

Principles of Macroeconomics

Principles of Macroeconomics

*FLORIDA STATE COLLEGE AT
JACKSONVILLE*



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PART I

FACULTY RESOURCES

I. Request Access



To preserve academic integrity and prevent students from gaining unauthorized access to faculty resources, we verify each request manually.

[Click here to fill out the request form](#), and we'll get you on your way.

Overview of Faculty Resources

This is a community course developed by an Achieving the Dream grantee. They have either curated or created a collection of faculty resources for this course. Since the resources are openly licensed, you may use them as is or adapt them to your needs.

Now Available

- Discussions
- Homework Assignments
- Problem Sets

- Question Banks
- Term Paper

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PART II

MODULE 1: WHAT IS MACROECONOMICS?

3. Introduction

Module 1 – What is Macroeconomics?

Module Introduction

In this module, you will learn important definitions and concepts in Economics. We will discuss how people make rational choices and explain the economic way of thinking. Several economic trends and economic problems to be discussed throughout the course, include:

- self-interest vs. social interest
- globalization, job outsourcing and multinational corporations
- information age
- business cycles and economic recessions
- economic growth
- unemployment
- inflation
- climate change and wasting the planet's resources
- growing government budget deficit and debt

Last, we briefly review the use of graphs, mathematics and geometry used in the course. ⁽¹⁾

Learning Objectives

- Define Economics concepts.
- Explain economic models.
- Discuss how economic concepts and models can be applied to

real-world situations.

- Recognize the use of graphs in Economics.
- Review basic graphing skills ⁽¹⁾

Reading

- Learning Unit

4. Key Terms

Key Terms

Ceteris paribus

The biggest assumption in Economics meaning “other things being equal.”

Economics

The study of how humans make choices under conditions of scarcity.

Globalization

The trend in which buying and selling in markets have increasingly crossed national borders.

Factors of production

Include land, labor capital, and entrepreneurial ability.

Goods and services market

A market in which firms are sellers of what they produce and households are buyers.

Invisible hand

Idea that self-interested behavior by individuals can lead to positive social outcomes.

Macroeconomics

The branch of economics that focuses on broad issues such as growth, unemployment, inflation, and trade balance.

Market economy

An economy where economic decisions are decentralized, resources are owned by private individuals, and businesses supply goods and services based on demand.

Market

Interaction between potential buyers and sellers; a combination of demand and supply.

Microeconomics

The branch of economics that focuses on actions of particular agents within the economy, like households, workers, and business firms.

Scarcity

When human wants for goods and services exceed the available supply.

Theory

A representation of an object or situation that is simplified, while including enough of the key features to help us understand the object or situation.

Opportunity cost

Measures cost by what is given up in exchange; opportunity cost measures the value of the forgone alternative.⁽¹⁾

5. Graphs

Making and Using Graphs

A graph enables us to visualize the relationship between two variables. To make a graph, set two lines perpendicular to each other:

- The horizontal line is called the x -axis.
- The vertical line is called the y -axis.
- The common zero point is called the *origin*.

Scatter diagram is a graph of the value of one variable against the value of another variable. ⁽¹⁾

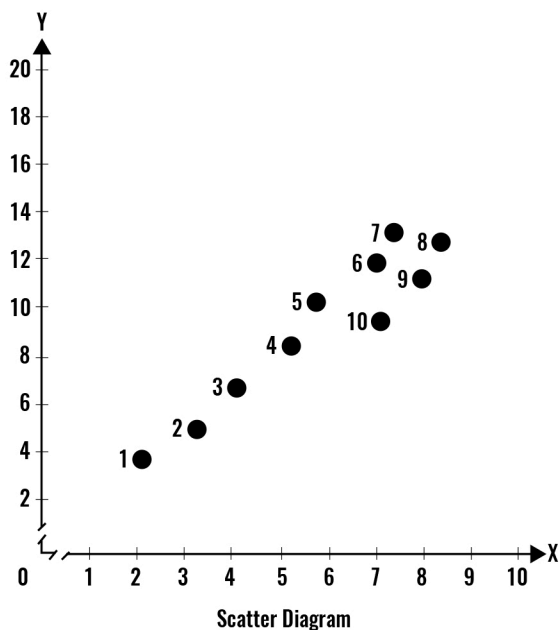


Figure 1-2: Scatter Diagram by FSCJ is licensed under CC-BY-4.0.

Time-series graph is a graph that measures time on the x-axis and the variable or variables in which we are interested on the y-axis. ⁽¹⁾

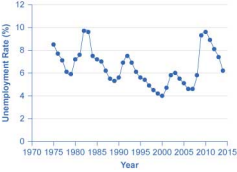


Figure 1-3: Time-Series Graph – Minimum Real and Nominal Wage in the U.S. by Openstax is licensed under CC-BY-4.0.

Cross-section graph is a graph that shows the values of an economic variable for different groups in a population at a point in time. ⁽¹⁾



Figure 1-4a – 1-4c: Cross-Section Graph. by Openstax is licensed under CC-BY-4.0

How Graphs Can Be Misleading

Graphs not only reveal patterns; they can also alter how patterns are perceived. To see some of the ways this can be done, consider

the line graphs on this page. These graphs all illustrate the unemployment rate—but from different perspectives.

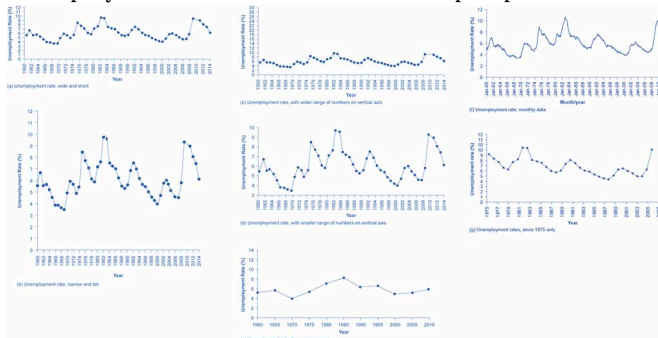


Figure 1-5a — 1-5b: Unemployment Rates in Different Ways by Openstax is licensed under CC-BY-4.0. Figure 1-5c — 1-5e: Unemployment Rates in Different Ways by Openstax is licensed under CC-BY-4.0. Figure 1-5f — 1-5g: Unemployment Rates in Different Ways by Openstax is licensed under CC-BY-4.0.

All figures on this page represent the unemployment rates in different ways. All of them are accurate, but by simply changing the width and height of the area in which data is displayed, one may alter the reader's perception of the data.

Data should not deceive, and economic graphs should represent the economic relationships in a simple and straightforward manner. Being able to read graphs is an essential skill both in economics and in life. A graph is just one perspective or point of view, shaped by choices such as those discussed in this section. Do not always believe the first quick impression from a graph. View with caution.⁽³⁾

Interpreting Graphs Used in Economic Models

Positive relationship or **direct relationship** is a relationship between two variables that move in the same direction. **Negative**

relationship or **indirect relationship** is a relationship between two variables that move in the opposite direction.

Linear relationship is a relationship that graphs as a straight line. A **non-linear relationship** graphs as a curve, which may take various shapes. ⁽¹⁾

Explaining the Rate of Increase/Decrease

The graph in Figure 1.6 shows a positive (direct) relationship, which is becoming weaker (less steep).

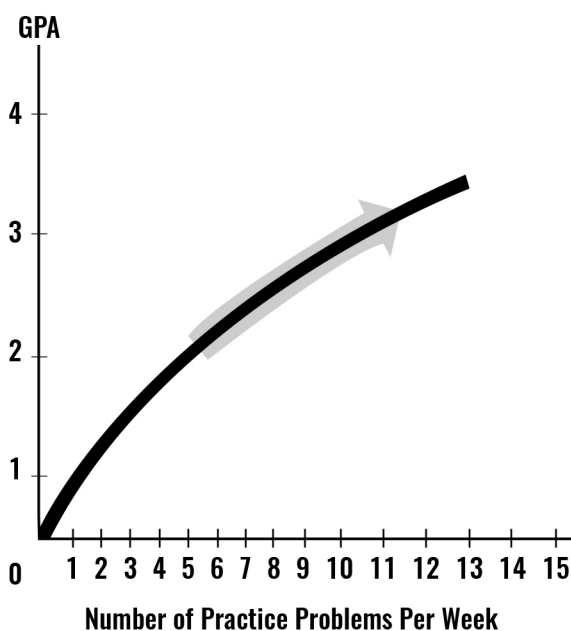


Figure 1-6: Positive Becoming Less Steep by FSCJ is licensed under CC-BY-4.0.

As number of practice problems worked increases in Figure 1.6, the GPA increases. But during the 10th and 11th problem worked, the increase in the GPA is the smallest, so the curve becomes flatter as

number of practice problems worked increases. In this case, we say that the variable Y **increases at a decreasing rate** because the curve gets flatter as the variable X increases.⁽¹⁾

The graph in Figure 1.7 shows a negative (inverse) relationship, which is becoming weaker (less steep).

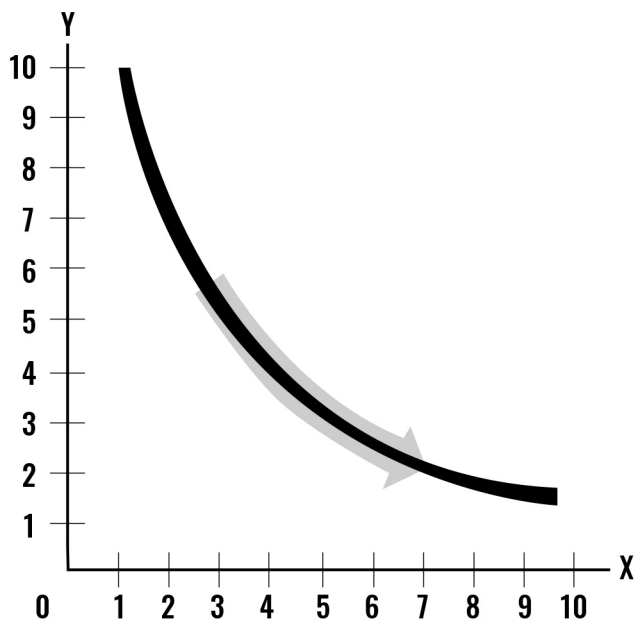


Figure 1-7: Negative Becoming Less Steep by FSCJ is licensed under CC-BY-4.0.

Unrelated Variables

Figures 1.8a and 1.8b show variables that are unrelated. If two variables are unrelated, either a perfectly vertical or perfectly horizontal line would represent the lack of relationship, depending on whether the Y variable or the X variable remains constant when the other variable changes.⁽¹⁾

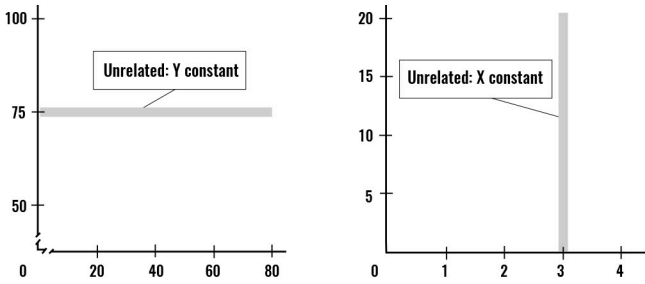


Figure 1-8a — 1-8b: Unrelated: y and x Constant by FSCJ is licensed under CC-BY-4.0.

The Slope

Slope equals the change in the value of the variable measured on the y-axis divided by the change in the value of the variable measured on the x-axis.

$$\text{Slope} = \delta y \div \delta x$$

Notice that slope can be either a positive or a negative number. It can also be zero, if the straight line is perfectly horizontal, in which case the change in Y equals 0.⁽¹⁾

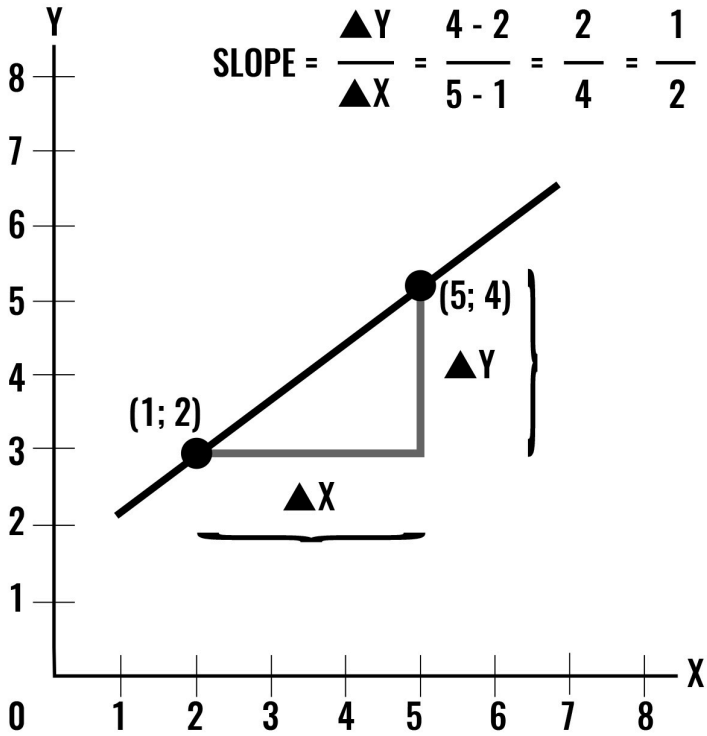


Figure 1-9: Positive Slope by FSCJ is licensed under CC-BY-4.0.

The figure 1.9 shows a positive slope. ⁽¹⁾

- When δx is 4
- δy is 2
- Slope ($\delta y \div \delta x$) is $2/4 = \frac{1}{2} = 0.5$

6. Economic Models and Problems

Economic Models

In studying economics, we must **build models** and **test theories** . The purpose of economic models is to **understand** the complex reality and **predict** outcomes.

Because the world we live in is too complex to be studied as it is, we need to build models to reduce such complexity. Models are simplified versions of the complex reality built to answer only certain questions. A good model is one based on certain assumptions (which are often false statements, when compared to their applicability in the real world) that is able to predict well most of the time. Models are constantly refined, and some of their assumptions relaxed, so as to build better models (with better predictability). Theories need to be tested with real-world data. Empirical research tests such models and their hypotheses. Theoretical research builds such models in an effort to explain certain aspects of the complex economic reality.

Examples of models you are familiar with:

- Weather Forecast
 - Driving direction (maps, GPS)
-

Economic Assumptions

Ceteris Paribus — “Other Things Being Equal” — is the biggest assumption in Economics. In order to establish a relationship between two variables, you must hold all other variables constant.

Economic Relationships

Economic relationships can often be expressed as mathematical functions. Variable Y is a function of variable X; when X changes, Y responds either by increasing or decreasing. Mathematically, economic relationships can be captured by linear or non-linear functions. ⁽⁴⁾

$$Y = F(X)$$

Linear Functions:

$$Y = 20 + 4X$$

$$D = 100 - 2P$$

$$S = 35 + 4P$$

Non-linear Functions:

$$Y = A - K^{1/3} L^{2/3}$$

$$Y = a + b e^{-x}$$

The Economic Way of Thinking

People make choices. Every choice involves a tradeoff, which represents an exchange — giving up one thing to get something else. In addition, people make rational choices by comparing the costs and the benefits of their alternative options, as well as using all of the available information to them up to that point in time. In other words, a rational choice is made when one uses all the available

resources to most effectively satisfy the wants of the person making the choice.

The benefit of a given alternative option is the gain or pleasure it brings and is determined by personal preferences — by what a person likes and dislikes and the intensity of those feelings. Economists measure the benefit of something by what a person is willing to give up to get it.

The cost of a given alternative option is what must be given up to get it. The **opportunity cost** of an option in Economics refers to the monetary value of the best alternative one must give up to obtain it. In a broader sense, the opportunity cost includes both direct and indirect costs associated with a given option. Only economists account for these indirect costs, such as the monetary value of the best alternative one must give up to obtain it. Accountants, for example, only consider the direct costs of a given option, the ones that require a direct outlay of money. Economists, on the other hand, consider a broader perspective by accounting for what we give up or sacrifice, which might not be readily observable.

The opportunity cost of attending college includes both direct costs of tuition and textbooks, and the indirect costs of a full-time or part-time job that the student could have had, but decided to give up in order to attend college full time. In summary, the opportunity cost of a given option is the best thing/alternative (usually measured as the monetary value) one **gives up** (sacrifices) to obtain that option.

Choices people make respond to *incentives*. An **incentive** is a reward that encourages an action, or a penalty that discourages an action. Changes in benefits and costs alter the incentives that we face when making choices. When incentives change, people's decisions change. For example, if a research project assignment is weighed more heavily in the final grade calculation as a required assignment, as opposed to an optional assignment, the benefit of completing this required assignment increases for every student, and we would expect more students to complete this assignment, as they respond to this incentive. ⁽¹⁾

Economic Problems

Throughout the course, we will elaborate on most of the following topics, representing major economic themes and macroeconomic problems:

Globalization, Job Outsourcing and Multinational Corporations, and the Information Age

Recent decades have seen a trend toward **globalization**, which is the expanding cultural, political, and economic connections among people around the world. One measure of this is the increased buying and selling of goods, services, and assets across national borders—in other words, international trade and financial capital flows.⁽²⁾

On the other hand, globalization has caused many countries to experience **job outsourcing** and the **brain drain** phenomena.

Economics as a Policy Tool

Economics is a tool that helps us make an endless array of decisions. **Personal Economic Policy** involves decisions about an individual's need for shelter, transportation, and time management. **Business Economic Policy** involves decisions made at the margin to accomplish a business' goals such as increasing sales, opening a new branch, or gaining market share. **Government Economic Policy** is perhaps the most controversial of the three types of economic policies. How should goals such as better education, military preparedness, and safe food be balanced against

limited tax revenue and the desire of individual members of government to be reelected? ⁽¹⁾

7. What is Economics?

What is Economics?

Economics is the study of how humans make decisions in the face of scarcity. These can be individual decisions, family decisions, business decisions, or societal decisions. If you look around carefully, you will see that scarcity is a fact of life.

Scarcity means that human wants for goods, services, and resources exceed what is available. Resources, such as labor, tools, land, and raw materials are necessary to produce the goods and services we want, but they exist in limited supply. Of course, the ultimate scarce resource is time — everyone, rich or poor, has just 24 hours in the day to try to acquire the goods they want. At any point in time, there is a finite amount of resources available.

At the core of the Economics science lies the problem of “scarcity.” We always want more than we can get, so we face **scarcity**, the inability to satisfy all our wants. Everyone faces scarcity, because no one can satisfy *all* of his or her wants.⁽²⁾

Faced with scarcity, we must make *choices* — we must choose among the available alternatives. The choices we make depend on the incentives we face. We have thus arrived at the definition of economics as provided in the learning unit.

To summarize, **Economics** is the social science that studies the **choices** that individuals, businesses, governments, and entire societies make when they cope with **scarcity**; the incentives that influence those choices; and the arrangements that coordinate them.⁽¹⁾

Economics Defined



Figure 1.1: Economics Defined by FSCJ is licensed under CC-BY-4.0.

Economics involves the study of how people choose to use the limited resources of land, capital, labor, and entrepreneurship—known as factors of production (that might have alternative uses) — to produce all the goods and services and distribute them to the people for consumption. In addition, Economics involves the study of activities that involve exchange between people, which can be for goods and services, labor, or loanable funds. Money is only an exchange tool. Thus, money is not a factor of production in economics.

Microeconomics is the study of the choices that individuals and businesses make and the way these choices interact and are influenced by governments. **Microeconomics** answers the following questions:

What determines how households and individuals spend their budgets? What combination of goods and services will best fit their needs and wants, given the budget they have to spend? How do people decide whether to work, and if so, whether to work full time or part time? How do people decide how much to save for the future, or whether they should borrow to spend beyond their current means?

What determines the products, and how many of each, a firm will produce and sell? What determines what prices a firm will charge? What determines how a firm will produce its products? What determines how many workers it will hire? How will a firm finance its business? When will a firm decide to expand, downsize,

or even close? We will learn about the theory of consumer behavior and the theory of the firm. ⁽²⁾

Macroeconomics is the study of the aggregate (total) effects on the national economy and the global economy of the choices that individuals, businesses, and governments make. **Macroeconomics** looks at the economy as a whole. It focuses on broad issues such as growth of production, the number of unemployed people, the inflationary increase in prices, government deficits, and levels of exports and imports. ⁽¹⁾

Macroeconomics answers the following questions:

What determines the level of economic activity in a society? In other words, what determines how many goods and services a nation actually produces? What determines how many jobs are available in an economy? What determines a nation's standard of living? What causes the economy to speed up or slow down? What causes firms to hire more workers or to lay workers off? Finally, what causes the economy to grow over the long term? ⁽¹⁾

Microeconomics and macroeconomics are not separate subjects, but rather complementary perspectives on the overall subject of the economy. To understand why both microeconomic and macroeconomic perspectives are useful, consider the problem of studying a biological ecosystem like a lake. One person who sets out to study the lake might focus on specific topics: certain kinds of algae or plant life; the characteristics of particular fish or snails; or the trees surrounding the lake. Another person might take an overall view and instead consider the entire ecosystem of the lake from top to bottom: what eats what, how the system stays in a rough balance, and what environmental stresses affect this balance. Both approaches are useful, and both examine the same lake, but the viewpoints are different.

In a similar way, both microeconomics and macroeconomics study the same economy, but each has a different viewpoint. Moreover, **macroeconomics** has **microeconomic** foundations, which we will begin to discover in Module 2 when we study the supply and

demand model, which is the cornerstone of both microeconomics and macroeconomics.

An economy's macroeconomic health can be defined by a number of goals: growth in the standard of living, low unemployment, and low inflation, to name the most important. How can macroeconomic policy be used to pursue these goals? **Monetary policy**, which involves policies that affect bank lending, interest rates, and financial capital markets, is conducted by a nation's central bank. For the United States, this is the Federal Reserve.

Fiscal policy, which involves government spending and taxes, is determined by a nation's legislative body. For the United States, this is the Congress and the executive branch, which originates the federal budget. These are the main tools the government has to work with.⁽²⁾

In the last two modules, we will focus on macroeconomic policies by utilizing the broader Aggregate Demand-Aggregate Supply model, which is first introduced in Module 2.

Main Questions in Economics

What?

What determines the quantities of the goods and services produced?

For example: Over the last 6 decades, the quantities of services produced in the U.S. as a percentage of total production have increased, while quantities of goods (e.g., farm output) have decreased.

How?

How are goods and services produced?

For example: Are we producing a good or service using more labor or more capital?

For Whom?

For whom are goods and services produced? Who gets what portion of the “pie”?

For example: People earn their income, which allows them to purchase the goods and services to satisfy human wants. What determines the income people earn? Why is there income inequality? ⁽¹⁾

PART III

MODULE 2: DEMAND, SUPPLY, AND MARKET EQUILIBRIUM

8. Introduction

Module 2 – Demand, Supply, and Market Equilibrium

Module Introduction

This module introduces the cornerstone model in economic theory: the demand and supply model, which is applied at the macro economy level in module 6 and module 7.

We create a tool (the supply-demand graph) to use in examining how a market operates. The model is laid out in blocks, and an approach to understanding the ability of the model to predict the equilibrium outcome variables of price and quantity is explained in detail. We also explain how market situations of price ceilings and price floors may create surpluses and shortages that cannot be eliminated. ⁽¹⁾

Learning Objectives

- Explain the demand relationship and factors that affect demand.
- Explain the supply relationship and factors that affect supply.
- Explain market equilibrium and changes to market equilibrium using the Three-Step Process
- Explain how price controls cause surpluses and shortages in the market. ⁽¹⁾

Reading

- Learning Unit

9. Assumptions

Introduction

When economists talk about prices, they are interested in gaining a practical understanding of what determines prices and why prices change. Consider a price most of us contend with weekly: that of a gallon of gas. Why was the average price of gasoline in the United States \$3.40 per gallon in January 2012? Why did the price for gasoline rise to \$3.93 per gallon only months later, by April 2012? To explain these price movements, economists focus on the determinants of what gasoline buyers are willing to pay and what gasoline sellers are willing to accept.

As it turns out, the price of gasoline in June of any given year is nearly always higher than the price in January of that same year; over recent decades, gasoline prices in midsummer have averaged about 10 cents per gallon more than their midwinter low. The likely reason is that people drive more in the summer, and are also willing to pay more for gas. However, in 2009, gasoline prices rose by more than the average winter-to-summer rise, which suggests that other factors were at work during those six months. ⁽⁴⁾

This module introduces the economic model of demand and supply — one of the most powerful models in all of economics. The discussion here begins by examining how demand and supply determine the price and the quantity sold in markets for goods and services, and how changes in demand and supply lead to changes in prices and quantities. ⁽¹⁾

Assumptions

Before we get started, two important assumptions about the demand and supply model in this module need to be pointed out.

Ceteris paribus

The assumption behind a demand curve or a supply curve is that no relevant economic factors, other than the product's price, are changing. Economists call this assumption **ceteris paribus**, a Latin phrase meaning “other things being equal.” Any given demand or supply curve is based on the *ceteris paribus* assumption that all else is held equal. A demand curve or a supply curve is a relationship between two, and only two, variables when all other variables are kept constant. If all else is not held equal, then the laws of supply and demand will not necessarily hold.

Ceteris paribus is typically applied when we look at how changes in price affect demand or supply, but *ceteris paribus* can be applied more generally. In the real world, demand and supply depend on more factors than just price.

