS is B+C, so TS is A+B+C. After opening to trade, CS is A+B+D. CS is just C. TS is A+B+C+D. Trade has increased total surplus by D, but this time, it's only consumers who have benefited from trade. Producer surplus has decreased. These domestic producers are not going to be happy about the competition they've gotten from foreign producers!

DOMESTIC PRODUCERS FIGHT BACK: TARIFFS

In the first case, when our country became an exporter, we saw that domestic consumers were worse off—but consumers of various goods are not a unified group. We don't all get together and protest more expensive shoes or steel. In the second case, when domestic consumers were better off thanks to a lower world price, it was domestic *producers* who were harmed. And in many cases, producers *are* unified; they have industry trade groups, lobbying groups, etc. If the beef industry or the wheat farmers saw their businesses gutted by foreign competition, they'd go to Congress and push for **tariff protection**.

A tariff is a tax on imports—sometimes on a good, sometimes on a good from a particular country. A tariff on [imported washing machines](#) will raise the world price of washing machines (which will raise the price of all washing machines):



Effects of a Tariff on the Importing Country

First, notice that the world price horizontal line has now been pushed up by the tax rate on the imported good. At the new, higher world price, domestic consumers are buying slightly more domestically produced goods, at a higher price than before the tariff. After trade but before the tariff, $CS = A + H + B + C + D + E + F$. And PS is only G . So TS is $A + H + B + C + D + E + F + G$.

A tariff on imports is a tax, so we will have government revenues in TS and we have deadweight loss, surplus that does not happen because a tax reduces economic activity. So after the tariff, CS is $A + H + B$. And PS is $C + G$. Government revenues are E . The deadweight loss—the loss to society from imposing this tariff—is $D + F$.

Who gains and loses from tariffs?

It's usually domestic producers who argue for tariff protection, and as we see in the diagram above, did producers gain area C.

Producers usually argue that a tariff will protect workers in their industry, not the business owners, although computations show that the cost of saving a single job can be a [million dollars a job](#), not an insignificant sum!

Domestic consumers lost C+D+E+F, although it could be argues that, as citizens, they still benefit from area E, as government revenues are spent on the public's well-being. In real life, consumers face [higher prices](#) on the tariffed product.

From a productivity point of view, tariffs—or quotas or any measure that protects an industry from more efficient competitors—lead to inefficiency.

It should be clearer, now, why economists are in favor of trade and against protectionist barriers to free trade. Trade allows countries to specialize in goods and services where they have a comparative advantage. Specialization and trade allow for a higher standard of living. Barriers to trade, like import exclusions, import quotas and tariffs, all reduce social surplus and protect inefficient producers.

Much of this discussion has been a bit theoretical, however. It's time we looked at some real life trade issues, like the problems of globalization and global supply chains, or the impact of exchange rates.

Next chapter, we return to planet earth!

Some Useful Information or

This [video](#) uses opportunity cost calculations to show the basis for comparative advantage.

[Watch](#) a video explaining comparative advantage and the gains from trade.

[Read](#) about Trump's anti-trade/pro-protectionist point of view.

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CHAPTER 24

The World Economy: Globalization and Its Problems

BETTINA BERCH

Consider this



Singapore port, 1890



Chuttersnap, 2017. Container shipping, Singapore.

Ports have always been busy places, but modern harbors are less about ships and more about the containers they carry. Has this changed anything about what's getting shipped?

We have seen that trade allows countries to specialize in producing the things they're relatively best at making. Specialization lets a country be more productive. A more productive country can have a higher standard of living. And while all that is very true and very important, *not everyone* is better off with specialization and trade. A lot of American workers lost their jobs in textiles, car production, electronics and more, to competition from lower-wage countries. This has resulted in a strong 'protectionist' push from unions, who've sometimes found themselves joining their bosses in calls for tariff protection.

SO IS TRADE GOOD, OR NOT?

Trade is obviously more complicated in real life than it is in our welfare analysis or our simple comparative advantage model. There *are* some important outcomes of trade to keep in mind. First, we can never forget the people that specialization displaces: a fourth generation Detroit auto worker is not going to pivot to home health care because the market has signaled it's a good idea!

Competition from free trade can be a big negative for a developing country. Consider the situation of Rwanda, [one of many African countries](#) trying to develop its own textile industry, but unable to compete with imports of secondhand clothing from the developed world. When a Salvation Army store in New York City can't sell racks of clothes, the garments are baled up and sold to jobbers for export. These clothes often end up in African marketplaces where they are sorted and resold (or sent to a local landfill). What felt like virtuous recycling in NYC is now disastrously cheap competition for a Ghanaian textile manufacturer. [Kenya](#) used early Covid concerns that secondhand clothing could spread disease, to ban imports, which pleased local producers, who realized that import protection might boost their businesses.

There are some positives to consider. Trade enables more price competition, so we, as consumers, access cheaper goods and services. Trade gives poorer countries access to markets with wealthier consumers. If you are thinking, those poor countries get ripped off by the wealthy, remember, trade is voluntary. If a country doesn't like the terms, they can say no and the deal doesn't happen. Or, you may be worried by the cultural imperialism that trade brings: McDonald's or KFC spoiling Thailand's countryside, for example. Again, the economist would remind you, some American fast food joint is simply another market option—and the fact that they do a lot of business means they are satisfying many people. On the other hand, [some countries](#), like Bermuda and Iceland, for example, *do* restrict the opening of certain foreign

franchises, to protect local businesses and/or their cultural heritage.

While it's not a pretty thought, the comparative advantage of many poor countries is their cheaper labor. If Nike opens a factory in a low wage country and their workers line up to get those jobs—it means Nike is probably paying more than anyone else.

These would be the standard economic arguments in favor of trade. They're based on the idea that workers and countries are free actors—if they don't like the deal, they can walk away. In the real world, political gamesmanship is probably more important than economic benefits. Maybe the strongest argument that trade's a good thing, is the realization that when we want to punish a country, we put trade sanctions on them. When the U.S. punishes Cuba and Iran and North Korea by shutting off trade with them—that says, trade's probably valuable.

TRADE ISSUES: PROBLEMS WITH THE GLOBAL SUPPLY CHAIN

The Covid pandemic taught all of us some new things about globalization. We discovered that protective gear for medical workers was mostly produced in Asia. We learned why it would take a long time for hospitals to get the ventilators they needed to save lives. The global supply chain had been invisible to most of us before the pandemic. As economies recovered, people realized that the furniture they'd bought the year before, was still sitting in a shipping container off the California coast. Who even *knew* about container shipping anyway?

People in the recycling industries have known about shipping containers for a long time. Historically, with China exporting more goods to the United States than it imports from us, some ships might have had to return to China with empty containers (what's sometimes called '[deadheading](#)'). With China offering to recycle world trash at cheap rates—what could be better than [filling the](#)

[departing containers](#) with American recyclables? Recycling was not a high profit margin business, but it did generate revenue for China-bound ships, at least until it was ended in 2017.

Bottom line, world trade and environmentalism have always been uncomfortable bedfellows. World trade wastes resources on transportation of goods. Transportation involves a lot of carbon pollution. Environmentalists are most likely to have the stall at the farmer's market urging people to 'buy local.' Self-sufficiency—even better! So, are there any ways that a [pro-trade person could also be green?](#) Perhaps we could start by realizing that climate change already poses an existential threat to whole populations suffering drought-based famine, flooding, and more. More than ever, the world's people are moving, as well as goods and services.

CURRENCIES AND EXCHANGE RATES

Underpinning all this trade are the national currencies which are exchanged when goods are bought and sold. Normally, we only think about exchange rates when we are visiting another country and we change some money at the airport. But exchange rates are lurking in the background every time you buy an imported mango or that cup of Yirgacheffee coffee.

