Principles of Macroeconomics

Principles of Macroeconomics

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About This Book

About this Book

Principles of Macroeconomics helps students understand macroeconomic activity measures such as Gross Domestic Product, Unemployment, and Inflation. It discusses the factors that result in growth in the economy. The book uses data and graphs for students to see the implications of these theories on our economy. The textbook uses economic models to determine equilibrium in an economy and explain what causes fluctuations in economic activity. It also describes fiscal and monetary policy tools and evaluates their relative effectiveness on the Canadian economy, outlining the Government's and Bank of Canada's roles in stabilizing the economy.

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- Key terms are highlighted(bolded) within the text and appear in the list of the key terms at the end of each chapter.
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CHAPTER 1: INTRODUCTION

Chapter Outline

1.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Define Economics
- Distinguish between microeconomics and macroeconomics
- Recognize Key Economic terms

Economic issues dominated the news in 2022, just as they dominated the news in most years. What happens to economic phenomena such as growth, unemployment, gasoline and food prices, house values, and the national debt matters—and these phenomena matter a great deal.

While investigating these problems indeed falls within the province of economics, economics encompasses a broader range of issues. Ultimately, economics is the study of choice. Because choices range over every imaginable aspect of human experience, so does economics. Economists have investigated the nature of family life, the arts, education, crime, sports, and law—the list is virtually endless because so much of our lives involves making choices.

In Perspective

Consider some of the choices you face. Would you like better grades? More time to relax? More time watching movies? Getting better grades probably requires more time studying and less relaxation and entertainment. Not only must we make choices as individuals, we must make choices as a society. Do we want a cleaner environment? Faster economic growth? Both may be desirable, but efforts to clean up the environment may conflict with faster economic growth. Society must make a choice

Economists have a way of looking at the world that differs from the way scholars in other disciplines look at the world. It is the *economic way of thinking*; this chapter introduces that way of thinking.

1.1 Economics

Definitions:

Economics is a social science that examines how people choose among the alternatives available. It is social because it involves people and their behaviour. It is a science because it uses, as much as possible, a scientific approach to investigate choices.

Scarcity means that human wants for goods, services and resources exceed what is available. Because of scarcity, we need to make choices.

Choices mean that one alternative is selected over another. Selecting alternatives involves three ideas central to economics: scarcity, choice, and opportunity cost.

Scarcity

If you look around carefully, you will see that scarcity is a fact of life. Our resources are limited. At any one time, we have only so much land, so many factories, so much oil, so many people. But our wants and desires for the things we can produce with those resources are unlimited. We would always like more and better housing and education—more and better of practically everything.

If our resources were unlimited, we could say yes to all our wants—and then there would be no economics. Since our resources are limited, we cannot say yes to everything. To say yes to one thing requires that we say no to another. Whether we like it or not, we must make choices.

Our unlimited wants are continually colliding with the limits of our resources, forcing us to pick some activities and reject others. **Scarcity** is the condition of having to choose among alternatives. A scarce good is one for which the choice of one alternative use of the good requires that another be given up. Consider a parcel of land. The parcel presents us with several alternative uses. We could build a house on it. We could put a gas station on it. We could create a small park on it. We could leave the land undeveloped to be able to make a decision later as to how it should be used. Suppose we have decided the land should be used for housing. Should it be a large and expensive house or several modest ones? Suppose it is to be a large and expensive house. Who should live in the house? If the Matthews live in it, the Nguyens cannot. There are alternative uses of the land in terms of the type of use and the sense of who gets to use it. The fact that land is scarce means that society must make choices concerning its use.

Virtually everything is scarce. Consider the air we breathe, available in huge quantities at no charge. Could it possibly be scarce? The test of whether air is scarce is whether it has alternative uses. What uses can we make of the air? We breathe it. We pollute it when we drive our cars, heat our houses, or operate our factories. In effect, one use of the air is as a garbage dump. We certainly need the air to breathe. But just as certainly, we choose to dump garbage in it. Those two uses are alternatives to each other. The more garbage we dump in the air, the less desirable—and healthy—it will be to breathe. To breathe cleaner air, we must limit the activities that generate pollution. Air is a scarce good because it has alternative uses.

Gas emissions at a manufacturing complex in Toronto, Canada. Photo by Kibae Park/Sipa Press CC BY-NC-ND 2.0

1.2 Microeconomics & Macroeconomics

Economics is concerned with the well-being of *all* people, including those with jobs and those without jobs, as well as those with high incomes and those with low incomes. Economics acknowledges that the production of valuable goods and services can create problems of environmental pollution. It explores the question of how investing in education helps to develop workers' skills. It probes questions like how to tell when big businesses or big labour unions are operating in a way that benefits society as a whole and when they are operating in a way that benefits their owners or members at the expense of others. It looks at how government spending, taxes, and regulations affect decisions about production and consumption.

It should be clear by now that economics covers considerable ground. We can divide that ground into two parts: microeconomics and macroeconomics.

Microeconomics focuses on the actions of individual agents within the economy, like households, workers, and businesses. Some examples of microeconomics include: What determines the products, and how many of each a firm will produce and sell? What determines the 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?

Macroeconomics looks at the economy as a whole. Microeconomics and macroeconomics are not separate subjects but complementary perspectives on the overall subject of the economy. What determines the level of economic activity in a society? In other words, what determines how many goods and services a nation produces? What determines how many jobs are available in an economy? What determines a nation's standard of living?

We can determine an economy's macroeconomic health by examining several goals: growth in the standard of living, low unemployment, and low inflation, to name the most important.

Definitions

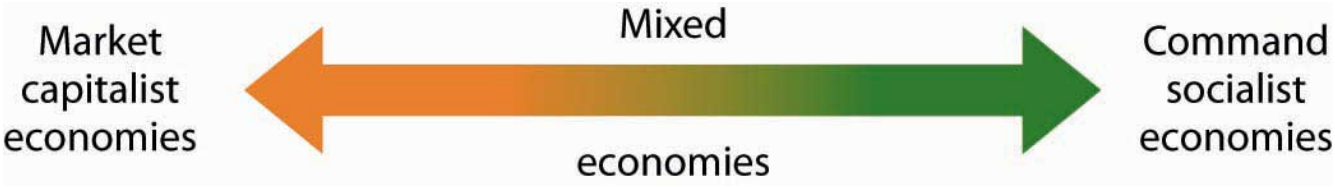
Microeconomics focuses on the actions of individual agents within the economy, like households, workers, and businesses.

Macroeconomics looks at the economy as a whole.

Organizing Economies

Think about what a complex system a modern economy is. It includes all production of goods and services, all buying and selling, and all employment. The economic life of every individual is interrelated, at least to a small extent, with the economic lives of thousands or even millions of other individuals. Who organizes and coordinates this system? Who ensures that the correct number of employees work in the electronics industry?

There are at least three ways that societies organize an economy.



"Economic Systems" by University of Minnesota Libraries, CC BY-NC-SA 4.0 (click to enlarge)

- **Market economy –** A market is an institution that brings together buyers and sellers of goods or services, individuals or businesses. The New York Stock Exchange is a prime example of a market that brings buyers and sellers together. In a market economy, decision-making is decentralized. Market economies are based on private enterprise: the private individuals or groups of private individuals own and operate the means of production (resources and businesses). (In a command economy, by contrast, the government owns resources and businesses). A person's income is based on his or her ability to convert resources (especially labour) into something that society values. The more society values the person's output, the higher the income (think of famous athletes or singers). In this scenario, market forces, not governments, determine economic decisions.
- **Mixed economy –** Most economies in the real world are mixed. They combine elements of command and market systems. The Canadian economy is positioned toward the market-oriented end of the spectrum. Some countries in Europe (Belarus) and Latin America (Venezuela), while primarily market-oriented, have a greater degree of government involvement in economic decisions than the Canadian economy. China and Russia, while over the past several decades have moved more in the direction of having a market-oriented system, remain closer to the command economy end of the spectrum.
- **Command economy** – The government decides what goods and services will be produced and what prices it will charge for them. The government decides what production methods to use and sets wages for workers. The government provides many necessities like healthcare and education for free. Currently, Cuba and North Korea have command economies.

1.3 Scarcity and the Fundamental Economic Questions

The choices we confront in society due to scarcity raise three issues. Every economy must answer the following BIG questions:

1. *What should be produced?* Using the economy's scarce resources to produce one thing requires giving up another. Producing better education, for example, may require cutting back on other services, such as health care. A decision to preserve a wilderness area requires giving up other uses of the land. Every society must decide what it will produce with its scarce resources.
2. *How should goods and services be produced?* There are many choices to determine how goods and services should be produced. Should a firm employ a few skilled or a lot of unskilled workers? Should it produce in its own country, or should it use foreign plants? Should manufacturing firms use new or recycled raw materials to make their products? Factors of production produce goods and services.
3. *For whom should goods and services be produced?* If a good or service is produced, a decision must be made about who will get it. Who gets the good or service depends on the income that people earn.

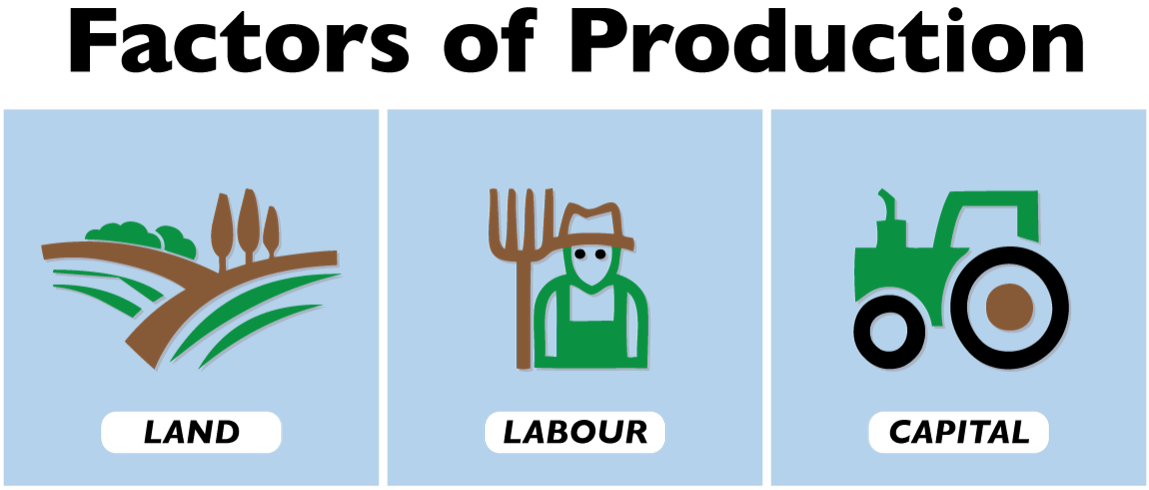
Definitions

The factors of production in an economy are its labour, capital, and natural resources.

Labour is the human effort that can be applied to producing goods and services. People who are employed—or are available to be—are considered part of the labour available to the economy.

Capital is a factor of production that has been produced for use in producing other goods and services. Office buildings, machinery, and tools are examples of capital. Natural resources are the resources of nature that can be used to produce goods and services.

Natural Resources have two essential characteristics: first, they are found in nature, and second, they can be used to produce goods and services.



"Factors of Production" by Fanshawe College, CC BY-NC-SA 4.0

Labour earns wages and salaries, capital earns interest, natural resources such as land earn rent, and entrepreneurship earns a profit. Below, we look at the factors of production in greater detail.

Labour

Labour is the human effort that can be applied to production. People who work to repair tires, pilot airplanes, teach children, or enforce laws are all part of the economy's labour. People who would like to work but have not found employment—who are unemployed—are also considered part of the labour available to the economy.

> In some contexts, it is helpful to distinguish two forms of labour. The first is the human equivalent of a natural resource. It is the natural ability an untrained, uneducated person brings to a particular production process. But most workers bring far more. A worker's skills as a result of education, training, or experience that can be used in production are called human capital. Students are acquiring human capital. Workers who are gaining skills through experience or through training are acquiring human capital.

Capital

We know that very early on, humans began shaping stones into tools, apparently for use in butchering animals. Those tools were the first capital because they were produced for use in producing other goods—food and clothing. Modern versions of the first stone tools include saws, meat cleavers, hooks, and grinders; all are used in butchering animals. Tools such as hammers, screwdrivers, and wrenches are also capital. Transportation equipment, such as cars and trucks, is capital. Facilities such as roads, bridges, ports, and airports are capital. Buildings, too, are capital; they help us to produce goods and services.

Capital does not consist solely of physical objects. Computer software used by business firms or government agencies to produce goods and services is capital. Capital may thus include physical goods and intellectual discoveries.

Natural Resources

There are two essential characteristics of natural resources. The first is that they are found in nature—no human effort has been used to make or alter them. The second is that they can be used to produce goods and services. That requires knowledge; we must know how to use the things we find in nature before they become resources.

Oil in the ground is a natural resource because it is found (not manufactured) and can be used to produce goods and services. In the mid-nineteenth century, a method was found for refining oil into kerosene that could be used to generate energy, transforming oil into a natural resource. Oil is now used to make all sorts of things, including clothing, drugs, gasoline, and plastic. It became a natural resource because people discovered and implemented a way to use it. Another type of natural resource is land on which factories are built to produce goods and services.

Defining something as a natural resource only if it can be used to produce goods and services does not mean that a tree has value only for its wood or that a mountain has value only for its minerals. If people gain utility from a beautiful wilderness area, that wilderness provides a service. The wilderness is thus a natural resource.

Technology and Entrepreneurship

Goods and services are produced using the factors of production available to the economy. Two things play a crucial role in putting these factors of production to work. The first is technology, the knowledge that can be applied to producing goods and services. The second is an individual who plays a key role in a market economy: the entrepreneur. An entrepreneur is a person who, operating within the context of a market economy, seeks to earn profits by finding new ways to organize factors of production.

1.4 Choices

In Perspective

What motivates people as they make choices?

Choices made in Pursuing Self-Interest

Perhaps more than anything else, it is the economist's answer to this question that distinguishes economics from other fields. Economists assume that individuals make choices that they expect will create the maximum value of some objective, given their constraints. Furthermore, economists assume that people's objectives will serve their self-interest. Economists assume, for example, that the owners of businesses seek to maximize profit. Given the assumed goal of profit maximization, economists can predict how firms in an industry will respond to changes in the markets in which they operate. Due to relatively higher labour costs in the West, for example, economists are not surprised to see firms moving some of their manufacturing operations overseas. Similarly, in studying consumers, economists assume that individual consumers make choices aimed at maximizing their level of satisfaction.

Choices, Opportunity Cost, and Trade–Off

It is within the context of scarcity that economists define, perhaps the most critical concept in all of economics, the concept of opportunity cost. **Opportunity cost** is the value of the best alternative forgone in making any choice.

The opportunity cost is the value of the best other use to which you could have put your time. If you spend $20 on a potted plant, you have simultaneously chosen to give up the benefits of spending the $20 on pizzas, a paperback book or a night at the movies. If the book is the most valuable of those alternatives, then the opportunity cost of the plant is the value of the enjoyment you otherwise expected to receive from the book.

The concepts of scarcity, choice, and opportunity cost are at the heart of economics. A good is scarce if one alternative requires that another be given up. The existence of alternative uses forces us to make choices. The opportunity cost of any choice is the value of the best alternative forgone in making it. This is the trade-off that individuals face in making choices. As decision-makers, we must make trade-offs on what we do with finite resources.

Choices and Marginal Thinking

Economists argue that most choices are made "at the margin." The margin is the current level of activity. Think

of it as the edge from which a choice will be made. A choice at the margin is to do a little more or a little less of something. Assessing choices at the margin can lead to beneficial insights.

Example: Water Conservation Choice

Consider, for example, the problem of curtailing water consumption when the amount of available water falls short of what people now use. Economists argue that one way to induce people to conserve water is to raise its price. A typical response to this recommendation is that a higher price would not affect water consumption because water is necessary. But choices in water consumption, like virtually all choices, are made at the margin. Individuals do not make choices about whether they should or should not consume water. Instead, they decide whether to consume a little more or a little less water.

Household water consumption in Canada totals about 329 litres per person per day (McGill University, 2020). Think of that starting point as the edge from which a choice at the margin of water consumption is made. Could a higher price cause you to use less water brushing your teeth, take shorter showers, or water your lawn less? Could a higher price cause people to reduce their use, say, to 328 gallons per person per day? To 327? When we examine the choice to consume water at the margin, the notion that a higher price would reduce consumption seems much more plausible. Prices affect our water consumption because choices in water consumption, like other choices, are made at the margin.

"Water Conservation" by GDJ, CC0 1.0

Marginal Benefit and Marginal Cost

Most decisions involve doing a little more or a little less of something. For example, should you watch an extra hour of TV or study instead? Marginal cost and benefit (MC and MB): the additional cost or benefit associated with a small addition to some action. Comparing MC and MB is known as Marginal Analysis.

Definition: Marginal Analysis

Marginal analysis breaks down a decision into a series of 'yes or no' decisions. More formally, it is an examination of the additional benefits of an activity compared to the additional costs incurred by that same activity. If benefits > costs, this is the right choice for a rational thinker.

Marginal analysis is an essential concept for everything we learn in economics because it lies at the core of why we make decisions. We have just scratched the surface of it now but will go more in-depth in Chapter 2.

Attribution

1.5 Economics - Social Science & Policy Tool

Economics is not a form of moral instruction. Instead, it seeks to describe economic behaviour as it exists. Philosophers draw a distinction between positive statements, which describe the world as it is, and normative statements, which describe how the world should be.

- A statement of fact or a hypothesis is a **positive statement**. Although people often disagree about positive statements, such disagreements can ultimately be resolved through investigation, such as "the unemployment rate in Canada is 6 percent," or "It is raining outside," or "Microsoft is the largest producer of operating systems for personal computers in the world." They may be true or false, but we can test them, at least in principle.