For example, a consumer's demand depends on income and a producer's supply depends on the cost of producing the product. How can we analyze the effect on demand or supply if multiple factors are changing at the same time—say price rises and income falls? The answer is that we examine the changes one at a time, assuming the other factors are held constant.

For example, we can say that an increase in the price reduces the amount consumers will buy (assuming income, and anything else that affects demand, is unchanged). Additionally, a decrease in income reduces the amount consumers can afford to buy (assuming price, and anything else that affects demand, is unchanged). This is what the *ceteris paribus* assumption really means. In this particular

case, after we analyze each factor separately, we can combine the results. The amount consumers buy falls for two reasons: first because of the higher price and second because of the lower income. ⁽⁴⁾

Competitive Market

The second assumption made throughout this module is that the market is a competitive one. Markets vary in the intensity of competition, ranging from highly competitive, such as the models of Perfect Competition and Monopolistic Competition to less competitive, such as the *Oligopoly model*, or no competition, such as the *Monopoly model* where the only operating firm faces no competition from other firms in the market. This module studies a **competitive market** (closer to the Perfectly Competitive model), which is a market that has **many** buyers and **many** sellers, so no single buyer or seller can **influence** the market price.

In such a market, no coordinated action on the part of government or any other central authority is required to make markets work efficiently, because highly competitive markets tend to work very efficiently on their own. This is related to the concept of the “invisible hand” first introduced by Adam Smith. ⁽⁵⁾

10. Demand

Demand

Economists use the term **demand** to refer to the amount of some good or service consumers are willing and able to purchase at each price. Demand is based on needs and wants — a consumer may be able to differentiate between a need and a want, but from an economist's perspective they are the same thing. Demand is also based on ability to pay. If you cannot pay for it, you have no effective demand. What a buyer pays for a unit of the specific good or service is called **price**. The total number of units purchased at that price is called the **quantity demanded**.

Demand is the **relationship** between the **quantity demanded** and **price** of the good when all other influences on buying plans remain the same. A demand curve is a relationship between two, and only two, variables: quantity on the horizontal axis and price on the vertical axis.

A rise in price of a good or service almost always decreases the quantity demanded of that good or service. Conversely, a fall in price will increase the quantity demanded. When the price of a gallon of gasoline goes up, for example, people look for ways to reduce their consumption by combining several errands, commuting by carpool or mass transit, or taking weekend or vacation trips closer to home. Economists call this inverse relationship between price and quantity demanded the law of demand. The law of demand assumes that all other variables that affect demand (to be explained in the next pages) are held constant.⁽⁴⁾

Demand for Gasoline

An example from the market for gasoline can be shown in the form of a table or graph. A table that shows the quantity demanded at each price, such as **Table 2.1**, is called a **demand schedule**. Price in this case is measured in dollars per gallon of gasoline. The quantity demanded is measured in millions of gallons over some time period (for example, per day or per year) and over some geographic area (like a state or a country).

A **demand curve** shows the relationship between price and quantity demanded on a graph like **Figure 2.1**, with quantity on the horizontal axis and the price per gallon on the vertical axis. (Note that this is an exception to the normal rule in mathematics that the independent variable (x) goes on the horizontal axis and the dependent variable (y) goes on the vertical. Economics principles are not always perfect matches to mathematical principles.)

The demand schedule shown by **Table 2.1** and the demand curve shown by the graph in **Figure 2.1** are two ways of describing the same relationship between price and quantity demanded.

The demand schedule shows that as price rises, quantity demanded decreases, and vice versa. These points are then graphed, and the line connecting them is the demand curve (D). The downward slope of the demand curve again illustrates the law of demand—the inverse relationship between prices and quantity demanded.⁽⁴⁾

Table 2.1 Price and Quantity Demanded of Gasoline

Price (Per Gallon)	Quantity Demanded (millions of gallons)
\$1.00	800
\$1.20	700
\$1.40	600
\$1.60	550
\$1.80	500
\$2.00	460
\$2.20	420

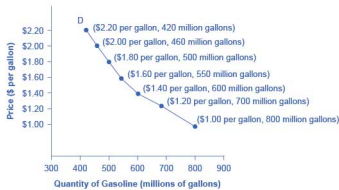


Figure 2-1: A Demand Curve for Gasoline by Openstax is licensed under CC-BY-4.0.

Demand and Law of Demand

Demand curves will appear somewhat different for each product. They may appear relatively steep or flat, or they may be straight or curved. Nearly all demand curves share the fundamental similarity that they slope down from left to right. So, demand curves embody the law of demand: As the price increases, the quantity demanded decreases, and conversely, as the price decreases, the quantity demanded increases, other things equal. Therefore, the demand curve **slows downward** due to the **negative** relationship between P and Q_D .⁽⁴⁾

In economic terminology, demand is not the same as quantity demanded, because demand refers to the curve and quantity demanded refers to the (specific) point on the curve. Whenever **only price changes**, and all other factors that influence demand remain the same, we **move along** the demand curve, as the new price is matched to its corresponding quantity demanded. ⁽¹⁾

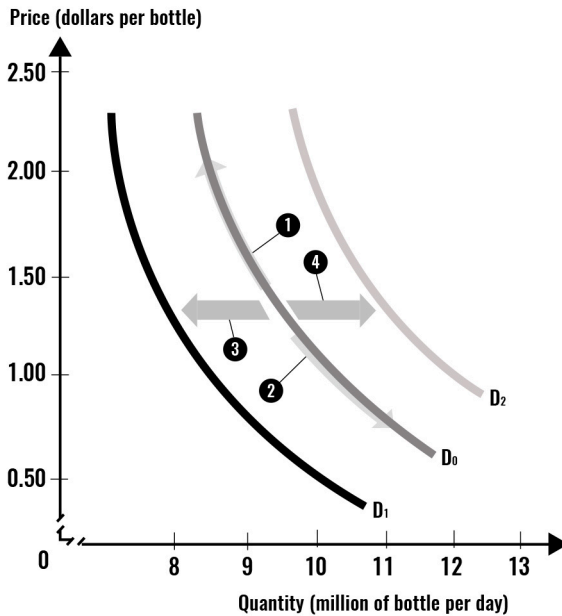
Demand Shifters

Now we will look at other factors, besides **the price of a good itself** that affect demand. When changing, these factors affect the demand curve by shifting it to the right (if demand increases) or to the left (if demand decreases). Thus, in our demand and supply model, we will refer to the following factors as demand shifters. Notice that for a good or service, there might be other important factors that affect demand, thus this list can be thought of as a theoretical list, which will cover the most important determinants of demand.

Demand Shifters:

- Prices of related goods: **substitutes** and **complements**
- **Expectations** in general
 - Expected future prices
 - Expected future income and credit
- Society's **income**
 - Normal goods
 - Inferior goods
- **Number of buyers** (market demand depends on number of buyers)
- **Preferences** (taste & attractiveness)
- â€œ If one of these factors **changes** (increases or decreases), the demand curve **shifts** .

- If demand **increases** , the demand curve shifts **right** .
Why? (The quantity demanded (on the horizontal quantity axis) increases when we move from 0 to + infinity, thus from left to right)
- If demand **decreases** , the demand curve shifts **left** . Why?
(When moving from right to left (towards 0) the quantity demanded decreases on the quantity axis)



1 = A decrease in the quantity demanded.

2 = An increase in the quantity demanded.

3 = A decrease in demand.

4 = An increase in demand.

Figure 2-2: Demand Shifters and Movement Along a Demand Curve by FSCJ is licensed under CC-BY-4.0.

The graph summarizes **demand** shifters leading to an increase or decrease in demand. In addition, it emphasizes that what causes

movement along the demand curve is the change in **the own price** of the good or service. ⁽¹⁾

II. Supply

Supply

When economists talk about **supply**, they mean the amount of some good or service a producer is willing to supply at each price. Price is what the producer receives for selling one unit of a good or service. A rise in price almost always leads to an increase in the **quantity supplied** of that good or service, while a fall in price will decrease the quantity supplied. When the price of gasoline rises, for example, it encourages profit-seeking firms to take several actions: expand exploration for oil reserves; drill for more oil; invest in more pipelines and oil tankers to bring the oil to plants where it can be refined into gasoline; build new oil refineries; purchase additional pipelines and trucks to ship the gasoline to gas stations; and open more gas stations or keep existing gas stations open longer hours.

Economists call this positive relationship between price and quantity supplied — that a higher price leads to a higher quantity supplied and a lower price leads to a lower quantity supplied — the **law of supply**. The law of supply assumes that all other variables that affect supply (supply shifters) are held constant.

Supply is the **relationship** between the **quantity supplied** and the **price** of the good when all other influences on selling plans remain the same. A **supply curve** is a relationship between two, and only two, variables: quantity supplied on the horizontal axis and price on the vertical axis.

In economic terminology, **supply** is not the same as **quantity supplied**. When economists refer to supply, they mean the relationship between a range of prices and the quantities supplied at those prices, a relationship that can be illustrated with a supply curve or a supply schedule. When economists refer to quantity

supplied, they mean only a certain point on the supply curve, or one quantity on the supply schedule. In short, supply refers to the curve and quantity supplied refers to the (specific) point on the curve.

Supply for Gasoline

Figure 2.3 illustrates the law of supply, again using the market for gasoline as an example. Like demand, supply can be illustrated using a table or a graph. A **supply schedule** is a table, like Table 2.2, that shows the quantity supplied at a range of different prices. Again, price is measured in dollars per gallon of gasoline and quantity demanded is measured in millions of gallons.

A **supply curve** is a graphic illustration of the relationship between price, shown on the vertical axis, and quantity, shown on the horizontal axis. The supply schedule and the supply curve are just two different ways of showing the same information. Notice that the horizontal and vertical axes on the graph for the supply curve are the same as for the demand curve.⁽⁴⁾

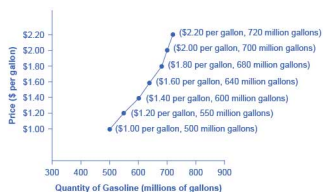


Figure 2-3: A Supply Curve for Gasoline by Openstax is licensed under CC-BY-4.0.

The supply schedule is the table that shows quantity supplied of gasoline at each price. As price rises, quantity supplied also increases, and vice versa. The supply curve (S) is created by graphing the points from the supply schedule and then connecting them. The upward slope of the supply curve illustrates the law of supply—that a higher price leads to a higher quantity supplied, and vice versa.⁽⁴⁾

Table 2.2 Price and Supply of Gasoline

Price (Per Gallon)	Quantity Supplied (millions of gallons)
\$1.00	500
\$1.20	550
\$1.40	600
\$1.60	640
\$1.80	680
\$2.00	700
\$2.20	720

Supply and Law of Supply

According to the law of supply, other things equal, as the **price** of a good **rises** , the **quantity supplied rises** . Therefore, the supply curve **slopes upward** due to the **positive** relationship between P and Q_S . The shape of supply curves will vary somewhat according to the product: steeper, flatter, straighter, or curved.

Nearly all supply curves, however, share a basic similarity: they slope up from left to right and illustrate the law of supply: as the price rises, say, from \$1.00 per bottle to \$2 per bottle, the quantity supplied increases from 30 bottles to 60 bottles. Conversely, as the price falls, the quantity supplied decreases.

Whenever **only price changes** , and all other factors that influence supply remain the same, we **move along** the supply curve, as the new price is matched to its corresponding quantity demanded. Why does the law of supply hold? The law of supply holds for two main reasons:

- First, a higher price brings a larger profit and a greater incentive for producers to produce more. Profit = Total

Revenue $\hat{>}$ Total Cost. Profit is negatively related to Total Cost, and positively related to Total Revenue = $P \cdot Q_{\text{sold}}$. A larger price creates incentives for producers and sellers to produce more to obtain a higher profit.

- Second, as more units of a good are produced (Q_s increases), the opportunity cost of making that good increases (what has to be given up in terms of other goods and services that could have been produced using the same resources), and a higher price is an incentive to bear the higher opportunity cost. ⁽¹⁾

Supply Shifters

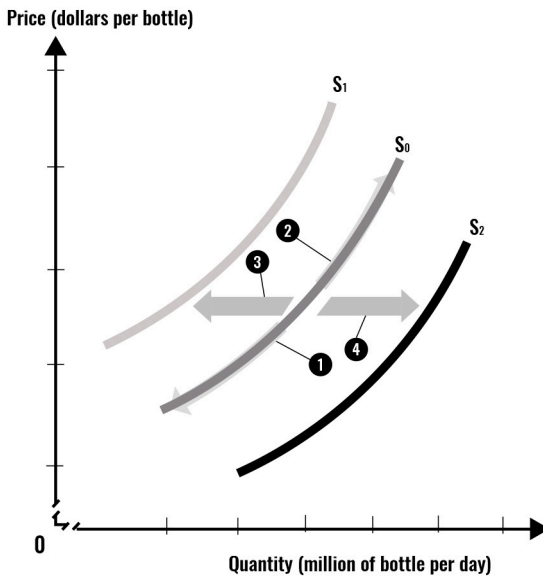
Now we will look at other factors, besides **the price of a good itself** that affect supply. When changing, these factors affect the supply curve by shifting it to the right (if supply increases) or to the left (if supply decreases). Thus, in our demand and supply model, we will refer to the following factors as supply shifters.

Notice that for a good or service, there might be other important factors that affect supply, thus this list can be thought of as a theoretical list, which will cover the most important determinants of supply.

- **Prices** of related goods
 - Substitutes in production
 - Complements in production
- **Prices** of resources and other inputs
- **Expectations** in general
 - Expected future prices for the good produced
 - Expected future prices of inputs used to produce the good
- **Number** of sellers (market supply depends on number of sellers)
- **Productivity** (Technology improvements)

If one of these factors changes, the supply curve **shifts** .

- If supply increases, the supply curve shifts right. Why? (The quantity demanded (on the horizontal quantity axis) increases when we move from 0 to + infinity, thus from left to right)
- If supply decreases, the supply curve shifts left. Why? (When moving from right to left (towards 0) the quantity supplied decreases on the quantity axis)



1 = A decrease in the quantity supplied.

2 = An increase in the quantity supplied.

3 = A decrease in supply.

4 = An increase in supply.

Figure 2-4: Supply Shifters and Movement Along the Supply Curve by FSCJ is licensed under CC-BY-4.0.

The graph summarizes **supply shifters** leading to an increase or

decrease in supply. In addition it emphasizes that what causes **movement along** the supply curve, is the **change in the own price** of the good or service. ⁽¹⁾

12. Market Equilibrium

Supply and Demand Together: Market Equilibrium

The **intersection** of the supply and demand curves determines the **market equilibrium**. At the equilibrium price, the quantity demanded equals the quantity supplied. Because the graphs for demand and supply curves both have price on the vertical axis and quantity on the horizontal axis, the demand curve and supply curve for a particular good or service can appear on the same graph. Together, demand and supply determine the price and the quantity that will be bought and sold in a market.

We can use either a tabular approach or a graphical approach to find the equilibrium in a market.

Table 2.3. Tabular Approach for the Gasoline Market

Price (per gallon)	Quantity demanded (millions of gallons)	Quantity supplied (millions of gallons)
\$1.00	800	500
\$1.20	700	550
\$1.40	600	600
\$1.60	550	640
\$1.80	500	680
\$2.00	460	700

The demand curve (D) and the supply curve (S) intersect at the equilibrium point E, with a price of \$1.40 and a quantity of 600. The equilibrium is the only price where quantity demanded is equal to

quantity supplied. At a price above equilibrium like \$1.80, quantity supplied exceeds the quantity demanded, so there is excess supply. At a price below equilibrium such as \$1.20, quantity demanded exceeds quantity supplied, so there is excess demand. ⁽⁴⁾

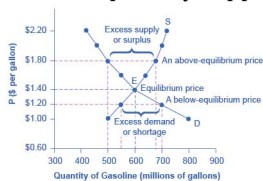


Figure 2-5: Graphical Approach for the Gasoline Market by Openstax licensed under CC-BY-4.0.

Equilibrium

When two lines on a diagram cross, this intersection usually means something. The point where the supply curve and the demand curve cross is called the **equilibrium**. The **equilibrium price** is the only price where the plans of consumers and the plans of producers agree — that is, where the amount of the product consumers want to buy (quantity demanded) is equal to the amount producers want to sell (quantity supplied). This common quantity is called the **equilibrium quantity**. At any other price, the quantity demanded does not equal the quantity supplied, so the market is not in equilibrium at that price.

The word “equilibrium” means “balance.” If a market is at its equilibrium price and quantity, then it has no reason to move away from that point. However, if a market is not at equilibrium, then economic pressures arise to move the market toward the equilibrium price and the equilibrium quantity. ⁽⁴⁾

Surplus and Shortage

Imagine, for example, that the price was above the equilibrium price. At this higher price, the quantity demanded is smaller than the quantity supplied. The difference represents a **surplus** (an excess supply). With a surplus, the gasoline will accumulate at the gas stations that sell. This accumulation puts pressure on gasoline gas stations (sellers). If a surplus remains unsold, those firms involved in making and selling gasoline are not receiving enough cash to pay their workers and to cover their expenses.

In this situation, some producers and sellers will want to cut prices, because it is better to sell at a lower price than not to sell at all. Once some sellers start cutting prices, others will follow to avoid losing sales. These price reductions in turn will stimulate a higher quantity demanded. So, if the price is above the equilibrium level, incentives built into the structure of demand and supply will create pressures for the price to fall toward the equilibrium.

Now suppose that the price is below its equilibrium level. At this lower price, the quantity demanded is greater than the quantity supplied. The difference represents a **shortage** (on the supply side). In this situation, consumers mob gas stations, only to find many of them are running short of gasoline. Gas stations recognize that they have an opportunity to make higher profits by selling what gasoline they have at a higher price. As a result, the price rises toward the equilibrium level. ⁽⁴⁾

Changes in Market Equilibrium

The 3-Step Approach to Changes in Equilibrium

To analyze how any event influences a market, we use the supply

and demand model to examine how the event affects the equilibrium price and the equilibrium quantity.

To do this we follow these **three steps** :

Step 1

We decide whether the event affects/shifts the supply curve or the demand curve, or both. We use the following theoretical shifters (scroll down the list until you find a match):

Demand Shifters:

- Prices of related goods: **substitutes** and **complements**
- **Expectations**
- Society's **income**
- **Number of buyers**
- **Preferences** (taste & attractiveness)

Supply Shifters:

- **Prices** of related goods (substitutes or complements in production)
- **Prices** of resources and other inputs
- **Expectations** in general
- **Number** of sellers
- **Productivity** (Technology improvements)

Next, we **combine** all the effects on supply/demand from each of the given events to find the net effect on each curve. If we cannot determine the **net effect** (i.e., one event causes demand to increase, and the other event causes demand to decrease, but we don't know which effect is greater) we cannot continue to step 2. ⁽¹⁾

Step 2

We decide in which direction each curve shifts (**increase** = shift to the **right** ; **decrease** = shift to the **left** for both supply and demand curves).⁽¹⁾

Step 3

We draw one graph (short-cut approach) or three graphs (comprehensive approach) every time we have a set of events that shifts both supply and demand curves (a double shift scenario). We find the original equilibrium and the new equilibrium points, and by comparing them we finally conclude on what happens to the equilibrium price and equilibrium quantity after the given events take place.

You need to be able to find such results from the graph(s) you build. Thus, there is no need to memorize any of the results. The model you build will produce those results, which are the theoretical predictions about the equilibrium price and the equilibrium quantity in the targeted market. Once all the relevant information is included in the graph, you should be able to find the model's predictions, and summarize them under the conclusions section.⁽¹⁾

Always remember:

In a **double shift** scenario, with no quantitative information on which shift is bigger, the conclusion on one of the equilibrium variables will always be: **undetermined** or **ambiguous** , which means that one of the equilibrium variables could go up, go down, or stay the same. Without additional information on the **relative size of shifts** of each curve, the only general prediction you can make on that particular equilibrium variable (which could be either the equilibrium price or the equilibrium quantity)

is: **undetermined** or **ambiguous**. On the other hand, if additional quantitative information is available, allowing you to draw the new curves based on the exact sizes of shifts provided you could conclude with certainty what happens to the equilibrium price and the equilibrium quantity.

To aid your understanding regarding Step 3 of the approach, check out these five short videos:

Click on the link below to view the video playlist. Be sure to watch all five videos in the playlist.

[Link to Playlist](#)

13. Key Terms

Key Terms

Please review the following key terms. ⁽⁴⁾⁽⁵⁾

Ceteris paribus – other things being equal.

Complements – goods that are often used together so that consumption of one good tends to enhance consumption of the other.

Demand curve – a graphic representation of the relationship between price and quantity demanded of a certain good or service, with quantity on the horizontal axis and the price on the vertical axis.

Demand schedule – a table that shows a range of prices for a certain good or service and the quantity demanded at each price.

Demand – the relationship between price and the quantity demanded of a certain good or service.

Equilibrium price – the price where quantity demanded is equal to quantity supplied.

Equilibrium quantity – the quantity at which quantity demanded and quantity supplied are equal for a certain price level.

Equilibrium – the situation where quantity demanded is equal to the quantity supplied; the combination of price and quantity where there is no economic pressure from surpluses or shortages that would cause price or quantity to change.

Factors of production – the combination of labor, materials, and machinery that is used to produce goods and services; also called inputs.

Inferior good – a good in which the quantity demanded falls as income rises, and in which quantity demanded rises and income falls.

Inputs – the combination of labor, materials, and machinery that

is used to produce goods and services; also called factors of production.

Law of demand – the common relationship that a higher price leads to a lower quantity demanded of a certain good or service and a lower price leads to a higher quantity demanded, while all other variables are held constant.

Law of supply – the common relationship that a higher price leads to a greater quantity supplied and a lower price leads to a lower quantity supplied, while all other variables are held constant.

Normal good – a good in which the quantity demanded rises as income rises, and in which quantity demanded falls as income falls.

Price – what a buyer pays for a unit of the specific good or service.

Quantity demanded – the total number of units of a good or service consumers are willing to purchase at a given price.

Quantity supplied – the total number of units of a good or service producers are willing to sell at a given price.

Shift in demand – when a change in some economic factor (other than price) causes a different quantity to be demanded at every price.

Shift in supply – when a change in some economic factor (other than price) causes a different quantity to be supplied at every price.

Shortage – at the existing price, the quantity demanded exceeds the quantity supplied; also called excess demand.

Substitute – a good that can replace another to some extent, so that greater consumption of one good can mean less of the other.

Supply curve – a line that shows the relationship between price and quantity supplied on a graph, with quantity supplied on the horizontal axis and price on the vertical axis.

Supply schedule – a table that shows a range of prices for a good or service and the quantity supplied at each price.

Supply – the relationship between price and the quantity supplied of a certain good or service“.

Surplus – at the existing price, quantity supplied exceeds the quantity demanded; also called excess supply ⁽¹⁾.

PART IV

MODULE 3: MEASURING GDP AND ECONOMIC GROWTH

14. Introduction

Module Introduction

This is the first module that directly explores one of the most important topics in macroeconomics:

- How do we measure economic production
- What determines economic growth?

In this module we define GDP and explain why for the economy, the value of production equals income, which also equals expenditure. We describe how economic statisticians measure GDP and distinguish between nominal GDP and real GDP. The rate of growth of real GDP is the first major indicator of economic performance, which provides information about a country's ability to increase its production of goods and services and in return increase income and standards of living over time. We explain and describe the uses of real GDP and its limitations.

Last, we discuss economic growth: its measurement, importance, historical data, and the theories that explain it. ⁽¹⁾

Learning Objectives

- Define gross domestic product (GDP) as the measure of total output of an economy and explain its calculation.
- Explain the Expenditure Approach and Income Approach via the Circular Flow Diagrams.
- Explain the difference between real GDP and nominal GDP.
- Identify the phases of a business cycle.

- Define and calculate the economic growth rate.
- Explain the rule of the 70 and implications of sustained growth.
- Explain theories of economic growth.
- Explain key factors that foster economic growth. ⁽¹⁾

Reading

- Learning Unit

15. Income Approach

Income Approach

While in the Expenditure Approach, the value of GDP was measured by the expenditures of households, firms, governments, and foreigners on goods and services, whereas in the Income Approach, the value of GDP is measured by the earnings of the factors of production.

- Labor earns wages
- Capital earns interest
- Land earns rent
- Entrepreneurship earns profit

Households receive wages, capital, interest, rent, and profit as income, depending of what factors of production they own. ⁽¹⁾

The income approach measures GDP using several steps:

1. The income approach starts with the sum of wage income plus interest, rent, and profit income. This sum equals **net domestic income at factor cost** .
2. To change the measure from factor cost to market price, indirect taxes less subsidies are added because these are government taxes and transfers that affect market prices.
3. The next step adds **depreciation** , the decrease in the value of capital that results from its use and obsolescence. ⁽¹⁾

16. Economic Growth

Factors for Economic Growth

Now we are going to look at what factors matter for economic growth. Real GDP grows when the quantities of the factors of production grow or when persistent advances in technology make them increasingly productive. Our standard of living improves only if growth occurs because of increases in labor productivity.⁽¹⁾

Labor Productivity

Labor productivity is the quantity of real GDP produced by one hour of labor.

Labor productivity = $(\text{Real GDP}) \div (\text{Aggregate hours worked})$

Real GDP = $(\text{Aggregate hours worked}) \times (\text{Labor productivity})$

Note: Using the rearranged formula shows that growth in Real GDP can be divided into growth in aggregate hours worked and growth in labor productivity.