The demand for a currency is a **derived demand**. People want the currency because they want the goods that currency will get them. The supply of a currency comes from people who want our goods and have exchanged their money for ours. The intersection gives us the exchange rate between the currencies. In other words, behind any exchange rate, stands the supply and demand for goods and services of the different countries. If the exchange rate can move freely—with no one controlling it—its equilibrium rate should reflect the demand for the each country's goods and services.

EXCHANGE RATES STABILIZE TRADE IMBALANCES

Suppose that year after year, Americans bought more goods from China than China bought from the U.S. This should mean, in currency markets, more demand for yuan (the Chinese currency) and an oversupply of dollars. The dollar would fall in value relative to the yuan. This would cause Chinese goods to look more expensive to American consumers. American's would buy fewer Chinese goods. For Chinese consumers, holding stronger yuan means American goods look cheaper. Chinese would buy more American goods. The trade imbalance could disappear!

While this is a grossly simplified description of how free floating exchange rates can make trade imbalances disappear—there's a big problem. Some countries do not allow the value of their currency to float freely.

HOW ARE EXCHANGE RATES SET?

Argentina's president, Javier Milei, was elected to office on a platform that promised, among other things, [to 'dollarize' Argentina](#): cure inflation (running over 160%) by getting rid of the peso and just using the American dollar for currency. (Apparently, some 30 countries in the world already use the dollar instead of having their own money, so it's a thing!) By dollarizing, Argentina prevents its own government from continually printing more money to pay for its over-spending. They are tying their own hands, as it were. Whatever America's Federal Reserve decides to do with the American money supply, will be what happens in Argentina as well.

Most countries *do* opt to create their own currencies. If they like, they can peg the value of their currency to some other country's at a fixed rate: \$2 Belize dollars = \$1 American dollar. Pegging value like this removes the need for an active monetary authority, while preserving a national identity. Or, they can allow the value of their

currency to move freely between upper and lower boundaries, creating a 'currency band.' managed float. Other countries may allow a fully floating exchange rate. In rare cases, a country can simply not exchange its currency with other countries.

WHAT HAPPENS WHEN A COUNTRY KEEPS ITS CURRENCY ARTIFICIALLY LOW IN VALUE?

First, how would we know if an exchange rate were 'artificially' low or high?

While career currency traders could probably tell you instantly which currencies were undervalued or overvalued, it's a little harder for the rest of us. Fortunately, The Economist magazine has developed a tool for the rest of us: the [Big Mac index](#). They started out by trying to imagine a product that's sold worldwide, that's standardized everywhere it's sold, which has a balanced input mix (not all labor or all capital goods). A haircut, for instance, might be a very similar service worldwide, but its inputs are almost all labor, very little natural resources or capital. They finally hit upon the Big Mac, which as a franchised product, has to be exactly the same everywhere in the world it's sold (except India, where it's not beef). The Big Mac also has labor and capital inputs. They then researched the price tag on the Big Mac around the world. By comparing the dollar equivalent of that price to the country's legal exchange rate, they could see if some currency was over or under valued.

Try this example. In China the Big Mac costs 25 yuan, In the U.S., the Big Mac at the same time is \$5.69. Since it's the same Big Mac, 25 yuan *should* equal \$5.69. By that Big Mac equivalency, \$1 dollar should equal 4.39 yuan. But the Chinese central bank sets the exchange rate at \$1= 7.20 yuan. The official exchange rate greatly undervalues the yuan.

Why would China undervalue its currency?

When a country undervalues its currency, its goods look cheaper to other countries. That 25 yuan Big Mac would only cost an American \$3.47 at the official exchange rate! And it's not just the Chinese Big Mac that looks cheap—all of China's goods—electronics, fashion, food—look cheap to someone shopping with dollars at the official exchange rate. And it's not just the dollar that's overvalued—other currencies are, as well. The result? People all over the world buy more Chinese goods! The flip side? Goods from the rest of the world look very expensive to the Chinese shopper. By undervaluing the yuan, Chinese imports will fall and exports will rise.

Export demand from wealthy countries increases demand for Chinese products, especially with regard to higher end output that's too expensive for Chinese shoppers. Increased demand for China's output can mean the construction of factories in rural areas, then roads from that region to port cities, and so forth. When your own population is not yet able to afford the goods you can produce, it is important to have a world market full of consumers. This is often called export-led growth, and it's a very successful path that China and other "Asian tiger economies" have followed.

Up until 2024, that is. In a significant departure from previous 'all trade is good' positions, Treasury Secretary Yellen [emphasized to her Chinese counterparts](#) "that China should focus more on investing in domestic consumption and warned that flooding markets with exports would disrupt supply chains." Export-led growth is one thing when a country is small. But in the world economy today, China is a huge player whose exports of electric vehicles or other green products could interfere with America's attempts to stimulate its own green industries. Tariff talk is definitely growing.

Still, as we shall see in the next chapter, export-led growth remains an important development strategy.

Some Useful Materials

[Watch](#) a video explaining imports, exports, and exchange rates.

What happens when a country decides to [“dollarize”](#) and gives up using its own currency? Did you know over 30 countries use someone else’s currency as their own?

Our secondhand clothing often ends up in African marketplaces. [Read](#) about why that’s a problem.

[See](#) current prices of Big Macs around the world.

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CHAPTER 25

The World Economy: The Challenges of Development

BETTINA BERCH

Consider this



USAID Food and Enterprise Development Program for Liberia (FED) / Nico Parkinson, 2014. Savings Club members in Liberia share their savings.

These women are part of a savings circle in Liberia, where they meet on a nine-month cycle to distribute the earnings from their projects. Why didn't they just go to a bank? Why are they all women?

In the last two chapters we talked a lot about trade, ending with 'export-led growth,' an important route to development favored by the so-called Asian tiger economies. Now we are going to focus on economic development—why some countries are wealthy, and others can't seem to escape dire poverty. What factors seem to make a difference? What could change this?

WHAT IS CONSIDERED POVERTY?

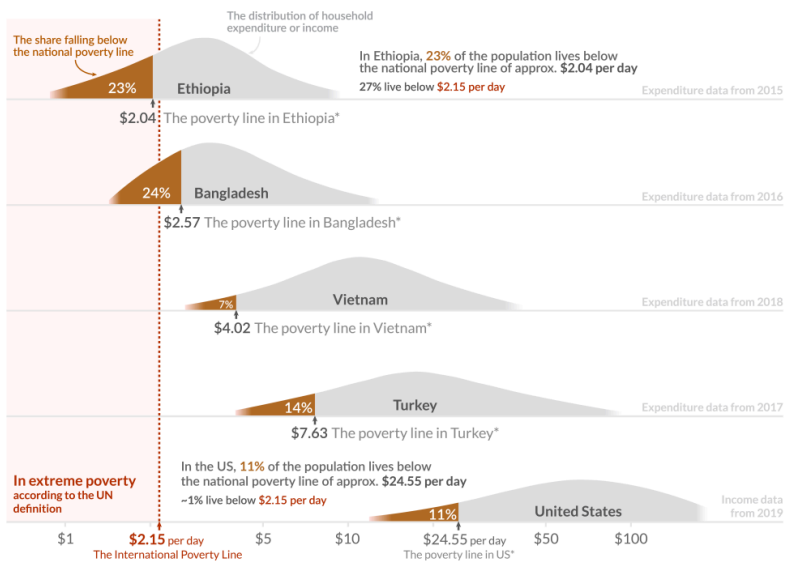
Anyone who has ever visited a place that's a lot richer or poorer than where they were brought up, knows that these things are relative. Yes, people in Manhattan throw away perfectly fine

furniture and appliances that people in Honduras or Vietnam would collect, repair and resell in a hot minute. So while different countries' standards of living differ, in any given country an economist could study what people consumed and develop a 'poverty line'—some amount in that country that it's a real struggle to live on. Consider this chart:

National poverty lines, poverty rates & incomes in five countries

Our World in Data

All figures are adjusted to account for differences in the cost of living across countries.