- There is another category of assertions, however, for which investigation can never resolve differences. A **normative statement** makes a value judgment. Such a judgment is the speaker's opinion; no one can "prove" that the statement is incorrect. Here are some examples of normative economic statements: "We ought to do more to help the poor." "People in Canada should save more." "The government should raise minimum wages." The statements are based on the values of the person who makes them. They cannot be proven false.

When economists are trying to explain the world, they are scientists. They use positive statements to describe the world, and when they are trying to change the world, they are policy advisors. They use normative statements about how the world should be.

Video: Positive Vs Normative

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/principlesofmacroeconomicscdn/?p=45#oembed-1

Episode 5: Positive vs Normative by mgmfoodie [1:24]

1.6 Economic Model

Economists see the world differently than anthropologists, biologists, classicists, or practitioners of any other discipline. They analyze issues and problems using economic theories based on particular assumptions about human behaviour. These assumptions tend to be different than the assumptions an anthropologist or psychologist might use.

Definitions:

A **theory** is a simplified representation of how two or more variables interact.

A **hypothesis** is an assertion of a relationship between two or more variables that could be proven false.

The purpose of a theory is to take a complex, real-world issue and simplify it to its essentials. If done well, this enables the analyst to understand the issue and any problems around it. A good theory is simple enough to understand while complex enough to capture the key features of the object or situation you are studying. Sometimes, economists use the term model instead of theory. Strictly speaking, a theory is a more abstract representation, while a model is a more applied or empirical representation. Models in economics also help us to generate hypotheses about the real world.

The statement "Increased solar radiation increases the rate of plant growth" is a hypothesis; experiments could be done to show the relationship between solar radiation and plant growth. If solar radiation were shown to be unrelated to plant growth or to retard plant growth, then the hypothesis would be demonstrated to be false. If a test reveals that a particular hypothesis is false, then the hypothesis is rejected or modified. In the case of the hypothesis about solar radiation and plant growth, we would probably find that more sunlight increases plant growth over some range but that too much can retard plant growth. Such results would modify our hypothesis about the relationship between solar radiation and plant growth. Economists often use statistical methods to test a hypothesis.

If the tests of a hypothesis yield results consistent with it, then further tests are conducted. A hypothesis that has not been rejected after widespread testing and that wins general acceptance is commonly called a **theory**. A theory subjected to even more testing and awarded virtually universal acceptance becomes a **law**.

We will examine the economic model of the Production Possibilities Frontier in the next chapter and study two economic laws in Chapter 3.

1.7 Key Terms

Key Terms

Capital

Choices

Command Economy

Economics

Hypothesis

Labour

Macroeconomics

Marginal Analysis

Market Economy

Microeconomics

Mixed Economy

Normative Statement

Positive Statement

Scarcity

Technology and Entrepreneurship

Theory

CHAPTER 2: SCARCITY AND CHOICES

Chapter Outline

2.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Describe how market systems work
- Analyze Production Possibilities Frontier (PPF) and opportunity cost
- Explain Comparative Advantage and Trade

In 1968, the Rolling Stones recorded "You Can't Always Get What You Want." Economists chuckled because they had been singing a similar tune for decades.

English economist Lionel Robbins (1898–1984), in his *Essay on the Nature and Significance of Economic Science* in 1932, described not always getting what you want in this way:

> *The time at our disposal is limited. There are only twenty-four hours in the day. We must choose between the different uses to which they may be put. … Everywhere we turn, if we choose one thing, we must relinquish others which, in different circumstances, we would wish not to have relinquished. The scarcity of means to satisfy given ends is an almost ubiquitous condition of human nature.*

Because people live in a world of scarcity, they cannot have all the time, money, possessions, and experiences they wish. Neither can society.

This chapter will continue our discussion of scarcity and the economic way of thinking by introducing the critical concepts of Production Possibility Frontier (PPF), Opportunity Cost, and Comparative Advantage as the basis for international trade.

2.1 Economic Model

An economic model is a simplified framework designed to illustrate complex processes. Often, in introductory Microeconomics, these models seem oversimplified because they hold certain variables constant. While one should remain aware of this, these models are still valid. Holding some information constant can help us understand a concept without being overwhelmed by a vast number of influencing factors. Economic models are the building blocks of most modern economic theories. By understanding these models, we can develop a mindset to understand the economic world.

The two essential Economic Models we shall consider here are:

- Circular Flow Model
- Production Possibility Model

Video: Economic Models & Theories

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/principlesofmacroeconomicscdn/?p=56#oembed-1

Episode 5A: Models & Theories by mgmfoodie [3:26]

2.2 Circular Flow Model

The circular Flow Diagram(Fig 2.1) 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 *labour market,* in which households sell, labour to business firms or other employees. The direction of the arrows shows that in the goods and services market, households receive goods and services and pay firms for them. In the labour market, households provide labour and receive payment from firms through wages, salaries, and benefits.

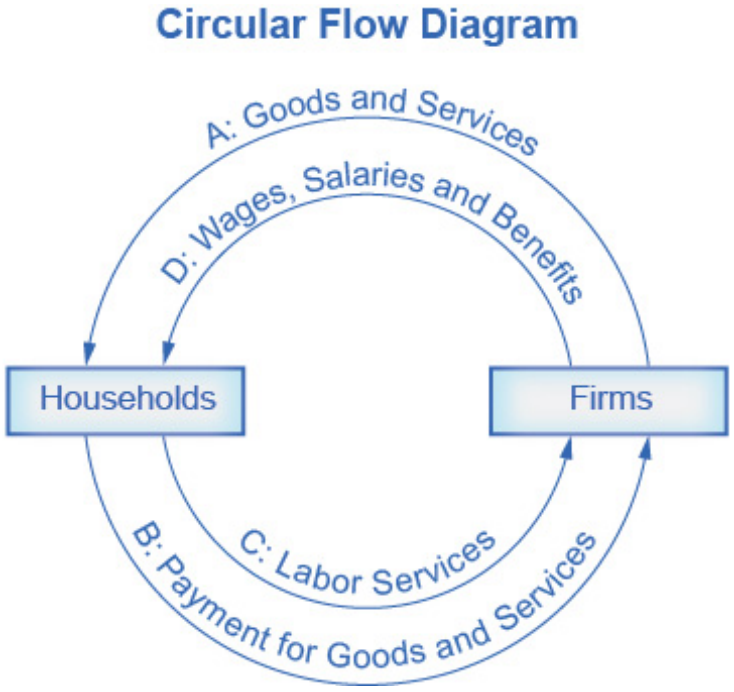


Fig 2.1 "Circular Flow Diagram" by OpenStax, CC BY 4.0.

Firms produce and sell goods and services to households in the market for goods and services (or product market). The arrow "A" indicates this. Households pay for goods and services, which become the revenues to firms. Arrow "B" indicates this. Arrows A and B represent the two sides of the product market. Where do households obtain the income to buy goods and services? They provide the labour and other resources (e.g. land, capital, raw materials) firms need to produce goods and services in the market for inputs (or factors of production). The arrow "C" indicates this. In return, firms pay for the inputs (or resources) they use in the form of wages and other factor payments. The arrow "D" indicates this. Arrows "C" and "D" represent the two sides of the factor market.

There are many different markets for goods and services and different types of labour. 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. The outer circle shows this and represents the two sides of the product market (for example, the market for goods and services) in which households demand and firms supply. Households sell their labour as workers to firms in return for wages, salaries, and benefits. The inner circle shows this and represents the two sides of the labour 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 labour 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).

2.3 Production Possibility Model

Just as individuals cannot have everything they want and must instead make choices, society as a whole cannot have everything it might want, either. This section of the chapter will explain the constraints society faces, using a model called the **Production Possibilities Frontier (PPF).**

In perspective

"Pineapple" by Twitter Emoji, CC BY 4.0.

You are stranded on a tropical island alone. On this island, there are only two foods: pineapples and crabs.

In other words, you face a trade-off: any time you spend harvesting pineapples is time that cannot be spent looking for crabs. You are forced to decide on how to allocate the scarce resource of time.

While this is an extreme example, it is reflective of a common problem in production. Since there are only a certain number of hours in the day, time is a scarce resource. This scarcity limits the amount of total production.

Possibilities	P	C
A	0	15
B	10	12
C	20	8
D	30	0

You
Fig. 2.2

Fig 2.2 – By Fanshawe College, CC BY-NC-SA 4.0

Figure 2.2 displays a table showing several different combinations of goods that can be harvested in a given week. The table is very logical – if you spend all your time catching crabs, you will have no pineapples. Notice that you can produce either all crabs, all pineapples, or a mix of the two.

Assume you choose only to catch crabs. How many would have to be given up to obtain ten pineapples? In this example, three. This is an important concept; even though our scarce resource is time, we can measure the cost of a good, in this case, pineapples, in terms of the foregone good, in this case, crabs.

> This concept is called the **Marginal (Opportunity) Cost** of an action. In this case, since you have to give up three crabs to produce ten pineapples, the marginal cost for one pineapple is 3/10 of a crab.

Notice how the marginal cost changes as you harvest more pineapples. To produce the next ten pineapples, it costs four crabs, and the following ten costs eight. Now, there are no more crabs to give up. While marginal opportunity cost is not continuously increasing, it is intuitive to think that the more pineapples you pick, the harder they will be to find, and therefore, the more time you will have to give up to harvest ten more.

While much useful analysis can be conducted with a chart, it is often useful to represent our models graphically. **A Production Possibility Frontier (PPF)** is the graphical representation of Figure 2.2. It represents the maximum combination of goods that can be produced given available resources and technology. Each point represents one of the combinations from Figure 2.2.

In our example, while we would love to produce 30 pineapples and 30 crabs, this is out of our realm of possible production. In other words, it is not a point on our PPF.

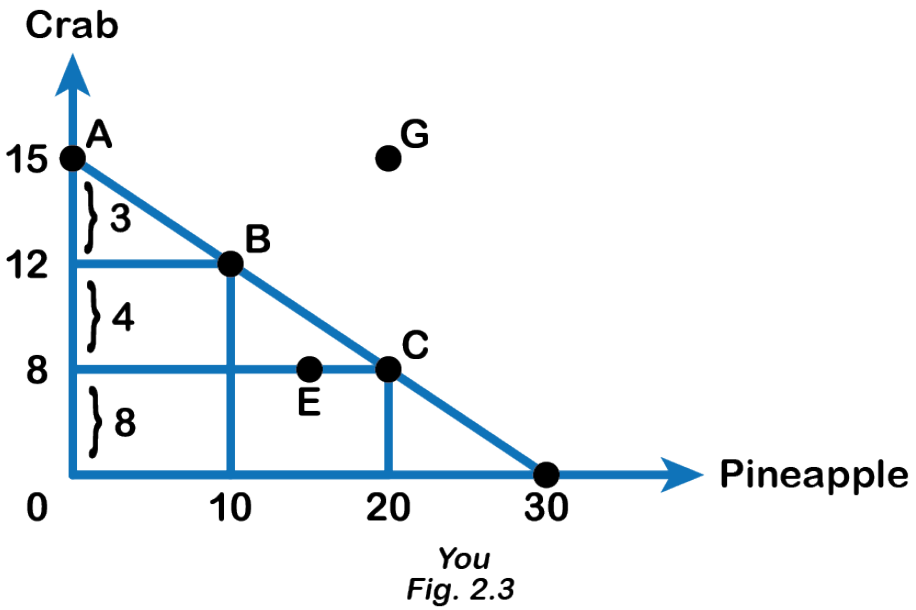


Fig 2.3 – By Fanshawe College, CC BY-NC-SA 4.0

Using our terminology from before, each point along our PPF (i.e. Point A) is *efficient* (in a one-person world) since there is no way to get more pineapples without giving up some crabs and vice-versa. If we are inside the PPF (i.e. Point B), we are not fully using our resources. In this case, we can produce more pineapples without having to give up any more crabs. This point is **inefficient**. Points outside the PPF (i.e. Point C), while preferable, are *unattainable* given constraints in resources and time.

PPF and Increasing Opportunity Cost

Using our analysis of Marginal Cost (MC) from before, we see that the Slope (absolute value) of the PPF is the amount of the good on the vertical axis given up to obtain additional units of the good on the horizontal axis. Recall that the slope is calculated using rise overrun. From Fig 2.2, we see that to gain ten additional pineapples (from 10 to 20 units), we give up four crabs (12 to 8 units). To obtain another ten units of pineapples (from 20 to 30 units), we give up eight crabs (8 to 0 units) as we move down the PPF, the slope and MC

increase. This pattern is common enough that economists have given it a name: **the law of increasing opportunity cost.**

Definition: law of increasing opportunity cost

The law of increasing opportunity cost – which holds that as the production of a good or service increases, the marginal opportunity cost of producing it increases as well.

This happens because some resources are better suited for producing certain goods and services instead of others. When the producer wants to obtain more pineapples and devotes more resources (time and effort) to it, there will be fewer resources available for obtaining the other goods, crab. Therefore, more pineapples result in the greater sacrifice of crabs.

Our government spends a certain amount of funds on reducing crime. However, additional increases typically cause relatively more significant increases in the opportunity cost of reducing crime and paying for enough police and security to reduce crime to nothing would be a tremendously high opportunity cost.

The curvature of the production possibilities frontier shows that as we add more resources to pineapples, moving from left to right along the horizontal axis, the original increase in opportunity cost is relatively small but gradually increases. In this way, the law of increasing opportunity cost produces the outward-bending shape of the production possibilities frontier.

2.4 Economic Growth

Shifting a PPF

An increase in the physical quantity or the quality of factors of production available to an economy or a technological gain will allow the economy to produce more goods and services; it will shift the economy's production possibilities curve outward. The process through which an economy achieves an outward shift in its production possibilities curve is called economic growth. An outward shift in a production possibilities curve is illustrated in Fig 2.4. In Panel (a), a point such as N is not attainable; it lies outside the production possibilities curve. Growth shifts the curve outward, as in Panel (b), making previously unattainable production levels possible. **Economic Growth** allows countries, individuals, or firms to reach points outside their PPF. Factors that allow shifts in countries' PPF, resulting in a change in attainable output, include:

- *A Shift in Technology.* If you were to invent a computer system that showed the location of crabs and pineapples on the island, you would be able to produce more of both goods, shifting the PPF outward.
- *More Physical capital, Education or Training.* If you were to become more skilled at harvesting pineapples or crabs and obtain more equipment, your attainable output would increase, shifting the PPF outward.

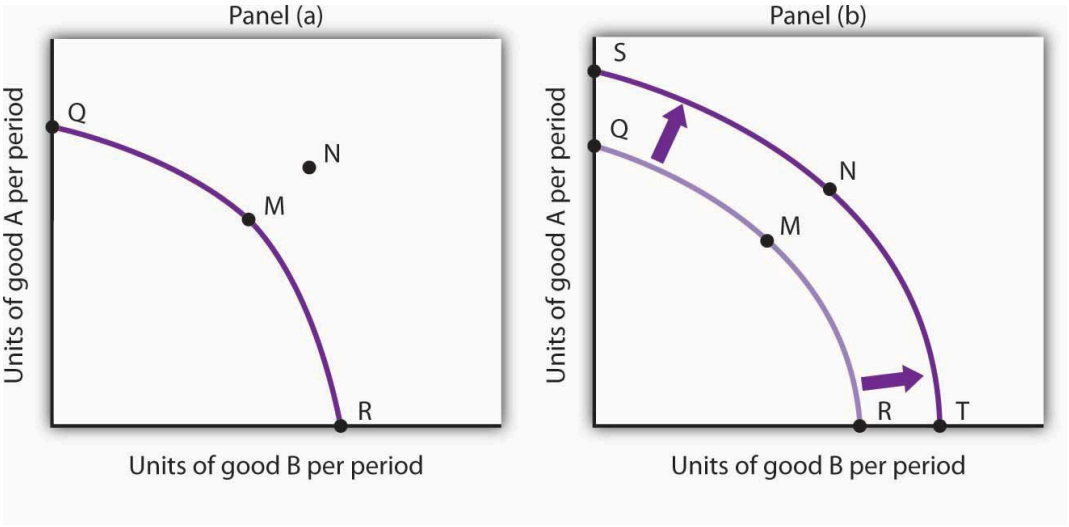


Fig 2.4 "Economic Growth and the Production Possibilities Curve" by University of Minnesota, CC BY-NC-SA 4.0.

2.5 PPF and International Trade

"Globalization Networking" by faith.e.murphy Murphy, Public Domain.

One of the most important implications of the concepts of the production possibilities curve relates to international trade. The evidence that international trade confers overall benefits on economies is solid. Trade has accompanied economic growth in Canada and around the world. Many economies that have shown the most rapid growth in the last few decades — for example, Japan, South Korea, China, and India — have done so by dramatically orienting their economies toward international trade. To understand the benefits of trade or why we trade in the first place, we need to understand the concepts of comparative and absolute advantage.

In the previous section on the production possibilities frontier, we stated that points outside the PPF were impossible given our constraints. With trade, these constraints can change. Continuing the pineapple and crab example from Fig 2.2, suppose another person, Jamie, becomes stranded on the island with you. You could choose to avoid him and live your own separate lives, or you could work together to improve each other's well-being. It turns out Jamie has different skills than you – he is *better* at producing crabs, and you are *better* at growing pineapples. Jamie's production possibilities are shown in the table below (Fig 2.5).

Possibilities	P	C
A^1	0	20
B^1	5	15
C^1	10	9
D^1	15	0

Jamie
Fig. 2.5

Fig 2.5 – By Fanshawe College, CC BY-NC-SA 4.0

In this case, where one person or group is *better* at producing a good, we say they have an **Absolute Advantage** in producing the good. In this example, from Fig 2.2 and 2.5, Jamie has an absolute advantage in the production of crab as he can produce a maximum of 20 crabs while you can produce a maximum of 15 crabs, and you have an absolute advantage in producing pineapples as you can grow a maximum of 30 pineapples while Jamie can produce a maximum of 15 only. The graph below (Fig 2.6) shows Jamie's production possibilities.