Recall,

Growth $(A \times B)$ is approximately = Growth A + Growth B

The growth of labor productivity is influenced by saving and investment in physical capital, expansion of human capital, and discovery of new technologies. More saving and investment in physical capital increases labor productivity. The **law of diminishing returns** states that if the quantity of capital is small, an increase in capital brings a large increase in production; and if the quantity of capital is large, an increase in capital brings a small increase in production. This fact about capital means that saving and investment in additional capital will not bring sustained

economic growth without an accompanying expansion of human capital and technological change.

- **Expansion of human capital** : Human capital is the accumulated skills and knowledge of people. Human capital is the most fundamental source of economic growth because it directly increases labor productivity and is the source of the discovery of new technologies. Human capital comes from education and training, job experience, and health and diet.
- **Discovery of new technologies** : New technologies increase labor productivity. Often these new technologies require new and better capital, such as personal computers replacing typewriters. ⁽¹⁾

Economic Growth Theories: Old and New

Old Growth Theory

An old growth theory is the **classical growth theory** . This theory predicts that the clash between an exploding population and limited resources will eventually bring economic growth to an end. According to this theory, labor productivity growth will increase real GDP per person above the subsistence level, which will bring a population explosion. Eventually, the population growth will decrease capital per worker hour and labor productivity will fall and real GDP per person will return to the subsistence level. **Malthusian theory** is another name for classical growth theory — named after *Thomas Robert Malthus* . Malthus predicted that population growth would result in people having a primitive standard of living at the subsistence level of real GDP per person. ⁽¹⁾

New Growth Theory

New growth theory is the theory that our unlimited wants will lead us to ever greater productivity and perpetual economic growth.

The new growth theory emphasizes the role played by choices and innovation. It emphasizes three key aspects of market economies:

- Human capital grows because of choices.
- Discoveries result from choices.
- Discoveries bring profit, and competition destroys profit.

Once a new discovery has been made, it can be used by everyone. In addition, production activities can be replicated so that identical firms can each produce the same quantity of an item and so the economy does not suffer from diminishing returns. Economic growth is driven by insatiable wants, which lead us to pursue profit and to innovate. The new and better products mean that old firms go out of business. New firms start up, which creates new and better jobs and leads to greater consumption and leisure. But insatiable wants simply start the growth cycle all over again. ⁽¹⁾

Preconditions for Economic Growth

Three necessary preconditions for economic growth are:

1. **Economic freedom** is a condition in which people are able to make personal choices, their private property is protected, and they are free to buy and sell in markets. What countries are considered economically free? Who is in control of economic decisions? Are people free to do what they want and to work where they want? Are businesses free to produce when they want and what they choose, and to hire and fire as they wish?

Are banks free to choose who will receive loans? Or, does the government control these kinds of choices? Each year, researchers at the Heritage Foundation and the *Wall Street Journal* look at 50 different categories of economic freedom for countries around the world. They give each nation a score based on the extent of economic freedom in each category. The 2013 Heritage Foundation's Index of Economic Freedom report ranked 177 countries around the world; some examples of the most free and the least free countries are listed in Table 3.5.

Table 3.5 The 2013 Heritage Foundation's Index of Economic Freedom report ranked 177 countries around the world.

Most Economic Freedom

1. Hong Kong
2. Singapore
3. Australia
4. New Zealand
5. Switzerland
6. Canada
7. Chile
8. Mauritius
9. Denmark
10. United States

Least Economic Freedom

1. Iran
2. Turkmenistan
3. Equatorial Guinea
4. Democratic Republic of Congo
5. Burma
6. Eritrea
7. Venezuela
8. Zimbabwe
9. Cuba
10. North Korea

The Heritage Foundation, 2013 Index of Economic Freedom, Country Rankings

1. **Markets** enable people to trade and to save and invest. Markets cannot operate without property rights. Markets and government regulations are always entangled. There is no such thing as an absolutely free market. Regulations always define the “rules of the game” in the economy. Economies that are primarily market-oriented have fewer regulations – ideally just enough to maintain an even playing field for participants. At a minimum, these laws govern matters like safeguarding private property against theft, protecting people from violence, enforcing legal contracts, preventing fraud, and collecting taxes.
2. **Property rights** are the social arrangements that govern the protection of private property. Clearly established and enforced property rights provide people with the incentive to work and save.

These three preconditions for economic growth are necessary for growth but do *not* guarantee that economic growth will occur. For growth to occur and to persist, people need incentives to save

and invest, to accumulate human capital, and to develop new technologies.⁽¹⁾

Policies to Achieve Faster Growth

Government policies to achieve economic growth must provide people with the incentives to save and investment, accumulate human capital, and develop new technologies. Below are listed some growth promoting policies:

- *Create Incentive Mechanisms* : Enforce property rights with a well-functioning legal system.
- *Encourage Saving* : Increased saving can increase the growth of capital and stimulate economic growth. East Asian countries have the highest growth rates and saving rates; some African economies have the lowest saving rates and the lowest economic growth rates.
- *Encourage Research and Development* : More research and development creates technological advances. Governments can direct public funds toward financing basic research.
- *Encourage International Trade* : International trade extracts all the available gains from specialization and exchange.
- *Improve the Quality of Education* : The social benefits of education go beyond the benefits accrued to the individuals who receive the education. The government can help by financing more basic education to raise skills in language, math and science. ⁽¹⁾

17. Limitations of Real GDP

Limitations of Real GDP: Goods and Services Omitted From GDP

GDP measures the value of goods and services that are bought in markets, so it excludes:

- **Household Production** : Household production is productive activities at the home that do not involve market transactions. As more services, such as childcare, meals and laundry are provided in the marketplace, the measured growth rate overstates development of all economic activity.
- **Underground Production** : Underground production is the part of the economy that is hidden from the view of the government either because people want to avoid taxes and regulations or because the goods and services being produced are illegal. If the underground economy is a reasonably stable proportion of all economic activity, the growth rate will be accurate.
- **Leisure Time** : Leisure time is an economic good that does not get measured in the official GDP figures. Increases in leisure time lower the economic growth rate, but we value our leisure time and we are better off with it. Increased output is not worth very much if we have little or no time to enjoy it.
- **Environmental Quality** : Pollution does not directly lower the economic growth rate. If our standard of living is adversely affected by pollution, our GDP measure does not show this fact. The reason is that the devices that we produce to mitigate pollution count as part of GDP but the pollution itself is not subtracted. ⁽¹⁾

Limitations of Real GDP

Other influences on the standard of living omitted from GDP, but important for the standard of living, is:

- **Health and Life Expectancy** : While obviously important factors determining the standard of people's living, they are omitted from real GDP. Health and life expectancy have improved as infant deaths and death in childbirth have almost been eliminated. Life expectancy has increased from 70 years at the end of WWII to nearly 80 years today. These gains have been checked somewhat by AIDS and drug abuse, which take away from our standard of living.
- **Political Freedom and Social Justice** : Political freedom and social justice are not measured by real GDP. A country might enjoy a very large GDP but have limited political freedom and social justice and, hence, have a lower standard of living.⁽¹⁾

Self-Check Activity

Economic growth is a sustained expansion of production possibilities. Consider Table 3.4 and answer the question below. Click on the blank space to reveal the answer. ⁽¹⁾

Table 3.4: Differences in Economic Growth Rates

Year	3 percent growth rate	5 percent growth rate	8 percent growth rate
5	\$115.92	\$127.63	\$146.93
10	\$134.39	\$162.89	\$215.89
20	\$180.61	\$265.33	\$466.10
40	\$326.20	\$704.00	\$2,172.45

Do you think an economy will grow dramatically differently if the growth rate is 8% compared to 3%? ⁽¹⁾[Do you think an economy will grow dramatically differently if the growth rate is 8% compared to 3%?(1) Looking at the table, in the first 5 years the change is not substantial (\$115.92 is not too different from \$146.93), but in 20 years, and especially in 40 years the gap gets wider and wider, thus allowing for a country experiencing an 8% growth rate to have much higher GDP and income per person in 20 years (more than double) or 40 years (about 7 times higher).].

18. Measures of Income

Expenditure Equals Income

Because firms pay out as income everything they receive as revenue from selling goods and services, total income, Y , equals total expenditure.

$$Y = C + I + G + NX$$

For a firm, the value of its production is the cost of the production, which equals the income generated by the production. So, the value of production equals income equals expenditure, or

$$GDP = Y = C + I + G + NX$$

Households use their income on consumption expenditure, saving, and paying net taxes. Therefore, it is the case that:

$$Y = C + S + NT$$

If everything is measured correctly, adding depreciation would yield GDP. But there often is a **statistical discrepancy**, the difference between the expenditure approach and the income approach. The difference is measured as the expenditure approach minus the income approach, so any statistical discrepancy is added to the sum to yield the income approach GDP.⁽¹⁾

GDP and Related Measures of Production and Income

In addition to GDP, another macroeconomic measure of production is GNP.

- **Gross national product**, (**GNP**) is the market value of all final goods and services produced anywhere in the world in a given

time period by the factors of production supplied by the residents of the country. So, pharmaceutical drugs produced in Ireland by a U.S. drug company is part of U.S. GNP but not part of U.S. GDP.

- U.S. GNP equals U.S. GDP plus net factor income from abroad.
- **Disposable personal income** is the income received by households minus personal income taxes paid. ⁽¹⁾

Uses of Real GDP

Real GDP can be used to compare the standard of living over time, to track the course of the business cycle, and to compare the standard of living among countries. ⁽¹⁾

The Standard of Living Over Time

Standard of living is measured by the value of goods and services that people enjoy, on average. Real GDP per person can be used to measure and compare the standard of living. **Real GDP per person** is real GDP divided by the population.

- In the United States in 2011, real GDP per person was 2.7 times larger than in 1961.
- In the United States in 2013, real GDP per person was 2.9 times larger than in 1961.
- Real GDP per person has doubled about every 30 years for the past 100 years, though its growth rate experiences short run fluctuations.

Potential GDP is the value of real GDP when all of the economy's factors of production — labor, capital, land, and entrepreneurship —

are fully employed. When some factors are *unemployed*, real GDP is below potential GDP. When some factors are *over-employed*, real GDP exceeds potential GDP. Potential GDP grows over time, though not at a constant rate. ⁽¹⁾

Tracking the Course of the Business Cycle

Fluctuations in the growth of real GDP reflect business cycles. A **business cycle** is the periodic but irregular up-and-down movement of total production and other measures of economic activity. Business cycles have two phases and two turning points:

- **Expansion** : The expansion phase is the period during which real GDP is increasing.
- **Recession** : The recession phase is commonly defined as a period during which real GDP decreases for at least six months, though the NBER has a broader definition.
- **Peak** : A peak is the highest level of real GDP yet attained. A peak is a turning point between an expansion and a recession.
- **Trough** : A trough is the temporary low-point in real GDP. A trough is a turning point between a recession and an expansion.

The Great Recession officially began in December 2007 and ended in June 2009, according to the National Bureau of Economic Research (NBER), which determines the start and end dates of U.S. recessions on the basis of a range of economic indicators. ⁽¹⁾

The Standard of Living Among Countries

To compare real GDP per person among countries, the real GDPs

should be calculated using a common set of prices, called purchasing power parity prices. When this conversion is done U.S. real GDP per person is higher than in other advanced economies. ⁽¹⁾

19. Expenditure Approach

Expenditure Approach

In the goods market, households, firms, governments, and foreigners buy goods and services.

- **Consumption expenditure** , C , is the expenditure by households on consumption goods and services. This includes both durable goods (meant to last 3 or more years) and nondurable goods.
- **Investment** , I , is the purchases of new capital goods (tools, instruments, machines, buildings, and other durable items), purchases of new homes by households, and additions to inventories. Investment does not include purchases of stocks and bonds, as these are not produced goods or services.
- **Government expenditures on goods and services** , G , is the expenditures by all levels of the government on goods and services. Government transfer payments, such as Social Security payments, are not part of government expenditures on goods and services because these expenditures include only funds used by the government to buy goods and services. Transfer payments are not buying a good or service for the government and so are not included in government expenditures on goods and services.
- **Net exports of goods and services** , NX , is the value of exports of goods and services minus the value of imports of goods and services. **Exports of goods and services** are the items that firms in the United States produce and sell to the rest of the world. **Imports of goods and services** are the items that households, firms, and governments in the United States buy from the rest of the world. ⁽¹⁾

Total expenditure equals $C + I + G + NX$.

Self-Check Activity

Identify if the following goods and services are included in GDP. ⁽¹⁾

Multiple Choice Self Check

1. The purchase of copy paper by Intel, which is used by the company staff.
 - Included
 - Not included
2. The purchase of an electronic handheld organizer by a sales manager to keep track of clients.
 - Included
 - Not included
3. The purchase of a new aircraft carrier by the Navy.
 - Included
 - Not included
4. An increase in Dell's inventory of unsold personal computers.
 - Included
 - Not included
5. A family eating dinner at Taco Bell.

- Included
 - Not included
6. The salary of the President of the United States.
- Included
 - Not included
7. A Mom baking a birthday cake for her 8-year-old daughter.
- Included
 - Not included
8. The sale of a used computer.
- Included
 - Not included
9. Your donation of a used computer to a local elementary school.
- Included
 - Not included
10. The purchase by a German resident in Germany of an American-made ceiling fan produced in the United States.
- Included
 - Not included

Expenditure Approach (Cont.)

The expenditure approach measures GDP as the sum of consumption expenditure, C , investment, I , government

expenditures on goods and services, G , and net exports of goods and services, $(X - M)$.

$$GPD = C + I + G + (X - M)$$

In the second quarter of 2011, annualized GDP in trillions of dollars was: \$10.7 trillion + \$1.9 trillion + \$3.0 trillion + (-\$0.6 trillion) = \$15 trillion.

In the second quarter of 2013, annualized GDP in trillions of dollars was: \$11.4 trillion + \$2.6 trillion + \$3.1 trillion + (-\$0.5 trillion) = \$16.7 trillion. ⁽¹⁾

Self-Check Activity

Carefully read each question below and write down your answer. ⁽¹⁾

Comparing 2011 with 2013, how do you think the U.S. is doing in terms of the GDP components?

[Consumption expenditure, Investment expenditure, Government expenditure and Net Exports have all increased from 2001 to 2013].

What do you think has happened with prices in general from 2011 to 2013? *[Prices have a tendency to increase from year to year in the U.S., but exceptions exist and we will discuss them in Module 5].*

What adjustments do you think we need to make to the above numbers for a better comparison of GDP from 2011 to 2013? *[We need to remove the effect of prices increasing, by calculating RGDP and comparing RGDP numbers, as shown in the rest of this Module].*

20. Circular Flow

Circular Flow

The **circular flow diagram** pictures the economy as consisting of two groups – households and firms – that interact in two markets: the **goods and services market** in which firms sell and households buy and the **labor market** in which households sell labor to business firms or other employees. To better understand the economy and the NIPAs, consider a simple economy consisting solely of businesses and individuals, as reflected in the circular flow diagram ⁽¹⁾:

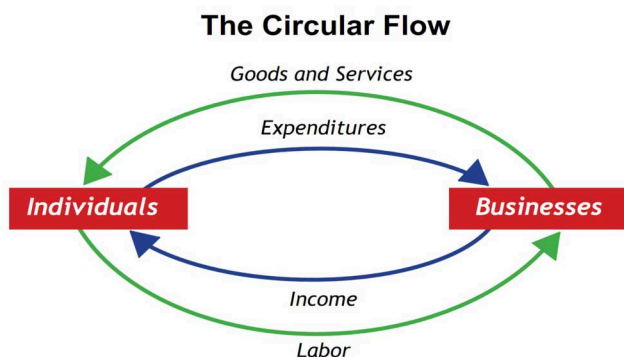


Figure 3-1: The Circular Flow by The Bureau of Economic Analysis is licensed under Public Domain.

In this simple economy, individuals provide the labor that enables businesses to produce goods and services. These activities are represented by the green lines in the diagram. Alternatively, one can think of these transactions in terms of the monetary flows that occur. Businesses provide individuals with income (in the form of

compensation) in exchange for their labor. That income is, in turn, spent on the goods and services businesses produce.

In the real world, there are many different markets for goods and services and markets for many different types of labor.

The total economy is much more complicated than the illustration above. An economy involves interactions between not only individuals and businesses, but also Federal, state, and local governments and residents of the rest of the world. Also, not shown in this simple illustration of the economy are other aspects of economic activity such as investment in capital (produced—or fixed—assets such as structures, equipment, research and development, and software) and flows of financial capital (such as stocks, bonds, and bank deposits).⁽²⁾

The circular flow diagram simplifies this to make the picture easier to grasp. In the diagram, firms produce goods and services, which they sell to households in return for revenues. This is shown in the outer circle, and represents the two sides of the product market (for example, the market for goods and services) in which household's demand and firms supply.

Households sell their labor as workers to firms in return for wages, salaries and benefits. This is shown in the inner circle and represents the two sides of the labor market in which households supply and firms demand.

This version of the circular flow model is stripped down to the essentials, but it has enough features to explain how the product and labor markets work in the economy. We could easily add details to this basic model if we wanted to introduce more real-world elements, like financial markets, governments, and interactions with the rest of the globe (imports and exports).

In any circular flow diagram, two flows are present, which can be thought of as two sides of the same coin. The coin can be thought of as GDP, and the two flows are the Expenditure Approach and the Income Approach in measuring GDP.⁽¹⁾

2I. Gross Domestic Product

Measuring the Size of the Economy: Gross Domestic Product

Macroeconomics is an empirical subject, meaning that it is verifiable by observation or experience rather than theory. Given this, the first step toward understanding macroeconomic concepts is to measure the economy. ⁽⁶⁾

How large is the U.S. economy? The size of a nation's overall economy is typically measured by its **Gross Domestic Product (GDP)**, which involves counting up the production of millions of different goods and services — houses, cars, smart phones, computers, steel, oranges, college educations, and all other new goods and services produced in the current year — and summing them into a total dollar value.

GDP measures the market value of the goods, services, and structures produced by the nation's economy in a particular period. GDP is one of the most comprehensive and closely watched economic statistics; It is used by the White House and Congress to prepare the Federal budget, by the Federal Reserve to formulate monetary policy, by Wall Street as an indicator of economic activity, and by the business community to prepare forecasts of economic performance that provide the basis for production, investment, and employment planning. While GDP is used as an indicator of economic activity, it is not a measure of well-being (for example, it does not account for rates of poverty, crime, or literacy). ⁽⁷⁾

GDP is equal to the total expenditures for all final goods and services produced within the country in a stipulated period of time. According to the Bureau of Economic Analysis (BEA), in 2015 the U.S. GDP totaled about \$18 trillion in current dollars, and about \$16.4

trillion in chained 2009 dollars, which represents the largest level of GDP among all countries in the world. ⁽⁸⁾

Each of the market transactions that enter into GDP must involve both a buyer and a seller. The GDP of an economy can be measured either by the total dollar value of what is purchased in the economy (the Income Approach), or by the total dollar value of what is produced (the Expenditure Approach). ⁽⁶⁾

Definition of the GDP: Breaking Things Down

At its core, the gross domestic product (GDP) measures how much output a country's economy has produced in a stipulated period of time. Because adding up different goods and services, measured in different measurement units, is not a practical way to measure production in the economy, economists rely on the market value of goods and services produced. Thus, GDP represents the market value (expressed in a country's currency, such as the dollar) of all final goods and services legally produced within a country in a given time period, typically one year.

In a nutshell, such measurement involves the calculation of **market value**, which for each unique good or service produced consists of multiplying its quantity with the market price, followed by adding everything up into an overall dollar figure. In practice, the process is much more complicated and involves NIPA accounts for thousands of goods and services. For a deeper understanding of NIPA accounts, see: https://www.bea.gov/national/pdf/nipa_primer.pdf

The following are several points to keep in mind when considering the output of the economy:

1. **Production**, not **sales**, within a given time period (typically one year) is what GDP captures. Not all output produced in a year is sold that year. The unsold output becomes inventory.

On the other hand, if a car produced last year was only sold this year, it will be counted in last year's GDP, when it was first produced, and became inventory (last year).

2. In addition to **market production**, GDP includes some **nonmarket production**. GDP is composed of goods and services, which are produced for sale in the market, and of nonmarket goods and services, which are not sold in the market, such as: the defense services provided by the federal government, the education services provided by local governments, the emergency housing or health care services provided by nonprofit institutions serving households (such as the Red Cross), and the housing services provided by and for persons who own and live in their home (referred to as "owner-occupants"). However, not all productive activity is included in GDP. In particular, because data are not available to accurately measure their value, the following activities are NOT included in GDP:

- Care of one's own children
- Unpaid volunteer work for charities
- Illegal activities ⁽⁷⁾

3. Whenever possible, GDP is valued at **market prices**. The NIPAs value market goods and services using **prices set by the market**. This approach provides a common unit of measurement (dollars) that facilitates comparisons of the various goods and services that make up economic activity. Using market values also facilitates the analysis of the impact of events on the economy, such as the implementation of government programs or the occurrence of natural disasters. ⁽⁷⁾
4. The reason why only **final** goods and services are included in the calculation of GDP is to avoid double counting. A final or finished good or service is a good or service that is produced for its final user, unlike an intermediate good or service, which

is a good or service that is used as a component of a final good or service.

5. Only legally produced goods and services are counted in the GDP.
6. The word " **domestic** " in Gross Domestic Product pertains to the fact that only the goods and services produced **within a country** are counted in the GDP. So, a Toyota Tundra produced in Texas is counted in the U.S. GDP, and a Chevy Silverado produced in Silao, Mexico is not counted in the U.S. GDP.
7. GDP measures production during a given period of time, typically one year. In the U.S., quarterly GDP data exist, but this is not the case in other countries. Production of a good or service produced in a previous time period (even if perhaps sold in the present time period) does not count in this period's GDP. ⁽¹⁾

22. Real GDP vs Nominal GDP

Comparing Real GDP to Nominal GDP

How much of the increase in GDP is the result of inflation and how much is an increase in real output? To answer this question, we need to take a closer look at how economists calculate Real GDP (RGDP), and how it differs from Nominal GDP (NGDP). The **market value** of production and hence GDP can increase either because the **production** of goods and services are higher (**quantities**) or because the **prices** of goods and services are higher. Because the focus in measuring GDP is to find out whether a country's ability to produce higher quantities of goods and services has changed, when calculating RGDP we try to remove the effect of price changes by using prices of a reference year, called a base year. This way, we keep prices fixed (unchanged) at the level they were in the base year whenever we calculate RGDP. ⁽¹⁾

Calculating Real GDP

- **Nominal GDP** is the value of the final goods and services produced in a given year expressed in terms of the prices in that same year.
- To calculate **Nominal GDP** , we use current year prices and multiply them by current year quantities for all the goods and services produced in an economy. For the purposes of demonstrating the method, we will work with hypothetical economies consisting of no more than two or three goods and

services. You can imagine that the same method applies if a lot more goods and services were included.

- **Real GDP** allows the quantities of production to be compared across time. Real GDP is the value of final goods and services produced in a given year expressed in terms of the prices in a base year.
 - To calculate Real GDP, we use base year prices and multiply them by current year quantities for all the goods and services produced in an economy. For the purposes of demonstrating the method, we will work with hypothetical economies consisting of no more than two or three goods and services. You can imagine that the same method applies if a lot more goods and services were included.
 - In the base year, RGDP is calculated using prices of the current year (base year = current year), therefore RGDP always equals NGDP in the base year. ⁽¹⁾

Example:

Table 3 contains summarized information for a hypothetical economy's total production and corresponding prices (you can think of them as average prices) of all the final goods and services it produced in 2015 and 2016. The base year is 2015.

Table 3

Year 2015

Item	Quantity	Price
Goods	120	\$50
Services	100	\$65

Year 2016

Item	Quantity	Price
Goods	130	\$55
Services	110	\$70

In 2015, nominal GDP = $120 \times \$50 + 100 \times \$65 = \$6,000 + \$6,500 = \$12,500$

In 2016, nominal GDP = $130 \times \$55 + 110 \times \$70 = \$7,150 + \$7,700 = \$14,850$

Nominal GDP has increased significantly, but what how much has real GDP changed between these years? To calculate RGDP, we first need to decide which one will be the base year. Use 2015 as the base year. Then, real GDP in 2015 equals nominal GDP in 2015 (always the case for the base year) = \$12,500.

To calculate real GDP in 2016, we need to use the 2016 quantities and the 2015 prices, since 2015 is the base year.

RGDP in 2016 = $130 \times \$50 + 110 \times \$65 = \$6,500 + \$7,150 = \$13,650$.

Notice that RGDP has increased less than NGDP from 2015 to 2016. This will always be the case if both prices and quantities increase from year to year. ⁽¹⁾

23. Growth Rates

Calculating Growth Rates

The **economic growth rate** can be measured as the annual percentage change of real GDP. The growth rate of real GDP equals:

$$\frac{(\text{Real GDP in current year} - \text{Real GDP in previous year})}{(\text{Real GDP in previous year})} \times 100$$

The Growth Rate of Real GDP by FSCJ is licensed under CC-BY-4.0.

Because the standard of living depends on **real GDP per person**, which is real GDP divided by the population, we will use the following formulas to calculate and compare standards of living across time or between two different countries.

Growth rate formula for any variable ⁽¹⁾:

$$\text{Growth} = [(X_2 - X_1) \div X_1] \times 100$$

X_2 is the final value and X_1 is the initial value of the variable.