Note: All figures are expressed in 2017 international-\$. The tails of the distribution are not shown since they tend to be poorly captured by household surveys on which this data is based.

*Poverty lines are approximations of national definitions, harmonized to allow comparisons across countries. All poverty lines are from Jolliffe et al. (2022), except for US - which we calculate from the value that in the World Bank's poverty data yields the same rate as the official US Census Bureau poverty rate in 2019.

Source: Jolliffe et al. (2022); US Census Bureau; World Bank Poverty and Inequality Platform.

OurWorldinData.org - Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the author Joe Hasell.

Comparative Poverty

Using an international poverty line of \$2.15 a day, you can see that 23% of Ethiopia's population falls below that mark, while barely 1% of Americans below *that* poverty line. In the U.S., our poverty line is variously determined to be around \$24.55 per day, and 11% of us fall below that. Almost everyone in Ethiopia falls below the American poverty line of \$24.55.

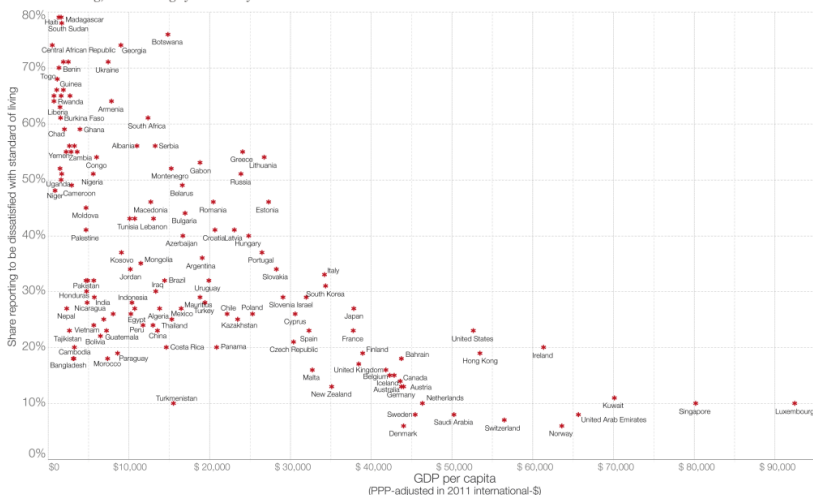
There are people who try to argue that the people they saw when

they visited Ethiopia or Vietnam looked very happy. Wasn't their 'simpler' lifestyle more satisfying? Luckily some researchers have followed this up with Gallup poll on from asking people if they were satisfied with their standard of living or not. Then they graphed % dissatisfied against GDP per capita in the various countries:

Dissatisfaction with standard of living vs GDP per capita

Shown on the y-axis is the share that answered 'dissatisfied' to the question "Are you satisfied or dissatisfied with your standard of living, all the things you can buy and do?".

Our World
In Data



Data source: GDP per capita data from the World Bank; survey data on the satisfaction with living standards from the Gallup World Poll. The visualization is available at OurWorldInData.org where you find more visualizations and research on global development.

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Are Poor People OK with Being Poor?

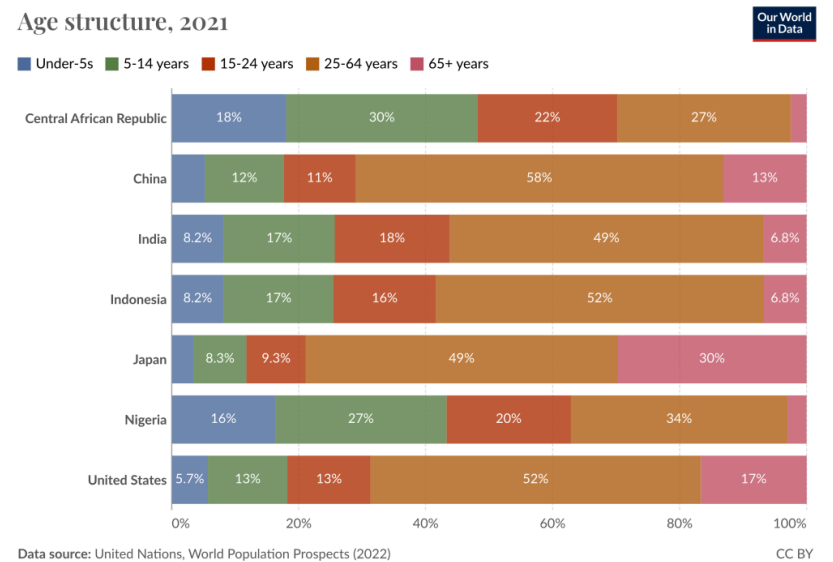
Roughly speaking, the lower a country's GDP per capita, the higher their dissatisfaction with their standard of living. Question settled: poor people aren't OK with being poor. So, let's try to figure out why some countries escaped poverty (since poverty is where we all started) and others haven't.

WHAT THE WEALTHY COUNTRIES HAVE, THAT POORER COUNTRIES LACK

Favorable geography can encourage economic growth. A country with many deepwater ports can import and export easily. A

temperate climate and good quality soil can make agriculture more productive. Rivers criss-crossing the country make for cheaper transportation of goods. On the other hand, deserts or mountain ranges can separate markets, making commerce difficult. Landlocked countries are forced to rely on the ports of neighbors. Hot and humid climates foster many diseases that Western medicine has not addressed. Periodic rainy and dry seasons disrupt peoples’ ability to work.

Then there’s demographics. Developing countries often have a higher proportion of children to adults in the population, meaning more people needing to be provided with food and clothing compared to the numbers working to support them. In the chart below, 43% of the population of Nigeria is under 14, compared to 18.7% in the United States. It’s not just the young who need to be supported by working-age people—it’s also the elderly. In Japan, 30% of the population is over 65!



Age Structure of Populations in 2021

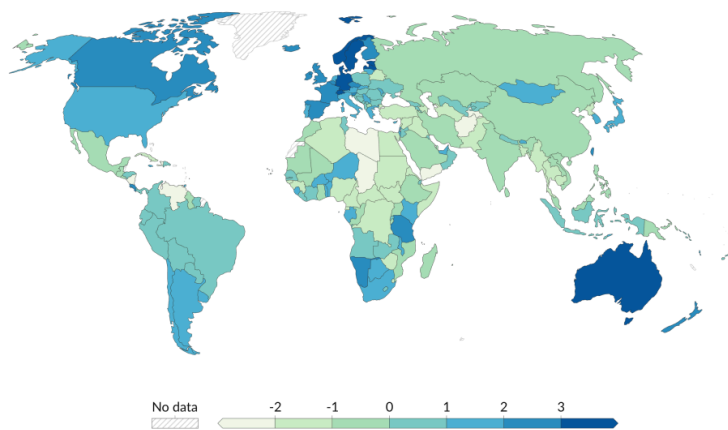
Poorer countries also have fewer resources to spend on maternal mortality, infant mortality, and nutrition. A whole host of diseases, from infections spread by parasites to diseases from human-animal contact, can spread rapidly in poorer countries with no quality treatment options.

The wealthier countries also tend to have strong political and economic institutions. Traditions like the respect for the rule of law and private property rights make it possible for people with entrepreneurial ambitions to succeed, without the fear that whatever they build will be confiscated. In modern times, respect for the rule of law varies greatly around the world:

Rigorous and impartial public administration index, 2022

Based on the expert assessments and index by V-Dem¹. It captures the extent to which public officials respect the law, and administer it without arbitrariness and bias. Higher scores mean more rigor and impartiality.

Our World
in Data



Data source: V-Dem (2023)

OurWorldInData.org/state-capacity | CC BY

1. V-Dem: The Varieties of Democracy (V-Dem) project publishes data and research on democracy and human rights. It relies on evaluations by around 3,500 country experts and supplementary work by its own researchers to assess political institutions and the protection of rights. The project is managed by the V-Dem Institute, based at the University of Gothenburg in Sweden. Learn more: Democracy data: how do researchers measure democracy? The 'Varieties of Democracy' data: how do researchers measure democracy? The 'Varieties of Democracy' data: how do researchers measure human rights?