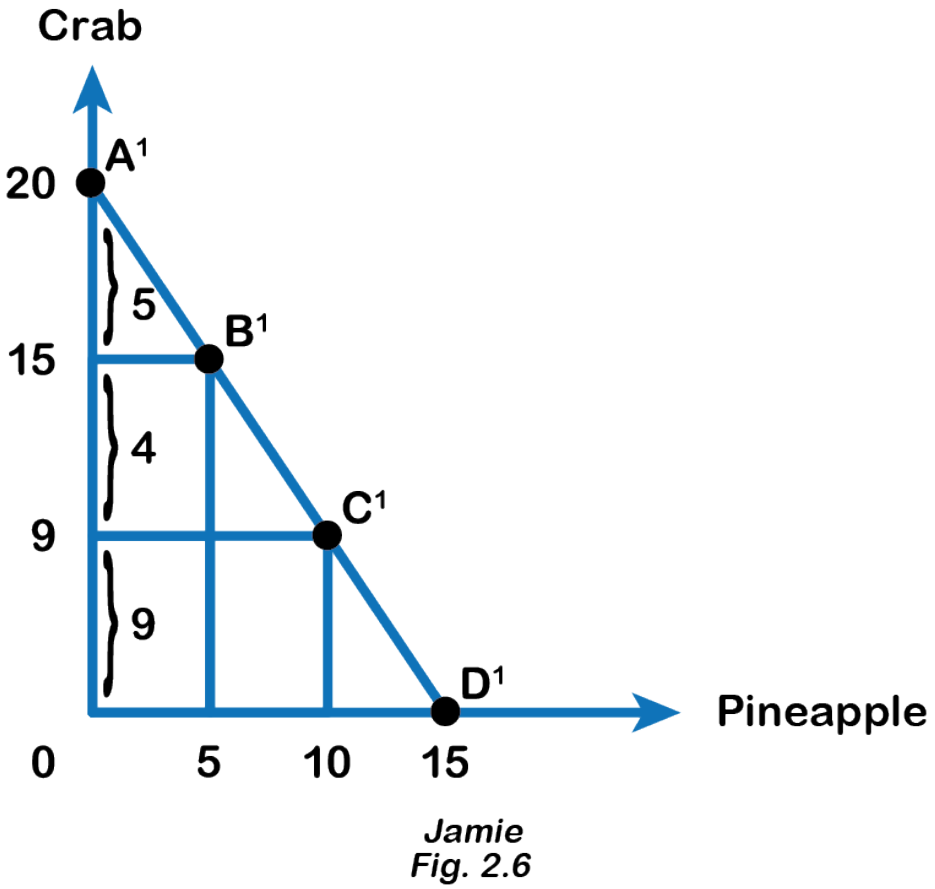


Fig 2.6 – By Fanshawe College, CC BY-NC-SA 4.0

The basis for trade is **Comparative Advantage**. When one can produce a good at a lower opportunity cost than another, the person is said to be efficient or have a comparative advantage in producing that good.

Finding Out Comparative Advantage

Refer to Fig 2.3. When you produce 15 crabs, you give up 30 pineapples. So, your opportunity cost of producing one crab is two pineapples. Referring to Fig 2.6, when Jamie produces 20 crabs, he gives up 15 pineapples. So Jamie's opportunity cost of producing one crab is 0.75 pineapples. Because Jamie has a lower opportunity cost in producing crabs, he has a **comparative advantage** in crabs. Similarly, we can find your opportunity cost in producing one pineapple is 0.5 crabs, and Jamie's opportunity cost is 1.33. Therefore, we can infer you have a lower opportunity cost or **comparative advantage** in producing pineapples.

Comparative Advantage and Specialization

When one has a comparative advantage in producing a good, that person should specialize in producing that good. This **specialization** in production results in gains from trade, as each person or country can focus on what it can produce at the lowest cost and trade it with its partner.

Even though Jamie had the absolute advantage in crabs, his opportunity cost of producing crabs was still higher since opportunity or marginal cost is based on a trade-off between the two goods. We can liken this example to trade between Canada and a developing country. Canada may be better at producing both computers and textiles (the absolute advantage), but the advantages we have in producing computers are far more significant. Any hour we have to give up to produce textiles comes at a much higher cost than it would to a developing country, giving us the comparative advantage at producing computers and the developing country the advantage at producing textiles.

The island example is no different. Even though Jamie is better at producing pineapples, what Jamie is an expert at is producing crabs, so having to give up time spent catching crabs comes at a high cost. Therefore, you should specialize in producing pineapples and export them to Jamie, while Jamie should produce crabs and export them to you.

2.6 Gains from Trade

Trade Example

Suppose, before trade, you choose to produce 20 pineapples and eight crabs, and Jamie decides to produce ten pineapples and nine crabs. Because you have a comparative advantage in growing pineapples, you should specialize in pineapples and can grow a maximum of 30. Jamie specializes in crabs and produces a maximum of 20 crabs. In this situation, both players produce only the goods they have the comparative advantage.

Before Trade Production Possibilities:

Fig 2.7

	Pineapple	Crab
You	20	8
Jamie	10	9

Exchange: If You and Jamie choose to trade ten pineapples for nine crabs, then after the trade, You are left with 20 pineapples and nine crabs (point S in Fig 2.8 Panel (A)) while Jamie is left with ten pineapples and 11 crabs (Point S^1 in Fig 2.8 Panel (B)). Therefore, after the trade, You gain +1 crab, and Jamie gains +2 crabs. Both trading partners move to a point outside their current PPF, resulting in economic growth. Figure 2.8 (Panels (A) and (B)) and Fig 2.9 below show your and Jamie's production possibilities both before and after the trade.

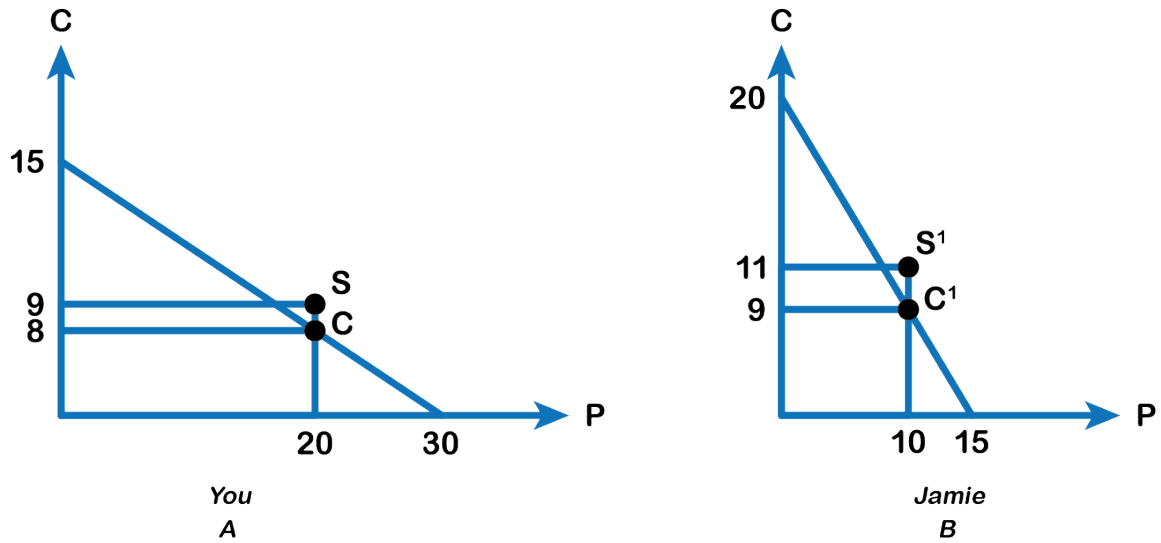


Fig 2.8 – By Fanshawe College, CC BY-NC-SA 4.0

Fig 2.9 Production possibilities both before and after the trade.

	You		Jamie	
	Pineapples	**Crabs**	**Pineapples**	**Crabs**
Before trade production	20	8	10	9
Specialization	30	0	0	20
After trade production and consumption	20	9	10	11
Gains from trade	–	+1	–	+2

The **implications** of our model for trade are that
(a) trade is mutually beneficial
(b) certainly redistributes resources among the two trading partners
(c) leads to specialization and more significant skills.
This reallocation of resources produces enormous benefits, but they do not come without costs.

In Chapter 2, we have explored the production possibility model in-depth, looking at a simplified version of trade and deepening our understanding of opportunity costs. Now, we can take our knowledge of basic economic modelling and examine one of the most important microeconomics: supply and demand.

2.7 Key Terms

Key Terms

Absolute Advantage

Circular Flow Diagram

Comparative Advantage

Economic Growth

Economic Model

Production Possibility Frontier (PPF)

Specialization

The law of increasing opportunity cost

CHAPTER 3: DEMAND AND SUPPLY

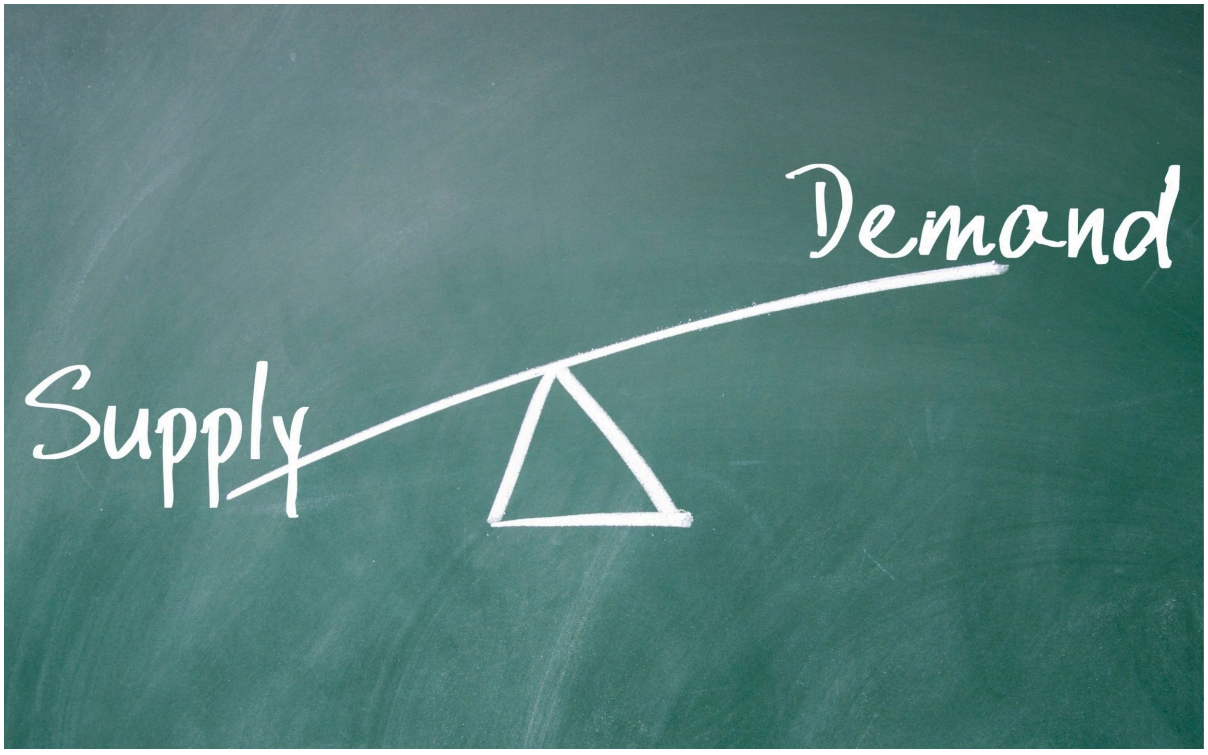
Chapter Outline

3.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Explain Demand and Quantity demanded
- Discuss variables that influence demand
- Describe Supply and Quantity supplied
- Elaborate variables that influence supply
- Illustrate Market Equilibrium
- Use demand-supply graphs to predict changes in price and quantity



"Supply and Demand" by Fanshawe College, CC BY-NC-SA 4.0

When economists talk about prices, they are less interested in making judgments than in understanding what determines prices and why prices change.

In perspective

Consider a price most of us contend with weekly: that of a litre of gas. Why was the average price of gasoline in Canada $1.39 per litre in July 2021? Why did the gasoline price fall sharply to 77.8 cents per litre in April 2020? 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.

Usually, the price of gasoline in June of any given year is nearly always higher than in January. 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 willing to pay more for gas, but that does not explain how steeply gas prices fell. Other factors were at work during those 18 months, such as increases in supply and decreases in the demand for crude oil.

This chapter introduces the economic model of demand and supply—one of the most influential economic models. 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.

3.1 Demand

Price and Quantity Demand

While different variables play different roles in influencing the demands for various goods and services, economists pay special attention to one: *the price of the good or service*. Given the values of all the other variables that affect demand, a higher price tends to reduce the quantity people demand, and a lower price tends to increase it.

In perspective

"Slice of pizza" by OpenClipart, Public Domain.

A medium pizza typically sells for $5 to $10. Suppose the price was $30. You would probably buy fewer pizzas at that price than you do now. Suppose pizzas are typically sold for $2 each. At that price, people would likely buy more pizzas than they do now.

We will discuss first how price affects the quantity demanded of a good or service and then how other variables affect demand. Because people will purchase different quantities of a good or service at different prices, economists must be careful when discussing the "demand" for something. They have, therefore, developed some specific terms for expressing the general concept of demand.

The quantity demanded of a good or service is the quantity buyers are willing and able to buy at a particular price during a specific period, all other things unchanged ("ceteris paribus" in Latin).

Example: Demand

Suppose, for example, 100,000 movie tickets are sold monthly in a particular town for $8 per ticket. That quantity—100,000—is the quantity of movie admissions demanded monthly for $8. If the price were $12, we would expect the quantity demanded to be less. If it were $4, we would expect the quantity demanded to be greater. The quantity demanded at each price would be different if other things that might affect it, such as the town's population, were to change. That is why we add the qualifier that *other things have not changed* to the definition of quantity demanded.

A demand schedule is a table that shows the quantities of a good or service demanded at different prices during a particular period, all other things unchanged. To introduce the concept of a demand schedule, let us consider the demand for coffee in Canada. The table in the figure below shows quantities of coffee demanded each month at prices ranging from $9 to $4 per pound; the table is a demand schedule. We see that the higher the price, the lower the quantity demanded and vice versa.

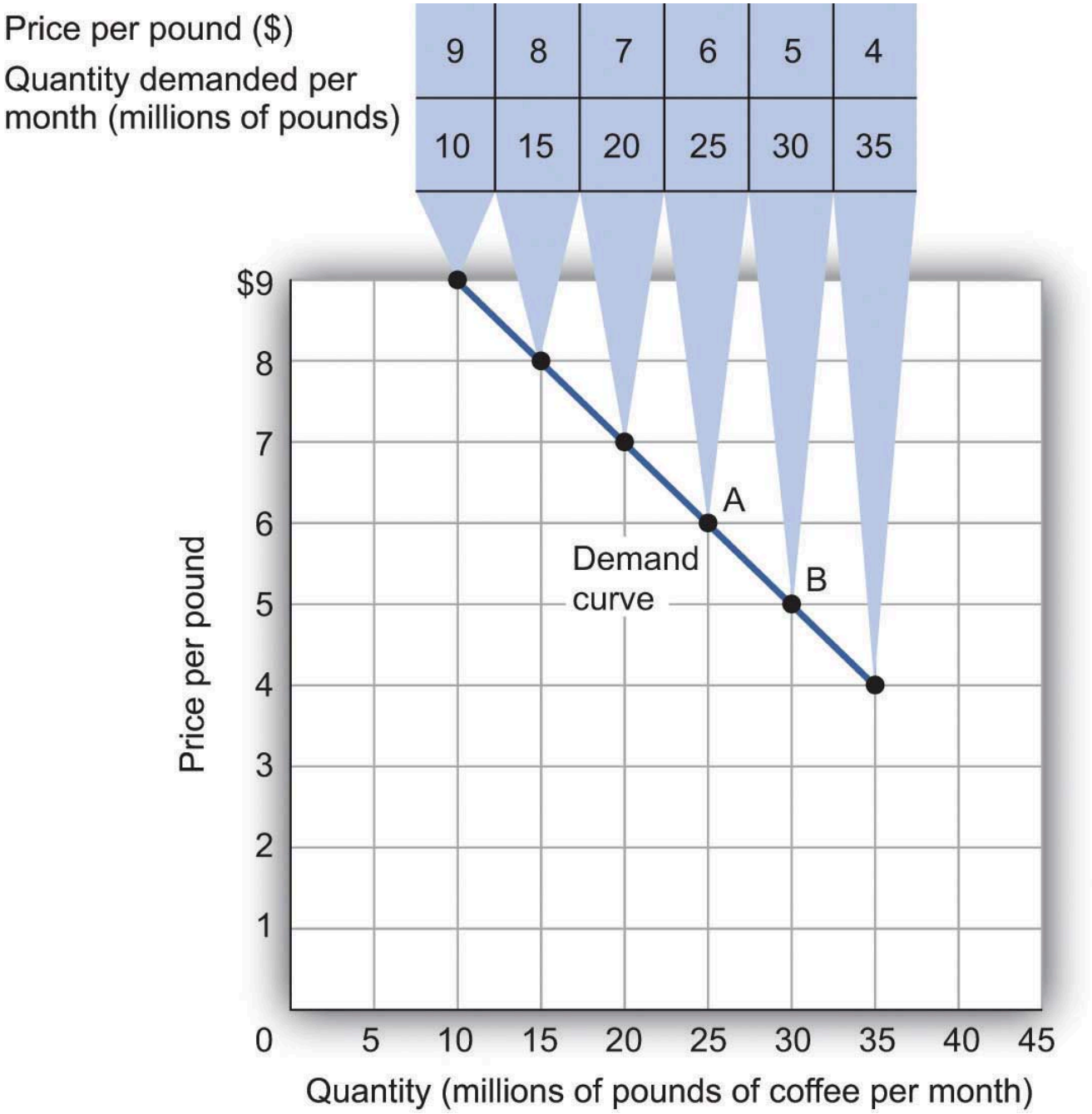


Fig 3.1. "A Demand Schedule and a Demand Curve" by University of Minnesota, CC BY-NC-SA 4.0.