Growth $(A \div B)$ is approximately = Growth A – Growth B

Growth $(A \times B)$ is approximately = Growth A + Growth B

RGDP per person = RGDP \div Population

Growth rate of RGDP per person = Growth rate of RGDP – Growth rate of population

The Magic of Sustained Growth

Sustained growth of real GDP per person can transform a poor society into a wealthy one. Even small changes in the rate of growth, when sustained and compounded over long periods of time, make

an enormous difference in the standard of living. The slowest rate of GDP per capita growth of 1% per year is similar to what the United States experienced during its weakest years of productivity growth. The 3% per year rate is close to what the U.S. economy experienced during the strong economy of the late 1990s and into the 2000s. Higher rates of per capita growth, such as 5% or 8% per year, represent the experience of rapid growth in economies like Japan, Korea, and China.

An economy growing at a 1% annual rate over 50 years will see its GDP per capita rise by a total of 64%. However, a country growing at a 5% annual rate will see (almost) the same amount of growth over just 10 years. Rapid rates of economic growth can bring profound transformation.

The Rule of 70 demonstrates the magic of economic growth. The Rule of 70 states that the number of years it takes for the level of any variable to double is approximately 70 divided by the annual percentage growth rate of the variable. ⁽¹⁾

Self-Check Activity

Let's practice using The Rule of 70.

Read the given scenario and questions. Choose the best answer. ⁽¹⁾

Assume that the U.S. Real GDP is \$13 trillion and grows at a 3 percent annual growth rate over the next several decades.

1. How long would it take the economy to double in size?
 - 13
 - 24
 - 3
 - 34

2. How long would it take for the economy to double in size if the growth rate is 2 percent?
- 15
 - 25
 - 35
 - 5

24. Key Terms

Please review the following key terms. ⁽⁶⁾

Business cycle

The relatively short-term movement of the economy in and out of recession.

Convergence

Pattern in which economies with low per capita incomes grow faster than economies with high per capita incomes.

Depreciation

The process by which capital ages over time and therefore loses its value.

Double counting

A potential mistake to be avoided in measuring GDP, in which output is counted more than once as it travels through the stages of production.

Economic freedom

A condition in which people are able to make personal choices, their private property is protected, and they are free to buy and sell in markets.

GDP per capita

GDP divided by the population.

Gross domestic product (GDP)

The value of the output of all goods and services produced within a country in a year.

Gross national product (GNP)

Includes what is produced domestically and what is produced by domestic labor and business abroad in a year.

Law of diminishing returns

If the quantity of capital is small, an increase in capital brings a large increase in production and vice versa.

National income

Includes all income earned: wages, profits, rent, and profit income.

Nominal value

The economic statistic actually announced at that time, not adjusted for inflation; contrast with real value.

Peak

During the business cycle, the highest point of output before a recession begins.

Real value

An economic statistic after it has been adjusted for inflation; contrast with nominal value.

Recession

A significant decline in national output.

Standard of living

All elements that affect people's happiness, whether these elements are bought and sold in the market or not.

Trough

During the business cycle, the lowest point of output in a recession, before a recovery begins. ⁽¹⁾

PART V

MODULE 4: MEASURING UNEMPLOYMENT AND LABOR FORCE PARTICIPATION

25. Introduction

Module 4 – Measuring Unemployment & Labor Force Participation

Module Introduction

The rate of unemployment is the second major indicator of economic performance, which provides information about how labor market conditions have changed in an economy and how these changes affect other markets.

This module will discuss how the unemployment rate is defined and computed; review labor market indicators, trends, and fluctuations in the labor market; explore the types of unemployment; define full employment; explore the influences on the natural unemployment rate; and explain the relationship between unemployment and real GDP using the output gap. ⁽¹⁾

Learning Objectives

- Define how the unemployment rate and the labor force participation rate are measured in the United States.
- Describe the trends and fluctuations of unemployment rate and the labor force participation rate in the United States.
- Describe the sources and types of unemployment.
- Define the natural rate of unemployment.
- Explain the relationship between unemployment and real GDP. ⁽¹⁾

Reading

- Learning Unit

Website:

- The Bureau of Labor Statistics

26. Unemployment

Introduction to Unemployment

When workers are unemployed, they, their families, and the country as a whole lose. Workers and their families lose wages, and the country loses the goods or services that could have been produced. In addition, the purchasing power of these workers is lost, which can lead to unemployment for yet other workers.⁽⁹⁾

Unemployment can be a terrible and wrenching life experience—like a serious automobile accident or a messy divorce—the consequences of which can be fully understood only by someone who has gone through it. For unemployed individuals and their families, there is the day-to-day financial stress of not knowing where the next paycheck is coming from. There are painful adjustments, like watching your savings account dwindle, selling a car and buying a cheaper one, or moving to a less expensive place to live. For many people, their job is an important part of their self-worth. When unemployment separates people from the workforce, it can affect family relationships as well as mental and physical health.

The human costs of unemployment alone would justify making a low level of unemployment an important public policy priority. But unemployment also includes economic costs to the broader society. When millions of unemployed but willing workers cannot find jobs, an economic resource is going unused. An economy with high unemployment is like a company operating with a functional but unused factory. The opportunity cost of unemployment is the output that could have been produced by the unemployed workers.⁽¹⁰⁾

Addressing the issue of unemployment requires information about the extent and nature of the problem. How many people are

unemployed? How did they become unemployed? How long have they been unemployed? Are their numbers growing or declining? Are they men or women? Are they young or old? Are they White, or Black, or Asian, or of Hispanic ethnicity? How much education do they have? Are they concentrated in one area of the country more than another? These statistics—together with other economic data—can be used by policymakers to determine whether measures should be taken to influence the future course of the economy or to aid those affected by joblessness.⁽⁹⁾

Unemployment is typically described in newspaper or television reports as a percentage or a rate. A recent BLS report states: “The unemployment rate declined by 0.7 percentage point over the year, to 5.0 percent in the fourth quarter of 2015. The rate reached a quarterly peak of 9.9% in the wake of the most recent recession and has been trending downward for the past 5 years. The rate at the start of the recent recession was 4.8%.”⁽¹¹⁾

Figure 4.1 shows a quarterly data time series of the unemployment rate in the U.S. since 1969. The shaded regions represent economic recessions. During a recession, the unemployment rate may increase drastically. The highest increase in the rate of unemployment post-WWII was recorded during the last recession (Dec 2007-June 2009) and immediately following the end of the last recession, known as the Great Recession.

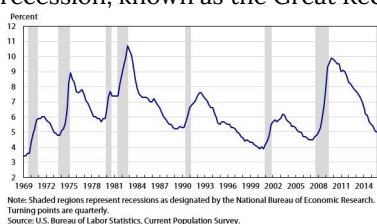


Figure 4-1: Unemployment rate for people 16 years and older, quarterly averages, seasonally adjusted, 1969–2015 by The U.S. Bureau of Labor Statistics is licensed under Public Domain.

Current Population Survey

Early each month, the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor announces the total number of employed and unemployed people in the United States for the previous month, after conducting a monthly survey called the Current Population Survey (CPS) since 1940. In 1942, the U.S. Census Bureau took over responsibility for the CPS. The survey has been expanded and modified several times since then. In 1994, for instance, the CPS underwent a major redesign to computerize the interview process as well as to obtain more comprehensive and relevant information. There are about 60,000 eligible households in the sample for this survey, which translates into approximately 110,000 individuals each month. The CPS sample is selected to be representative of the entire population of the United States.⁽⁹⁾

Measuring Unemployment: Breaking Things Down

We begin by discussing the most commonly watched indicator of the state of the labor market: the unemployment rate. In the United States, the unemployment rate is measured by the Bureau of Labor Statistics (BLS). The BLS classifies under the working-age civilian noninstitutional population those individuals aged 16 years and over who are not part of the U.S. Armed Forces, or in prisons, hospitals, or some other form of institutional care.⁽¹²⁾

The working-age civilian noninstitutional population consists of the following three categories:

1. Employed. Individuals with a job, either full time or part time.
2. Unemployed. Individuals who do not currently have a job but are searching for employment.

3. Not in the labor force. Individuals who are not employed and not looking for work.

Before defining the unemployment rate, let's first look at the BLS definitions of the categories of the employed and the unemployed. People with jobs are employed. For example, someone who reported to the interviewer that last week she worked 40 hours as an accountant for a manufacturing company is employed. More broadly speaking, per the BLS definitions, people are considered employed if they did any work at all for pay or profit during the survey reference week. This includes all part-time and temporary work, as well as regular full-time, year-round employment. Individuals are also counted as employed if they have a job at which they did not work during the survey week, whether they were paid or not, because they were either on vacation, ill, experiencing child care problems, were on maternity or paternity leave, were taking care of some other family or personal obligation, were involved in a labor dispute, or were prevented from working by bad weather. ⁽⁹⁾

People who are jobless, looking for a job, and available for work are unemployed. For example, someone who lost his job when the local branch of a financial institution closed and, since then, has been contacting other banks in town trying to find a job, is considered unemployed. Broadly speaking, people are classified as unemployed if they do not have a job, have actively looked for work in the prior four weeks, and are currently available for work. Actively looking for work may consist of any of the following activities:

- Contracting:
 - an employer directly or having a job interview
 - a public or private employment agency
 - friends or relatives
 - a school or university employment center
- Submitting resumes or filling out applications
- Placing or answering job advertisements
- Checking union or professional registers

- Searching active jobs through different ways

Workers expecting to be recalled from temporary layoff are counted as unemployed, whether or not they have engaged in a specific job-seeking activity. In all other cases, the individual must have been engaged in at least one active job search activity in the four weeks preceding the interview and be available for work (except for temporary illness). The total unemployment figures cover more than the number of people who have lost jobs. They include people who have quit their jobs to look for other employment, workers whose temporary jobs have ended, individuals looking for their first job, and experienced workers looking for jobs after an absence from the labor force (for example, stay-at-home parents who return to the labor force after their children have entered school).⁽⁹⁾

27. Unemployment Rate

Two Main Labor Market Indicators: Calculating the Unemployment Rate and the Labor Force Participation Rate

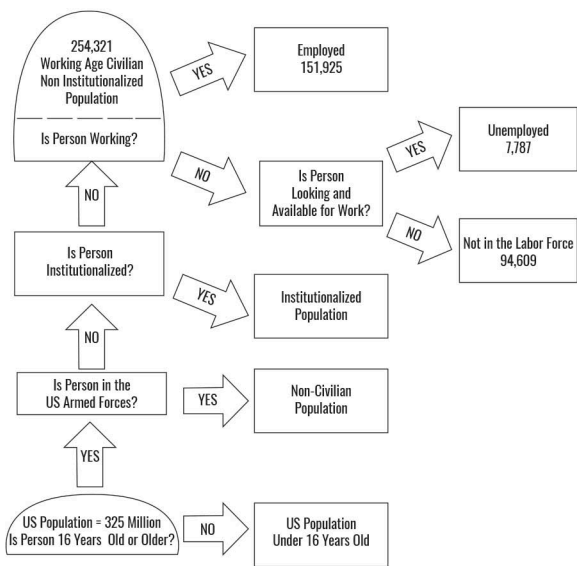


TABLE: Understanding Labor Market Categories in Thousands, Oct. 2016

Figure 4-2: Labor Market Categories in Thousands, October 2016 by FSCJ is licensed under CC-BY-4.0.

The labor force is defined as the sum of employed and unemployed persons:

$$\text{Labor Force} = \text{Employed} + \text{Unemployed}$$

Working-Age Civilian Noninstitutional Population is defined as follows: ⁽¹⁾

Working-Age Civilian Noninstitutional Population = Labor Force + Not in the Labor Force.

The unemployment rate is the percentage of the people in the labor force who are unemployed. It equals:

$$\frac{(\text{Number of people unemployed})}{(\text{Labor Force})} \times 100$$

The Unemployment Rate by FSCJ is licensed under CC-BY-4.0.

Let's practice using the numbers (in millions) from Figure 4.2 ⁽⁹⁾:

$$\text{Unemployment rate} = \{7.8 \div (151.9 + 7.8)\} \times 100 = 4.9\%$$

Those counted in the numerator are people who are unemployed, but at the same time are actively seeking employment. Only the fact that the individual may be without work does not qualify the person to be classified as unemployed.

The labor force participation rate is the percentage of working-age civilian noninstitutional population who are members of the labor force. It equals:

$$\frac{(\text{Labor Force})}{(\text{Working-age population})} \times 100$$

The Labor Force Participation Rate by FSCJ is licensed under CC-BY-4.0.

Let's practice using the numbers (in millions) from Figure 4.2.

$$\text{Labor force participation rate} = (159.7 \div 254.3) \times 100 = 62.8\%$$

Alternative Measures of Unemployment: People Not in the Labor Force and the Marginally

Attached Workers

Even with the “not in the labor force” category, there are still some people that are mislabeled in the categorization of employed, unemployed, or out of the labor force. There are some people who only have part-time or temporary jobs and who are looking for full-time and permanent employment that are counted as employed, though they are not employed in the way they would like or need to be. Additionally, there are individuals who are underemployed. This includes those who are trained or skilled for one type or level of work, but are working in a lower paying job or one that does not utilize their skills. For example, an individual with a college degree in finance who is working as a sales clerk would be considered underemployed. They are, however, also counted in the employed group. ⁽⁹⁾

In addition to the employed and the unemployed, there is a third group of people who are placed in a special category called not in the labor force, or out of the labor force. For example, a stay-at-home mother, or father, who last week was occupied with normal household activities, but neither held a job nor looked for a job is considered not in the labor force. Broadly speaking, those who are not in the labor force include retired persons, students, those taking care of children or other family members, and others who are neither working nor seeking work. ⁽⁹⁾

Since the mid-1990s, typically fewer than 1 in 10 people not in the labor force reported that they want a job. A series of questions is asked each month of persons not in the labor force to obtain information about their desire for work, the reasons why they had not looked for work in the last four weeks, their prior job search, and their availability for work. These questions form the basis for estimating the number of people who are not in the labor force, but who are marginally attached to the labor force. These are individuals without jobs who are not currently looking for work (and therefore are not counted as unemployed), but who nevertheless

have demonstrated some degree of labor force attachment. Specifically, to be counted as marginally attached to the labor force, they must indicate that they currently want a job, have looked for work in the last 12 months (or since they last worked if they worked within the last 12 months), and are available for work.

Discouraged workers are a subset of the marginally attached. Discouraged workers report they are not currently looking for work for one of the following types of reasons:

- They believe no job is available to them in their line of work or area;
- They had previously been unable to find work;
- They lack the necessary schooling, training, skills, or experience;
- Employers think they are too young or too old; or
- They face some other type of discrimination.⁽⁹⁾

Labor Market Categories: A Summary

The Current Population Survey excludes children and young teens under 16 years of age, people living in institutions (for example, a correctional institution or a residential nursing or mental health care facility), and those on active duty in the Armed Forces. Thus, if from total population we remove the above categories, we obtain working-age civilian population. The survey is designed so that each person age 16 and over (there is no upper age limit) is counted and classified in only one group.

Employed are:

- All those who did any work for pay or profit during the survey reference week.

- All those who did at least 15 hours of unpaid work in a business or farm operated by a family member with whom they live.
- All those who were temporarily absent from their regular jobs because of illness, vacation, bad weather, labor dispute, or various personal reasons, whether or not they were paid for the time off. ⁽¹¹⁾

Unemployed are:

- All those who did not have a job at all during the survey reference week, made at least one specific active effort to find a job during the prior four weeks, and were available for work (unless temporarily ill).
- All those who were not working and were waiting to be called back to a job from which they had been laid off. (They need not be looking for work to be classified as unemployed.) ⁽¹¹⁾

The Bureau of Labor Statistics defines a person as unemployed if he or she is not working, but is looking for and available for work. The labor force is the total number of people working or unemployed. The unemployment rate is the percentage of the labor force that is unemployed. The labor force participation rate is the percentage of the working-age population that is part of the labor force. ⁽¹³⁾

Table 1. Labor Market Indicators in Thousands 2014-2016

	Fourth Quarter 2014	Fourth Quarter 2016	October 2016
Labor Force	156,316	157,432	159,712
Labor Force Participation Rate (%)	62.8	62.5	62.8
Working-age Civilian Non-institutional Population	248,911	251,891	254,321
Employed	147,400	149,523	151,925
Unemployed	8,915	7,909	7,787
Unemployed rate (%)	5.7	5	4.9
Not in Labor Force	92,596	94,459	94,609

The following are some categories that represent underutilization of labor:

- A marginally attached worker is a person who does not have a job, is available and willing to work, has not made specific efforts to find a job within the previous four weeks, but has looked for work sometime in the recent past.
- A discouraged worker is a marginally attached worker who has not made specific attempts to find a job within the previous four weeks because previous unsuccessful attempts were discouraging.
- Full-time workers are those who usually work 35 hours or more a week.
- Part-time workers are those who usually work less than 35 hours a week.
- People who work part time for economic reasons (also known as *involuntary part-time workers*) are people who work 1 to 34 hours per week, but who are looking for full-time work and cannot find it because of unfavorable business conditions. These workers are not considered strictly unemployed, but are

certainly underemployed. ⁽⁹⁾

28. Labor Market Categories

Special Activity — Understanding Labor Market Categories

Some fictional examples of typical responses that may result in a person being classified as unemployed are:

- Yvonne reported that two weeks ago she applied for jobs at a bank and at a mortgage lending company. She currently is waiting to hear back from both businesses. Yvonne is unemployed because she made a specific effort to find a job within the prior four weeks and is presently available for work.
- Ms. Jenkins tells the interviewer that her teenage daughter, Katherine, was thinking about looking for work in the prior four weeks but knows of no specific efforts she has made. Katherine does not meet the activity test for unemployment and is, therefore, counted as not in the labor force.
- John has been checking for openings at a local warehouse store for each of the past three weeks, but last week he had the flu and was unavailable for work because of it. John is counted as unemployed because he took steps to look for work and would have been available for work during the survey reference week, except for his temporary illness.
- Marcus was laid off from the local plant of a major automaker when the firm began retooling to produce a new model car. Marcus knows he will be called back to work as soon as the model changeover is completed, and he also knows it is unlikely that he would be able to find a job for the period he is laid off. So, although he is available to work, he is not seeking a job. Marcus is unemployed because he is waiting to be recalled from layoff.

- Julia told the interviewer that she has submitted applications with three companies for summer jobs. However, it is only April and she doesn't wish to start work until at least June 15, because she is attending school. Although she has taken specific steps to find a job, Julia is classified as not in the labor force because she is not currently available for work. (She could not have started a job if one had been offered.) Students are treated the same as other persons; that is, they are classified as employed or unemployed if they meet the criteria, whether they are in school on a full- or part-time basis.
- James and Elyse are high school students. James works after school at a fast food restaurant, and Elyse is seeking a part-time job at the same establishment (also after school). James' job takes precedence over his non-labor force activity of going to school, as does Elyse's search for work; therefore, James is counted as employed and Elyse is counted as unemployed.
- Last week, Megan, who was working for a comic book store, went to a home electronics store on her lunch hour to be interviewed for a higher paying job. Megan's interview constitutes looking for work, but her work takes priority, and she is counted as employed. (Indeed, because the questionnaire does not ask about job search by the employed, information about Megan's search for work is not even obtained.)
- Mike has a job at a fabricated metal manufacturer, but he didn't go to work last week because of a strike at the plant. Last Thursday, he went to a machinery manufacturing company to see about getting a temporary job until the strike ends. Mike was with a job but not at work due to a labor dispute, which takes priority over looking for work; therefore, he is counted as employed. (Again, information would not be obtained on Mike's job search effort.)
- Avery lost her full-time job at a bookstore on Wednesday of the survey reference week. She submitted several applications with other local retailers on Thursday and Friday, but had not

obtained a new job by the end of the week. Avery is counted as employed, since she did work for three days in the reference week, even though she was unemployed for part of the week. Once again, information would not be obtained on her search for work, though Avery would be identified as working part time for economic reasons also called “involuntary part time,” by virtue of having her workweek reduced to part time—defined as less than 35 hours per week—by her dismissal from her previous job. ⁽⁹⁾

Labor Market Trends and Fluctuations

Unemployment Rate

Since 1929, the unemployment rate in the United States has averaged 7.2 percent. Since 1948, the average U.S. unemployment rate has been 5.8 percent, with much higher rates during the Great Depression and the 1973-1975, 1981-1982, and 2008-2009 recessions and lower rates during the expansions of the 1960s and 1990s. ⁽¹¹⁾⁽¹²⁾

The Labor Force Participation Rate

Since 1960, the labor force participation rate for men has decreased and for women has increased. In 2011 the labor force participation rate for men — about 70 percent — remains higher than that for women — about 60 percent. The overall labor force participation rate has increased from about 59 percent in 1960 to about 67 percent in 2009. It did drop below 64 percent by 2013, after the Great Recession. ⁽¹¹⁾⁽¹²⁾

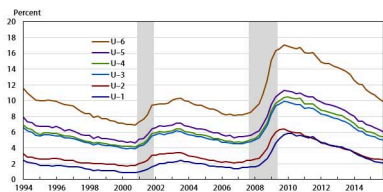
29. Alternative Measures of Unemployment

Alternative Measures of Unemployment

Because the unemployment rate does not include marginally attached workers and people who work part time for economic reasons, the BLS also provides three broader measurements of unemployment (or underemployment).

- U-1 Persons unemployed 15 weeks or longer, as a percent of the civilian labor force.
- U-2 Job losers and persons who completed temporary jobs, as a percent of the civilian labor force.
- U-3 Total unemployed, as a percent of the civilian labor force (the official unemployment rate).
- U-4 is U-3 plus discouraged workers.
- U-5 is U-4 plus other marginally attached workers.
- U-6 is U-5 plus employed part time for economic reasons.

The broader the measurement, the higher the rate at any given time period. However, these measurements tend to have similar fluctuations over the course of the business cycle. ⁽¹²⁾



Note: Shaded regions represent recessions as designated by the National Bureau of Economic Research. Turning points are quarterly. Measures of labor underutilization are as follows: U-1 = people unemployed 15 weeks or longer, as a percentage of the civilian labor force; U-2 = job losers and people who completed temporary jobs, as a percentage of the civilian labor force; U-3 = total unemployed, as a percentage of the civilian labor force (official unemployment rate); U-4 = total unemployed plus discouraged workers, as a percentage of the civilian labor force plus discouraged workers; U-5 = total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percentage of the civilian labor force plus all marginally attached workers; U-6 = total unemployed, plus all marginally attached workers, plus total employed part time for economic reasons, as a percentage of the civilian labor force plus all marginally attached workers.

Source: U.S. Bureau of Labor Statistics, Current Population Survey.

Figure 4-4: Measures of labor underutilization, quarterly averages, seasonally adjusted, 1994–2015 by The U.S. Bureau of Labor Statistics is licensed under Public Domain.

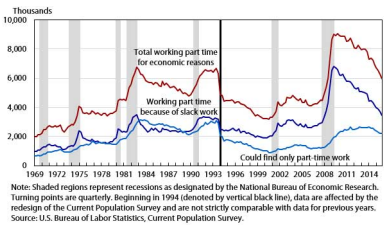


Figure 4-5: Number of people employed part time for economic reasons, quarterly averages, seasonally adjusted, 1969–2015 by The U.S. Bureau of Labor Statistics is licensed under Public Domain.

Since 1980, the number of people who are part-time workers for noneconomic reasons has remained roughly constant at about 13 to 14 percent of total employment and changes very little over the business cycle. The number of people who work part time for economic reasons (involuntary part-time workers), while consistently being much smaller than part time for noneconomic reasons, experiences large swings over the business cycle, increasing during recessions and decreasing during expansions. For recent data see U.S. Bureau of Labor Statistics ⁽¹²⁾

Seasonal Fluctuations in Labor Markets

Total employment and unemployment are higher in some parts of the year than in others. For example, unemployment is higher in January and February, when it is cold in many parts of the country and work in agriculture, construction, and other seasonal industries is curtailed. Also, both employment and unemployment rise every June, when students enter the labor force in search of summer jobs.

The seasonal fluctuations in the number of employed and unemployed people reflect not only the normal seasonal weather

patterns that tend to be repeated year after year, but also the hiring (and layoff) patterns that accompany regular events such as the winter holiday season and the summer vacation season. These variations make it difficult to tell whether month-to-month changes in employment and unemployment are due to normal seasonal patterns or to changing economic conditions. To deal with such problems, a statistical technique called seasonal adjustment is used. This technique uses the past history of the series to identify the seasonal movements and to calculate the size and direction of these movements.

A statistical procedure is then applied to the estimates to remove the effects of regular seasonal fluctuations on the data. Seasonal adjustment eliminates the influence of these fluctuations and makes it easier for users to observe fundamental changes in the level of the series, particularly changes associated with general economic expansions and contractions. Many of the monthly time series for major labor market indicators, especially those in the monthly Employment Situation report, are seasonally adjusted. More information about seasonal adjustment of CPS data is available in the CPS technical documentation.⁽¹⁴⁾

Types of Unemployment

Full employment does not mean that there is no unemployment. Full employment occurs when there is no cyclical unemployment or, equivalently, when all the unemployment is frictional and structural. The unemployment rate at full employment is called the natural unemployment rate. The term “natural” refers to the idea that some positive level of unemployment is the outcome in any dynamic economy. The underlying economic, social, and political factors that determine the natural rate of unemployment can change over time, which means that the natural rate of unemployment can change over time, too.⁽¹⁰⁾

In a market economy, some companies are always going broke for a variety of reasons:

- Old technology
- Poor management
- Good management that happened to make bad decisions
- Shifts in tastes of consumers so that less of the firm's product is desired
- A large customer who went broke
- Tough domestic or foreign competitors

Conversely, other companies will be doing very well for just the opposite reasons and looking to hire more employees. In a perfect world, all of those who lost jobs would immediately find new ones. But in the real world, even if the number of job seekers is equal to the number of job vacancies, it takes time to find out about new jobs, to interview and figure out if the new job is a good match, or perhaps to sell a house and buy another in proximity to a new job. ⁽¹⁰⁾

There are three types of unemployment:

1. Frictional Unemployment
 2. Structural Unemployment
 3. Cyclical Unemployment
-

Frictional unemployment is the unemployment that arises from normal labor turnover as people enter and leave the labor force, quit jobs to find better ones, and from the ongoing creation and destruction of jobs. These workers are searching for jobs and unemployment related to this search process is a permanent phenomenon in a dynamic, growing economy. Frictional unemployment increases when more people enter the labor market or when unemployment benefits increase.