Do people follow the rule of law?

For the most part, the darker blue countries in the chart (Australia,

Sweden, Canada) have higher respect for the law and are also some of the wealthiest nations in the world. Some countries with the lowest regard for law (Chad, Libya, Afganistan, Yemen) are also some of the poorest.

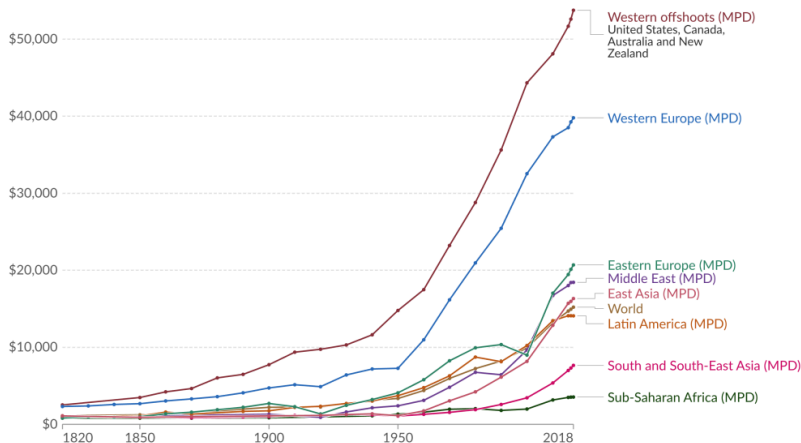
In some cases, the foundations of these strong political and economic institutions date back to the country's colonial history. The American colonies were founded (largely) by Europeans who intended to build lives in this New World. These colonialists built banks, meeting halls, ports, schools. By contrast, regions of the African continent colonized by Europeans with no intentions of staying, just there to extract valuable resources—are largely impoverished to this day. Their colonists built little infrastructure—few schools, banking systems, legislatures. When the colonial powers were thrown out, there was little left for the indigenous people to build on.

If we compare GDP per capita of people around the world over the last two centuries we see the cumulative results of these and other factors:

GDP per capita, 1820 to 2018

This data is adjusted for inflation and for differences in the cost of living between countries.

Our World
in Data



Data source: Maddison Project Database 2020 (Bolt and van Zanden, 2020)

OurWorldInData.org/economic-growth | CC BY

Note: This data is expressed in international-\$¹ at 2011 prices.

1. **International dollars:** International dollars are a hypothetical currency that is used to make meaningful comparisons of monetary indicators of living standards. Figures expressed in international dollars are adjusted for inflation within countries over time, and for differences in the cost of living between countries. The goal of such adjustments is to provide a unit whose purchasing power is held fixed over time and across countries, such that one international dollar can buy the same quantity and quality of goods and services no matter where or when it is spent. Read more in our article: [What are Purchasing Power Parity adjustments and why do we need them?](#)

World growth rates, 1820-2018

Yes, the trend is mostly upward for all countries, but that's where the similarities end. While most of the world starts out fairly poor in 1820, Western Europe, the U.S., Canada, Australia, and New Zealand show geometric growth rates after 1950.

WHAT CAN BE DONE ABOUT DIRE POVERTY?

First, some things don't matter as much as you think they do, like a country having natural resources or not. Many countries in this world have had spectacular growth rates without having natural resources—Japan, Israel. Others have had huge natural resources—Nigeria, Russia—but very low growth rates. Most of the oil-rich OPEC countries offer a low standard of living to ordinary

citizens. Guyana's recent discovery of huge oil reserves has attracted the interest of major multinationals, but Guyana is [going to have to be pro-active](#) or its own people won't reap much benefit.

For a long time, a popular solution for underdevelopment was foreign aid from rich countries. Whether that aid brought long-term growth is a hard question to answer without considering alternative uses of those aid funds.

Microcredit

In 1976 an economics professor, Muhammad Yunus, was walking in a village near his university in Bangladesh, when he was stopped by some village women who were asking for money. They could use this money to buy the bamboo they needed to make furniture they could sell. Banks didn't want to loan to poor people, but if they could have a small amount to buy their raw materials, they could get their furniture business going. Yunus loaned these 42 women the \$27 they needed...and microcredit was born. The loan to the women turned a profit. Yunus decided to go bigger and start a bank that would lend to the poor, and his Grameen Bank was officially opened in 1983. In 2006, Yunus and his Grameen Bank was awarded the Nobel Peace Prize, among other accolades.

Yunus was clear that microcredit involved loans that would actually be repaid. In his mind, charity created dependency. Microcredit encouraged financial competence and independence. Loans to small groups, especially small groups of women, could be more effective than traditional individual loans, as these women used their solidarity and the group's honor to get them through difficulties. Over time, the concept spread to developing countries around the world. After a time, the for-profit banking sector decided to look into the micro-credit market. With these banks came predatory lending. Before long, Yunus's original concept was attracting major criticism. (If you're having a hard time imagining what microcredit is like, think of Kickstarter. If a group of you

wanted to get together and produce some new tech toy, you could put a pitch on Kickstarter and get micro-loans from strangers on the internet so you'd get your prototypes made.)

Heifer International

Another approach to development is the Heifer International model. Starting in the U.S. in the 1940s, the idea was to send livestock to poor people in other countries, so they could live off the milk and eggs. They also offer recipients agricultural assistance. Usually you see [their brochures](#) around Christmas time, where you can send in \$20 and that will pay for Heifer giving a family a flock of chicks to raise, or send them \$120 for a goat. [As their founder said](#), after seeing too many hungry children, "These children don't need a cup [of milk], they need a cow." It seems so sensible, right?

But—imagine your poor family was given a flock of chicks by Heifer! All went well with your egg business, until the week when the chickens stopped laying and the family was getting hungrier and hungrier. Soon those chicks would be dinner. So Heifer has been putting more emphasis on the [self-help-group model](#) that Yunus pioneered. They have also partnered with BRAC.

The BRAC model

Founded in Bangladesh in 1972, BRAC is one of the biggest nonprofits in the world devoted to raising some 100 million people out of poverty. Their approach seems obvious—[test your projects](#) to see if they are actually effective, focus on traditionally underserved women, take into account the various ways poverty handicaps people, etc. But BRAC has been effective, in part, because a lot of previous organizations simply assumed that their projects were effective. BRAC [evaluates](#). So, like the original Heifer projects, they *do* offer participants livestock, but they also give

training and income support for a long enough period that the recipient isn't forced to eat their capital.

Evidence-based development planning wins the Nobel Prize in Economics in 2019

Esther Duflo and Abhijit Banerjee of MIT and Michael Kremer of Harvard were jointly awarded the economics Nobel in 2019 for their work in development science—precisely for treating [development programs as a science](#), and not a 'good intentions are everything' kind of field. If you want to know the best way to boost students' school attendance, take a few popular approaches and test each one out with a control group and pick the winner. If you discover parasitic worms are the key reason that children miss school, create a few programs to encourage parents to get their children dewormed and see which is most effective. If you are going to distribute bed nets to reduce malaria, should you give them away for free, or charge a small amount? (One study found that paying a small fee for the net [did not improve](#) utilization, which seems [to run counter](#) to economic logic!)

While it's taken a long time for economists to arrive at "evidence-based" development policy—it's definitely here to stay...which is a good thing.

It also means that many of you should go into evidence-based development policy and try to make a difference in this world!

Some Useful Materials

[Watch](#) a video about why some countries are rich and others poor.

The farm to factory to office model of development may be over: [new paths](#) are important.

[Watch](#) a video about the pros and cons of globalization.

A [great source for data](#) to use to compare the standard of living in different countries.