The information given in a demand schedule can be presented with a demand curve, a graphical representation of a demand schedule. A demand curve thus shows the relationship between the price and quantity demanded of a good or service during a particular period, with all other things unchanged. The demand curve in the above figure shows the prices and amounts of coffee given in the demand schedule. At point A, for example, we see that 25 million pounds of coffee per month are demanded for $6 per pound. By convention, economists graph price on the vertical axis and quantity on the horizontal axis.

A change in price, with no change in any of the other variables that affect demand, results in a movement

along the demand curve. If the price of coffee falls from $6 to $5 per pound, consumption rises from 25 million pounds to 30 million pounds per month. That is a movement from point A to point B along the demand curve in Fig 3.1. A movement along a demand curve resulting from a price change is called a **change in quantity demanded.** Note that a change in quantity demanded is not a change or shift in the demand curve but a movement along the demand curve.

All other things unchanged, the Law of demand holds that, for virtually all goods and services, a higher price leads to a reduction in quantity demanded and a lower price leads to an increase in quantity demanded. The law of demand is called a law because the results of countless studies are consistent. Given the values of other variables that influence demand, a higher price reduces the quantity demanded. A lower price increases the quantity demanded—demand curves, in short, slope downward, as seen in the graph above.

3.2 Changes in Demand

Price alone does not determine the quantity of a good or service people consume.

Coffee consumption, for example, will be affected by such variables as income and population. Preferences also play a role. We also expect other prices to affect coffee consumption. People often eat doughnuts or bagels with their coffee, so a reduction in the price might induce people to drink more coffee. An alternative to coffee is tea, so a decrease in tea price might result in more tea and less coffee. Thus, changing any of the variables held constant in constructing a demand schedule will change the quantities demanded at each price. The result will be a shift in the entire demand curve rather than a movement along the demand curve. A shift in a demand curve is called a change in demand.

Factors that change demand:

Prices of Related Goods and Services

In general, if a reduction in the price of one good increases the demand for another, the two goods are called **complements**. If a reduction in the price of one good reduces the demand for another, the two goods are called **substitutes**. These definitions hold in reverse as well: two goods are complements if an increase in the price of one reduces the demand for the other, and they are substitutes if an increase in the price of one increases the demand for the other. Doughnuts and coffee are complements; tea and coffee are substitutes.

Refer to Fig 3.2; when the price of tea, a substitute for coffee, rises, more coffee is demanded at each price, as people substitute away from tea and consume more coffee. The result is a shift in demand from the original curve D1 to D2. The quantity of coffee demanded for $6 per pound rises from 25 million pounds per month (point A) to 35 million pounds per month (point A'). Note that a change in quantity demanded, ceteris paribus, refers to a movement along the demand curve, while a change in demand refers to a shift in the demand curve. A *rightward* shift of the demand curve is called an *increase* in demand.

Price	Old quantity demanded	New quantity demanded
$9	10	20
8	15	25
7	20	30
6	25	35
5	30	40
4	35	45

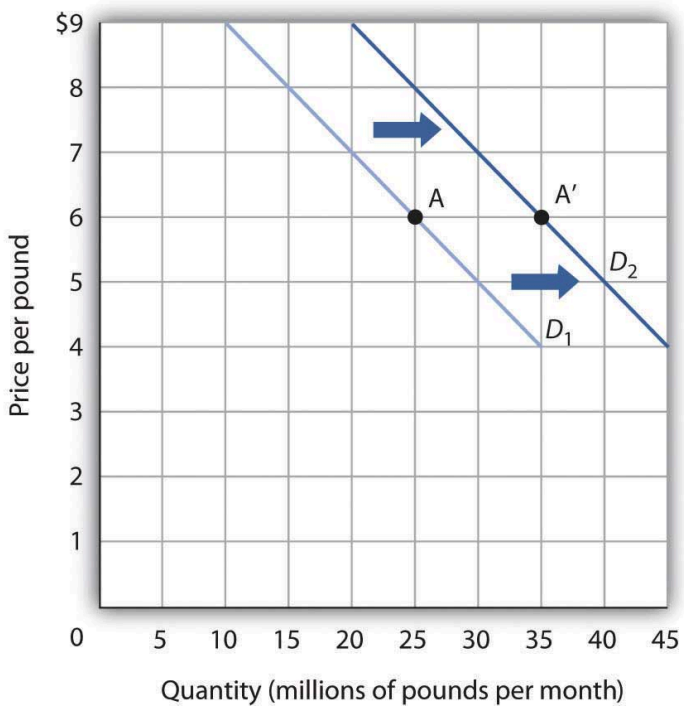


Fig 3.2 "An Increase in Demand" by the University of Minnesota, CC BY-NC-SA 4.0.

Refer to Fig 3.3; when the price of tea, a substitute for coffee, falls, less coffee is demanded at each price, as people substitute away from coffee because tea is relatively cheaper. The result is a shift in demand from the original curve D1 to D3. The quantity of coffee demanded for $6 per pound falls from 25 million pounds per month (point A) to 15 million pounds per month (point A"). Note, again, that a change in quantity demanded, ceteris paribus, refers to a movement along the demand curve, while a change in demand refers to a shift in the demand curve. A *leftward* shift of the demand curve is called a *decrease* in demand.

Price	Old quantity demanded	New quantity demanded
$9	10	0
8	15	5
7	20	10
6	25	15
5	30	20
4	35	25

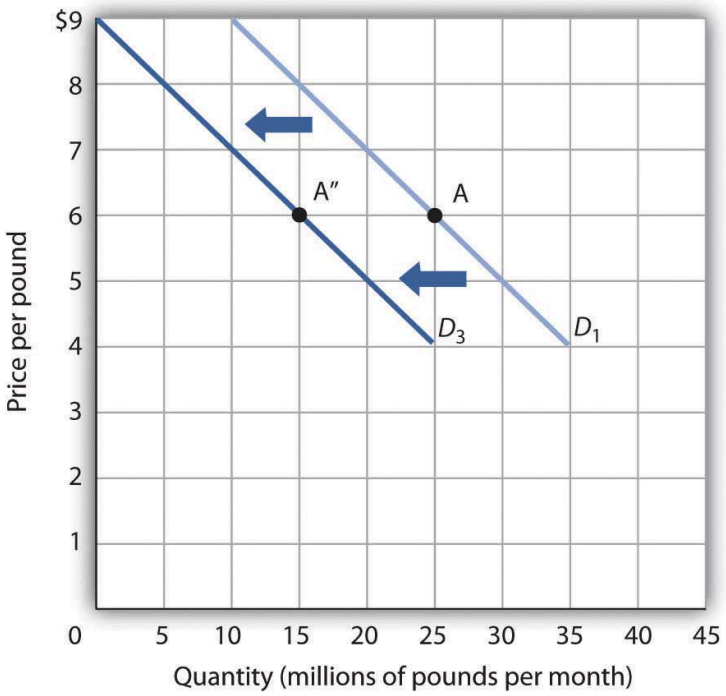


Fig 3.3 "A Reduction in Demand" by University of Minnesota, CC BY-NC-SA 4.0.

Income

As incomes rise, people increase their consumption of many goods and services, and as incomes fall, their consumption of these goods and services falls. An increase in income is likely to raise the demand for gasoline, ski trips, new cars, and jewellery. There are, however, goods and services for which consumption falls as income rises—and rises as income falls. As incomes rise, for example, people tend to consume more fresh fruit but less canned fruit.

A good for which demand increases when income increases is called a normal good. A good for which demand decreases when income rises is called an inferior good. An increase in income shifts the demand curve for fresh fruit (a **normal** good) to the right; it shifts the demand curve for canned fruit (an **inferior** good) to the left.

Preferences

Changes in the preferences of buyers can have significant consequences for demand. An example is the reduced demand for cigarettes caused by concern about the effect of smoking on health. A preference change that makes one good or service more popular will shift the demand curve to the right. A change that makes it less popular will shift the demand curve to the left.

Demographic Characteristics

The number of buyers affects the total quantity of a good or service that will be bought; generally, the greater

the population, the greater the demand. Other demographic characteristics can affect demand as well. As the share of the population over age 65 increases, the demand for medical services increases. When birth rates rise, this raises the demand for such things as infant supplies, elementary school teachers, soccer coaches, in-line skates, and college education. Demand can thus shift as a result of changes in both the number and characteristics of buyers.

Buyer Expectations about future prices

The consumption of goods that can be easily stored or whose consumption can be postponed is strongly affected by buyer expectations. The expectation of newer TV technologies, such as high-definition TV, could slow down sales of regular TVs. If people expect gasoline prices to rise tomorrow, they will fill up their tanks today to try to beat the price increase. The same will be valid for goods such as automobiles and washing machines: an expectation of higher prices in the future will lead to more purchases today. If the price of a good is expected to fall, however, people are likely to reduce their purchases today and await tomorrow's lower prices. For example, the expectation that computer prices will fall can reduce current demand.

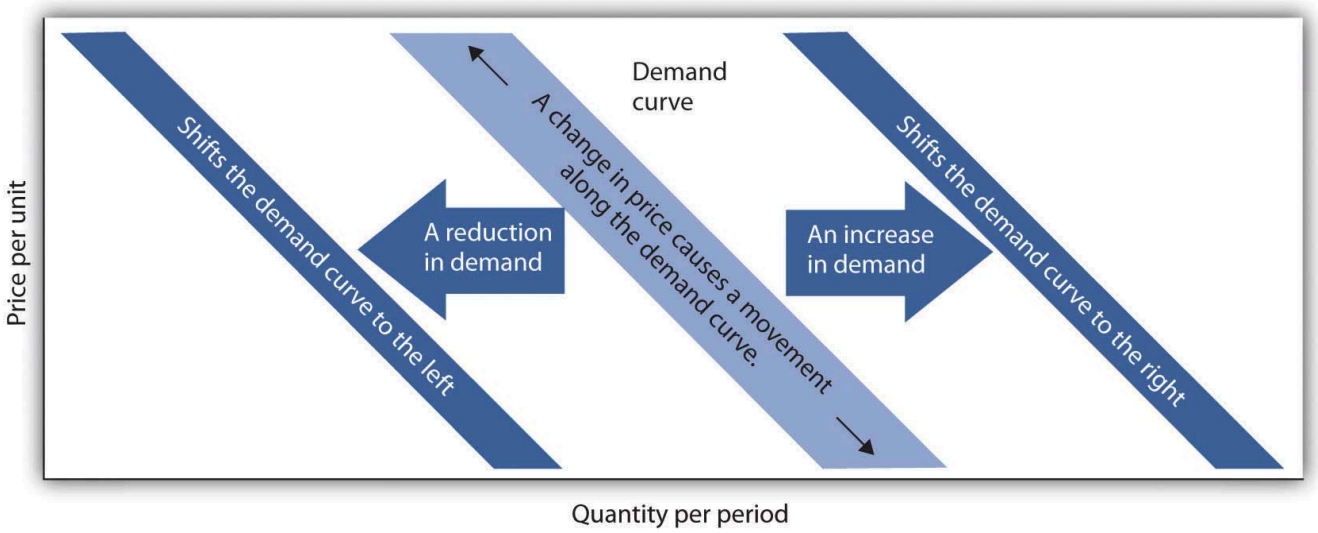


Fig 3.4 Figure by University of Minnesota, CC BY-NC-SA 4.0

3.3 Supply

Price and Quantity Supplied

In Perspective

What determines the quantity of a good or service sellers are willing to offer for sale?

Price is one factor; ceteris paribus, a higher price is likely to induce sellers to offer a greater quantity of a good or service. Production cost is another determinant of supply. Variables that affect production cost include the prices of factors used to produce the good or service, returns from alternative activities, technology, the expectations of sellers, and natural events such as weather changes. We will discuss first how price affects the quantity supplied of a good or service and then how other variables affect supply.

Definition: Quantity supplied

The **quantity supplied** of a good or service is the quantity sellers are willing to sell at a particular price during a particular period, all other things unchanged. Ceteris paribus, receiving a higher price increases profits and induces sellers to increase the quantity they supply. In general, an increase in price results in an increase in quantity supplied, and this relationship is often referred to as the **Law of supply**, with other factors remaining unchanged.

The relationship between price and quantity supplied is suggested in a supply schedule. This table shows quantities supplied at different prices during a particular period, all other things unchanged. Fig 3.5 gives a supply schedule for the quantities of monthly coffee supplied at various prices, ceteris paribus. For $4 per pound, for example, producers are willing to supply 15 million pounds of coffee per month. A higher price, say $6 per pound, induces sellers to provide a greater quantity — 25 million pounds of coffee per month.

Fig 3.5 Supply Schedule

Price	Old Quantity Supplied	New Quantity Supplied
$4	15	25
5	20	30
6	25	35
7	30	40
8	35	45
9	40	50

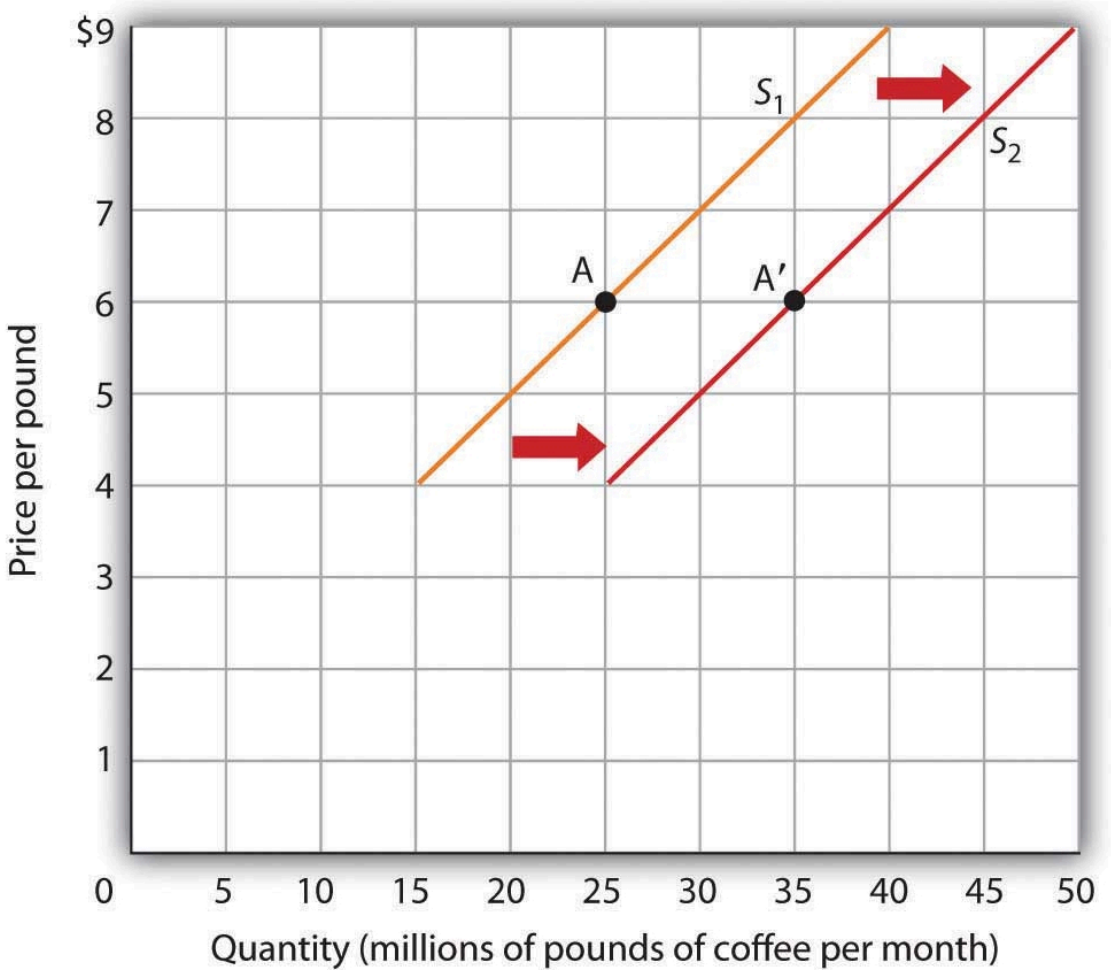


Fig 3.6 "An Increase in Supply" by University of Minnesota, CC BY-NC-SA 4.0.

The information given in a supply schedule in Fig 3.5 can be presented with a supply curve, a graphical representation of a supply schedule, as shown in Fig 3.6. A supply curve thus indicates the relationship between the price and quantity supplied of a good or service during a particular period, all other things unchanged. Because the relationship between price and quantity supplied is generally positive, supply curves are generally upward-sloping.

A change in price causes a movement along the supply curve; such a movement is called a change in quantity supplied. As with a change in quantity demanded, a change in quantity supplied does not shift the supply curve. By definition, it is a movement along the supply curve. For example, if the price rises from $6 per pound to $7 per pound, the quantity supplied rises from 25 million pounds per month to 30 million pounds per month. That's a movement from point A to point B along the supply curve in Fig 3.6.