Structural unemployment is the unemployment that arises when changes in technology or international competition change the skills needed to perform jobs or change the locations of jobs. Sometimes there is a mismatch between skills demanded by firms and skills provided by workers, especially when there are great technological changes in an industry. Structural unemployment generally lasts longer than frictional unemployment.

Cyclical unemployment is the fluctuating unemployment over the business cycle. Cyclical unemployment increases during a recession and decreases during an expansion.

The natural unemployment rate is related to two other important concepts: full employment and potential real GDP. The economy is considered to be at full employment when the actual unemployment rate is equal to the natural unemployment rate. When the economy is at full employment, real GDP is equal to potential real GDP. By contrast, when the economy is below full employment, the unemployment rate is greater than the natural unemployment rate and real GDP is less than potential. Finally, when the economy is above full employment, then the unemployment rate is less than the natural unemployment rate and real GDP is greater than potential. Operating above potential is only possible for a short while, since it is analogous to all workers working overtime.

The most important factors that influence the natural unemployment rate are:

- The Age Distribution of the Population: An economy with a young population has a large number of new job seekers and a high level of frictional unemployment.
 - The Pace of Structural Change: An increase in the pace of technological change and international competition will lead to a higher level of structural unemployment.
 - The Real Wage Rate: A real wage rate higher than
-

the equilibrium real wage rate (such as from minimum wage or efficiency wages) will create a surplus of labor and increases the natural unemployment rate.

- Unemployment Benefits: Unemployment benefits lower the opportunity cost of job search and can increase the natural unemployment rate.⁽¹⁰⁾
-

Unemployment and Real GDP

The quantity of real GDP at full employment is called potential GDP. Potential GDP is the value of real GDP when all the economy's factors of production — labor, capital, land, and entrepreneurial ability — are fully employed.

When the economy is at full employment, the unemployment rate equals the natural rate of unemployment (no cyclical unemployment) and real GDP equals potential GDP.

When the unemployment rate is less than the natural rate of unemployment (negative cyclical unemployment), real GDP is greater than potential GDP. And when the unemployment rate is greater than the natural rate of unemployment (positive cyclical unemployment), real GDP is less than potential GDP. Real GDP minus potential GDP expressed as a percentage of potential GDP is called the output gap.⁽¹⁰⁾

30. Key Terms

Cyclical Unemployment

Unemployment closely tied to the business cycle, like higher unemployment during a recession.

Discouraged Workers

Those who have stopped looking for employment due to the lack of suitable positions available.

Employed

Currently working for pay.

Frictional Unemployment

Unemployment that occurs as workers move between jobs.

Labor Force

The number of employed plus the unemployed.

Labor Force Participation Rate

This is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job.

Natural Rate of Unemployment

The unemployment rate that would exist in a growing and healthy economy from the combination of economic, social, and political factors that exist at a given time.

Not in the Labor Force

Those who are not working and not looking for work, whether they want employment or not; also termed “out of the labor force.”

Structural Unemployment

Unemployment that occurs because individuals lack skills valued by employers.

Underemployed

Individuals who are employed in a job that is below their skills.

Unemployed

Out of work and actively looking for a job.

Unemployment Rate

The percentage of adults who are in the labor force and thus seeking jobs, but who do not have jobs. ⁽¹⁾

PART VI

MODULE 5: MEASURING THE PRICE LEVEL AND INFLATION

31. Introduction

Module 5 – CPL, Inflation, and Money

Module Introduction

The rate of inflation, commonly measured as the change in the consumer price index (CPI), is the third major indicator of economic performance, which provides information about how prices have changed in an economy.

This module will explain what the Consumer Price Index (CPI) is and how it is calculated and used in the calculation of the inflation rate. We will take a look at the limitations of the CPI as a measure of the cost of living and examine alternative measures of the price level: the GDP price index, the Personal Consumption Expenditures (PCE) price index, and the PCE price index excluding food and energy. We will also discuss how to compare the value of money across time by using CPI and inflation rate to calculate real wage rates and real interest rates.

In addition, this module will focus on money, its functions, the Banking System, the Federal Reserve System (Fed) and the Fed's main policy tools. We will also discuss the relationship between money growth, inflation, and real GDP growth in the long run via the Quantity Theory of Money.⁽¹⁾

Learning Objectives

- Explain and calculate Consumer Price Index (CPI).

- Explain the limitations of the CPI and describe other measures of the price level.
- Adjust money values for inflation.
- Calculate real wage rates and real interest rates.
- Explain the functions of money.
- Describe the Fed's main policy tools.
- Explain the relationship between money growth, inflation, and real GDP growth. ⁽¹⁾

Reading

- Learning Unit

Website

- The Bureau of Labor Statistics U.S. Bureau of Labor

32. Consumer Price Index

Introduction

This module begins by demonstrating how to combine prices of individual goods and services to create an index of prices, called the Consumer Price Index (CPI), which we then will use to calculate the rate of inflation. Inflation has costs and consequences for people and firms throughout the economy through their roles as lenders and borrowers, wage-earners, taxpayers, and consumers. The module discusses some imperfections and biases regarding CPI and inflation statistics, how to convert dollar values across time so as to make comparisons possible, and historical inflation around the world.

Next, we focus on money, its functions, the Banking System, the Federal Reserve System (Fed) and the Fed's main policy tools. Last, we explain the relationship between money growth, inflation, and real GDP growth in the long-run via the Quantity Theory of Money.⁽¹⁾

Inflation is a general and ongoing rise in the level of prices in an entire economy. Inflation does not refer to a change in relative prices. A relative price change occurs when you see that the price of tuition has risen, but the price of laptops has fallen. Inflation, on the other hand, means that there is pressure for prices to rise in most markets in the economy. In addition, price increases in the supply-and-demand model were one-time events, representing a shift from a previous equilibrium to a new one. Inflation implies an ongoing rise in prices.

A price index can be used to compare the real value of money between time periods. Have you heard the reminiscing of your elderly relatives about how things were so much better when they were kids? Maybe some of your elders brag about the \$.05 Coca-

Cola they enjoyed or the \$.50 movies they went to when they were younger. When people often complain about the rising price of something, they are nearly always speaking of nominal prices, not real prices. So, in today's dollars, how much was that famous \$.05 Coca-Cola we've heard so much about?

If we use 1939 as the starting year, a \$.05 Coca-Cola would be the equivalent of paying \$.84 in 2013 — which for a 12oz can purchased from a grocery store, would be a bit on the high side (especially if considering the per unit price of purchasing in bulk). What about a \$.50 movie? A \$.50 movie in 1939 (the year *Gone with the Wind* was first released), would be \$8.40 in 2013 — which is about the same as the 2013 average ticket price. Recall the concept of opportunity cost. If the price of a particular good is rising at a slower rate than other prices of other goods, then the opportunity cost of acquiring that item has actually fallen. ⁽¹⁵⁾

Consumer Price Index

The **Consumer Price Index (CPI)** is a measure of the **average** of the **prices** paid by urban **consumers** for a **fixed market basket** of consumer goods and services. CPI is the most commonly cited measure of inflation in the United States. The CPI is calculated by government statisticians at the U.S. Bureau of Labor Statistics based on the prices in a fixed basket of goods and services that represents the purchases of the average family of four. ⁽¹⁶⁾

Reading the CPI Numbers from Newspaper Articles

- The CPI is defined to equal 100 for a period called the **reference base period**. The current reference base period

is 1982–1984, so the average CPI during that period was 100.

- In July 2011, the CPI was 225.4. Thus, since 1982–84, prices have increased by 125.4 percent to July 2011.
- In May 2013, the CPI was 232.9. Thus, since 1982–84, prices have increased by 132.9 percent to May 2013.
- To find the increase/decrease in CPI as a percentage change we use this formula: $(\text{CPI}_2 - \text{CPI}_1) \div \text{CPI}_1 \times 100$. This is the **inflation rate** formula, to be formally introduced in the next few sections.

Constructing the CPI

The U.S. Bureau of Labor Statistics (BLS) conducts a survey of consumers (the Consumer Expenditure Survey) to determine the average market basket of goods and services purchased by an urban household. Then, each month the BLS records the prices of goods and services in the market basket, keeping the representative items as similar as possible in consecutive months. The BLS uses the **fixed basket quantities** and the **recorded prices (which change)** to determine the cost of the basket each month.⁽¹⁵⁾

The Eight Major Categories in the Consumer Price Index

1. Food and beverages (breakfast cereal, milk, coffee, chicken, wine, full-service meals, and snacks)
2. Housing (renter's cost of housing, homeowner's cost of housing, fuel oil, bedroom furniture)
3. Apparel (men's shirts and sweaters, women's dresses, jewelry)
4. Transportation (new vehicles, airline fares, gasoline, motor vehicle insurance)
5. Medical care (prescription drugs and medical supplies, physicians' services, eyeglasses and eye care, hospital services)

6. Recreation (televisions, cable television, pets and pet products, sports equipment, admissions)
7. Education and communication (college tuition, postage, telephone services, computer software and accessories)
8. Other goods and services (tobacco and smoking products, haircuts and other personal services, funeral expenses) ⁽¹⁵⁾

Student's CPI Activity

Write down your own personal percentage expenditures for the list provided below. Try to make estimates of what percentage each item represents in terms of your annual income.

Fill in the blank lines with the average expenditures' percentage spending for each category in the CPI Market Basket.

Item	Percentage spending for each category in the CPI Market Basket (percent)
Housing	-----
Transportation	-----
Food and Beverages	-----
Medical Care	-----
Education and Communication	-----
Recreation	-----
Apparel	-----
Other goods and services	-----

The purpose of this activity was to demonstrate that although the CPI is a statistically sound measure of the average change in the cost of a bundle of goods, it does not measure each and every individual person's average change in cost. Indeed, there is at least one item on this list that has a markedly different weight of importance than the

figure that you assigned to it. That item is education. Many students who are working their way through college are probably also paying their own tuition. Therefore, it is likely that the percentage in this category for you is much higher than the BLS reported figure.

However, the CPI is an “average” measure, thus if we were to find the averages of those percentages even in a small group of students, like our class size, chances are that the class average will be closer in value to the BLS percentages, than any individual percentage in itself.

CPI is not necessarily a reflection of how all consumers experience inflation. How does your personal market basket compare to that of the average American household? How does it compare to your basket of goods? How might the market basket of a group near the opposite end of the age scale – senior citizens – compare to the student market basket and the average market basket used by the CPI? Given that college students and seniors may rely on more fixed incomes than most groups (financial aid and Social Security, respectively), why do these price trends pose more of a problem for these groups? Why might using CPI measurements for different groups (a student CPI, a senior CPI, etc.) instead of just the general CPI be useful for targeted income assistance programs like financial aid and Social Security? How does the fact that the CPI tends to overstate the actual rate of inflation complicate this analysis? ⁽¹⁾

33. Constructing the CPI

Constructing the CPI

The CPI for the month equals 100 multiplied by the ratio of the cost in the current month to the cost in the base period, or

$$\frac{\text{(Cost of CPI basket at current period prices)}}{\text{(Cost of CPI basket at base period prices)}} \times 100$$

The CPI for a month by FSCJ is licensed under CC-BY-4.0.

For example, suppose the initial survey shows that the CPI market basket is 2 books and 20 coffees. The initial base period prices and quantities are in the first table below. In this base period, say 2011, the cost of the CPI market basket is \$100.

Next, suppose that the BLS survey taken one month in 2012 reveals that the price of a book is \$35 and the price of a coffee is \$3. These 2012 prices and the initial base period quantities are shown in Table 1. In this period, the cost of the CPI basket is \$130.

Using these data, the CPI equals $(\$130 \div \$100) \times 100$, or 130%.

So, between the base period and the current period, the CPI has risen by 30 percent $(130\% - 100\%)$.⁽¹⁾

Table 1. Hypothetical CPI Calculations

Item	Quantity	Price	Cost (dollars)
Books	2	\$30	\$60
Coffee	20	\$2	\$40
Basket	1	\$100	\$100

Item	Quantity	Price	Cost (dollars)
Books	2	\$35	\$70
Coffee	20	\$3	\$60
Basket	1	\$130	\$130

34. Inflation

Measuring Inflation and Deflation

The **inflation rate** is the percentage change in the price level from one year to the next. In a formula:

$$\text{Inflating rate} = \left(\frac{\text{CPI in current year} - \text{CPI in previous year}}{\text{CPI in previous year}} \right) \times 100$$

The inflation rate by FSCJ is licensed under CC-BY-4.0.

Deflation is when the price level is falling and the inflation rate is **negative**.

Keep in mind that there is a difference between calculating the CPI and calculating the inflation rate. Don't confuse the two! To graphically notice the difference, CPI is generally an upward sloping curve, as prices, overall, tend to increase from year to year in any economy. However, the rate of growth of these price increases is not the same every year, which means the inflation rate graph shows several ups and downs.⁽¹⁾

Historical Inflation and Hyperinflation Around the World

In the last three decades, inflation has been relatively low in the U.S. economy, with the Consumer Price Index typically rising 2% to 4% per year. Looking back over the twentieth century, there have been several periods where inflation caused the price level to rise at double-digit rates, but nothing has come close to hyperinflation.

Figure 5.1 shows that the U.S. price level rose relatively little over the first half of the twentieth century, followed by more substantial increases in recent decades. Inflation during the twentieth century was highest just after World Wars I and II, and during the 1970s. Deflation occurred several times in the first half of the century and in 2009. For the most part, inflation rates in the U.S. since the 1990s have been in the low single digits.

The first two waves of inflation are easy to characterize in historical terms: they are right after World War I and World War II. However, there are also two periods of severe negative inflation — called **deflation** — in the early decades of the twentieth century: one following the deep recession of 1920–21 and the other during the Great Depression of the 1930s. Times of recession or depression often coincide with times when the inflation rate is lower, as in the recession of 1920–1921, the Great Depression, the recession of 1980–1982, and the Great Recession in 2008–2009.⁽¹⁵⁾

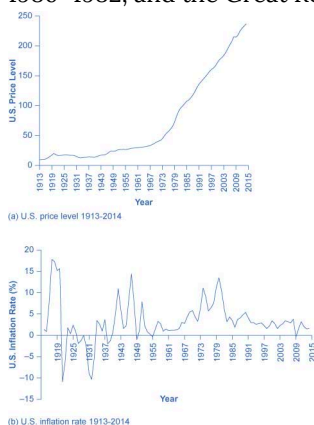


Figure 5-1: U.S. Price Level and Inflation Rates from 1913–2014 by Openstax is licensed under CC-BY-4.0.

Inflation around the World

Around the rest of the world, the pattern of inflation has been very

mixed, as can be seen in Figure 5.2, which shows inflation rates over the last several decades. Many industrialized countries, not just the United States, had relatively high inflation rates in the 1970s. For example, in 1975, Japan's inflation rate was over 8% and the inflation rate for the United Kingdom was almost 25%. In the 1980s, inflation rates came down in the United States, and in Europe, and have since then remained low.

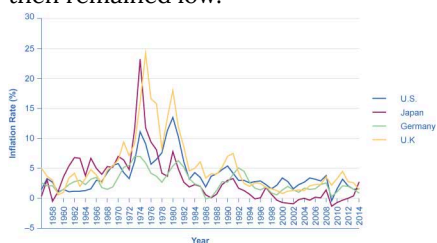


Figure 5-2: Countries with Relatively Low Inflation Rates, 1960–2014 by Openstax is licensed under CC-BY-4.0

Figure 5.2 shows the annual percentage change in consumer prices compared with the previous year's consumer prices in the United States, the United Kingdom, Japan, and Germany. Countries with controlled economies in the 1970s, like the Soviet Union and China, historically had very low rates of measured inflation—because prices were forbidden to rise by law, except for the cases where the government deemed a price increase to be due to quality improvements. However, these countries also had perpetual shortages of goods, since forbidding prices to rise acts like a price ceiling and creates a situation where quantity demand often exceeds quantity supplied.

As Russia and China made a transition toward more market-oriented economies, they also experienced high rates of inflation. Inflation in China averaged about 10% per year for much of the 1980s and early 1990s, although it has dropped off since then. Russia experienced hyperinflation of 2,500% per year in the early 1990s. The closest the United States has ever gotten to hyperinflation was during the Civil War, 1860–1865, in the Confederate states.

Many countries in Latin America experienced raging

hyperinflation during the 1980s and early 1990s, with inflation rates often well above 100% per year. In 1990, for example, both Brazil and Argentina saw inflation climb above 2000%. Certain countries in Africa experienced extremely high rates of inflation, sometimes bordering on hyperinflation, in the 1990s. Nigeria, the most populous country in Africa, had an inflation rate of 75% in 1995. ⁽¹⁵⁾

35. Inflation Pros and Cons

Economic Problems Associated with Inflation

Inflation can cause redistributions of purchasing power that hurt some and help others. People who are hurt by inflation include those who are holding a lot of cash, whether it is in a safe deposit box or in a cardboard box under the bed. When inflation happens, the buying power of cash is diminished. But cash is only an example of a more general problem: anyone who has financial assets invested in a way that the nominal return does not keep up with inflation will tend to suffer from inflation.

For example, if a person has money in a bank account that pays 4% interest, but inflation rises to 5%, then the real rate of return for the money invested in that bank account is negative 1%. The problem of a good-looking nominal interest rate being transformed into an ugly-looking real interest rate can be worsened by taxes. The U.S. income tax is charged on the nominal interest received in dollar terms, without an adjustment for inflation. So, a person who invests \$10,000 and receives a 5% nominal rate of interest is taxed on the \$500 received — no matter whether the inflation rate is 0%, 5%, or 10%. If inflation is 0%, then the real interest rate is 5% and all \$500 is a gain in buying power. But if inflation is 5%, then the real interest rate is zero and the person had no real gain — but owes income tax on the nominal gain anyway. If inflation is 10%, then the real interest rate is *negative* 5% and the person is actually falling behind in buying power, but would still owe taxes on the \$500 in nominal gains. Inflation can cause unintended redistributions for wage earners, too. Wages do typically creep up with inflation over time eventually. ⁽¹⁵⁾

U.S. Minimum Wage and Inflation

The average hourly wage in the U.S. economy increased from \$3.23 in 1970 to \$19.20 in 2012, which is an increase by a factor of almost six. Over that time period, the Consumer Price Index increased by an almost identical amount. However, increases in wages may lag behind inflation for a year or two, since wage adjustments are often somewhat sticky and occur only once or twice a year. Moreover, the extent to which wages keep up with inflation creates insecurity for workers and may involve painful, prolonged conflicts between employers and employees. If the minimum wage is adjusted for inflation only infrequently, minimum wage workers are losing purchasing power from their nominal wages, as shown in Figure 5.3.

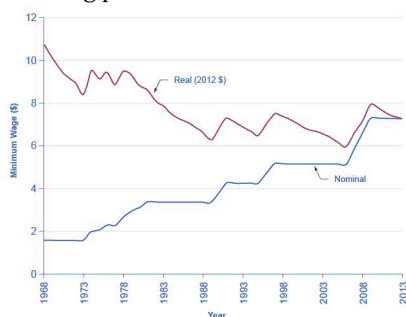


Figure 5-3: Real vs. Nominal Minimum Wage in the U.S. by Openstax is licensed under CC-BY-4.0.

After adjusting for inflation, the federal minimum wage dropped more than 30 percent from 1967 to 2010, even though the nominal figure climbed from \$1.40 to \$7.25 per hour. Increases in the minimum wage in between 2008 and 2010 kept the decline from being worse — as it would have been if the wage had remained the same as it did from 1997 through 2007. ⁽¹⁵⁾

Economic Problems Associated with Inflation

(Cont'd)

Retirees often receive a large share of their income in a form that does not increase over time. Most pensions have traditionally been set as a fixed nominal dollar amount per year at retirement. For this reason, pensions are called “defined benefits” plans. Even if inflation is low, the combination of inflation and a fixed income can create a substantial problem over time. A person who retires on a fixed income at age 65 will find that losing just 1% to 2% of buying power per year to inflation compounds to a considerable loss of buying power after a decade or two.

Fortunately, pensions and other defined benefits retirement plans are rare, and replaced instead by “defined contribution” plans, such as 401(k)s and 403(b)s. In these plans, the employer contributes a fixed amount to the worker’s retirement account on a regular basis (usually every pay check). To the extent that the investments made generate real rates of return, retirees do not suffer from the inflation costs of traditional pensioners.

However, ordinary people can sometimes benefit from the unintended redistributions of inflation. Consider someone who borrows \$10,000 to buy a car at a fixed interest rate of 9%. If inflation is 3% at the time the loan is made, then the loan must be repaid at a real interest rate of 6%. But if inflation rises to 9%, then the real interest rate on the loan is zero. In this case, the borrower’s benefit from inflation is the lender’s loss. A borrower paying a fixed interest rate, who benefits from inflation, is just the flip side of an investor receiving a fixed interest rate, who suffers from inflation.

The unintended redistributions of buying power caused by inflation may have a broader effect on society. When inflation causes a retiree who built up a pension or invested at a fixed interest rate to suffer, however, while someone who borrowed at a fixed interest rate benefits from inflation, it is hard to believe that this outcome was deserved in any way. Similarly, when homeowners benefit from inflation because the price of their homes rises, while

renters suffer because they are paying higher rent, it is hard to see any useful financial benefits. One of the reasons that inflation is so disliked by the general public is a sense that it makes economic rewards and penalties more arbitrary, and therefore likely to be perceived as unfair. ⁽¹⁵⁾

Benefits of Inflation

Although the economic effects of inflation are primarily negative, two counteracting points are worth noting.

First, the impact of inflation will differ considerably according to whether it is creeping up slowly at 0% to 2% per year, galloping along at 10% to 20% per year, or racing to the point of hyperinflation at, say, 40% per month. Hyperinflation can rip an economy and a society apart. An annual inflation rate of 2%, 3%, or 4%, however, is a long way from a national crisis. Low inflation is also better than deflation, which occurs with severe recessions.

Second, an argument is sometimes made that moderate inflation may help the economy by making wages in labor markets more flexible. This argument may, however, be controversial. A full analysis would have to take all the effects of inflation into account. It does, however, offer another reason to believe that, all things considered, very low rates of inflation may not be especially harmful. ⁽¹⁵⁾

36. Price Level Measures

The CPI and Other Price Level Measures

The CPI is a **cost of living index**, which is a measure of the change in the amount of money that people need to spend to achieve a given standard of living. However, the CPI is not a perfect measure of the cost of living because it does not try to measure all the changes in the cost of living and the components that are measured are not always measured accurately.

Sources of Bias in the CPI

In recent years, economists have paid considerable attention to the fact that the change in the total cost of buying a fixed basket of goods and services over time is conceptually not the same. This occurs because the change in the cost of living represents how much more it would cost for a person to provide an equal level of satisfaction.

CPI has four biases that lead it to **overstate** the inflation rate. The biases are:

- *New Goods Bias* : New goods are often more expensive than the goods they replace.
- *Quality Change Bias* : Sometimes price increases reflect quality improvements (safer cars, improved health care) and should not be counted as part of inflation.
- *Commodity Substitution Bias* : Consumers substitute away from goods and services with large relative price increases.
- *Outlet Substitution Bias* : When prices rise, people use discount

stores more frequently and convenience stores less frequently.

The Magnitude and Consequences of the Bias

- The Boskin Commission in 1996 estimated the bias overstates the inflation rate by about 1.1 percentage points a year.
- Many contracts and payments are indexed to the CPI. If the CPI is biased, then these contracts are distorted because they incorrectly account for inflation.
- Many government outlays, such as Social Security payments, are linked to the CPI. If the CPI is biased upward, then government outlays increase more than what is required to offset inflation. Taxes are also indexed to the CPI so that the incomes for which tax rates rise are adjusted to take account of inflation. The upward bias means that adjustments are biased upward so that the government collects less tax revenues.
- To reduce the bias, the BLS has decided to undertake consumer spending surveys more frequently.

Alternative Measures of the Price Level and Inflation Rate

- The **GDP price index** (also called the GDP deflator) is an average of the current prices of all the goods and services in GDP expressed as a percentage of base-year prices. The GDP price index includes prices of *all* the goods and services in GDP: consumption expenditure, investment, government expenditure, exports, and imports. The GDP price index is broader than the CPI, but is **not perfect** because it still suffers from the CPI's biases since the CPI is used to help construct

real GDP. It also suffers from the fact that it accounts only for *domestically* produced goods and services, while CPI takes into account the consumption of all goods consumed by the typical urban consumer, including the ones that were not produced domestically.