[Listen](#) to (or read the captions as her accent is thick!) Nobel Prize-

winner Esther Duflo talk about using the experimental approach to development planning.

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BETTINA BERCH



Peambles World, 2014. Money

A SAMPLE SYLLABUS

Macroeconomics

Our course in macroeconomics falls into three main sections.

In the first section, we explore some basic concepts of economics, like scarcity and rational decision-making, as well as some basic models: the circular flow, the production possibilities model, and the supply and demand model.

In the second section of the course, we look at the building blocks of macroeconomics: GNP, the price level, employment, growth, banking, etc.

In the third and final section of the course, we build our aggregate model of the economy and explore the policy tools that emerge from it. We conclude with a look at the world economy—exploring trade issues and development.

In the end, you should learn

1. The basic tools of economics
2. How economists use those tools to analyze economic affairs
3. How you can use these tools to understand the economic world around you

Evaluation and Requirements of Students

–Exams

15% First Exam

15% Second Exam

25% Final Exam

–Written Work

30% Assignments

In assignments, you will find a link to a chapter to read and a prompt to respond to. At the end of the first, second and third sections of the course, your work will be graded on a 4.0 -> 0 scale.

–Panel Presentation

15% Every student has been assigned to make a panel presentation during a particular class session, usually with one or two other students. Each of you will prepare an approximately five minute video or powerpoint (or other format) presentation based on some of the assigned readings for that session. In effect, you are teaching the class. During breakout sessions in the first part of

the course, you will meet with your fellow panelists to plan your presentations, so you do not repeat each other. However, you do not have to work with each other on the actual presentations, and you are only graded on your own work. Students who CHOOSE to work together will each receive the same grade on their project.

How These Components are Evaluated

Exams:

On exams you are assigned points for correct answers. Exams draw heavily on material taught in class, so students who miss a lot of classes, or who attend 'in name only' may have difficulties doing well on exams.

Presentations:

Did you prepare your panel presentation on time? (This is important since you and your panel-mates are teaching the class a particular subject on a particular day. Offering to present later does not do your fellow students much good.)

Did you present the correct material? (that is, either material listed for your panel or an alternative **approved by the professor in advance**?)

Did you understand the material you were presenting?

Did you help students understand this material as well?

Assignment Entries:

Have you kept making entries throughout the semester? Do your entries show that you really read the assigned material? (Note: if you used an artificial intelligence engine to write your responses, you receive zero credit; it's not YOUR work.)

Students often ask about extra credit. This semester, I will give "extra credit" based on your participation in class sessions. Regularly attending class with your camera ON will earn you some extra credit; being an active class participant (reporting on breakout discussions, asking/answering questions) can earn you even more!

Schedule of Class Topics

Macroeconomics: Economics 201

1. Introduction to course structure

In this opening session we meet each other and go over the structure of the course. Notice that we have 3 exams weighted with more importance as the course progresses. You have also been assigned to a panel on a particular date and theme. So you have work to do as a panelist, and as a regular discussion participant.

Please visit the Panel Page (located in **Course Information**) and find which panel you have been assigned to, see the names of your co-presenters and your theme. You will be meeting with this group next session.

2. Welcome to economics

Economics, like other disciplines, has a central organizing concept: scarcity. That seems reasonable...until we explore it a bit more, and then we wonder: are the important things in life really scarce? Before coming to class today, please visit the Panel Page (located in **Course Information**) and find which panel you have been assigned to, see the names of your co-presenters and your theme. You will be meeting with this group in today's session.

3. Scarcity, Choice, and Rational Decision-making

Traditionally, economic theory is based on the idea of the rational 'economic man' who makes decisions based on the costs and benefits of every choice. But is that how we decide things? Is it good enough to pretend we act *as if* that is true?

4. The Demand and Supply Model

The most famous economic model is the 'demand and supply

model.' We develop its most basic version: demand and supply in 'perfect competition.' We define what markets are, what perfect competition is, and what it means to be a 'price taker.'

5. Elasticity & Welfare Analysis

Now that we have our demand and supply model with its equilibrium, we look more closely at the shape of the curves (elasticity) to see what insights their steepness or flatness offer. We then use 'welfare analysis' to understand some hidden benefits (consumer surplus, producer surplus) of that equilibrium price.

6. Government Roles: Price Ceilings and Price Floors

This is our first of three sessions on proper roles of the government in the economy. Here, we examine what happens when the government puts a maximum on a price (a ceiling) or sets a minimum price (a floor), when it is effective (binding) and what happens to these markets.

7. Government Roles: Market Failure and Criminal Justice

We continue looking at appropriate roles for the government in the economy. Understanding that private enterprise can impose costs on society from its activities (externalities) we look at situations where the government corrects the market.

8. Government Roles: Taxation and Addressing Income Inequality

Finally, governments levy taxes to finance the services they provide

(education, infrastructure, etc). Governments also redistribute tax revenues to address inequality.

9. First Exam

10. Defining GNP

We are starting the real “macro” part of the course, so first we define key concepts.

The most basic is GNP (or GDP) which is defined as the “market value of ‘all’ final goods and services produced within an economy in a given period of time.” We need to examine each part of that definition to understand its importance.

11. Interpreting GNP

Now that we understand how GNP is defined, we can explore its usefulness as a concept. We’d like to be able to measure how well an economy was performing over time, or compared to other economies. Is this what GNP actually does?

12. Measuring the Price Level

We have a problem. If our GNP is 10% bigger this year than last year, does that mean we have 10% more stuff to play with? Or does it just mean the price of everything went up by 10%?

13. Unemployment: How It Is Defined and Modeled

The person on the street thinks you are unemployed if you don’t have a job. But that’s not how economists define unemployment.

So now we look closely at who is included and excluded from these figures.

14. Unemployment and the Future of Work

Does Automation Mean a Jobless Future? If so, what will we live on?

15. Production and Growth

Remember the production possibilities frontier from the first sessions? We saw that pushing the frontier outward was a way of showing economic growth. Now we look at growth and what determines it. We start with the production function, which is like a 'recipe' for the output of the economy. Then we examine what happens to output when we increase the various inputs. In particular, we are interested in what stimulates technological change, or inventions, or creativity. Do patents and copyrights play a role? What about open source?

16. Tools of Finance: Stocks, Bonds, Mutual Funds, Insurance

If investment in human and physical capital is a route to growth, we need to see how funds are channeled into such capital formation. How does cash get from your wallet to a business that wants to expand? Financial intermediaries!

17. The Market for Loanable Funds/Alternatives

Economists model the market for loanable funds, showing the supply of these funds (your personal savings and government budget savings) and the demand for such funds (from businesses

wanting to expand, to invest in capital formation). This model determines an equilibrium real interest rate and a quantity of loanable funds.

We also consider economies where there is no interest rate because interest is NOT charged, the world of Islamic, or sharia-compliant, finance. How does that work?

We also consider informal systems for raising funds for investment without interest charges, and new ways of financing student loans.

18. Second Exam

19. Money: What It Is, How It Works

Finally, it is time to talk about money—what it is... and isn't. We consider the different types of money, liquidity, and how fractional reserve banking works.

20. The Federal Reserve

The “Fed” was established early in the 20th century as America's central bank. It regulates and stabilizes the banking system and formulates monetary policy.

21. Monetary Policy, and Inflation

We explore the policy tools the Fed uses (setting the reserve requirement, setting the discount rate, performing open market operations). What are the problems created by inflation or deflation?

22. The Future of Money

Now that we understand the role of money a bit more, we need to think about how money is changing. Globally, a lot of people have no access to banks (the “unbanked”) so new types of money (m-pesa, for example) have been invented. People who wanted more anonymity and less government regulation with their transactions have invented various cryptocurrencies, like Bitcoin, to serve their needs. How do these work (and not work)?