3.4 Changes in Supply

Definition: Change in Supply

When we draw a supply curve, we assume that other variables that affect the willingness of sellers to supply a good or service are unchanged. It follows that a change in any of those variables will cause a change in supply, which is a shift in the supply curve. Suppose the cost of producing coffee decreases due to a drop in the price of coffee beans. This increases the quantity of coffee supplied at each price, shifting the supply curve to the right. This *shift* in the supply curve is called a **change in supply.**

Factors that change supply:

Prices of Factors of Production

Suppose, for example, that the price of coffee beans falls. That will reduce the cost of producing coffee and thus increase the quantity of coffee producers will offer for sale at each price. The supply schedule in Fig 3.7 shows an increase in the quantity of coffee supplied at each price increase graphically as a shift in the supply curve from 1 to S2. The amount supplied at each price increases by 10 million pounds of coffee monthly. At point A on the original supply curve S1, for example, 25 million pounds of coffee per month are supplied for $6 per pound. After the increase in supply, 35 million pounds per month are supplied at the same price (point A' on curve S2).

Price	Old quantity supplied	New quantity supplied
$4	15	25
5	20	30
6	25	35
7	30	40
8	35	45
9	40	50

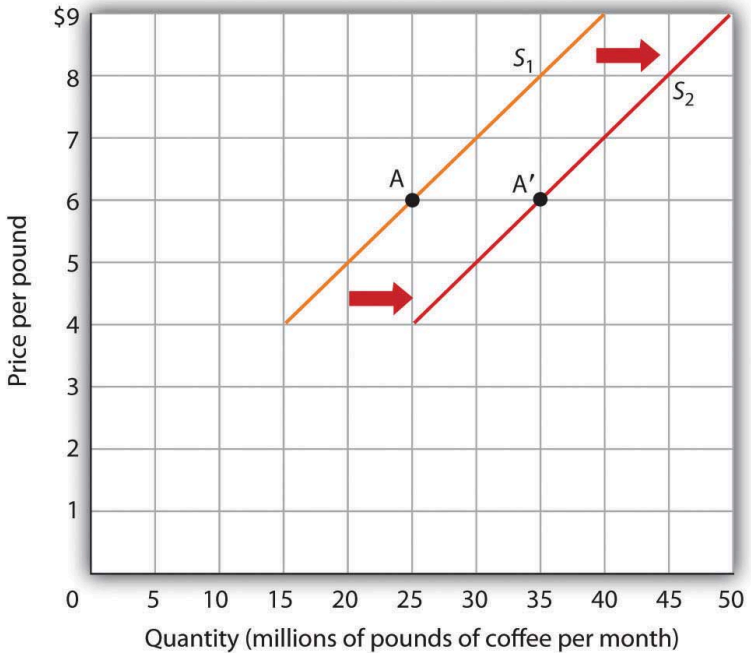


Fig 3.7 "An Increase in Supply" by University of Minnesota, CC BY-NC-SA 4.0

An event that reduces the quantity supplied at each price shifts the supply curve to the left. Adverse weather, such as excessive rain that reduces the yields from coffee plants, are examples of events that might reduce supply. Fig. 3.8 shows a reduction in the supply of coffee. We see in the supply schedule that the quantity of coffee supplied falls by 10 million pounds of coffee per month at each price. The supply curve thus shifts from S1 to S3.

Price	Old quantity supplied	New quantity supplied
$4	15	5
5	20	10
6	25	15
7	30	20
8	35	25
9	40	30

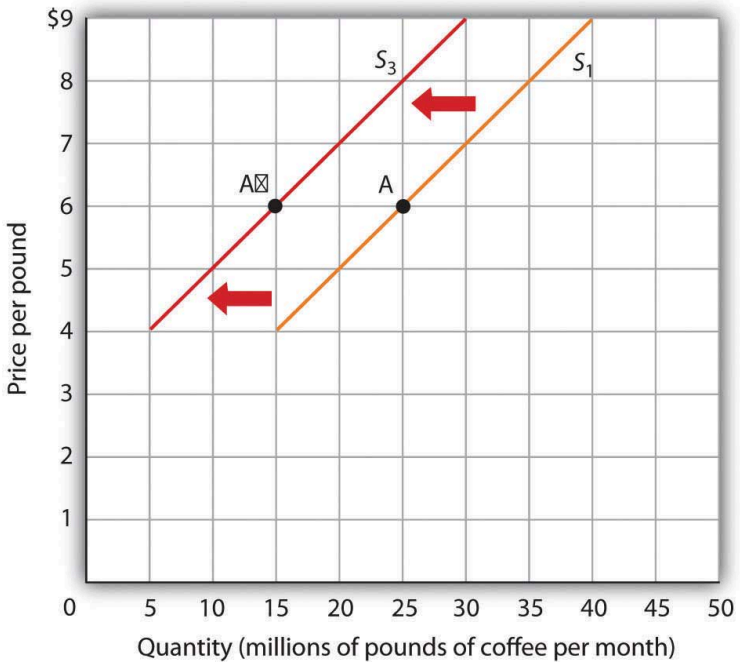


Fig 3.8 "A Reduction in Supply" by University of Minnesota, CC BY-NC-SA 4.0.

Prices of related goods

Like demand, there could be substitutes in production as well. Suppose a producer makes cupcakes and cookies. If the relative price of cupcakes rises, the producer tends to devote more time and resources to producing cupcakes because that is more profitable, so the number of cupcakes supplied increases. At the same time, the opportunity cost of producing cupcakes increases. The opportunity cost of producing a cupcake is not producing cookies. So, the supply of cookies decreases, and the supply curve shifts leftward due to a rise in the price of a related (substitute) good.

Seller expectations about future prices

Like demand, expectations of the supply price affect production decisions. Production decisions are a lot like playing the stock market; if we are producing cupcakes and cookies to sell to the store tomorrow, we have to make them based on the current knowledge we have about those prices. Usually, you will be confident that these prices will stay relatively stable. Still, if you have reason to believe the prices of cupcakes will drastically rise from next week, you may devote less of your attention to producing them today and increase the quantity supplied next week when the price rises. Expectations are usually based on some form of evidence or signal and can cause supply shifts quite suddenly. If the firm expects future prices to rise, supply will decrease today. If the firm expects future prices to fall, supply will increase in the current period.

Number of producers

An increase in the number of sellers supplying a good or service shifts the supply curve to the right; a reduction in the number of sellers shifts the supply curve to the left. If, for example, four new coffee-producing stores enter the market, more will be supplied at each price. The market for cellular phone service has been affected by an increase in the number of firms offering the service. Over the past decade, new cellular phone companies emerged, shifting the supply curve for cellular phone service to the right.

Technology

A technology change alters the combinations of inputs or the types of inputs required in the production process. Technological improvement usually means that the same amount of input can now produce more due to increased productivity from the advanced technology. With more produced at every price, the supply curve will shift to the right, meaning an increase in supply.

Impressive technological changes have occurred in the computer industry in recent years. Computers are much smaller and are far more powerful than they were only a few years ago due to innovation. The result has been a massive increase in the supply of computers, shifting the supply curve to the right.

Natural events

Storms, insect infestations, and drought affect agricultural production and, thus, the supply of agricultural goods. If something destroys a substantial part of an agricultural crop, the supply curve will shift to the left. The terrible cyclone that killed more than 50,000 people in Myanmar in 2008 also destroyed some of the country's prime rice-growing land. That shifted the supply curve for rice to the left. If there is an excellent harvest, the supply curve will shift to the right.

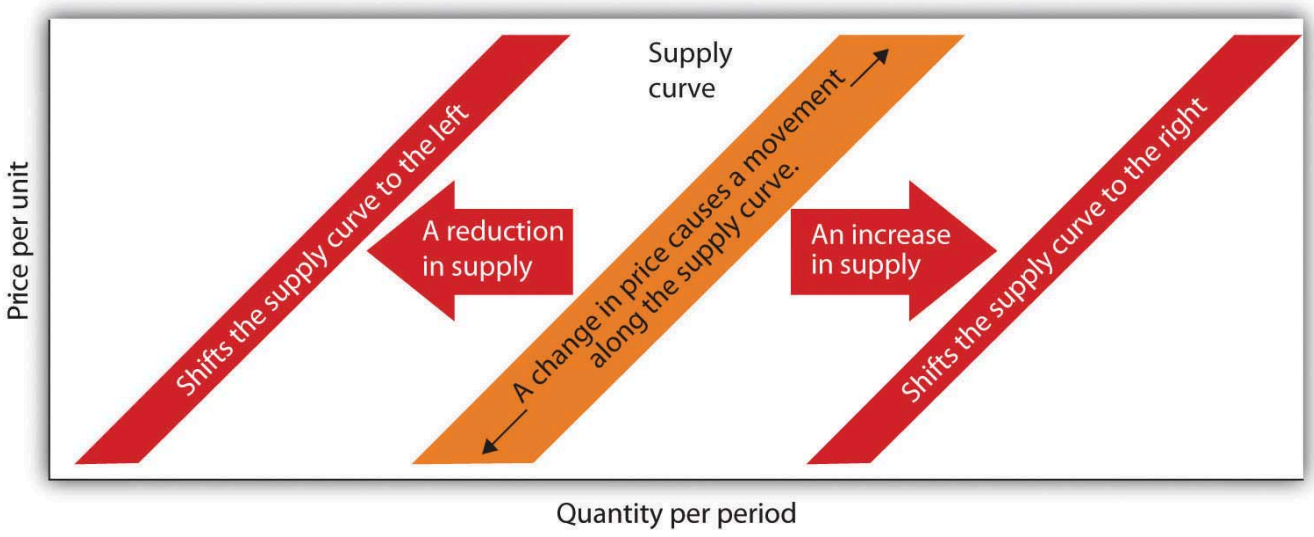


Fig 3.9 Figure by University of Minnesota, CC BY-NC-SA 4.0.

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3.5 Demand, Supply and Equilibrium

The logic of the model of demand and supply is simple. The demand curve shows the quantities of a particular good or service that buyers will be willing and able to purchase at each price during a specified period. The supply curve shows the quantities sellers will offer at each price during that period. By putting the two curves together, we should find a price at which the quantity buyers are willing and able to purchase equals the quantity sellers will offer for sale.

Fig 3.10 combines the demand and supply data introduced in Fig 3.1 and Fig 3.8. Notice that the two curves intersect for $6 per pound — at this price, the quantities demanded and supplied are equal. Buyers want to purchase, and sellers are willing to offer 25 million pounds of coffee per month for sale. The coffee market is in equilibrium. Unless the demand or supply curve shifts, there will be no tendency for price to change. The equilibrium price in any market is the price at which quantity demanded equals quantity supplied. The equilibrium price in the market for coffee is thus $6 per pound. The equilibrium quantity is the quantity demanded and supplied at the equilibrium price. At a price above the equilibrium, there is a natural tendency for the price to fall. At a price below the equilibrium, there is a tendency for the price to rise.

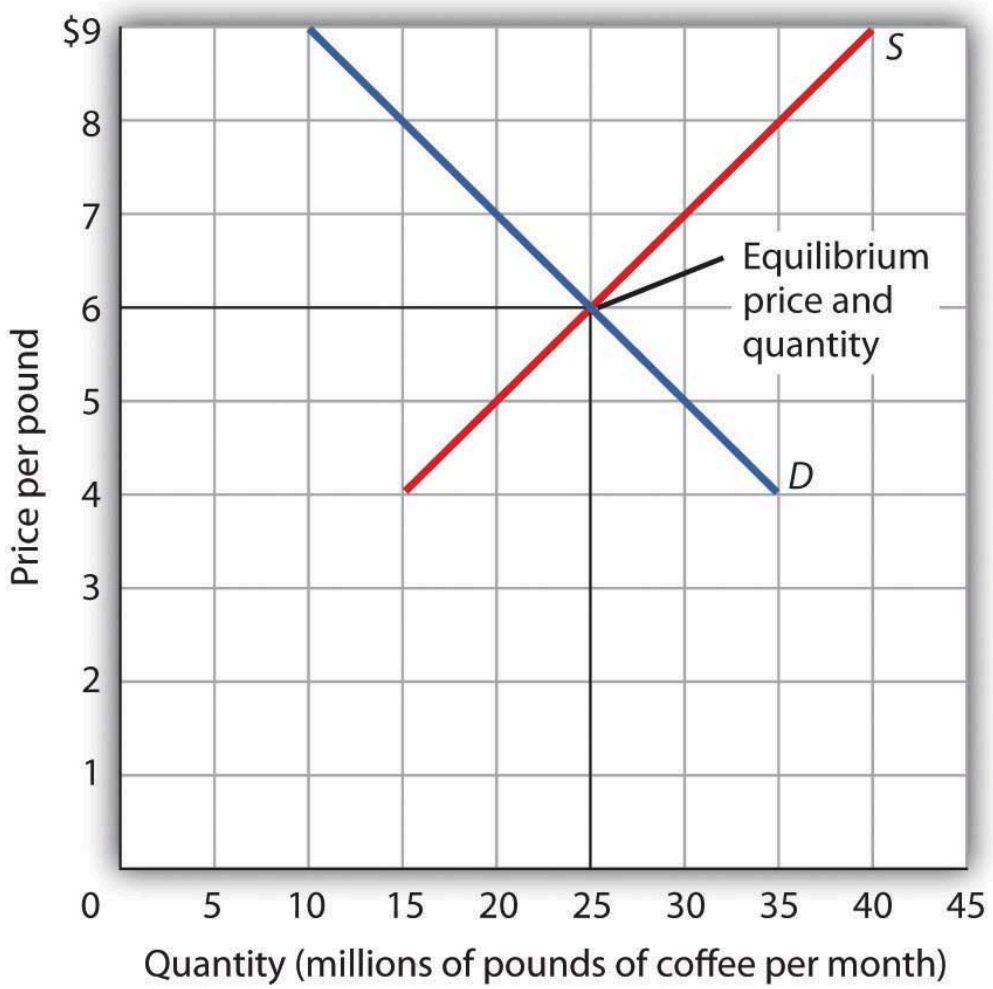

Fig 3.10 "The Determination of Price and Quantity" by University of Minnesota, CC BY-NC-SA 4.0.

With an upward-sloping supply curve and a downward-sloping demand curve, there is only a single price at which the two curves intersect. This means there is only one price at which equilibrium is achieved. It follows that at any price other than the equilibrium price, the market will not be in equilibrium. We next examine what happens at prices different than the equilibrium price.

Surplus

Fig 3.11 shows the same demand and supply curves we have just examined, but this time, the initial price is $8 per pound of coffee. Because we no longer have a balance between quantity demanded and quantity supplied, this price is not the equilibrium price. For $8, the amount of coffee consumers will be willing to buy — 15 million pounds per month. The supply curve tells us what sellers will offer for sale — 35 million pounds per month. The difference, 20 million pounds of coffee per month, is called a **surplus**.

Definition: Surplus

More generally, a **surplus** is the amount by which the quantity supplied exceeds the quantity demanded at the current price. A surplus occurs only if the current price exceeds the equilibrium price.

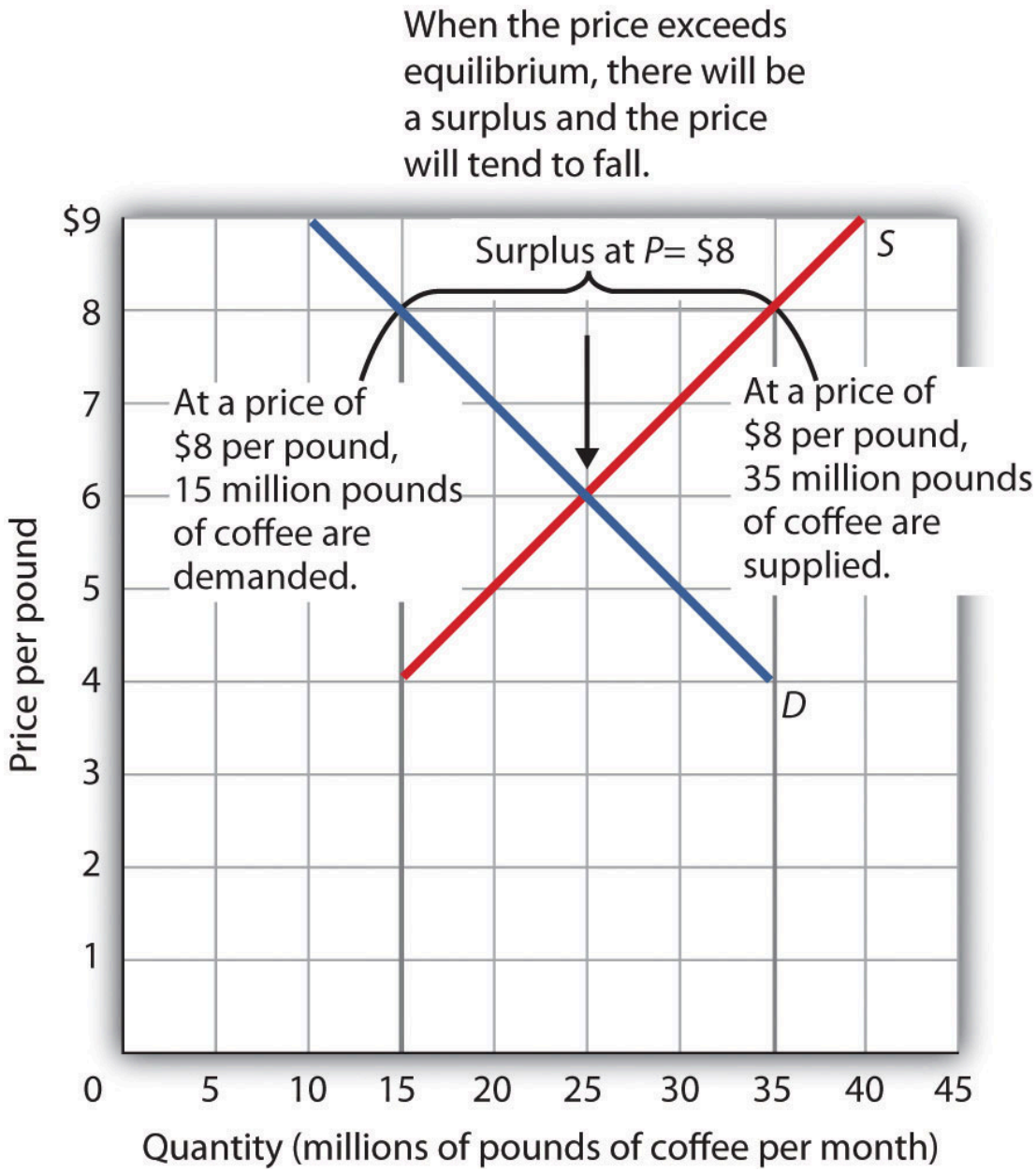

Fig 3.11 "A Surplus in the Market for Coffee" by University of Minnesota, CC BY-NC-SA 4.0.