- The **PCE price index** is an average of the current prices of the goods and services in the consumption expenditure part of GDP expressed as a percentage of base-year prices.
- The percentage change in the PCE price index, excluding food and energy, measures the **core inflation rate**. Food and energy prices fluctuate much more than other prices and their changes can obscure the underlying trends in prices.
- Over time, the CPI and PCE indices move up and down in similar ways, but the previously discussed biases cause the CPI to rise slightly more rapidly than the PCE indices. ⁽¹⁵⁾

A Brief Discussion

Some people, including the media, often don't understand why core inflation is a useful measurement. They might assume that it is a way for the government or economists to "trick" people into thinking inflation is not as high by removing food and energy prices, which obviously do play a role in people's expenditures.

Economists, on the other hand, believe that it is important to identify that food and energy prices can be extremely volatile, especially as a function of weather and global politics. Not only does this volatility complicate the analysis of other price changes, but from a *policy perspective* core inflation measurements may serve as a better guide than overall inflation.

Food and energy price changes that are the result of changes in weather and global politics are largely outside of the influence of policies. Therefore, it may make sense to ignore food and energy price changes and focus on core inflation when designing policies,

since it's that underlying inflation that may be a reflection of the functioning of the economy and economic policies, as opposed to external factors which cannot be controlled. This is why policymakers (especially the Federal Reserve) tend to focus more on core inflation when designing policies. ⁽¹⁵⁾

37. Nominal and Real Values

Nominal and Real Values

Dollars and Cents at Different Dates

To compare dollar amounts at different dates, we need to know the CPI on those dates. To convert the price of a good in past dollars (Year 2) to its price in current dollars (Year 1), use the following formula:

Value in Year 1 dollars = $\{(CPI \text{ in Year 1}) \div (CPI \text{ in Year 2})\} \times \text{Value in Year 2 dollars}$

Notice that in the above formula, Year 2 does not necessarily have to be greater than Year 1. Thus, the formula works for any two years.⁽¹⁷⁾

Nominal and Real Values in Macroeconomics

The difference between nominal and real variables is important in macroeconomics. In macroeconomics, we generally use the GDP deflator rather than the CPI as our measure of the price level because we are dealing with economy totals, of which consumer spending is just one part.

The calculation of the real wage is similar to the calculation of real GDP, only using a different set of variables.⁽¹⁷⁾

Real wage = $(\text{Nominal wage}) \div (\text{CPI})$

Real GDP = $(\text{nominal GDP}) \div (\text{GDP deflator})$

Nominal GDP and Real GDP

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP price index}} \times 100$$

Real GDP by FSCJ is licensed under CC-BY-4.0.

Nominal Wage Rate and Real Wage Rate

The **nominal wage rate** is the average hourly wage rate measured in *current* dollars and the **real wage rate** is the average hourly wage rate measured in dollars of a given reference base year.

$$\text{Real wage rate} = \frac{\text{Nominal wage rate}}{\text{CPI}} \times 100$$

Real wage rate by FSCJ is licensed under CC-BY-4.0.

The real wage rate is the quantity of goods and services that an hour's work can buy.

Between 1981 and 2011, the nominal wage rate more than doubled, but the real wage rate stayed roughly constant because the increase in the nominal wage rate just kept up with inflation. ⁽¹⁷⁾

Nominal Interest Rate and Real Interest Rate

The **nominal interest rate** is the percentage return on a loan calculated by using dollars. The **real interest rate** is the percentage return on a loan calculated by using purchasing power; it's the nominal interest rate adjusted for the effects of inflation.

Real interest rate = Nominal interest rate – Inflation rate

The calculation of the real interest rate also “deflates” the nominal interest rate. However, because the numbers are already percentages, we must subtract the percentage change in prices (the inflation rate) rather than divide by the price level. When the inflation rate was high, during the 1970s and early 1980s, the gap between the real interest rate and the nominal interest rate was large. The real interest rate was negative in the mid-to-late 1970s and very high in the early 1980s, but has shown no real upward or downward trend since 1971.⁽¹⁷⁾

38. Money and Banking

What is Money?

Money is any commodity or token that is generally acceptable as a means of payment. A **means of payment** is a method of settling a debt.

Money has three functions:

1. *Medium of exchange* : A **medium of exchange** is any object that is generally accepted in exchange for goods and services. Money acts as a medium of exchange. As a result, money eliminates the need for **barter** , which is the exchange of goods and services directly for other goods and services, which requires a **double coincidence of wants** (a situation in which two people each want some good or service that the other person can provide).
2. *Unit of account* : Money serves as a **unit of account** , which is an agreed-upon measure for stating the prices of goods and services
3. *Store of value* : Money serves as a **store of value** , which is any commodity or token that can be held and exchanged later for goods and services. ⁽¹⁸⁾

Money Today

Fiat money refers to objects that are money because the law

decrees or orders them to be money. Today's fiat money consists of **currency** (the bills and coins that we use in the United States today) and **deposits** at banks and other depository institutions. Deposits are money because they can be converted into currency and because they are used to settle debts.

- Currency in a bank is *not* counted as money; only currency held by individuals and businesses in any form is counted money.
- Credit cards are not money — they are IDs that allow an instant loan.
- Checks, e-checks, and debit cards are not money — they are instructions to a bank to transfer money from one person to another.
- E-cash operates similarly to paper notes and coins, but doesn't yet meet the definition of money. However, as it becomes more widely accepted it will likely gradually replace physical forms of currency. ⁽¹⁸⁾

Read questions carefully and write down your answer.

Question 1: Cigarettes are used as money in prison. Are cigarettes in prison commodity money or fiat money?

Answer: _____

Question 2: What about the tickets won playing games at Chuck-E-Cheese? Inside Chuck-E-Cheese, are those tickets commodity money or fiat money? What about outside of Chuck-E-Cheese?

Answer: _____

Official Measures of Money: M₁ and M₂

M₁ consists of **currency** held by individuals and businesses and **traveler's checks**, plus checkable deposits owned by individuals and businesses.

A broader definition of money, **M2** includes everything in **M1** but also adds other types of deposits. For example, M2 includes **savings deposits** in banks, which are bank accounts on which you cannot write a check directly, but from which you can easily withdraw the money at an automatic teller machine or bank. Many banks and other financial institutions also offer a chance to invest in **money market funds**, where the deposits of many individual investors are pooled together and invested in a safe way, such as short-term government bonds. Another ingredient of M2 are the relatively small (that is, less than about \$100,000) certificates of deposit (CDs) or **time deposits**, which are accounts that the depositor has committed to leaving in the bank for a certain period of time, ranging from a few months to a few years, in exchange for a higher interest rate.

In short, all these types of M2 are money that you can withdraw and spend, but which require a greater effort to do so than the items in M1. ⁽¹⁸⁾

The Banking System

The **banking system** consists of the **Federal Reserve (Fed)** and the banks and other institutions that accept deposits. There are three types of depository institutions whose deposits are money: commercial banks, thrift institutions, and money market mutual funds.

Commercial Banks

A **commercial bank** is a firm that is chartered by the Comptroller of the Currency or by a state agency to receive deposits and make

loans. The number of commercial banks in the U.S. has shrunk dramatically in the past decade due to mergers and failures.

- A commercial bank accepts checkable deposits, savings deposits, and time deposits.
- A commercial bank tries to maximize their stockholders' wealth by lending for long terms at high interest rates and borrowing from depositors and others. Banks must be careful to balance security for depositors and stockholders against high but risky returns from loans. To tradeoff between risk and profit, a bank divides its assets into:
 - *Reserves* . A bank's **reserves** are its currency in its vault plus the balance on its reserve account at a Federal Reserve Bank. The **required reserve ratio** is the ratio of reserves to deposits that banks are required, by regulation, to hold.
 - *Liquid Assets* . Liquid assets are short-term Treasury Bills and overnight loans to other banks — these assets have **low interest rates** and **low risk** .
 - The **federal funds rate** is the interest rate on interbank loans and is the **central target for monetary policy** .
 - *Securities and loans* . Banks buy securities issued by the U.S. government and large businesses. Some securities have low interest rates and low risk, while others have high interest rates and high risk. Banks also make loans to businesses and individuals. Loans tend to have higher interest rates and high risk and cannot be recalled until the agreed date.⁽¹⁸⁾

Thrift Institutions

Thrift institutions are savings and loan associations, savings banks, and credit unions. A *savings and loan association* (S&L) is a financial

institution that receives checking deposits and savings deposits and that makes personal, commercial, and home-purchase loans. A *savings bank* is a financial institution that accepts saving deposits and makes mostly mortgage loans. A *credit union* is a financial institution owned by a social or economic group such as a firm's employees that accepts savings deposits and makes mostly consumer loans.⁽¹⁸⁾

Money Market Funds

A money market fund is a fund operated by a financial institution that sells shares in the fund and holds liquid assets such as U.S. Treasury bills or short-term commercial debt. Shareholders can write checks of large amounts (for instance, a \$500 minimum) on a money market fund account.⁽¹⁸⁾

The Federal Reserve System

The central bank of the United States is the **Federal Reserve System**. A **central bank** is a public authority that provides banking services to banks and regulates financial institutions and markets.

The Structure of the Federal Reserve

- The Board of Governors has seven members who are appointed by the President and confirmed by the Senate to 14-year nonrenewable terms. One of the members is appointed by the President to act as the Chairman (a 4-year renewable position).

- There are 12 regional Federal Reserve banks.
- **The Federal Open Market Committee (FOMC)** is the Fed's main policy-making committee that meets approximately every 6 weeks. It is comprised of the members of the Board of Governors and the Presidents of the regional Federal Reserve Banks. The Board of Governors, the President of the Federal Reserve Bank of New York, and, on a rotating basis, the presidents of four other regional Federal Reserve Banks, vote on monetary policy. In practice, the chairman has the largest influence on policy. The chairman is the Fed's chief executive, public face, and center of power and responsibility. ⁽¹⁹⁾

The Fed's Policy Tools

- **Required reserve ratios** : The minimum percentage of deposits that depository institutions must hold as reserves are the required reserve ratios. The Fed sets the required reserve ratios.
- **Discount rate** : The discount rate is the interest rate at which the Fed stands ready to lend reserves to depository institutions.
- **Open market operation** : An open market operation is the purchase or sale of government securities by the Federal Reserve System in the open market. The Fed does not directly purchase bonds from the federal government because it would appear that the government was printing money to finance its expenditures.
- **Extraordinary crisis measures** : In response to the 2008 financial crisis, the Fed created new policy tools that can be grouped into three broad categories:
 - **Quantitative easing** : when the Fed creates bank reserves by a large scale open market operation at a **low or possibly zero interest rate** in the federal funds market.

- **Credit easing** : when the Fed buys private securities or makes loans to financial institutions to stimulate their lending.
- **Operation Twist** : when the Fed sells short-term securities and buys long-term securities in an attempt to lower long-term interest rates and stimulate long-term borrowing and investment. ⁽¹⁹⁾

How the Fed's Policy Tools Work

- The **monetary base** is the sum of coins, Federal Reserve notes, and banks' reserves at the Fed. It is by changing the monetary base that the Fed can change the quantity of money in the economy.
- By increasing the required reserve ratio, the Fed forces banks to hold more reserves, which are part of the monetary base. This action decreases the quantity of money.
- By raising the discount rate, the Fed discourages banks from borrowing reserves, which decreases the quantity of money.
- By selling securities in the open market, the Fed decreases the monetary base, which decreases the quantity of money. ⁽¹⁹⁾

Quantity Theory of Money

The **quantity theory of money** is the proposition that when real GDP equals potential GDP, an increase in the quantity of money brings an equal percentage increase in the price level.

The **velocity of circulation** is the number of times in a year that the average dollar of money gets used to buy final goods and services. Nominal GDP equals real GDP(Y), multiplied by the price

level (P), or $GDP = P \cdot Y$. So, the velocity of circulation (V) is given by ⁽¹⁹⁾:

$$V = (P \times Y) \div M$$

The **equation of exchange** states that the quantity of money (M), multiplied by the velocity of circulation (V), equals the price level multiplied by real GDP:

$$M \times V = P \times Y$$

The equation of exchange is a definition and so is always true. It becomes the quantity theory of money by adding two facts:

- Real GDP equals potential GDP at full employment, and potential GDP is determined by only real factors and not the quantity of money.
- The velocity of circulation does not change when the quantity of money changes.

Rearrange the equation of exchange as:

$$P = (M \times V) \div Y = M \times (V \div Y)$$

According to the quantity theory, velocity and potential GDP are not influenced by the quantity of money. So, an x percent change in M results in the same x percent change in P ⁽¹⁹⁾.

Inflation and the Quantity Theory of Money

In rates of growth, the equilibrium of exchange is:

$$(\text{Money growth}) + (\text{Velocity growth}) = (\text{Inflation rate}) + (\text{Real GDP growth})$$

The previous equation can be rearranged as:

$$\text{Inflation rate} = \text{Money growth} + \text{Velocity growth} - \text{Real GDP growth}$$

This formula concludes that, in the long run, the percentage increase in the price level, which is the inflation rate, equals the percentage increase in the quantity of money, plus the percentage

increase in velocity, minus the percentage increase in real GDP. If the growth rates of velocity and real GDP do not change when the money growth rate changes, then changes in the money growth rate lead to equal changes in the inflation rate.⁽¹⁹⁾

39. Key Terms

Key Terms

Please review the following key terms. ⁽¹⁵⁾⁽¹⁷⁾⁽¹⁸⁾⁽¹⁹⁾

Barter — literally, trading one good or service for another, without using money.

Base year — arbitrary year whose value as an index number is defined as 100; inflation from the base year to other years can easily be seen by comparing the index number in the other year to the index number in the base year — for example, 100; so, if the index number for a year is 105, then there has been exactly 5% inflation between that year and the base year.

Basket of goods and services — a hypothetical group of different items, with specified quantities of each one meant to represent a “typical” set of consumer purchases, used as a basis for calculating how the price level changes over time.

Commodity money — an item that is used as money, but which also has value from its use as something other than money.

Consumer Price Index (CPI) — a measure of inflation calculated by U.S. government statisticians based on the price level from a fixed basket of goods and services that represents the purchases of the average consumer.

Core inflation index — a measure of inflation typically calculated by taking the CPI that excludes volatile economic variables such as food and energy prices to better measure the underlying and persistent trend in long-term prices.

Double coincidence of wants — a situation in which two people each want some good or service that the other person can provide.

Deflation — negative inflation; most prices in the economy are falling.

Fiat money — has no intrinsic value, but is declared by a government to be the legal tender of a country.

Financial intermediary — an institution that operates between a saver with financial assets to invest and an entity who will borrow those assets and pay a rate of return.

Liability — any amount or debt owed by a firm or an individual.

M1 money supply — a narrow definition of the money supply that includes currency and checking accounts in banks, and to a lesser degree, traveler's checks.

M2 money supply — a definition of the money supply that includes everything in M1, but also adds savings deposits, money market funds, and certificates of deposit.

Medium of exchange — whatever is widely accepted as a method of payment.

GDP deflator — a measure of inflation based on the prices of all the components of GDP.

Hyperinflation — an outburst of high inflation that is often seen (although not exclusively) when economies shift from a controlled economy to a market-oriented economy.

Inflation — a general and ongoing rise in the level of prices in an economy.

Money — whatever serves society in four functions: as a medium of exchange, a store of value, a unit of account, and a standard of deferred payment.

Producer Price Index (PPI) — a measure of inflation based on prices paid for supplies and inputs by producers of goods and services.

Quality/new goods bias — inflation calculated using a fixed basket of goods over time tends to overstate the true rise in cost of living because it does not take into account improvements in the quality of existing goods or the invention of new goods.

Quantity equation of money — $\text{money supply} \times \text{velocity} = \text{nominal GDP}$

Reserves — funds that a bank keeps on hand and that are not loaned out or invested in bonds.

Substitution bias — an inflation rate calculated using a fixed basket of goods over time tends to overstate the true rise in the cost of living because it does not take into account that the person can substitute away from goods whose prices rise by a lot.

Store of value — something that serves as a way of preserving economic value that can be spent or consumed in the future.

Unit of account — the common way in which market values are measured in an economy.

Velocity — the speed with which money circulates through the economy; calculated as the nominal GDP divided by the money supply.

PART VII

MODULE 6: AGGREGATE
DEMAND, AGGREGATE
SUPPLY, AND FISCAL
POLICY

40. Introduction

Module 6: Aggregate Demand, Aggregate Supply, and Fiscal Policy

Module Introduction

This module discussed the AS-AD model and explains the influences on both aggregate supply and aggregate demand. We use aggregate demand and aggregate supply to explain how fluctuations in aggregate demand and/or aggregate supply create the business cycle and inflation cycle, or why economies expand and contract over time. This module also relates the model of aggregate supply and aggregate demand to the three goals of economic policy (growth, unemployment, and inflation), and provides a framework for thinking about many of the connections and tradeoffs between these goals.

This module will also describe the federal budget process and the recent history of revenues, outlays, deficits and debts. Next, using the AS-AD model, we explain the effects of fiscal policy on employment and real GDP. The limitations of fiscal policy are also discussed. ⁽¹⁾

Learning Objectives

- Define and explain the influences on aggregate supply.
- Define and explain the influences on aggregate demand.
- Explain how trends and fluctuations in aggregate demand and

aggregate supply bring economic growth, inflation, and the business cycle.

- Describe the federal budget process and the recent history of tax revenues, outlays, deficits, and debts.
- Discuss how fiscal stimulus is used to fight a recession. ⁽¹⁾

Reading

- Learning Unit

41. Overview

Overview

A key part of macroeconomics is the use of models to analyze macro issues and problems. How is the rate of economic growth connected to changes in the unemployment rate? Is there a reason why unemployment and inflation seem to move in opposite directions: lower unemployment and higher inflation from 1997 to 2000, higher unemployment and lower inflation in the early 2000s, lower unemployment and higher inflation in the mid-2000s, and then higher unemployment and lower inflation in 2009? Why did the current account deficit rise so high, but then decline in 2009?

To analyze questions like these, we must move beyond discussing macroeconomic issues one at a time, and begin building economic models that will capture the relationships and interconnections between them. This module introduces the macroeconomic model of aggregate supply and aggregate demand, how the two interact to reach a macroeconomic equilibrium, and how shifts in aggregate demand or aggregate supply will affect that equilibrium. The purpose of the AD/AS model is to explain how the price level and real GDP are determined. Real GDP depends on labor, capital, technology, land, and entrepreneurial talent. In the short run, only the quantity of labor can vary, so fluctuations in employment lead to changes in real GDP. When the quantity of labor demanded equals the quantity of labor supplied, there is full employment in the labor market and real GDP equals potential GDP. ⁽²⁰⁾

This module also relates the model of aggregate supply and aggregate demand to the three goals of economic policy (growth, unemployment, and inflation), and provides a framework for thinking about many of the connections and tradeoffs between these goals. Next, this module briefly describes the federal budget

process and the recent history of revenues, outlays, deficits and debts. Then, using the AD/AS model, this module explains the effects of fiscal policy on the price level, employment and real GDP. The limitations of fiscal policy are also discussed. ⁽¹⁾

42. Say's Law and Keynes' Law

Say's Law and the Macroeconomics of Supply

Those economists who emphasize the role of supply in the macro economy often refer to the work of a famous French economist of the early nineteenth century named Jean-Baptiste Say (1767–1832). Say's law is: "Supply creates its own demand." The intuition behind Say's law is that each time a good or service is produced and sold, it generates income that is earned for someone: a worker, a manager, an owner, or those who are workers, managers, and owners at firms that supply inputs along the chain of production. The forces of supply and demand in individual markets will cause prices to rise and fall. The bottom line remains, however, that every sale represents income to someone, and so, Say's law argues, a given value of supply must create an equivalent value of demand somewhere else in the economy. Because Jean-Baptiste Say, Adam Smith, and other economists writing around the turn of the nineteenth century who discussed this view were known as "classical" economists, modern economists who generally subscribe to the Say's law view on the importance of supply for determining the size of the macro economy are called neoclassical economists.

If supply always creates exactly enough demand at the macroeconomic level, then it is hard to understand why periods of recession and high unemployment should ever occur. To be sure, even if total supply always creates an equal amount of total demand, the economy could still experience a situation of some firms earning profits while other firms suffer losses. Nevertheless, a recession is not a situation where all business failures are exactly counterbalanced by an offsetting number of successes. A recession is a situation in which the economy as a whole is shrinking in

size, business failures outnumber the remaining success stories, and many firms end up suffering losses and laying off workers.

Say's law that supply creates its own demand does seem a good approximation for the long run. Over periods of some years or decades, as the productive power of an economy to supply goods and services increases, total demand in the economy grows at roughly the same pace. However, over shorter time horizons of a few months or even years, recessions, or even depressions, occur in which firms, as a group, seem to face a lack of demand for their products.⁽²⁰⁾

Keynes' Law and the Macroeconomics of Demand

The alternative to Say's law, with its emphasis on supply, can be named Keynes' law: "Demand creates its own supply." When Keynes wrote his great work *THE GENERAL THEORY OF EMPLOYMENT, INTEREST, AND MONEY* during the Great Depression of the 1930s, he pointed out that during the Depression, the capacity of the economy to supply goods and services had not changed much. U.S. unemployment rates soared higher than 20% from 1933 to 1935, but the number of possible workers had not increased or decreased much. Factories were closed and shuttered, but machinery and equipment had not disappeared. Technologies that had been invented in the 1920s were not un-invented and forgotten in the 1930s.

Thus, Keynes argued that the Great Depression — and many ordinary recessions as well — were not caused by a drop in the ability of the economy to supply goods as measured by labor, physical capital, or technology. He argued the economy often produced less than its full potential, not because it was technically impossible to produce more with the existing workers and machines, but because a lack of demand in the economy as a whole led to inadequate incentives for firms to produce. In such cases,

he argued, the level of GDP in the economy was not primarily determined by the potential of what the economy could supply, but rather by the amount of total demand.

Keynes' law seems to apply fairly well in the short run of a few months to a few years, when many firms experience either a drop in demand for their output during a recession or so much demand that they have trouble producing enough during an economic boom. However, demand cannot tell the whole macroeconomic story either. After all, if demand was all that mattered at the macroeconomic level, then the government could make the economy as large as it wanted just by pumping up total demand through a large increase in the government spending component or by legislating large tax cuts to push up the consumption component. Economies do, however, face genuine limits to how much they can produce, limits determined by the quantity of labor, physical capital, technology, and the institutional and market structures that bring these factors of production together. These constraints on what an economy can supply at the macroeconomic level do not disappear just because of an increase in demand. ⁽²⁰⁾

Combining Supply and Demand in Macroeconomics

Two insights emerge from the overview of Say's law, with its emphasis on macroeconomic supply, and Keynes' law, with its emphasis on macroeconomic demand. The first conclusion is that an economic approach focused only on the supply side or only on the demand side can be only a partial success. Both supply and demand need to be taken into account. The second conclusion is that since Keynes' law applies more accurately in the short run and Say's law applies more accurately in the long run, the tradeoffs and connections between the three goals of macroeconomics may be different in the short run and the long run. ⁽²⁰⁾

43. Aggregate Supply and Demand

Building the Model: Aggregate Supply

The aggregate supply is the relationship between the quantity of real GDP supplied and the price level when all other influences on production plans (the money wage rate, the prices of other resources, and potential GDP) remain constant. The AS curve, as shown in Figure 6.1, is upward-sloping. This slope reflects that a higher price level, combined with a fixed money wage rate, lowers the real wage rate, thereby increasing the quantity of labor employed and, hence, increasing real GDP. The potential GDP line is vertical because it is moving along at both the price level rate and money wage rate, and money prices of other resources change by the same percentage. ⁽²⁰⁾

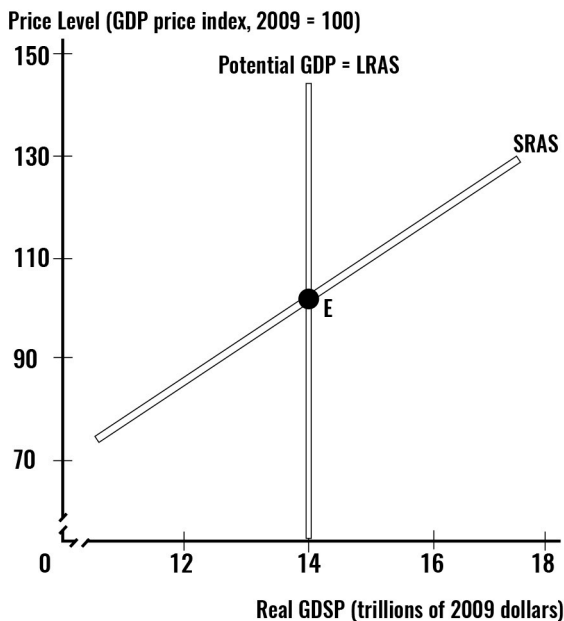


Figure 6-1: Aggregate Supply in the Short-Run and Long-Run by FSCJ is licensed under CC-BY-4.0.

Why does the AS Curve Slope Upward?

When the price level rises and the money wage rate is constant, the real wage rate falls and employment increases. The quantity of real GDP supplied increases. When the price level falls and the money wage rate is constant, the real wage rate rises and employment decreases. The quantity of real GDP supplied decreases. When the price level changes and the money wage rate and other resource prices remain constant, real GDP departs from potential GDP and there is a movement along the AS curve. ⁽²⁰⁾

What Shifts the Aggregate Supply?