23. Building the Aggregate Model of the Economy: aggregate demand, short run aggregate supply and long run aggregate supply

Now that we have examined some key concepts (GNP, CPI, full employment, growth, the money supply) we can put our aggregate model together. The aggregate model, with the price level on the vertical axis, and real output on the horizontal axis, is saying that nominal variables CAN affect real variables, and this is a very neo-classical view.

Notice that in our aggregate model, we are relating changes in the prices of ALL goods and services to the quantities of ALL things being produced. Unlike the simple S & D model at the beginning of our course, there’s no way to ‘substitute-away’ from a good that has become more expensive. Everything is more expensive. We also introduce a time dimension now—a short run and a long run on the supply side.

24. The Aggregate Model: Equilibrium and Automatic Stabilizers

Now that we have our aggregate curves, we need to understand the equilibrium positions we have reached. We need to interpret the graphs.

25. The Aggregate Model: Discretionary Policy (Monetary and Fiscal Policy)

26. International Trade: In theory, great. In reality, there are problems...

Why are economists in favor of free trade (as few barriers to trade as possible)? To understand this position, we look at the theory of (absolute) and comparative advantage, which says that when countries specialize in what they do best and trade with each other, world output increases. So, first we explore the theory, and then examine real-world outcomes.

27. Globalization, a good thing?

In the modern world, companies are multinational and supply chains are sourced all over the world, with different pieces processed in different countries. This is a different reality than the simple comparative advantage model, of one country trading beef for cars. Also, what is the relationship of globalization to global warming?

28. Development Economics

The field of development economics brings together insights from studying economic growth, the role of government in an economy, trade issues, and more. A basic concern for global social justice brings many economists to the development field, yielding a variety of different approaches.

Final Review

29. Final Exam

SAMPLE PANEL ASSIGNMENTS PAGE

Panels Assignments

You have been assigned to a panel on a particular theme, on a particular date. On that class day, everyone in the class (you included) have been assigned some basic readings. But the panel has some extra readings that they have prepared, to teach the class some new perspectives. (Please do NOT use panel time to repeat what everyone in the class has learned from doing the assigned homework.)

Each panel has 2-3 topics listed, with your source material also listed. **You pick ONE of these! You don't duplicate!** You USE the source material that's indicated to prepare your presentation (not something you happened to find on the internet).

Sometimes there are 1 or 2 panelists assigned, sometimes 3. Sometimes 2 students are assigned and 1 drops the course. It is NOT your problem. You are only responsible for YOUR theme/topic/source material, and for not duplicating someone else on the panel. EACH PERSON PICKS ONE TOPIC, even if that means some topic isn't covered by anyone. When panel members meet early in the semester, in Zoom class breakouts, they should decide which panel member will take which topic.

Latecomers to the course will have to accept whatever topic the others have left for them. Most of the time, each student works and presents on their own. Sometimes the students on a panel decide to collaborate and present jointly—that's up to you!

Each panel relates to the theme of the class for that date. Students will present for up to 5 minutes EACH, by sharing their screen with the rest of the class. You are free to make powerpoints or videos, or to give a short lecture.

If you don't do your panel presentation, you get a 0 (zero) for 15% of your total grade (unless you have spoken with the professor BEFORE that date and some alternative arrangement has been made).

Do not ask to present your work a few days or weeks later—the class will have already moved on to other themes. If you have been assigned to a panel and you have not done the work, DO attend class anyway, so you don't lose even more ground.

Panel #1, Session 7: Government Roles: Criminal Justice

1. a) The 'convicted' and their debt: "Restitution centers" in Mississippi and LFOs (legal financial obligations) all over the U.S.

<https://www.themarshallproject.org/2020/01/09/think-debtors-prisons-are-a-thing-of-the-past-not-in-mississippi>

<https://www.aclu-wa.org/questions-and-answers-about-legal-financial-obligations-lfos>

<https://jlc.org/resources/reimagining-restitution-new-approaches-support-youth-and-communities>

b) Could police liability/malpractice insurance be a route to police reform?

<https://www.theatlantic.com/politics/archive/2017/06/insurance-companies-police/529833/>

<https://www.npr.org/2016/06/27/483420607/to-stop-police-lawsuits-reformers-want-officers-to-get-insurance>

c) Some propose reforming the criminal justice system by getting rid of cash bail, would this be a good idea?

<https://www.americanprogress.org/issues/criminal-justice/reports/2020/03/16/481543/ending-cash-bail/>

<https://ctmirror.org/2019/12/06/state-considering-alternatives-to-unjust-cash-bail-system/>

2. **Panel #2, Session 8: Government Roles: Taxation and Addressing Income Inequality** a) INCOME inequality in America and what could be done about it? (this presenter should go first)

<https://www.cfr.org/backgrounder/us-inequality-debate>

b) WEALTH inequality (and that buzzword 'generational wealth')

<https://www.stlouisfed.org/on-the-economy/2021/january/>

wealth-gaps-white-black-hispanic-families-2019

[https://www.nytimes.com/2021/12/03/business/personal-finance-influencers-](https://www.nytimes.com/2021/12/03/business/personal-finance-influencers-retirement.html?campaign_id=231&emc=edit_tmc_20220131&instance_id=51793&nl=tressie-mcmillan-cottom®i_id=69093598&segment_id=81248&te=1&user_id=94f85bf314c7f840b82a2e840e1cc06e)

[retirement.html?campaign_id=231&emc=edit_tmc_20220131&instance_id=51793&nl=tressie-mcmillan-cottom®i_id=69093598&segment_id=81248&te=1&user_id=94f85bf314c7f840b82a2e840e1cc06e](https://www.nytimes.com/2021/12/03/business/personal-finance-influencers-retirement.html?campaign_id=231&emc=edit_tmc_20220131&instance_id=51793&nl=tressie-mcmillan-cottom®i_id=69093598&segment_id=81248&te=1&user_id=94f85bf314c7f840b82a2e840e1cc06e)

c) Cut tax rates and raise tax revenues? The “magical thinking” of the Laffer curve, explained

<https://www.youtube.com/watch?v=Man2ObWWSgc>

Panel #3 Session11: Interpreting GNP

WARNING: do not stand up and tell the class what GNP and GDP are! We have already covered this in class!

a) How GDP gets it wrong

<https://www.weforum.org/agenda/2018/01/gdp-frog-matchbox-david-pilling-growth-delusion/>

b) Measure GDP or...maybe it's better to measure “welfare”?

<https://blogs.imf.org/2018/03/07/welfare-versus-gdp-what-makes-people-better-off/> (please focus on the video at the end of the blog)

c) Bhutan proposes Gross National Happiness

<http://www.nytimes.com/2014/10/30/t-magazine/bhutan-bicycle-gross-national-happiness.html> <http://www.grossnationalhappiness.com/>

Panel #4 Session 14: Unemployment and the Future of Work (there are many choices here and someone could combine b and c if they liked)

a) Did the Covid Pandemic Accelerate Automation and Unemployment?

https://www.hamiltonproject.org/assets/files/AutorReynolds_LO_FINAL.pdf

b) Is Universal Basic Income (UBI) one solution to the Jobless Future? How is UBI doing around the world?

<https://www.vox.com/future-perfect/2020/2/19/21112570/universal-basic-income-ubi-map>

c) Will AI (artificial intelligence) kill jobs or “upskill” jobs?

[https://urldefense.com/v3/_https://builtin.com/artificial-intelligence/ai-replacing-jobs-creating-jobs_!!Jjn2ZwtPC4Q!cksqyQ1CVgTBPrtEtsObvpzYvgcbqBgt1uY2F4Dje0ITXQPqWL00h7febIMLCAunvqU7jKKMrPCNCsEHNuhtiEUtJbw\\$](https://urldefense.com/v3/_https://builtin.com/artificial-intelligence/ai-replacing-jobs-creating-jobs_!!Jjn2ZwtPC4Q!cksqyQ1CVgTBPrtEtsObvpzYvgcbqBgt1uY2F4Dje0ITXQPqWL00h7febIMLCAunvqU7jKKMrPCNCsEHNuhtiEUtJbw$)

Panel #5 Session 15: Production and Growth

5. a) Does Property in Ideas (patents, copyrights) enhance economic growth or is ‘open source’ better?