A surplus in the market for coffee will not last long. With unsold coffee on the market, sellers will reduce their prices to clear out unsold coffee. As coffee prices begin to fall, the quantity of coffee supplied declines. At the same time, the quantity of coffee demanded begins to rise. Remember that the reduced quantity supplied is a movement along the supply curve—the curve itself does not shift in response to a decrease in price.

Similarly, the increase in quantity demanded is a movement along the demand curve—the demand curve does not shift in response to a reduction in price. Price will continue to fall until it reaches its equilibrium level, at which the demand and supply curves intersect. At that point, there will be no tendency for prices to fall further. In general, surpluses in the marketplace are short-lived. The prices of most goods and services adjust quickly, eliminating the surplus.

Shortage

Just as a price above the equilibrium price will cause a surplus, a price below the equilibrium will cause a shortage.

Definition: Shortage

A **shortage** is the amount by which the quantity demanded exceeds the quantity supplied at the current price.

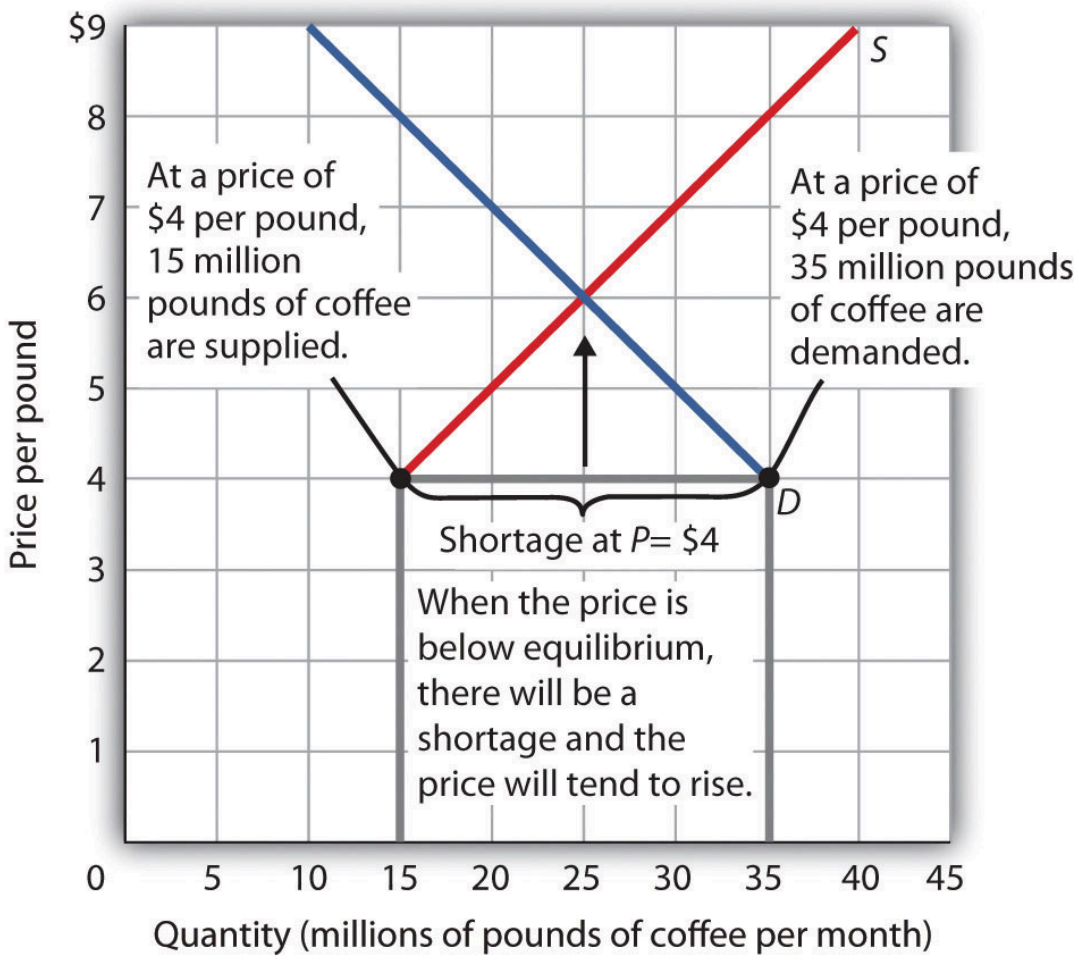

Fig 3.12 "A Shortage in the Market for Coffee" by University of Minnesota, CC BY-NC-SA 4.0

Fig 3.12 shows a shortage in the market for coffee. Suppose the price is $4 per pound. At that price, 15 million pounds of coffee would be supplied monthly, and 35 million pounds would be demanded monthly. When the quantity demanded exceeds the quantity supplied, there is a shortage. In the face of a shortage, sellers are likely to begin to raise their prices. As the price rises, there will be an increase in the quantity supplied (but not a change in supply) and a reduction in the quantity demanded (but not a change in demand) until the equilibrium price is achieved.

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3.6 Shifts in Demand and Supply

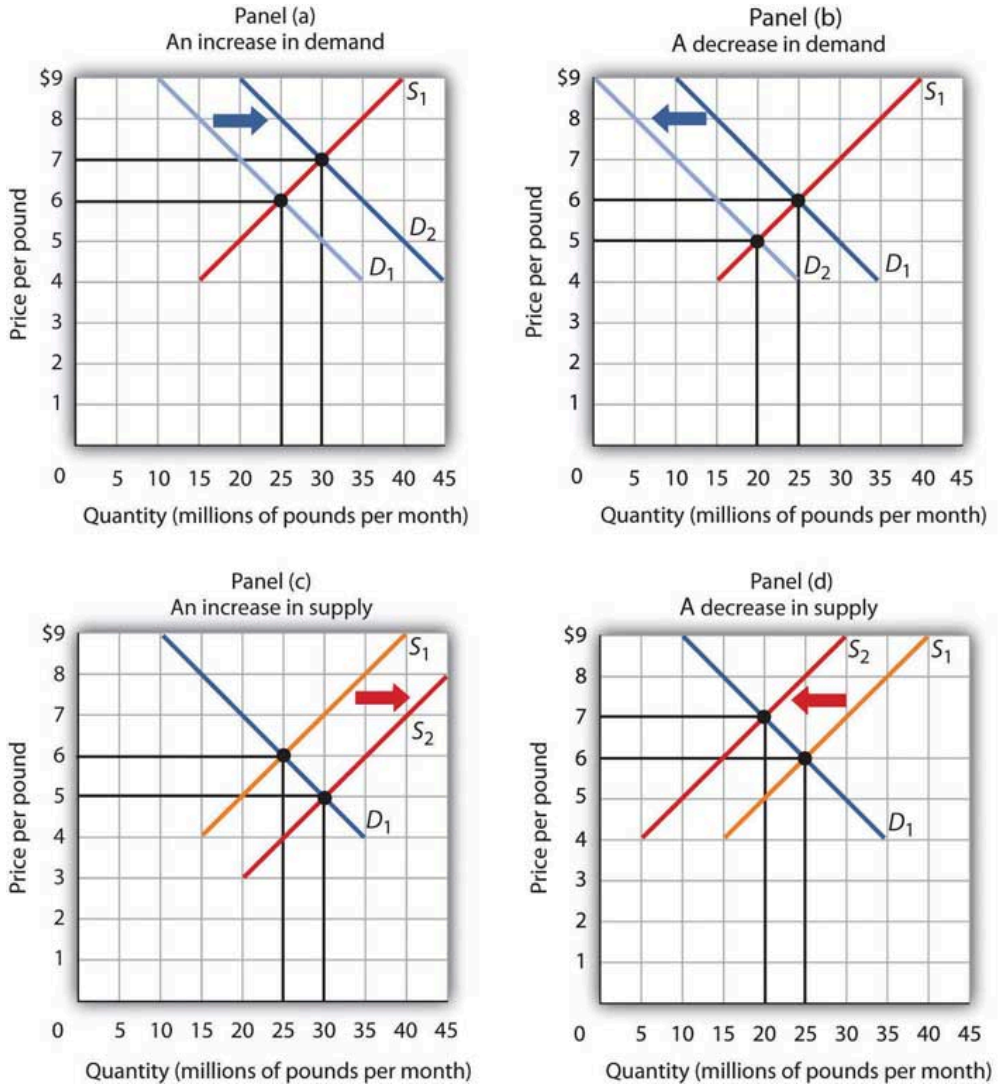


Figure 3.13 "Changes in Demand and Supply" by University of Minnesota, CC BY-NC-SA 4.0.

The above graphs show the market for coffee. Refer to Panel A; suppose the original equilibrium price and quantity of coffee are $6 and 25 pounds, respectively. Assuming coffee is a normal good, an increase in income, with no change in the price of coffee and other factors, will increase the demand for coffee and shift the demand curve to the right. The equilibrium price of coffee rises to $7, and the equilibrium quantity increases to 30 pounds. Panel B shows the decrease in the demand for coffee when income decreases, and the demand curve shifts to the left. The equilibrium price of coffee falls, and the equilibrium quantity decreases.

Refer to Panel C; suppose the initial equilibrium price and quantity of coffee are $6 and 25 pounds, respectively. If the cost of producing coffee decreases, ceteris paribus, the supply of coffee increases and shifts the supply curve to the right, resulting in a fall in the equilibrium price of coffee to $5 and an increase in the equilibrium quantity to 30 pounds. Panel D shows the decrease in the supply of coffee when the production

cost increases and the supply curve shifts to the left. The equilibrium price of coffee rises, and the equilibrium quantity decreases.

Simultaneous Shifts in Demand and Supply

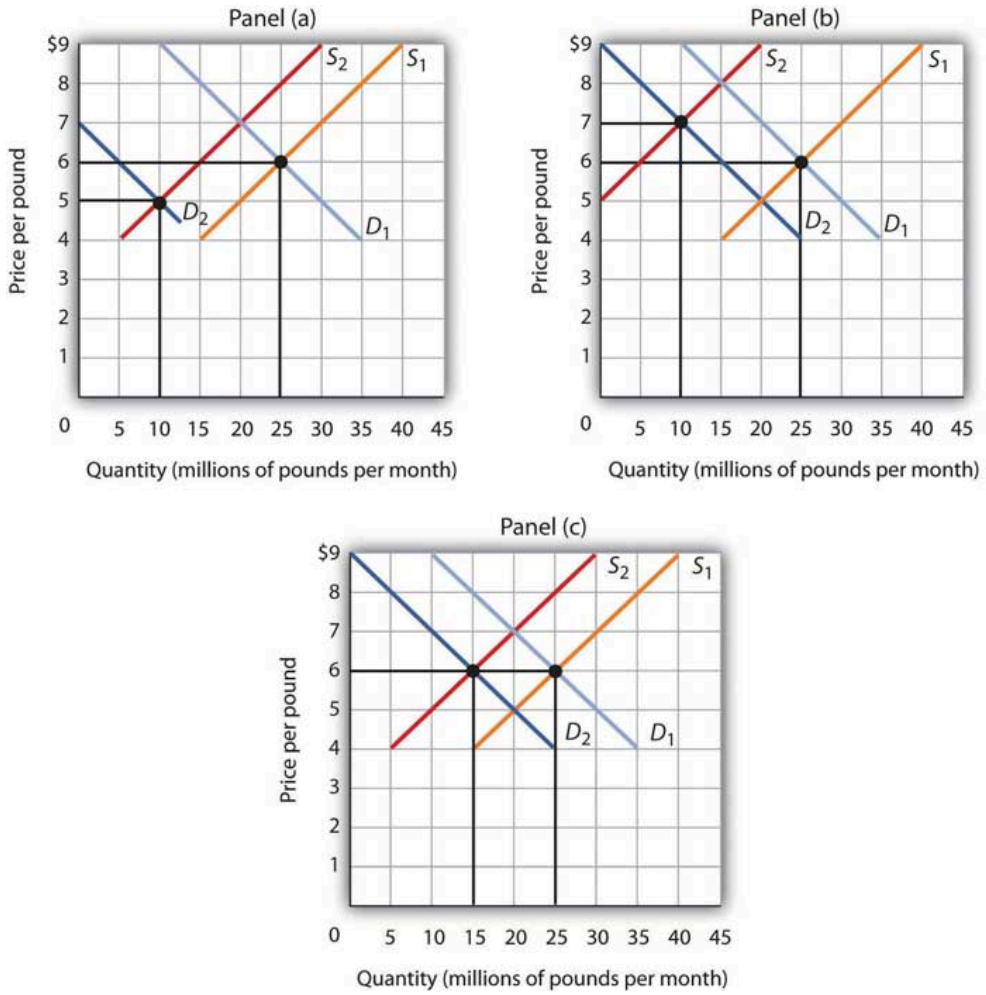


Fig 3.14 "Simultaneous Decreases in Demand and Supply" by University of Minnesota, CC BY-NC-SA 4.0.

As we have seen, when either the demand or the supply curve shifts, the results are unambiguous; that is, we know what will happen to both equilibrium price and equilibrium quantity, so long as we know whether demand or supply increases or decreases. However, in practice, several events may occur around the same time that cause both the demand and supply curves to shift. To figure out what happens to equilibrium price and equilibrium quantity, we must know not only in which direction the demand and supply curves have shifted but also the relative amount by which each curve shifts. Of course, the demand and supply curves could shift in the same or opposite directions, depending on the specific events causing them to shift.

Example: Shifts in Demand and Supply

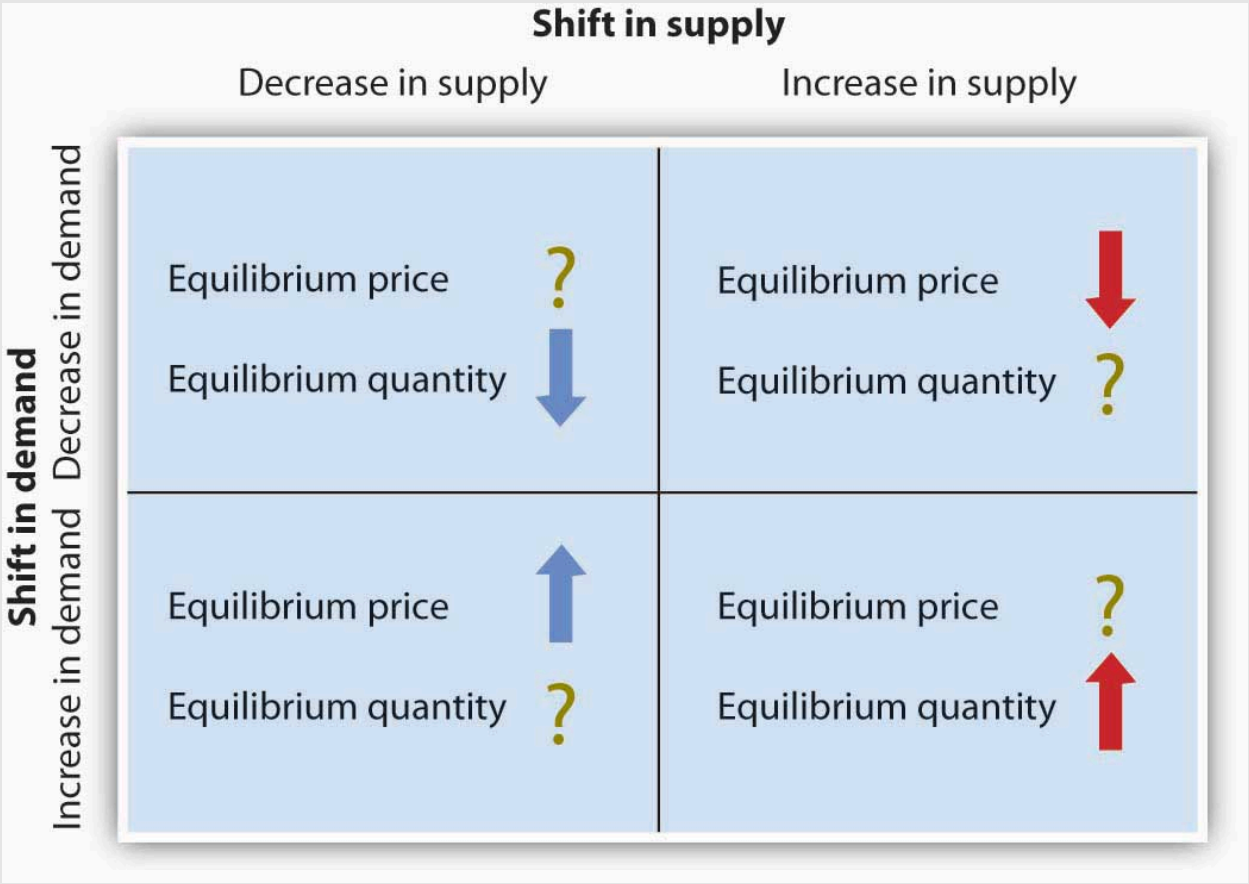


Fig 3.15 "Simultaneous Shifts in Demand and Supply" by University of Minnesota, CC BY-NC-SA 4.0.

All three panels of Fig 3.15show a decrease in demand for coffee (caused perhaps by a decrease in the price of a substitute good, such as tea) and a simultaneous decrease in the supply of coffee (caused perhaps by bad weather). Since reductions in demand and supply, considered separately, each causes the equilibrium quantity to fall, the impact of both curves shifting simultaneously to the left means that the new equilibrium quantity of coffee is less than the old equilibrium quantity. The effect on the equilibrium price, though, is ambiguous. Whether the equilibrium price is higher, lower, or unchanged depends on how much each curve shifts.