Aggregate supply changes when any influence on production plans, other than the price level, changes. In particular, aggregate supply changes when:

- Potential GDP changes
- The money wage rate changes
- The money prices of other resources change

When potential GDP increases, aggregate supply increases and the AS curve shifts rightward. The potential GDP line also shifts rightward. Short-run aggregate supply changes and the AS curve shifts when there is a change in the money wage rate or other resource prices. A rise in the money wage rate or other resource prices decreases short-run aggregate supply and shifts the AS curve leftward. In this case, the potential GDP line does *not* shift. ⁽²⁰⁾

Building the Model: Aggregate Demand

Aggregate Demand

The quantity of real GDP demanded is the sum of consumption expenditure (C), investment (I), government expenditures (G), and net exports ($X - M$), or:

$$Y = C + I + G + (X - M)$$

X = Exports and M = Imports

The relationship between the quantity of real GDP demanded and the price level is called **aggregate demand**. Other things remaining the same, the higher the price level, the smaller is the quantity of real GDP demanded. In Figure 6.2, the AD curve is downward

sloping. Moving along the aggregate demand curve, the only thing that changes is the price level. ⁽²⁰⁾

Why does the AD Curve Slope Downward?

There are three reasons for the negative relationship between the price level and the quantity of real GDP demanded:

- **The buying power of money** : When the price level rises, the buying of money decreases and so people decrease consumption expenditure.
- **The real interest rate** : When the price level rises, the demand for money increases, which raises the nominal interest rate. Because the inflation rate does not immediately change, the real interest rate also rises so that people decrease their consumption expenditure and firms decrease their investment.
- **The real price of exports and imports** : When the price level rises, domestic goods become more expensive relative to foreign goods, so people decrease the quantity of domestic goods demanded. ⁽²⁰⁾

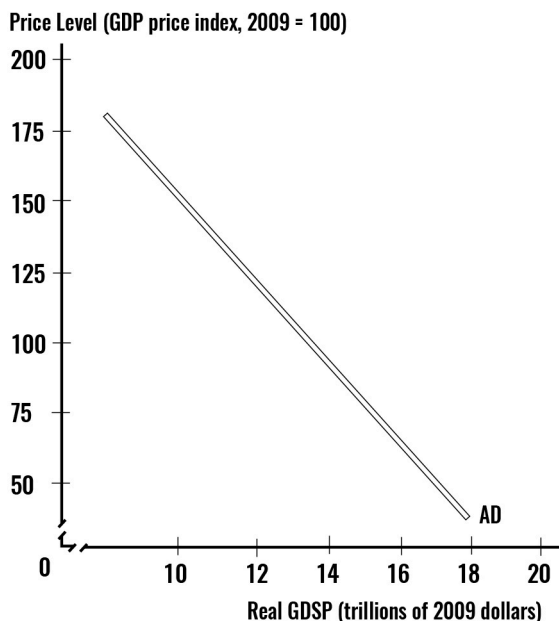


Figure 6-2: Aggregate Demand in the Short-Run by FSCJ is licensed under CC-BY-4.0.

What Shifts the Aggregate Demand?

Any factor that influences expenditure plans, other than the price level, changes aggregate demand and shifts the aggregate demand curve. Factors that change aggregate demand are:

- **Expectations** : Expectations of higher future income, expectations of higher future inflation, and expectations of higher future profits increase aggregate demand and shift the AD curve rightward.
- **Fiscal policy and monetary policy** : The government influences the economy by setting and changing taxes, making

transfer payments, and purchasing goods and services, which is called fiscal policy. Tax cuts, increased transfer payments, or increased government purchases increase aggregate demand. Monetary policy consists of changes in interest rates and in the quantity of money in the economy. An increase in the quantity of money and lower interest rates increase aggregate demand.

- **The world economy** : Exchange rates and foreign income affect net exports ($X - M$) and, therefore, aggregate demand. A decrease in the exchange rate or an increase in foreign income increases aggregate demand. ⁽²⁰⁾

44. Macroeconomic Equilibrium

Macroeconomic Equilibrium

Macroeconomic equilibrium occurs when the quantity of real GDP demanded equals the quantity of real GDP supplied at the point of intersection of the AD curve and the AS curve. If the quantity of real GDP supplied exceeds the quantity demanded, inventories pile up so that firms will cut production and prices. If the quantity of real demand exceeds the quantity supplied, inventories are depleted so that firms will increase production and prices.

Three Types of Macroeconomic Equilibrium: The Recessionary Gap

A **full employment equilibrium** occurs when equilibrium real GDP equals potential GDP. In this case, AS intersects AD and the Potential GDP at the same equilibrium point. There are no gaps in this case.

A **recessionary gap** (or *below full employment equilibrium*) occurs when real GDP is less than potential GDP and that brings a falling price level. A recessionary gap occurs when the SRAS curve and the AD curve intersect to the left of the potential GDP line. In Figure 6.3, potential GDP is \$16 trillion but the actual equilibrium real GDP is \$15 trillion. In a recessionary gap, there is a surplus of labor and firms can hire new workers at a lower wage rate. As the money wage rate falls, the SRAS curve shifts rightward and the price level falls and real GDP rises. The money wage rate falls until real GDP equals potential GDP. ⁽²⁰⁾

Contractionary Fiscal Policy

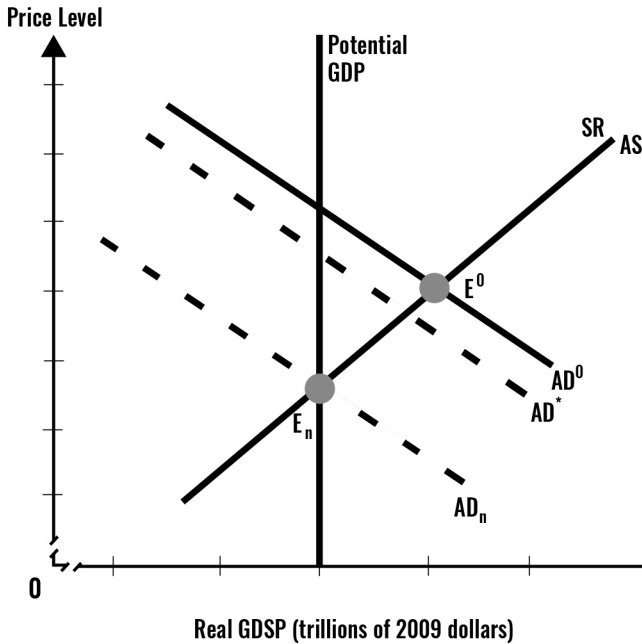


Figure 6-3: A Recessionary Gap by FSCJ is licensed under CC-BY-4.0.

An inflationary gap (or *above full employment equilibrium*) occurs when real GDP exceeds potential GDP and that brings a rising price level. An inflationary gap occurs when the AS curve and the AD curve intersect to the right of the potential GDP line. In Figure 6.4, potential GDP is \$16 trillion but the actual real GDP is \$16.5 trillion. In an inflationary gap, there is a shortage of labor and firms must offer higher wage rates to hire the labor they demand. As the money wage rate rises, the AS curve shifts leftward and the price level rises and real GDP falls. The money wage rate rises until real GDP equals potential GDP. ⁽²⁰⁾

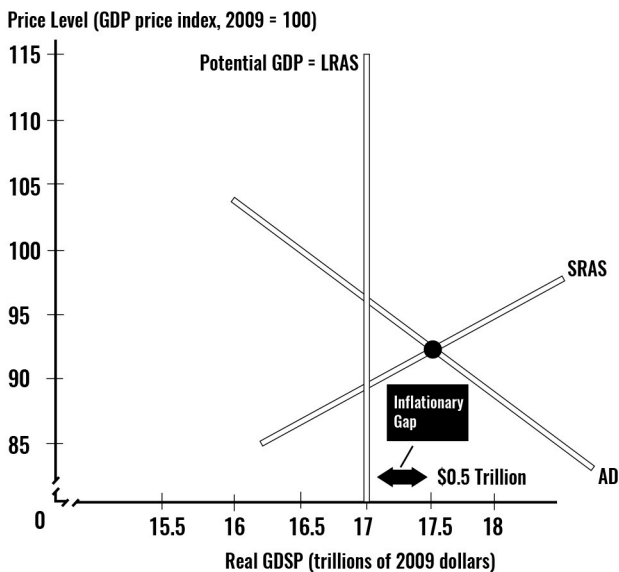


Figure 6-4: An Inflationary Gap by FSCJ is licensed under CC-BY-4.0

Using the AD/AS Model to Explain Inflation and the Business Cycle

Inflation results when the quantity of money grows at a rate that outpaces the growth of potential GDP. Using the AD/AS model, when the AD curve shifts rightward at a faster rate than the potential GDP curve, inflation occurs.

The business cycle results from fluctuations in aggregate supply and aggregate demand. Aggregate supply fluctuates because labor productivity grows at a variable pace, which brings fluctuations in the growth of potential GDP. A real business cycle results from fluctuations in the pace of growth of labor productivity and potential GDP.

Aggregate demand fluctuations are the main source of the

business cycle, since swings in aggregate demand occur more quickly than changes in the money wage rate that change aggregate supply.

Demand-pull inflation is inflation that starts because aggregate demand increases. Demand-pull inflation can be started by any of the factors that increase aggregate demand, but can only be sustained by growth in the quantity of money.

Starting at full employment, an increase in AD increases the price level and real GDP and creates an inflationary gap. The shortage of labor increases the money wage rate, which decreases AS and thereby increases the price level and decreases GDP back to potential GDP. If the quantity of money increases, AD will increase again, creating an inflationary gap. This process repeating itself results in an ongoing demand-pull inflation spiral.

Cost-push inflation is an inflation that begins with an increase in cost. The two main sources of cost increases are increases in the money wage rate and increases in the money prices of raw materials, such as oil. Cost-push inflation can be started by an increase in costs, but can only be sustained by growth in the quantity of money. Starting at full employment, an increase in oil prices decreases the AS, which increases the price level, decreases real GDP, and creates a recessionary gap. When the unemployment rate rises above the natural rate, the Fed increases the quantity of money to restore full employment. AD increases and returns real GDP back to potential GDP, but the price level rises further. Oil producers now see the price of everything else rising, so they raise the price of oil higher, and this process repeats in a cost-push inflation spiral.

The combination of recession (decreasing real GDP) and inflation (rising price level) is called **stagflation** and occurred in the United States in the 1970s as a result of the oil price shocks. Stagflation poses a dilemma for the Fed, because if they fail to increase the quantity of money, the economy remains below full employment, but if they increase the quantity of money it can create a cost-push inflation spiral. ⁽²⁰⁾

45. Great Depression vs. Great Recession

Deflation and the Great Depression vs. the Great Recession

In the Great Depression from 1929 to 1933, the price level fell by 22 percent and real GDP fell by 31 percent. In the 2008–2009 recession, the price level rose at a slow pace and real GDP fell by less than 4 percent. The 2008–2009 recession was much milder than the Great Depression for various reasons:

- During the Great Depression, bank failures, a 25 percent contraction in the quantity of money, and inaction by the Fed resulted in a collapse of aggregate demand. Money wage rates and the price level were slow to adjust, resulting in huge decreases in real GDP and employment.
- During the 2008 financial crisis, the Fed bailed out troubled financial institutions and doubled the monetary basis, which kept the quantity of money growing. Combined with increased government expenditure, the growing quantity of money limited the fall in aggregate demand, thus resulting in smaller decreases in employment and real GDP. ⁽²¹⁾

The 2008–2009 Recession

At the peak in 2008, real GDP was \$15 trillion and the price level was 99. In the second quarter of 2009, real GDP had fallen to \$14.3 trillion and the price level had risen to 100. A recessionary gap

appeared in 2009. The financial crisis that began in 2007 and intensified in 2008 decreased the supply of loanable funds and investment fell. In particular, construction investment collapsed. Recession in the global economy lowered the demand for U.S. exports, so this component of aggregate demand also decreased. The decrease in aggregate demand was moderated by a large injection of spending by the U.S. government, but it did not stop aggregate demand from decreasing.

Aggregate supply also decreased. The rise in oil prices in 2007 and a rise in the money wage rate were two factors that brought a decrease in aggregate supply. ⁽²¹⁾

46. Federal Budget and Spending

The Federal Budget

The federal budget is the annual statement of the expenditures and tax revenues of the government of the United States. The President proposes a budget to Congress in February. The Congress passes budget acts by September and the President either signs them or vetoes them.

Budget balance = Tax revenues — Outlays

If tax revenues exceed outlays, the government has a budget surplus.

If outlays exceed tax revenues, the government has a budget deficit.

In recent years, the federal government has run a budget deficit. For the 2014 fiscal year, the projected U.S. budget balance is \$3,000 billion — \$3,627 billion = —\$627 billion, that is, a budget deficit of \$627 billion. In 2009, the U.S. government experienced its largest budget deficit ever, as the federal government spent \$1.4 trillion more than it collected in taxes. This deficit was about 10% of the size of the U.S. GDP in 2009, making it by far the largest budget deficit relative to GDP since World War II.

Personal income taxes (\$1,358 billion) and Social Security taxes (\$1,031 billion) are the two largest sources of tax revenues. Transfer payments (\$2,253 billion) — Social Security benefits, Medicare and Medicaid benefits, unemployment benefits, and other cash benefits paid to individuals and firms — and expenditure on goods and services (\$1,152 billion) are the two largest components of government outlays.

Baby boomers will result in a massive increase in the Social

Security and Medicare benefits that need to be paid. The government's Social Security and Medicare obligations are a debt (estimated at \$91 trillion) that must be considered when developing a path towards fiscal sustainability. The options for addressing the Social Security and Medicare time-bomb include raising income taxes, raising Social Security taxes, cutting Social Security benefits, and cutting other federal government spending. While all of these options entail major sacrifices, a combination of these measures will lessen the severity of the sacrifices. ⁽²¹⁾

Federal Spending

Each year, the government borrows funds from U.S. citizens and foreigners to cover its budget deficits. It does this by selling securities (Treasury bonds, notes, and bills) — in essence borrowing from the public and promising to repay with interest in the future. From 1961 to 1997, the U.S. government has run budget deficits, and thus borrowed funds, in almost every year. It had budget surpluses from 1998 to 2001, and then returned to deficits.

The interest payments on past federal government borrowing were typically 1–2% of GDP in the 1960s and 1970s but then climbed above 3% of GDP in the 1980s and stayed there until the late 1990s. The government was able to repay some of its past borrowing by running surpluses from 1998 to 2001 and, with help from low interest rates, the interest payments on past federal government borrowing had fallen back to 1.4% of GDP by 2012.

National debt is the amount of outstanding government debt that has arisen from past budget deficits. The difference between the deficit and the debt lies in the time frame. The government deficit (or surplus) refers to what happens with the federal government budget each year. The government debt is accumulated over time; it is the sum of all past deficits and surpluses.

If you borrow \$10,000 per year for each of the four years of

college, you might say that your annual deficit was \$10,000, but your accumulated debt over the four years is \$40,000.

These four categories — national defense, Social Security, healthcare, and interest payments — account for roughly 71% of all federal spending, as Figure 6.5 shows. The remaining 29% wedge of the pie chart covers all other categories of federal government spending: international affairs; science and technology; natural resources and the environment; transportation; housing; education; income support for the poor; community and regional development; law enforcement and the judicial system; and the administrative costs of running the government. ⁽²²⁾

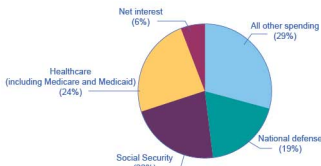


Figure 6-115: Federal Spending, 2014 by Openstax is licensed under CC-BY-4.0

The Path from Deficits to Surpluses to Deficits

Why did the budget deficits suddenly turn to surpluses from 1998 to 2001? And why did the surpluses return to deficits in 2002? Why did the deficit become so large after 2007? Figure 6.6 suggests some answers.

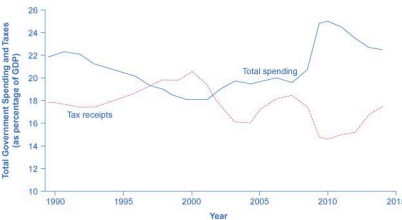


Figure 6-6: Total Government Spending and Taxes as a Share of GDP, 1990–2014 by Openstax is licensed under CC-BY-4.0

Government spending as a share of GDP declined steadily through the 1990s. The biggest single reason was that defense spending declined from 5.2% of GDP in 1990 to 3.0% in 2000, but interest payments by the federal government also fell by about 1.0% of GDP. However, federal tax collections increased substantially in the later 1990s, jumping from 18.1% of GDP in 1994 to 20.8% in 2000. Powerful economic growth in the late 1990s fueled the boom in taxes. Personal income taxes rise as income goes up; payroll taxes rise as jobs and payrolls go up; corporate income taxes rise as profits go up. At the same time, government spending on transfer payments such as unemployment benefits, food stamps, and welfare declined with more people working.

This sharp increase in tax revenues and decrease in expenditures on transfer payments was largely unexpected even by experienced budget analysts, and so budget surpluses came as a surprise. But in the early 2000s, many of these factors started running in reverse. Tax revenues sagged, due largely to the recession that started in March 2001, which reduced revenues. A series of tax cuts was enacted by Congress and signed into law by President George W. Bush, starting in 2001. In addition, government spending swelled due to increases in defense, healthcare, education, Social Security, and support programs for those who were hurt by the recession and the slow growth that followed. Deficits returned. When the severe recession hit in late 2007, spending climbed and tax collections fell to historically unusual levels, resulting in enormous deficits. ⁽²²⁾

47. Fiscal Policy

The Role of Fiscal Policy Based on the Keynesian Perspective

Fiscal policy is the use of the federal budget to achieve the macroeconomic objectives of high and sustained economic growth and full employment.

Fiscal Policy can be Expansionary or Contractionary:

- **Expansionary Fiscal Policy (Fiscal Stimulus)** , generally speaking, consists in an increase in government spending, a decrease in taxes (tax cuts), or a combination of both.
- **Contractionary Fiscal Policy** , generally speaking, consists in a decrease in government spending, an increase in taxes, or a combination of both.

Different economic conditions call for a different set of fiscal policies.

Typically, in the presence of a recessionary gap (remember, short run equilibrium RGDP is less than Potential GDP), expansionary fiscal policy is needed to close the gap. For example, due to the presence of the multiplier effect, to close a recessionary gap of \$5 billion, government spending, G , needs to increase by \$1 billion if the government spending multiplier, GM , is 5. ⁽²³⁾

Expansionary Fiscal Policy

Figure 6.7 illustrates how to close a recessionary gap of 1 trillion dollars, the initial increase in government spending, or the initial tax cut, need only be a fraction of the gap. Once the multiplier effect has taken full effect, AD_0 shifts to AD_1 , and the gap is closed – the economy has reached its potential GDP. ⁽²³⁾

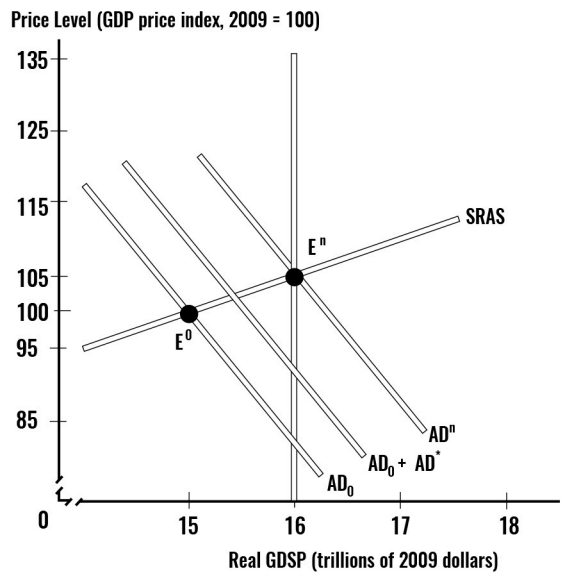


Figure 6-7: Expansionary Fiscal Policy by FSCJ is licensed under CC-BY-4.0.

Contractionary Fiscal Policy

On the other hand, in the presence of an inflationary gap (remember, short run equilibrium RGDP is higher than Potential GDP), contractionary fiscal policy is needed to close the gap. For example, due to the presence of the multiplier effect, to close an

inflationary gap of \$4 billion, Taxes on Personal Income, T , need to increase by \$1 billion, if the tax multiplier, T_M , is 4.

Figure 6.8 illustrates an economy experiencing an inflationary gap of 1 trillion dollars. The initial decrease in government spending, or the initial increase in taxes, need only be a fraction of the gap. Once the multiplier effect has taken full effect, the AD curve shifts all the way down to the left to intersect both AS and the Potential GDP curves, and eliminate the inflationary gap. ⁽²³⁾

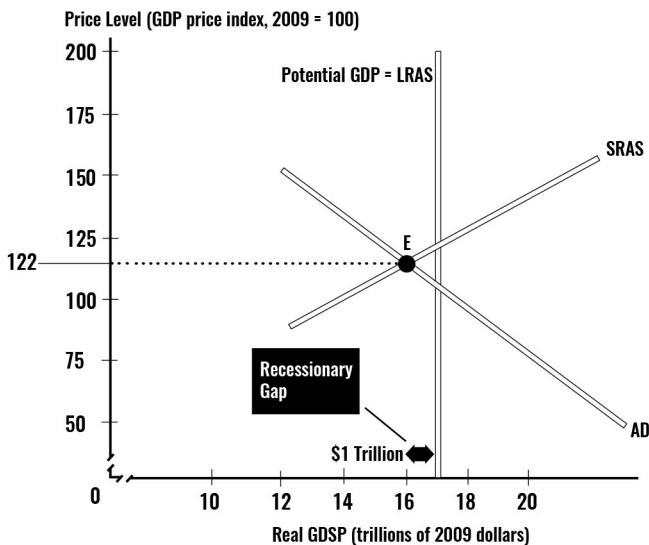


Figure 6-8: Contractionary Fiscal Policy Figure by FSCJ is licensed under CC-BY-4.0.

48. Government Spending Multiplier

Deriving the Government Spending Multiplier, G^M :

From the equilibrium condition:

$$AD = AS = Y = \text{Income} = \text{RGDP } Y = C + I + G + NX \quad (1)$$

Let Consumption, C , be dependent on disposable income as follows:

$$C = C_0 + MPCx(Y - T), \quad (2)$$

Where:

C_0 = autonomous consumption (consumption that does not depend on income)

MPC = marginal propensity to consume

T = Taxes on personal income.

MPC is a positive number greater than 0 and less than 1, which captures the proportion (or percentage) of disposable income, $(Y - T)$, that goes for consumption spending. The rest of income that is not consumed is saved.

Thus,

$$MPC + MPS = 1$$

Where MPS is the marginal propensity to save.

In the U.S.A, MPC has ranged from 0.7 to 0.9. Other countries, such as Italy or France, tend to have a much smaller MPC .

By plugging (2) into (1), we get:

$$Y = C_0 + MPCx(Y - T) + I + G + NX$$

If we assume that T , I , G and NX do not depend on level of income, or RGDP , Y (thus are fixed terms), we can group them together with C_0 under the same fixed term A , as shown below.

$$Y = C_0 + MPCxY - MPCxT + I + G + NX = MPCxY + A$$

$$Y - MPC \times Y = A$$

$$(1 - MPC) \times Y = A$$

Dividing both sides by $1 - MPC$ (or solving for Y) we get:

$$Y = \{1 \div (1 - MPC)\} \times A$$

The term inside the brackets is the multiplier: **$1 \div (1 - MPC)$**

Notice that since MPC is less than 1, then $1 \div (1 - MPC)$ will be greater than 1. Also, the higher MPC , the higher the multiplier.

If G is the component of A that changes, then the government spending multiplier G_M is given by the multiplier we derived above ⁽²⁰⁾:

$$1 \div (1 - MPC) = G_M$$

The Government Spending Multiplier and the Tax Multiplier

The following formula gives the impact on RGDP of a change in G .

$$\text{Change in RGDP} = 1 \div (1 - MPC) \times (\text{change in } G)$$

Implication: Fiscal policy is more effective in countries with greater MPC (because these countries tend to have a greater G_M , all else equal).

In a similar way, we can derive the Tax multiplier, T_M :

$$\text{Change in RGDP} = -MPC \div (1 - MPC) \times (\text{change in } T)$$

Let's compare G_M with T_M :

The magnitude (size) of G_M is greater than T_M .

- **Implication 1:** An increase in G is more effective than the same size decrease in T . G_M has the opposite sign compared to T_M .
- **Implication 2:** Remember that the same directional result can be achieved if G is increased, or taxes are decreased and vice versa.
- **Final Implication:** If both G and T increase by same amount (thus the government is running a balanced budget), the net effect on RGDP is not zero, because of the different magnitude

(size) of the G_M and T_M .⁽²²⁾

Schools of Thought and Cracks in Today's Consensus

The Keynesian view is that fiscal stimulus (expansionary fiscal policy) boosts real GDP and creates or saves jobs by increasing aggregate demand with a multiplier effect.

The mainstream view is that Keynesians over-estimate the multiplier effects of fiscal stimulus and that these effects are small, short-lived, and incapable of working fast enough to be useful.