<http://www.ipwatchdog.com/2011/01/02/why-patents-matter-job-creation-economic-growth/id=14170/>

<https://techcrunch.com/2015/12/15/the-golden-age-of-open-source-has-arrived/>

b) Let’s Stop Insisting on Growth, on an Economy of MORE and MORE stuff (this panelist goes second)

<https://www.nytimes.com/interactive/2022/07/18/magazine/herman-daly-interview.html>

c) Is there a ‘resource curse’? [https://urldefense.com/v3/_https://www.npr.org/2024/01/10/1197960933/why-oil-in-guyana-could-be-a-curse_!!Jjn2ZwtPC4Q!df4qM6wtTUKucU-yZYc063Qspg1pdgw-UWtBJRiCF_9wEdMZORYCwjK8sOWhXw3l2ja82vQewmPGK_2yw0mlcrK7yA\\$](https://urldefense.com/v3/_https://www.npr.org/2024/01/10/1197960933/why-oil-in-guyana-could-be-a-curse_!!Jjn2ZwtPC4Q!df4qM6wtTUKucU-yZYc063Qspg1pdgw-UWtBJRiCF_9wEdMZORYCwjK8sOWhXw3l2ja82vQewmPGK_2yw0mlcrK7yA$)

Panel #6 Session 17: Alternatives to Traditional Finance

6. a) What can we learn about traditional methods of finance by studying Islamic Finance?

<https://www.gfmag.com/topics/blogs/islamic-finance-faq-what->

[islamic-finance-and-how-does-it-work](#) you could read more in this series if interested,

or go for a different angle:

<https://www.theguardian.com/sustainable-business/2014/dec/04/could-islamic-finance-solution-capitalism>

b) informal finance in America today

<https://static1.squarespace.com/static/53d008ede4b0833aa2ab2eb9/t/542b1f5ee4b0801eab6fa720/141211222733/issue3-informal.pdf>

c) alternatives to traditional big banks—post office? Community banks?

<https://podcasts.apple.com/us/podcast/best-new-ideas-in-money/id1587222768?i=1000548493013>

Panel #7 Session 22: The Future of Money

a) How does a cryptocurrency like Bitcoin work? (please go first when presenting)

<https://www.youtube.com/watch?v=kubGCSj5y3k>

b) environmental impact of crypto: (a few to read, so try a few and see which ones click for you)

<https://www.nytimes.com/2021/10/10/business/dealbook/crypto-climate.html>

<https://everestpipkin.medium.com/but-the-environmental-issues-with-cryptoart-1128ef72e6a3>

https://restofworld.org/2022/crypto-miners-fleeing-kazakhstan/?campaign_id=116&emc=edit_pk_20220517&instance_id=61582&nl=paul-krugman®i_id=69093598&segment_id=92491&te=1&user_id=94f85bf314c7f840b82a2e840e1cc06e

c) African Americans and crypto

<https://www.kansascityfed.org/>

[Payments%20Systems%20Research%20Briefings/documents/8843/PSRB22Bradford0601.pdf](https://www.psr.org.uk/systems/research/briefings/documents/8843/PSRB22Bradford0601.pdf)

Panel #8 Session 26: International Trade: In theory, great! But there are problems...

8. a) America's changing positions on free trade, tariffs, and other types of trade protection

<https://www.wsj.com/articles/free-trade-united-states-policy-11670602596>

(and for more background on recent tariffs <https://www.thebalance.com/trade-wars-definition-how-it-affects-you-4159973>)

- b) Could protectionism be good for a developing economy? Insights from the clothing/textile industries

<https://www.nytimes.com/2017/10/12/world/africa/east-africa-rwanda-used-clothing.html?referringSource=articleShare>

<https://www.nytimes.com/2020/07/09/world/africa/kenya-secondhand-clothes-ban-coronavirus.html?referringSource=articleShare>

<https://www.greenbiz.com/article/invasion-second-hand-clothes-africa>

<https://www.greenbiz.com/article/invasion-second-hand-clothes-africa>

Panel #9 Session 27: Globalization: is it good? Bad?

9. a) Climate change and world trade

<https://www.weforum.org/agenda/2022/02/rethinking-trades-relationship-to-the-fight-against-climate-change/>

- b) One of our current environmental crises—recycling—has a world trade dimension (think about all the container ships leaving Asia full of exports, and going back...empty?)

<https://www.nytimes.com/2018/01/11/world/china-recyclables-ban.html>

<https://www.npr.org/sections/goatsandsoda/2019/03/13/702501726/where-will-your-plastic-trash-go-now-that-china-doesnt-want-it>

Panel #10 Session 28: Development Economics

a) Nobel-prize winner Dr. Duflo (use the subtitles if her accent bothers you) recommends an experimental approach to poverty

https://www.ted.com/talks/esther_duflo_social_experiments_to_fight_poverty?utm_campaign=tedspread&utm_medium=referral&utm_source=tedcomshare

b) Is “microfinance” a solution to poverty/road to development?

First, some background on micro-credit: <https://www.gdrc.org/icm/not-new.html>

Then, some critical thoughts: <https://www.worldfinance.com/special-reports/why-the-microfinance-model-wont-solve-the-global-poverty-crisis>

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Appendix: Summary of Course Topics

BETTINA BERCH

SUMMARY OF COURSE

TOPICS

Introduction: Economics is a social science, using models to test theories. We explore the circular flow model and the production possibilities model.

2. Economics is a Social Science: We Use Models to Analyze Real Life: Economics is the science of the rational allocation of scarce resources. People are not always rational when it comes to money, however, so economic models may not predict outcomes very accurately.

3. How Markets Work: Supply and Demand and Equilibrium: The law of demand says when prices are higher, you demand less. When prices are lower, you demand more, other things held constant. In perfect competition, buyers and sellers are price takers and markets are large enough so that neither side can affect the price. Things that shift demand curves: changes in income, changes

in prices of substitutes and complements. The time dimension (short run or long run) shifts supply curves.

4. Diving Deeper into the Curves: Elasticity and Welfare Analysis and What they Offer:

Elasticity is responsiveness of supply or demand to changes in price, defined as change in quantity divided by change in price. Consumer surplus is the difference between what you are willing to pay and the market price. Producer surplus is the difference between what you were willing to supply something for, and what the market price is. Total surplus is maximized at market equilibrium.

5. Roles of the Government in the Economy: Price Controls:

A binding price floor (minimum wage, agricultural price supports) is above equilibrium and leads to a surplus; a binding price ceiling (rent control) is below equilibrium and leads to shortages. You can't go below a floor, can't go above a ceiling.

6. Roles of the Government in the Economy: Market Failures (Public Goods and Externalities) and the Criminal Justice System: Externalities are costs/benefits that lie outside a private enterprise's cost calculations, like pollution. When there are externalities, the government has to enter the marketplace to regulate. The criminal justice system is usually a government function, although we have had private enterprise bidding to provide various services.

7. Roles of the Government in the Economy: Taxation and Reducing Inequality: The government taxes people to finance its activities, and to redistribute income. Taxes can be progressive (tax rich at

greater rate than the poor), proportional (tax all at same rate) or regressive (tax the poor at greater rate than rich). Some taxes appear proportional but are regressive in impact, like the sales tax. Supply-siders promote the Laffer curve, which argues that you can reduce tax rates and still increase tax revenues. Kansas tried it and went bankrupt!