If the demand curve shifts farther to the left than does the supply curve, as shown in Panel A of Fig 3.15, then the equilibrium price will be lower than it was before the curves shifted. In this case, the new equilibrium price falls from $6 per pound to $5 per pound. If the shift to the left of the supply curve is greater than that of the demand curve, the equilibrium price will be higher than before, as shown in Panel B. In this case, the new equilibrium price rises to $7 per pound. In Panel C, since both curves shift to the left by the same amount, the equilibrium price does not change; it remains $6 per pound.

Regardless of the scenario, changes in equilibrium price and equilibrium quantity resulting from two different events need to be considered separately. If both events cause the equilibrium price or quantity to move in the same direction, then clearly, the price or quantity can be expected to move in that direction. If one event

causes price or quantity to rise while the other causes it to fall, the extent by which each curve shifts is critical to figuring out what happens. Fig 3.15 summarizes what may happen to equilibrium price and quantity when demand and supply both shift.

3.7 Summary

The Demand Shocks are summarized in the table below.

The best way to learn these shifts is not to memorize them but to practice shifts on the diagram to view their effects.

Demand Shock	Increase in Demand, Shifts curve to the Right	Decrease in Demand, Shifts curve to the Left
Price of a Substitute	Increases	Decreases
Price of a complement	Decreases	Increases
Buyers' Expectations about Future Prices	Increases (normal good)	Decreases (normal good)
Preferences	Increases	Decreases
Demographic Characteristics (Population)	Increases	Decreases
Buyers' Expectations about Future Prices	Increases	Decreases

The Supply shocks are summarized in the table below:

Supply Shock	Increase in Supply, Shifts curve to the Right	Decrease in Supply, Shifts curve to the Left
Price of factors of production	Decreases	Increases
Price of a Substitute	Decreases	Increases
Sellers' Expectations about Future Prices	Decreases	Increases
Number of Producers	Increases	Decreases

Reference

Published by Statista Research Department, & 4, F. (2022, February 4). *Retail prices gasoline Canada 2021*. Statista. https://www.statista.com/statistics/444194/average-retail-price-for-regular-unleaded-gasoline-in-canada/

3.8 Key Terms

Key Terms

Change in Demand

Change in Quantity Demanded

Change in Quantity Supplied

Change in Supply

Complements

Inferior Goods

Movement Along The Supply Curve

Normal Goods

Shortage

Substitutes

Surplus

CHAPTER 4: GDP AND MEASUREMENTS OF PRODUCTION

Chapter Outline

4.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Define gross domestic product and its four major spending components.
- Illustrate the various flows using the circular flow model.
- Distinguish between measuring GDP as the sum of the values of final goods and services and as the sum of values added at each stage of production.
- Distinguish between Real and Nominal gross domestic products
- Distinguish between gross domestic product and gross national product.

An economy produces a mind-boggling array of goods and services every year. For example, Domino's Pizza produces hundreds of millions of pizzas. Alimentation Couche-Tard Inc. (ATD-A.TO) is based in Quebec and operates convenience stores across Canada and many foreign locations. A small logging company in Ontario produces a couple million board feet of lumber. A university hockey team draws over half a million fans to its home games. A pediatric nurse in Toronto delivers hundreds of babies and cares for several hundred additional patients. A list of all the goods and services an economy produces in any year would be endless.

So—what is the year we are looking at? We would not get far trying to wade through a list of all the goods and services produced that year. It is helpful to have a single number that measures the economy's total output: GDP.

How large is the Canadian economy? Economists typically measure the size of a nation's overall economy by its gross domestic product (GDP), which is the value of all final goods and services produced within a country in a given year. Measuring GDP involves counting the production of millions of different goods and services—smartphones, cars, music downloads, computers, steel, bananas, college educations, and banking and real estate services. So all kinds of new goods and services that a country produced in the current year—and summing them into a total dollar value. This task is straightforward: take the quantity of everything produced, multiply it by the price at which each product is sold, and add up the total. In 2022, the World Bank reported the GDP of Canada to be US $1.894 trillion.

Each market transaction that enters into GDP must involve both a buyer and a seller. We can measure an economy's GDP by the total dollar value of what consumers purchase or the total dollar value of what the country produces.

4.1 GDP Measured by Components of Demand

GDP is the **market** value of all **final** goods and services produced within an economy in a given period. We will explain the definition in the following few paragraphs. This method of estimating the GDP is called the **Expenditure Approach**.

First, have you considered who buys (demands) all of this production? We can divide this demand into four main parts: consumer spending (consumption), business spending (private investment), government spending on goods and services (government), and spending on net exports (net exports).

$$\text{GDP} = \text{consumption}(C) + \text{private investment}(I) + \text{government purchases}(G) + \text{net exports}(X)$$

Or

$$\text{GDP} = C + I + G + NX, \text{where } NX = \text{Exports}(X) - \text{Imports}(M)$$

We will examine each of these components and see how each fits into the pattern of macroeconomic activity. Before we begin, it will be helpful to distinguish between two types of variables: stocks and flows. A **flow variable** is a variable that is measured over a specific period. A **stock variable** is a variable that is independent of time. Income is an example of a flow variable. For example, saying one's income is $1,000 is meaningless without a time dimension. Is it $1,000 per hour? Per day? Per week? Per month? Until we know the period, we have no idea what the income figure means. The balance in a checking account is an example of a stock variable. When we learn that the balance in a chequing account is $1,000, we know precisely what that means; we do not need a time dimension. We will see that stock and flow variables play very different roles in macroeconomic analysis.

We also need to distinguish between **Intermediate** and **Final Goods** before discussing GDP. GDP is the total value of all *final* goods and services produced. That is not the same as the total value of all goods and services produced during a period. Suppose, for example, a logger cuts some trees and sells the logs to a sawmill. The mill makes lumber and sells it to a construction firm, which builds a house. The value of the final good, house, will be added to the economy's total output or GDP. We will not add the value of the logs or lumber used in making the house to the GDP. The house's value already includes the value of the lumber and the log used in making the house, so adding these intermediate goods to the GDP will result in *double counting*. Therefore, we do not add the value of intermediate goods while measuring the value of total production or GDP.

Personal Consumption

Personal consumption is a flow variable that measures the value of goods and services households purchase during a period. Household purchases of groceries, health-care services, clothing, and automobiles—all are counted as consumption.

The production of consumer goods and services accounts for about 70% of total output. Because consumption is such a large part of GDP, economists seeking to understand the determinants of GDP must pay special attention to the determinants of consumption.

Figure 4.1 "Personal Consumption in the Circular Flow" presents a circular flow model for an economy that produces only personal consumption goods and services. (We will add the other components of GDP to the circular flow as we discuss them.) Spending on goods flows from households to firms; it is the arrow labelled

"Personal consumption." Firms produce these goods and services using factors of production: labour, capital, and natural resources. Households ultimately own these factors. The production of goods and services thus generates income for households; we see this income as the flow from firms to households labelled "Factor incomes" in the exhibit.

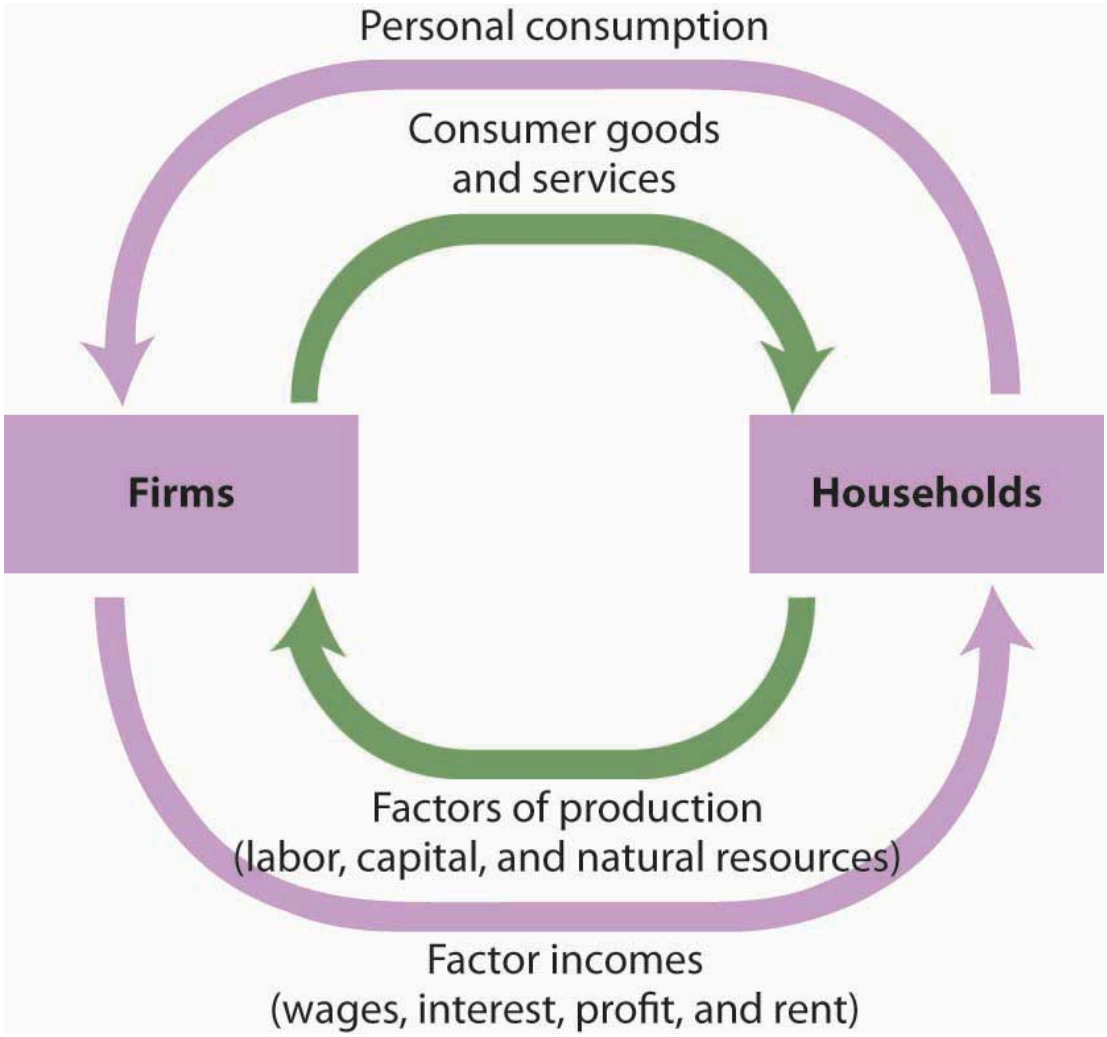


Fig 4.1 "Personal Consumption in the Circular Flow" by University of Minnesota, CC BY-NC-SA 4.0

In exchange for payments that flow from households to firms, consumer goods and services flow from firms to households. This flow is shown in Fig 4.1 as an arrow going from firms to households. When you buy a soda, for example, your payment to the store is part of the flow of personal consumption; the soda is part of the flow of consumer goods and services that go from the store to the household.

In thinking about the flow of consumption spending from households to firms, we emphasized demand and supply in particular markets — markets such as blue jeans, haircuts, and apartments (Chapter 3). In thinking about the flow of income payments from firms to households, we focused on the demand and supply for particular factors of production, such as textile workers, barbers, and apartment buildings. Because our focus now is macroeconomics, the study of aggregates of economic activity, we will think in terms of the *total* of personal consumption and the *sum* of payments to households.

Private Investment

Gross private domestic investment is the value of all goods produced during a period for use in producing other goods and services. Like personal consumption, gross private domestic investment is a flow variable. It is often referred to as "private investment." A hammer produced for a carpenter is a private investment. A printing press produced for a magazine publisher is a private investment, as is a conveyor-belt system built for a manufacturing firm. Capital includes all the goods produced for other goods; it is a stock variable. Private investment is a flow variable that adds to the stock of capital during a period.

Important Note

The term "*investment*" can generate confusion. In everyday conversation, we use the term "*investment*" to use money to earn income. We say we have invested in a stock or invested in a bond. Economists, however, restrict "*investment*" to activities that increase the economy's stock of capital. The purchase of a share of stock does not add to the capital stock; it is *not* an investment in the economic meaning of the word. By investment, we mean purchasing physical capital to produce goods or services that add to production. Confusing the economic concept of private investment with the concept of financial investment can cause a misunderstanding of how critical components of the economy relate to one another.

Gross private domestic investment includes three flows that add to or maintain the nation's capital stock: expenditures by business firms on new buildings, plants, tools, equipment, and software that will be used in the production of goods and services; expenditures on new residential housing; and changes in business inventories. If a clothing store stocks 1,000 pairs of jeans, the jeans represent an addition to inventory and are part of gross private domestic investment.

In the circular flow model in Figure 4.2, "Private Investment in the Circular Flow," we see a flow of investment going from firm to firm. The production of goods and services for consumption generates factor incomes for households; the production of capital goods for investment generates income for households.

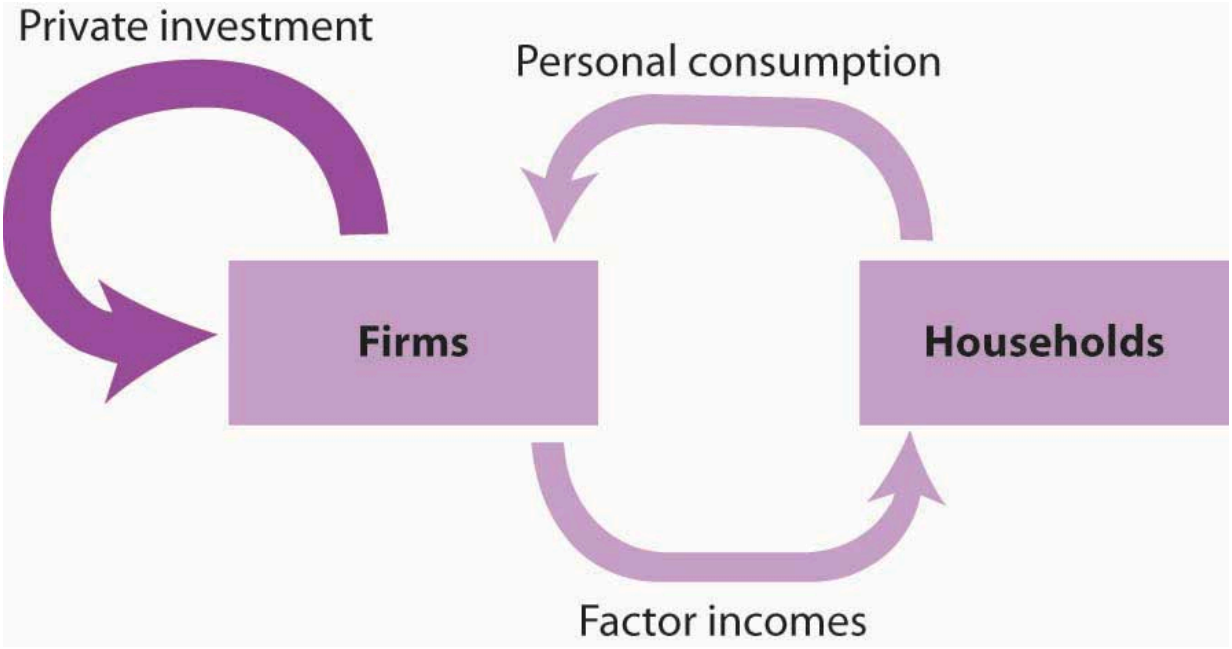


Fig 4.2 "Private Investment in the Circular Flow" by University of Minnesota, CC BY-NC-SA 4.0

Government Purchases

Government agencies at all levels purchase goods and services from firms. They buy office equipment, vehicles, buildings, janitorial services, etc. Many government agencies also produce goods and services. Police departments produce police protection. Public schools produce education. The Banks produce financial services.

Government purchases are the sum of purchases of goods and services from firms by government agencies plus the total value of output produced by government agencies themselves during a period.

Important Note

Government purchases are not the same thing as government spending. Much government spending takes the form of transfer payments, which are payments that do not require the recipient to produce a good or service to receive them. Transfer payments include Social Security and other types of assistance to retired people, welfare payments to poor people, and unemployment compensation to people who have lost their jobs. Transfer payments are undoubtedly significant—they account for roughly half of all federal government spending in Canada. They do not count in a nation's GDP because they *do not* reflect the production of a good or service.

Government purchases represent a demand placed on firms, characterized by the flow shown in Figure 4.3, "Government Purchases in the Circular Flow."