Moreover, government stimulus “crowds out” private consumption expenditure and investment, and ultimately leads to a bigger government, lower potential GDP, a slower real GDP growth rate, and a greater burden of government debt on future generations.⁽²²⁾

Limitations of Fiscal Policy

In practice, fiscal policy is hampered by several factors:

- **Law-Making Time Lag** : The law-making lag is the amount of time it takes Congress to pass the laws needed to change taxes or spending.
- **Estimating Potential GDP** : It is not easy to tell whether real GDP is below, above, or at potential GDP, so it is not easy to tell if discretionary fiscal policy will move real GDP away from potential GDP instead of towards it. Too much fiscal stimulus can cause inflation, while too little can lead to recession.
- **Economic Forecasting** : Fiscal policy must target forecasts of where the economy will be in the future. Economic forecasting

has improved enormously in recent years, but it remains inexact and subject to error.

Long-Run Fiscal Policy Effects

Large budget deficits crowd out investment and slow the economic growth rate. Persistently large budget deficits that increase the debt can erode confidence in the value of money and increase inflation. These long-run effects of fiscal policy make it vital to keep government expenditures and budget deficits under control and to have a plan for restoring a balanced budget at full employment. ⁽²²⁾

49. Key Terms

Please review the following key terms. ⁽²⁰⁾⁽²¹⁾⁽²²⁾⁽²³⁾

Aggregate demand (AD) — curve the relationship between the total spending on domestic goods and services and the price level for output

Aggregate demand/aggregate supply (AD/AS) model — a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level

Aggregate supply (AS) — curve the relationship between real GDP and the price level for output, holding the price of inputs fixed

Aggregate supply (AS) — the relationship between real GDP and the price level for output, holding the price of inputs fixed

Balanced budget — when government spending and taxes are equal

Budget deficit — when the federal government spends more money than it receives in taxes in a given year

Budget surplus — when the government receives more money in taxes than it spends in a year

Contractionary fiscal policy — fiscal policy that decreases the level of aggregate demand, either through cuts in government spending or increases in taxes

Expansionary fiscal policy — fiscal policy that increases the level of aggregate demand, either through cuts in government spending or increases in taxes

Full-employment GDP — another name for potential GDP, when the economy is producing at its potential and unemployment is at the natural rate of unemployment

Keynes' law — “demand creates its own supply”

Legislative lag — the time it takes to get a fiscal policy bill passed

National debt — the total accumulated amount the government has borrowed, over time, and not yet paid back

Neoclassical economists — who generally emphasize the importance of aggregate supply in determining the size of the macro economy over the long run

Potential GDP — the maximum quantity that an economy can produce given full employment of its existing levels of labor, physical capital, technology, and institutions

Say's law — “supply creates its own demand”

Stagflation — an economy experiences stagnant growth and high inflation at the same time

PART VIII

MODULE 7: AGGREGATE
DEMAND, AGGREGATE
SUPPLY, AND FISCAL
POLICY

50. Introduction

Module 7 : Monetary Policy

Module Introduction

This module focuses on monetary policy. We discuss the objectives of monetary policy, the framework for achieving them, and the Fed's monetary policy actions. Using the loanable funds market and the AS-AD model, we explain the transmission channels through which the Fed influences real GDP and the inflation rate. Lastly, we explain what is Quantitative Easing and how it has been implemented in recent years. ⁽¹⁾

Learning Objectives

- Describe the objectives of U.S. monetary policy and the framework for achieving those objectives.
- Describe the Fed's monetary policy actions.
- Explain the transmission channels through which the Fed influences real GDP and the inflation rate in the economy.
- Explain the differences between expansionary and contractionary monetary policies.
- Explain under what economic conditions expansionary and contractionary monetary policies are needed, and what economic outcomes such policies achieve. ⁽¹⁾

Reading

- Learning Unit

51. Overview

Overview

Money, loans, and banks are all tied together. Money is deposited in bank accounts, which is then loaned to businesses, individuals, and other banks. When the interlocking system of money, loans, and banks works well, economic transactions are made smoothly in goods and labor markets and savers are connected with borrowers. If the money and banking system does not operate smoothly, the economy can either fall into recession or suffer prolonged inflation.

The government of every country has public policies that support the system of money, loans, and banking. These policies, however, do not always work perfectly. This module discusses how monetary policy works and what may prevent it from working perfectly.

The organization responsible for conducting monetary policy and ensuring that a nation's financial system operates smoothly is called the central bank. In making decisions about the money supply, a **central bank** decides whether to raise or lower interest rates and, in this way, to influence macroeconomic policy, whose goal is low unemployment and low inflation. The central bank is also responsible for regulating all or part of the nation's banking system to protect bank depositors and ensure the health of the bank's balance sheet.

Most nations have central banks or currency boards. Some prominent central banks around the world include the European Central Bank, the Bank of Japan, and the Bank of England. In the United States, the central bank is called the Federal Reserve, often abbreviated as just "the Fed."⁽¹⁹⁾

52. Federal Reserve

Structure and Organization of the Federal Reserve

Unlike most central banks, the Federal Reserve is semi-decentralized, mixing government appointees with representation from private-sector banks. At the national level, it is run by a Board of Governors, consisting of seven members appointed by the President of the United States and confirmed by the Senate. Appointments are for 14-year terms and they are arranged so that one term expires January 31 of every even-numbered year. The purpose of the long and staggered terms is to insulate the Board of Governors as much as possible from political pressure so that policy decisions can be made based only on their economic merits. Additionally, each member only serves one term, except when filling an unfinished term, further insulating decision-making from politics.

Policy decisions of the Fed do not require congressional approval; and the President cannot ask for the resignation of a Federal Reserve Governor, as the President can with cabinet positions. One member of the Board of Governors is designated as the Chair. For example, from 1987 until early 2006, the Chair was Alan Greenspan. From 2006 until 2014, Ben Bernanke held the post. The current Chair, Janet Yellen, has made many headlines already. What individual can make financial market crash or soar just by making a public statement? It is not Bill Gates or Warren Buffett. It is not even the President of the United States. The answer is the Chair of the Federal Reserve Board of Governors.

In early 2014, Janet L. Yellen, shown in Figure 7.1 became the first woman to hold this post. Yellen has been described in the media as “perhaps the most qualified Fed chair in history.” With a Ph.D. in

economics from Yale University, Yellen has taught macroeconomics at Harvard, the London School of Economics, and most recently at the University of California at Berkeley. From 2004–2010, Yellen was President of the Federal Reserve Bank of San Francisco. Yellen became one the few economists who warned about a possible bubble in the housing market, more than two years before the financial crisis occurred. Yellen served on the Board of Governors of the Federal Reserve twice, most recently as Vice Chair. She also spent two years as Chair of the President’s Council of Economic Advisors.⁽¹⁹⁾



Figure 7-1: Chair of the Federal Reserve Board by Board of Governors of the Federal Reserve System is licensed under Public Domain.

Structure and Organization of the Federal Reserve (Continued)

The Federal Reserve is more than the Board of Governors. The Fed also includes 12 regional Federal Reserve banks, each of which is responsible for supporting the commercial banks and economy generally in its district. The Federal Reserve districts and the cities where their regional headquarters are located are shown in the figure 7.2. The commercial banks in each district elect a Board of Directors for each regional Federal Reserve Bank, and that board chooses a president for each regional Federal Reserve district. Thus, the Federal Reserve System includes both federally and private-sector appointed leaders. ⁽¹⁹⁾

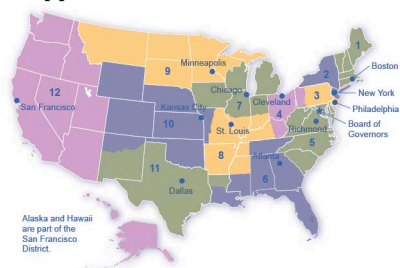


Figure 7-2: The Twelve Federal Reserve Districts by Openstax is licensed under CC-BY-4.0.

What Does a Central Bank Do?

The Federal Reserve, like most central banks, is designed to perform three important functions:

- To conduct monetary policy.
- To promote stability of the financial system.
- To provide banking services to commercial banks and other depository institutions, and to provide banking services to the

federal government.

The Federal Reserve provides many of the same services to banks as banks provide to their customers. For example, all commercial banks have an account at the Fed where they deposit reserves. Similarly, banks can obtain loans from the Fed through the “discount window” facility, which will be discussed in more detail later.

The Fed is also responsible for check processing. For example, when you write a check to buy groceries, the grocery store deposits the check in its bank account. Then, the physical check (or an image of that actual check) is returned to your bank, after which funds are transferred from your bank account to the account of the grocery store. The Fed is responsible for each of these actions.

On a more mundane level, the Federal Reserve ensures that enough currency and coins are circulating through the financial system to meet public demands. For example, each year the Fed increases the amount of currency available in banks around the Christmas shopping season and reduces it again in January.

Finally, the Fed is responsible for assuring that banks are in compliance with a wide variety of consumer protection laws. For example, banks are forbidden from discriminating on the basis of age, race, sex, or marital status. Banks are also required to disclose public information about the loans they make for buying houses and how those loans are distributed geographically, as well as by sex and race of the loan applicants.⁽¹⁹⁾

53. Monetary Policy

How the Fed Conducts Monetary Policy: Monetary Policy Objectives

The Fed's mandate is that "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee (FOMC) shall maintain long-run growth of the monetary and credit aggregates commensurate with the economy's long-run potential to **increase production**, so as to promote effectively the goals of **maximum employment, stable prices, and moderate long-term interest rates**."⁽²⁴⁾

The goals are often described as a "**dual mandate**" to achieve **stable prices** and **maximum employment** (full employment).

- In the *short run*, the Fed can face a tradeoff between policy that lowers the inflation rate but raises the unemployment rate, and policy that lowers the unemployment rate but raises the inflation rate.
- In the *long run*, the Fed's goals are in harmony. Achieving stable prices, and keeping the inflation rate low and predictable is the source of maximum employment and moderate long-term interest rates.⁽¹⁰⁾

Low inflation rates mean that people make decisions without the confusion created by inflation. A low inflation rate also means low long-term interest rates (*nominal interest rate* is real interest rate plus inflation rate).

Fed's Operational Goals and FOMC:

- Operational "Maximum Employment" Goal: The Fed tracks

the *output gap* , which is the percentage deviation of real GDP from potential GDP. A positive output gap leads to inflation; a negative output gap results in unemployment. The Fed tries to minimize the output gap.

- Operational “Stable Prices” Goal: The Fed pays attention to the *core inflation rate* , which is the annual percentage change in the Personal Consumption Expenditure deflator (PCE deflator) *excluding* the prices of food and fuel. ⁽¹⁹⁾

Price stability can mean a core inflation rate between one and two percent. ⁽²⁵⁾

Responsibility for Monetary Policy

The FOMC makes monetary policy decisions at eight scheduled meetings a year. The Fed (*not* the Congress or the President) has ultimate responsibility for monetary policy.



Figure 7-3: Marriner S. Eccles Federal Reserve Headquarters, Washingtonby Wikipedia is licensed under CC BY-SA 3.0

The Fed's Decision-Making Strategy: Policy Instruments

A monetary policy instrument is a variable that the Fed can directly control or closely target and that influences the economy in desirable ways. The Fed, similar to most central banks, chooses to use a short-term interest rate as its monetary policy instrument. The interest rate the Fed targets is the federal funds rate, which is the interest rate at which banks can borrow and lend reserves in the federal funds market (that is, the market for overnight loans of reserves). Although the Fed can change the federal funds rate by any amount, it normally changes the federal funds rate one quarter of a percentage point at a time. ⁽¹⁹⁾

The Fed can use two alternative decision-making strategies:

- *Instrument rule* : A decision rule, which sets the policy instrument at a level that is based on the current state of the economy.
- *Targeting rule* : A decision rule, which sets the policy instrument at a level that makes the forecast of the ultimate policy goal equal to its target.

FOMC minutes suggest that the Fed follow a targeting rule that sets the federal funds rate at a level that it forecasts will set the inflation rate equal to its targeted value. ⁽¹⁹⁾

Hitting the Federal Funds Rate Target

The Fed uses open market operations—the purchase or sale of government securities in the open market—to hit its federal funds target rate.

- *An Open Market Purchase* : The Fed buys government securities from a bank and pays for the purchase by increasing the bank's reserves.
- *An Open Market Sale* : The Fed sells government securities to a bank and receives payment for the sale by decreasing the bank's reserves.

The federal funds rate is determined in the market for reserves. The higher the federal funds rate, the greater the opportunity cost of holding reserves rather than loaning them. The higher the federal funds rate, the smaller the quantity of reserves demanded. The Fed's open market operations determine the supply of reserves.

If the Fed wants to lower the federal funds rate, the Fed undertakes an open market purchase of government securities. The quantity of reserves increases and the federal funds rate falls. If the Fed wants to raise the federal funds rate, the Fed undertakes an open market sale of government securities. The quantity of reserves decreases and the federal funds rate rises.⁽¹⁹⁾

Monetary Policy Transmission: An Overview

Suppose the Fed uses an open market operations purchase of government securities to lower the federal funds rate. The transmission mechanism for this expansionary monetary policy is then:

Other interest rates : Other short-term interest rate falls. Long-term bond interest rates fall, but by less.

Exchange rate : The fall in the U.S. interest rate lowers the U.S. interest rate differential. The demand for U.S. dollars decreases and the supply of U.S. dollars increases. The U.S. dollar depreciates, which means that the exchange rate falls.

Money and bank loans : Banks' reserves have increased so they

have excess reserves. Banks loan the excess reserves, so loans and the quantity of money increases.

Long-term real interest rate : The real interest rate is determined in the loanable funds market. In the short run, the increase in loans increases the supply of loanable funds and lowers the real interest rate.

Expenditure plans : Consumption expenditure and investment increase as a result of the lower real interest rate. Net exports increase as a result of the fall in the exchange rate.

Aggregate demand : Because aggregate expenditure increases, aggregate demand increases. A multiplier effect increases aggregate demand by more than the initial increase in aggregate expenditure. As a result of the increase in aggregate demand, the equilibrium price level rises and equilibrium real GDP increases. ⁽¹⁹⁾

Contractionary Monetary Policy

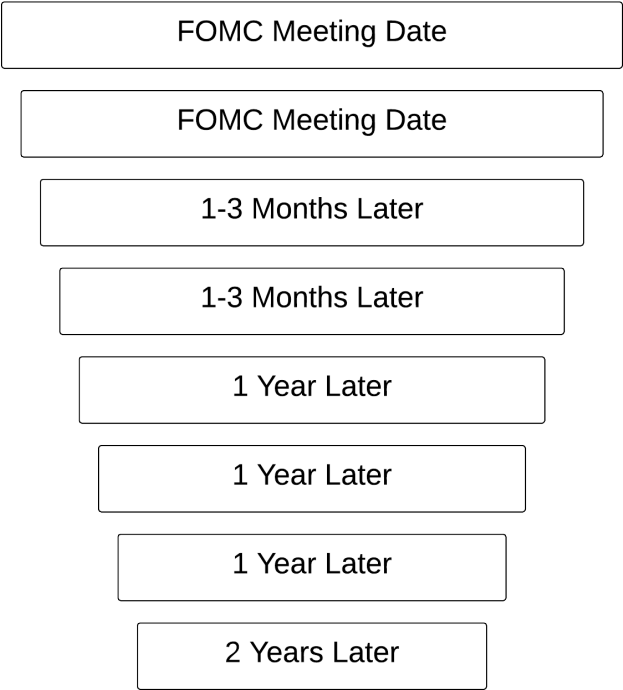


Figure 7-4: Contractionary Monetary Policy by FSCJ is licensed under CC-BY-4.0.

Expansionary Monetary Policy

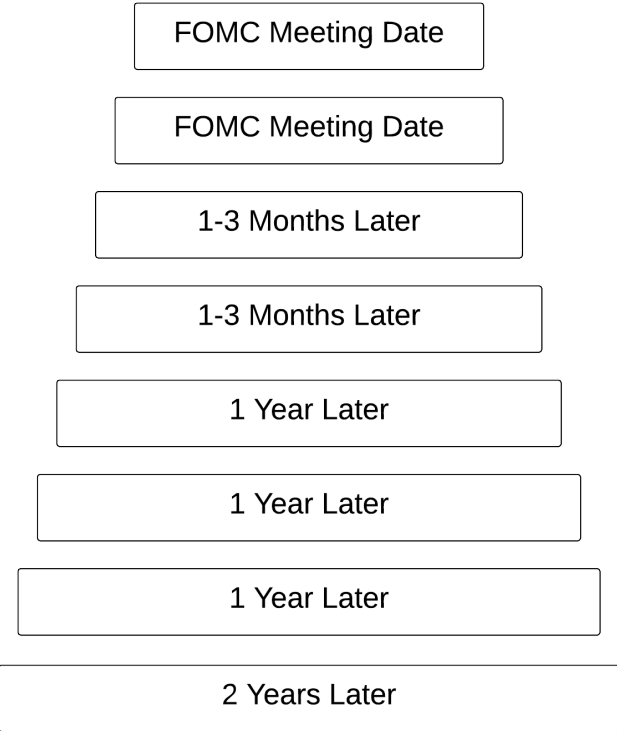


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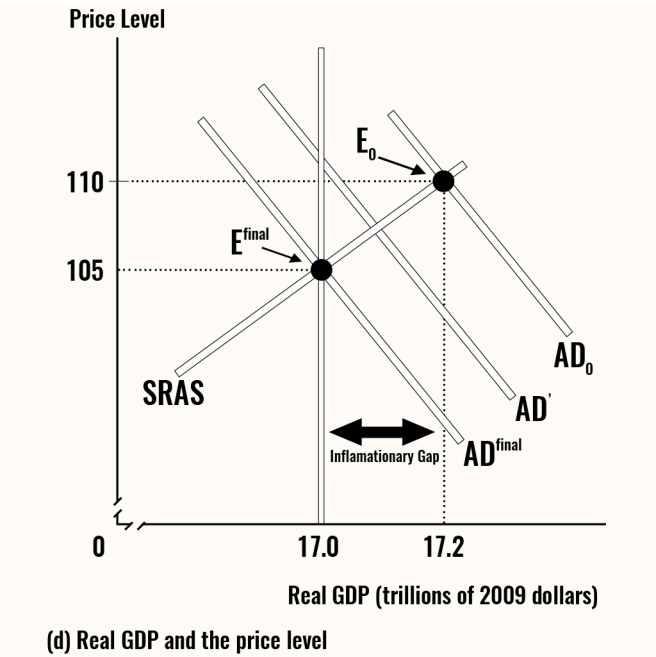


Figure 7-6: The Fed Combats Inflationary Pressures by FSCJ is licensed under CC-BY-4.0.

54. Restoring Financial Stability

Restoring Financial Stability in a Financial Crisis

At a time of financial instability and panic, banks' assessments of risk increase. Banks slash their loans and hold more of their assets in safe, reserve deposits at the Fed. The demand for reserves skyrockets, which raises the federal funds interest rate.

To avoid the rise in the interest rate and the decrease in bank lending that would shrink the quantity of money, all of which would intensify a recession, the Fed uses quantitative easing and credit easing to drastically increase bank reserves.

Quantitative Easing

The most powerful and commonly used of the three traditional tools of monetary policy—open market operations—works by expanding or contracting the money supply in a way that influences the interest rate. In late 2008, as the U.S. economy struggled with recession, the Federal Reserve had already reduced the interest rate to near-zero. With the recession still ongoing, the Fed decided to adopt an innovative and nontraditional policy known as *quantitative easing* (QE). This is the purchase of long-term government and private mortgage-backed securities by central banks to make credit available so as to stimulate aggregate demand.

Quantitative easing (QE) differed from traditional monetary policy in several key ways. First, it involved the Fed purchasing long-term Treasury bonds, rather than short-term Treasury bills. In 2008,

however, it was impossible to stimulate the economy any further by lowering short-term rates because they were already as low as they could get. Therefore, the Fed's Chairman, Bernanke sought to lower long-term rates utilizing quantitative easing.

This leads to a second way QE is different from traditional monetary policy. Instead of purchasing Treasury securities, the Fed also began purchasing private mortgage-backed securities, something it had never done before. During the financial crisis, which precipitated the recession, mortgage-backed securities were termed "toxic assets," because when the housing market collapsed, no one knew what these securities were worth, which put the financial institutions that were holding those securities on very shaky ground. By offering to purchase mortgage-backed securities, the Fed was both pushing long-term interest rates down and also removing possibly "toxic assets" from the balance sheets of private financial firms, which would strengthen the financial system. ⁽¹⁹⁾

Quantitative easing (QE) occurred in three episodes:

1. During QE1, which began in November 2008, the Fed purchased \$600 billion in mortgage-backed securities from government enterprises Fannie Mae and Freddie Mac.
2. In November 2010, the Fed began QE2, in which it purchased \$600 billion in U.S. Treasury bonds.
3. QE3, began in September 2012 when the Fed commenced purchasing \$40 billion of additional mortgage-backed securities per month. This amount was increased in December 2012 to \$85 billion per month. The Fed has stated that, when economic conditions permit, it will begin tapering (or reducing the monthly purchases). This has not yet happened as of early 2014.

The quantitative easing policies adopted by the Federal Reserve (and by other central banks around the world) are usually thought of

as temporary emergency measures. If these steps are, indeed, to be temporary, then the Federal Reserve will need to stop making these additional loans and sell off the financial securities it has accumulated. The concern is that the process of quantitative easing may prove more difficult to reverse than it was to enact. The evidence suggests that QE1 was somewhat successful, but that QE2 and QE3 have been less so. ⁽¹⁹⁾

The Fed Fights a Recession

If the Fed believes that real GDP is less than potential GDP, the Fed will undertake expansionary monetary policy: it lowers the federal funds rate using an open market sale. The monetary policy is transmitted as outlined in the Figure 7.7.

Figure 7.7 shows the transmission mechanism from the money market to the aggregate supply and aggregate demand. When the Fed purchases government securities, it lowers the federal funds rate. The increase in reserves increases the quantity of money and short-term interest rates fall. This increases the supply of loanable funds. This increase lowers the real interest rate, and increases the quantity of loanable funds. The increase in loanable funds primarily goes to raise investment, so investment increases. Finally, the increase in consumption expenditure, investment, and net exports increases aggregate demand so that the aggregate demand curve shifts right. The increase in AD is larger than the initial increases in expenditures because of the multiplier effect. As the AD-AS diagram shows, the expansionary monetary policy raises the price level and increases real GDP. ⁽¹⁹⁾

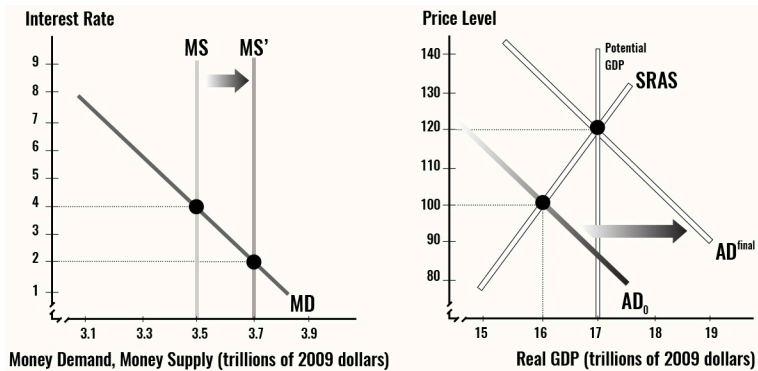


Figure 7-7: The Fed Fights a Recession by FSCJ is licensed under CC-BY-4.0.

If the Fed believes that real GDP is greater than potential GDP so that inflation is a problem, the Fed will undertake contractionary monetary policy: it raises the federal funds rate using an open market sale. The effects of the monetary policy are transmitted, but the directions of the changes are reversed. Real GDP decreases. The AD-AS diagram in this case will look just like the one in Figure 7.6. The Money Market diagram will differ in terms of the direction of the shift of the MS curve, which now shifts to the left, causing interest rates to increase, which in turn negatively affect Investments, known as the “crowding out” effect, which shrinks the AD curve, by shifting it to the left, as shown on Figure 7.6. ⁽¹⁹⁾

Loose Links and Long and Variable Lags

In reality, the ripple effects of monetary policy are not as precise as shown on Figure 7.7. The long-term real interest rate that influences expenditure plans is linked only loosely to the federal funds rate. In addition, the response of expenditure plans to the real interest rate is also not tight. The transmission channels described in this module

take time to operate and the time can vary from one episode to the next.

In the United States, it takes about a year from when a monetary policy action is undertaken until real GDP is affected. It takes about two years for monetary policy to affect the inflation rate. The long and variable time lags make monetary policy difficult to implement. However, in comparison with fiscal policy, monetary policy has shorter time lags.⁽¹⁹⁾

55. Key Terms

Key Terms

Click on each key term to review its definition. ⁽¹⁹⁾

Central Bank

Institution which conducts a nation's monetary policy and regulates its banking system.

Contractionary Monetary Policy

A monetary policy that reduces the supply of money and loans.

Discount Rate

The interest rate charged by the central bank on the loans that it gives to other commercial banks.

Excess Reserves

Reserves banks hold that exceed the legally mandated limit.

Expansionary Monetary Policy

A monetary policy that increases the supply of money and the quantity of loans.

Federal Funds Rate

The interest rate at which one bank lends funds to another bank overnight.

Inflation Targeting

A rule that the central bank is required to focus only on keeping inflation low.

Open Market Operations

The central bank selling or buying Treasury bonds to influence the quantity of money and the level of interest rates.

Quantitative Easing (QE)

The purchase of long term government and private mortgage-backed securities by central banks to make credit available in hopes of stimulating aggregate demand.

Reserve Requirement

The percentage amount of its total deposits that a bank is legally obligated to either hold as cash in their vault or deposit with the central bank. ⁽¹⁾

PART IX

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56. Footnote Attribution List

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