8. GDP: What It Is...and What It Isn't: The market value ($p \times q$) of "all" final goods and services produced within a country in a given period of time. Many things are not included in GDP, especially things about the quality of life. Also, increases in nominal GDP *might* mean just an increase prices, not any increase of goods and services. We construct a small GDP deflator, holding prices at base year level and evaluating changes in GDP, creating an index. The total output of the economy can be divided: $\text{Output} = \text{Consumption} + \text{Investment} + \text{Government} + \text{Net Exports}$

9. Evaluating GDP: Does it Measure What We Want It To? We looked at different ways of measuring the 'wealth of nations,' including Bhutan's Gross National Happiness, and some U.N. measures of quality of life.

10. Measuring the Price Level: The Consumer Price Index: Another way to deal with changes in the price level, particularly useful for adjusting wages/social security benefits, is the Consumer Price Index (CPI). The gov't surveys consumers to identify a "typical market basket" purchased, and this identical basket is priced over time, to create an index of changes in the price level. The GDP deflator and the CPI measure different things: the former includes

goods that consumers don't buy (weapons systems) and the CPI includes imported goods, which were not produced by the home economy.

11. Employment, Unemployment, and How They Are Measured: If you have a job, you are employed. If you have no job but are actively looking for a job, you are unemployed. If you have no job and are not actively looking for one either, you are NOT in the labor force. This may include discouraged workers (you gave up the job search, so you went from unemployed to out of labor force) or people no longer interested in labor market jobs (retired people, lottery-winners, etc). If the unemployment rate declines, check what has happened to the labor force participation rate before you cheer. The highest unemployment rates in our economy are suffered by younger workers (16-19 yrs old), especially youth of color. Unemployment might be a result of a binding price floor, caused by the minimum wage, union wage, or the efficiency wage.

12. The Future of Work: Male labor force participation is declining, perhaps because men won't consider pink collar jobs. Automation and artificial intelligence now threaten jobs (blue collar, white collar, anything repetitive) more than competition from cheap labor in foreign countries. A Universal Basic Income might be a solution, severing the connection between the job and access to a basic income.

13. Production and Growth: The production function defines how much our economy can produce. $Output = t * f \{physical\ capital, human\ capital, labor, natural\ resources\}$. We explore what happens if we try to increase each input. Adding more and more units of physical capital can result in diminishing returns (output increasing at a slower rate). Patents and copyrights may boost technological change by turning public goods (knowledge) into private property. Open source may stimulate growth and creativity in different sectors.

14. Tools of Finance: Stocks, Bonds, Mutual Funds, Insurance
Tools of Finance: Firms raise funds for

expanding investment by issuing debt (bonds), by selling equity (stock). Risk can be addressed in different ways—mutual funds and derivatives . Insurance does not prevent bad things from happening, it just spreads the cost over a larger pool of customers. Moral hazard and adverse selection are always a problem with insurance.

15. Investment: The Market for Loanable Funds and Alternative Systems: The market for loanable funds shows the supply of funds (from private savings and government savings) and the demand for funds (firms wanting to expand investment). This market determines the real interest rate and the quantity of loanable funds in the economy, and is a useful tool for evaluating the impact of changing policy on taxing savings, investment incentives, and government budget deficits. We consider economies that do not charge interest, and place ethical limits on various types of investment—Islamic Finance.

16. Money: What It Is and How It Works: The three functions of money (store of value, unit of account, means of exchange); three types of money (commodity, commodity-backed, and fiat money); how economists organize the money supply (M0-M3) according to liquidity; increases in the money supply through fractional reserve banking.

17. The Federal Reserve: After more than a century of financial instability, our central bank, the Federal Reserve, was created in 1913. It regulates the orderly operation of the banking system, and conducts monetary policy. The traditional tools of monetary policy: setting the reserve requirement, setting the discount rate, and conducting open market operations. (Newer tools include

paying interest on reserves at the Fed, IOBR.) When the Fed Open Market Committee buys bonds, for example, it stimulates the economy by putting more liquidity into banks, and by bidding up the price of bonds it reduces their yield, or the interest rate. Lowered interest rates mean increased Investment.

18. Monetary Policy and Inflation: We relate the purchasing power or the value of money ($1/\text{the price level}$) and the quantity of money: In the high price level economy (nightmare scenario), the purchasing power of money is low, so you need to carry more of it to finance your transactions. In the fantasy world of a low price level, the purchasing power of money is high so you need less of it: this results in a downward sloping demand curve for money.

The supply of money is set by the Fed. So when the Fed increases the money supply, this reduces its purchasing power, its value. We consider the costs of inflation and deflation, and the need to focus on the real, not the nominal.

19. The Future of Money: Cryptocurrencies like Bitcoin offer some anonymity but uncertain value. For unbanked people, access to money transfer on phone-based platforms like m-pesa are important. Some economies go cashless to reduce crime, fraud, tax evasion. Central banks have been exploring blockchain for increased security.

20. The Aggregate Model: Aggregate Demand, Long-Run Aggregate Supply, and Short-Run Aggregate Supply: The aggregate model relates the price level and real output, a nominal and a real variable, so it's neo-classical. The vertical axis is the Price Level, representing the prices of all goods and services, so it's not possible to substitute away from some good that got more expensive. All prices are moving in the same direction. The aggregate model also includes a time dimension, a short run and a

long run. Aggregate Demand is determined by the equation learned earlier: $\text{Output} = C + I + G + NX$. When the price level is high, all components of aggregate demand are lower. When the price level is low, all components of aggregate demand go higher. This results in a downward-sloping Aggregate Demand curve. The Long Run Aggregate Supply curve is a vertical line at full employment, determined by the production function. Changes in the price level do not change its position. The Short Run Aggregate Supply curve slopes upward from stickiness, or variables that do not adjust immediately.

21. The Aggregate Model: Equilibrium: The aggregate curves can indicate an economy in recession, an overheated economy, or a balanced economy in short run and long run equilibrium. When the economy is NOT in equilibrium, there are some automatic stabilizers (workers accepting lower wages/demanding higher wages; government budget surpluses or deficits) that might kick in.

22. The Aggregate Model: Discretionary (Monetary and Fiscal) Policy: According to where the Aggregate Demand curve intersects the SRAS, to the left or to the right of LRAS, we will need to stimulate or to dampen economic activity. We could use fiscal policy, spending/cutting measures proposed by Congress and approved by the President, shifting the Aggregate Demand curve. Or we could have monetary policy (when the Federal Reserve increases or decreases the money supply, lowering or raising interest rates) impacting Investment and therefore shifting the Aggregate Demand curve.

23. The World Economy: International Trade in Theory and Reality: Much of trade theory is based on the concepts of comparative and absolute advantage. With comparative

advantage, each side specializes in what it does best and trades; total output increases. Absolute advantage means one side is better at producing everything, but it still pays to specialize and trade. This is the theory supporting free trade, but realities of the world mean domestic manufacturers demand protective tariffs when the world price is much lower than their domestic price. With welfare analysis, you can see the gainers and losers when a country opens itself to trade.

24. The World Economy: Globalization and Its Problems:

Trade brings challenges to economies trying to build up their own industries. Trade displaces workers. Global trade has its benefits and costs. We then consider the valuation of currencies. Free floating currency exchange rates equilibrate trade imbalances, since when a country is importing more than it is exporting, the value of its currency should drop, which will discourage its citizens from importing more in the future, since imports will have gotten more expensive. But some countries set the value of their currencies low, so that other countries will find their products cheap: export-led growth results! The Big Mac index can be used to see what currencies are over-valued and undervalued.

25. The World Economy: The Challenges of Development:

Comparing per capita average incomes in the world reveals big differences between the rich and the poor countries. There are structural causes: climate, institutions, resources, etc. Economist Duflo argues for an evidence-based approach to helping developing countries: seeing what works best by trying controlled experiments. Microcredit and self-help groups are other approaches to development aid.

Appendix: Resources for teachers

These websites can be useful for building courses:

<https://serc.carleton.edu/econ/activities.html>

<https://www.bea.gov/resources/learning-center>