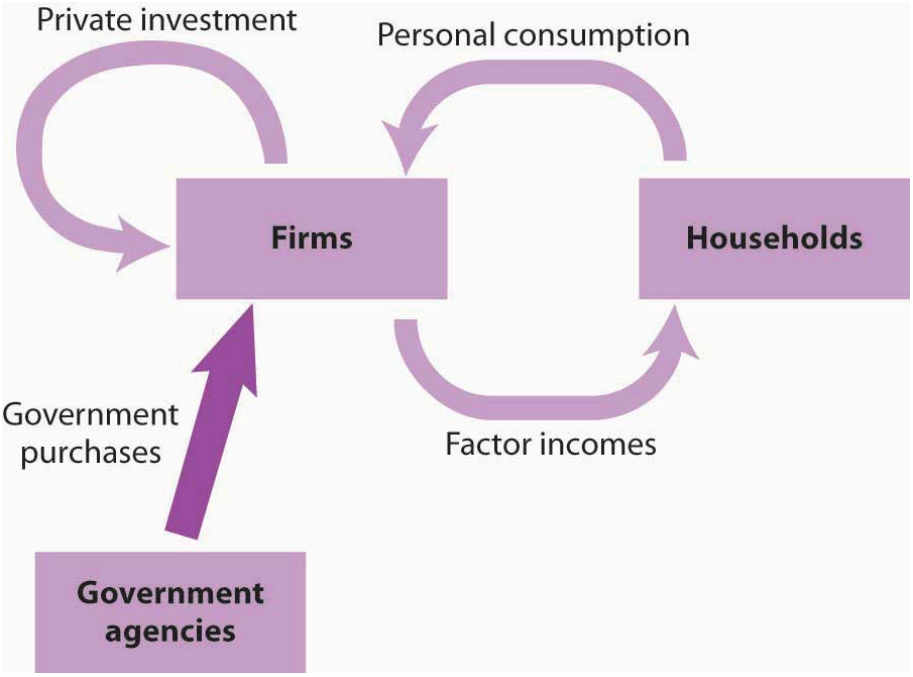


Fig 4.3 "Government Purchases in the Circular Flow" by University of Minnesota, CC BY-NC-SA 4.0

Net Exports

Sales of a country's goods and services to buyers in the rest of the world during a particular period represent its exports. A purchase by a buyer of a Ford Taurus produced in Canada by someone in Japan is Canada's export. Exports also include such transactions as purchasing accounting services from a Toronto accounting firm by a shipping line based in Hong Kong. Imports are purchases of foreign-produced goods and services by a country's residents during a period. Canadian imports include such transactions as the purchase by Canadians of cars produced in Japan, tomatoes grown in Mexico, or a stay in a French hotel by a tourist from Canada. Subtracting imports from exports yields net exports.

Net exports can be negative if imports exceed exports. Negative net exports constitute a trade deficit. The amount of the deficit is the amount by which imports exceed exports. When exports exceed imports, there is a trade surplus.

In the circular flow diagram in Figure 4.4, "Net Exports in the Circular Flow," net exports are shown with an arrow connecting firms to the rest of the world. The balance between the flows of exports and imports is net exports. When there is a trade surplus, net exports are positive and add spending to the circular flow. A trade deficit implies negative net exports; spending flows from firms to the rest of the world.

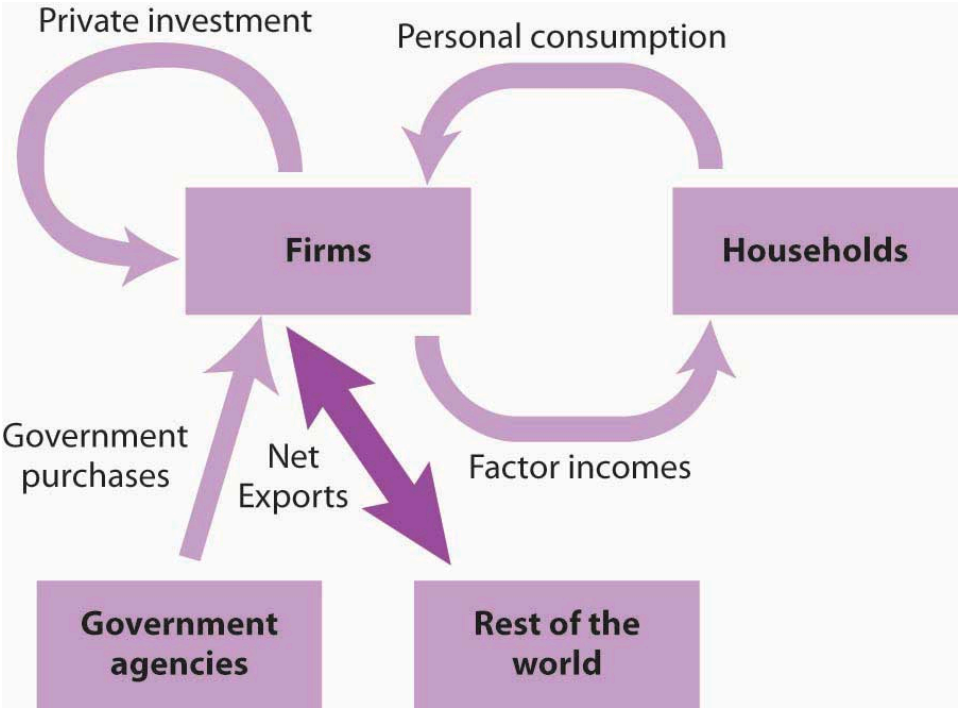


Fig 4.4 "Net Exports in the Circular Flow" by University of Minnesota, CC BY-NC-SA 4.0

Fig. 4.5 Components of GDP

Component	Spending in Trillions of CAD	Pct. of Total
Consumption	$16.7	70.5
Investment	$3.8	16.0
Government	$3.8	16.0
Net Exports	-$0.6	-2.5
Exports	$2.5	10.5
Imports	-$3.1	13.0
Total GDP	$23.7	100.0

Fig 4.6 GDP: Top 10 Countries, 2019 (Data Source: International Monetary Fund)

Rank	Country	GDP (trillion US$)
1	United States	28.8
2	China	18.9
3	Japan	6.9
4	Germany	5..2
5	India	3.9
6	United Kingdom	3.6
7	France	3.6
8	Italy	2.7
9	Brazil	2.4
10	Canada	2.3

The following chart shows the percentage contribution of the various goods and services sectors to Canada's total GDP.

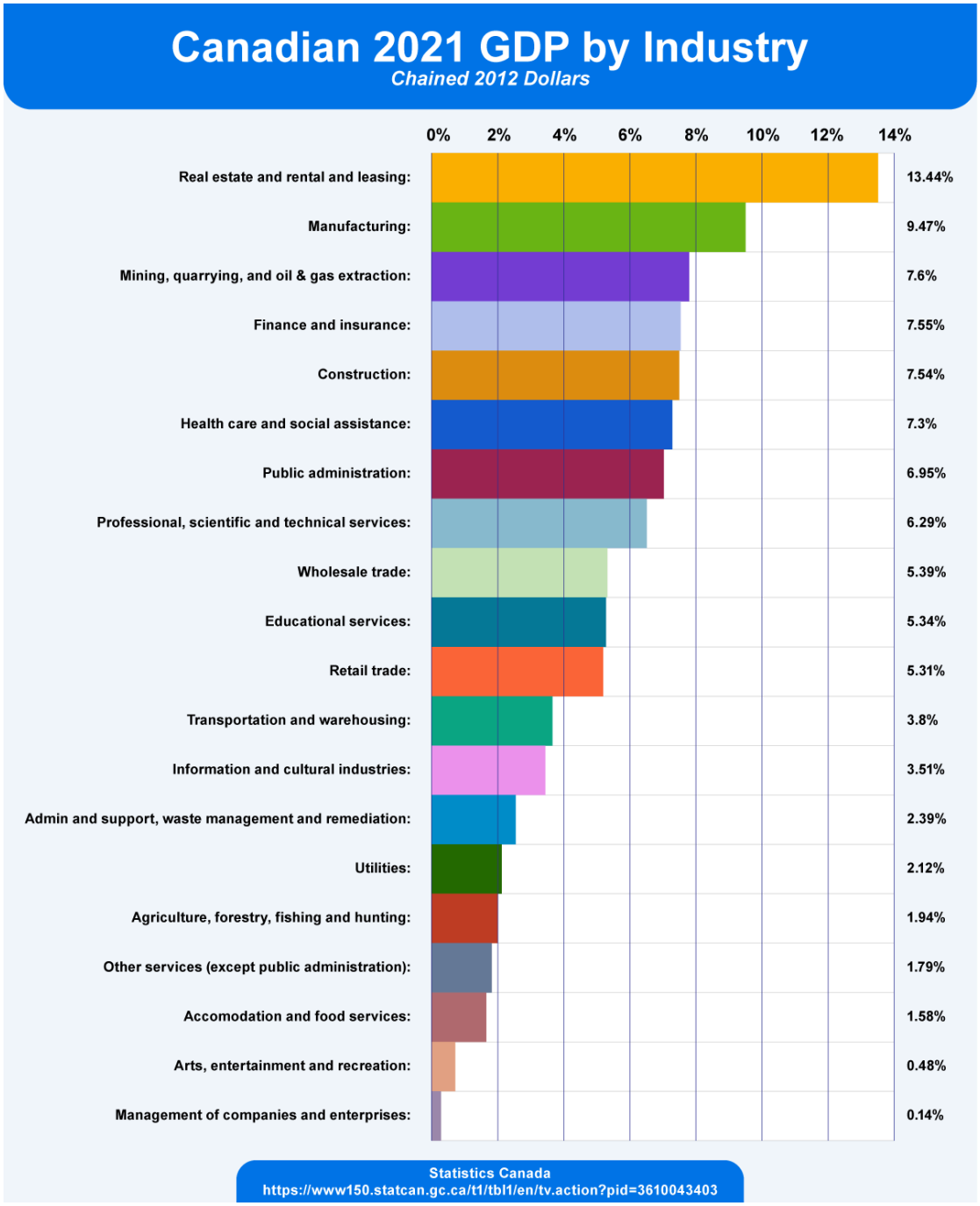


Fig 4.7 "Canadian GDP by Industry" by Fanshawe College, CC BY-NC-SA 4.0. Data Source: Statistics Canada

Canada 2021 GDP by Industry, Chained 2012 CAD (Data for Fig 4.7, Source: Statistics Canada)

Industry	% of GDP
Real estate and rental and leasing	13.44
Manufacturing	9.47
Mining, quarrying, and oil and gas extraction	7.60
Finance and insurance	7.56
Construction	7.54
Health care and social assistance	7.31
Professional, scientific and technical services	6.30
Wholesale trade	5.39
Educational services	5.34
Retail trade	5.32
Transportation and warehousing	3.81
Information and cultural industries	3.52
Administrative and support, waste management and remediation services	2.40
Utilities	2.13
Agriculture, forestry, fishing and hunting	1.95
Other services (except public administration)	1.79
Accommodation and food services	1.59
Arts, entertainment and recreation	0.49
Management of companies and enterprises	0.14

Attribution

4.2 Value Added Approach

Another approach to estimating the value of final production is to estimate the value added for each stage of production. This will be the amount by which the value of a firm's output exceeds the value of the goods and services the firm purchases from other firms. Fig 4.8 "Final Value and Value Added" illustrates the use of value added in the production of a house.

Fig 4.8 Final Value and Value Added

Good	Produced by	Purchased by	Price	Value Added
Logs	Logger	Sawmill	$12,000	$12,000
Lumber	Sawmill	Construction firm	$25,000	$25,000 − $12,000 = $13,000
House	Construction firm	Household	$400,000	$400,000 − $25,000 = $375,000
		Final Value	**$400,000**	
		Sum of Values Added		**$400,000**

If we sum the value added at each stage of the production of a good or service, we get the final value of the item. The example shown here involves the construction of a house, which is produced from lumber that is, in turn, produced from logs.

Suppose the logs produced by the logger are sold for $12,000 to a mill and that the mill sells the lumber it produces from these logs for $25,000 to a construction firm. The construction firm uses the lumber to build a house, which it sells to a household for $400,000. (To simplify the example, we will ignore inputs other than lumber used to build the house.) The value of the final product, the house, is $400,000. The value added at each stage of production is estimated as follows:

1. The logger adds $12,000 by cutting the logs.
2. The mill adds $13,000 ($25,000 − $12,000) by cutting the logs into lumber.
3. The construction firm adds $375,000 ($400,000 − $25,000) to build a house using the lumber.

The sum of values added at each stage ($12,000 + $13,000 + $375,000) equals the final value of the house, $400,000.

The value of an economy's output in any period can thus be estimated in either of two ways. The values of final goods and services produced can be added directly, or the values added at each stage in the production process can be added. Statistics Canada, the national statistical organization that provides key information on Canada's economy, society, and the environment, uses both approaches in its estimate of the nation's GDP.

4.3 Goods not in GDP (Shortcomings of GDP measure)

The sales of used goods are not included because they were produced in a previous year and are part of that year's GDP. The entire underground economy of services paid "under the table," and illegal sales should be counted, but not because tracking these sales is impossible. Statistics Canada estimates underground economic activity for 2021 totalled $68.5 billion in Canada, or about 2.7% of gross domestic product.

Also, the production of some goods — such as when you make your breakfast or mow your lawn—is not counted because these goods are not sold in the marketplace. To add to this, environmental pollution caused by production processes and leisure are not counted in GDP, even though the latter two are parts of people's "well-being," in addition to the incomes they earn. Therefore, the estimated value of GDP is an underrepresentation of the actual production in an economy in a given time period.

4.4 Income Approach to measuring GDP

We have seen in the flow diagram Fig 4.1 in Chapter 4.1 that the production of goods and services generates factor incomes to households. The production of a given value of goods and services generates an equal value of total income. **Gross domestic income (GDI)** equals the total income generated in an economy by the production of final goods and services during a particular period. It is a flow variable. Because an economy's total output equals the total income generated in producing that output, GDP = GDI, we can estimate GDP either by measuring total output or by measuring total income.

GDP Calculation

Consider a $4 box of Cheerios. It is part of total output and thus is part of GDP. Who gets the $4? Part of the answer to that question can be found by looking at the cereal box. Cheerios are made from oat flour, wheat starch, sugar, salt, and various vitamins and minerals. Therefore, part of the $4 goes to the farmers who grew the oats, the wheat, and the cane from which the sugar was extracted. Workers and machines at General Mills combined the ingredients, crafted all those little O's, toasted them, and put them in a box. The workers were paid part of the $4 as wages. The owners of General Mills and the physical capital it used received part of the $4 as profit. The Cheerios box was made from a tree, so a lumber company somewhere received part of the $4. The truck driver who brought the cereal box to the grocery store got part of the $4, as did the truck's owner and the oil that fueled the truck. The clerk who rang up the sale at the grocery store was paid part of the $4. And so on.

"Cheerios" by Mike Mozart CC BY 2.0

How much of the $4 was income generated in the production of the Cheerios? The answer is simple: all of it. Some of the money went to workers as wages. Some went to owners of the capital and natural resources used to produce it. Profits generated along the way went to the owners of the firms involved. All these items represent the costs of producing the Cheerios and also represent income to households. As it is with Cheerios, so it is with everything else. The value of output equals the income generated as the output is produced. So, for the aggregate economy, the GDP estimated using the Expenditure Approach (section 4.1) is equal to the GDP estimated using the Income Approach.

4.5 Nominal and Real GDP

The distinction between nominal and real measurements refers to whether inflation distorts a given statistic. Looking at economic statistics without considering inflation is like looking through a pair of binoculars and trying to guess how close something is: unless you know how strong the lenses are, you cannot guess the distance very accurately. Similarly, if you do not know the inflation rate, it isn't easy to figure out if a rise in GDP is due mainly to a rise in the overall level of prices or to a rise in the quantities of goods produced. The nominal value of any economic statistic means that we measure the statistic in terms of actual prices at the time. The real value refers to the same statistic after it has been adjusted for inflation. Generally, it is the real value that is more important.

Calculating Nominal GDP

As mentioned, nominal GDP is the value of the goods and services produced in the stated year.

$$\text{Nominal GDP} = \text{Price} \times \text{Quantity}$$

Therefore, the nominal GDP is simply the sum of all individual contributions.

Let us consider an economy that only produces three goods: apples, bananas, and cherries. The economic agency of that economy reports the production and pricing data in Table 4.9.

Table 4.9 Example: Price and Quantity of Economic Production

Year	P(Apple)	Q(Apple)	P(Banana)	Q(Banana)	P(Cherry)	Q(Cherry
2018	$1.00	200	$0.50	300	$6.00	20
2019	$1.25	260	$0.50	350	$6.50	30
2020	$1.50	260	$0.80	450	$7.50	30

To calculate each year's nominal GDP, we multiply each good's price by the corresponding quantity. Then, add up all of the individual contributions.

$$\text{NGDP}_{18} = (\$1.00)(200) + (\$0.50)(300) + (\$6.00)(20) = \$200 + \$150 + \$120 = \$470$$

$$\text{NGDP}_{19} = (\$1.25)(260) + (\$0.50)(350) + (\$6.50)(30) = \$325 + \$175 + \$195 = \$695$$

$$\text{NGDP}_{20} = (\$1.50)(260) + (\$0.80)(450) + (\$7.50)(30) = \$390 + \$360 + \$225 = \$975$$

Calculating Real GDP

For the real GDP calculation, we pick a year called the **base year**. This information will always be given to you.

$$\text{Real GDP} = \text{Base Year Price} \times \text{Current Year Quantity}$$

For our example, let us call 2018 the base year. Then, we keep prices constant at base year levels. For our example, we will use $1.00 as the price of apples, $0.50 as the price of bananas, and $6.00 as the price of cherries for each year. This allows us to focus only on changes in production rather than allowing for changes in the price level. In our example, the real GDPs would be calculated as:

$$\text{RGDP}_{18} = (\$1.00)(200) + (\$0.50)(300) + (\$6.00)(20) = \$200 + \$150 + \$120 = \$470$$

$$\text{RGDP}_{19} = (\$1.00)(260) + (\$0.50)(350) + (\$6.00)(30) = \$260 + \$175 + \$180 = \$615$$

$$\text{RGDP}_{20} = (\$1.00)(260) + (\$0.50)(450) + (\$6.00)(30) = \$260 + \$225 + \$180 = \$665$$

Notice that the price for each good remains constant. Because of this, any increase in the real GDP must be caused by increased production.

You should also notice that the nominal and real GDP are identical in the base year. This is not a coincidence. In our example, 2018 was the base year. The nominal GDP for 2018 used the price level from 2018. The real GDP for 2018 used the price levels from the base year...which was 2018. Therefore, the calculation for 2018 and any base year will always be identical.

4.6 GDP Deflator

In the next chapter, we will learn about inflation. This occurs when prices in the economy increase. We may also track the impact of price changes using GDP, in addition to using other measures that we will learn in Chapter 5. This form of measurement is referred to as the GDP Deflator."

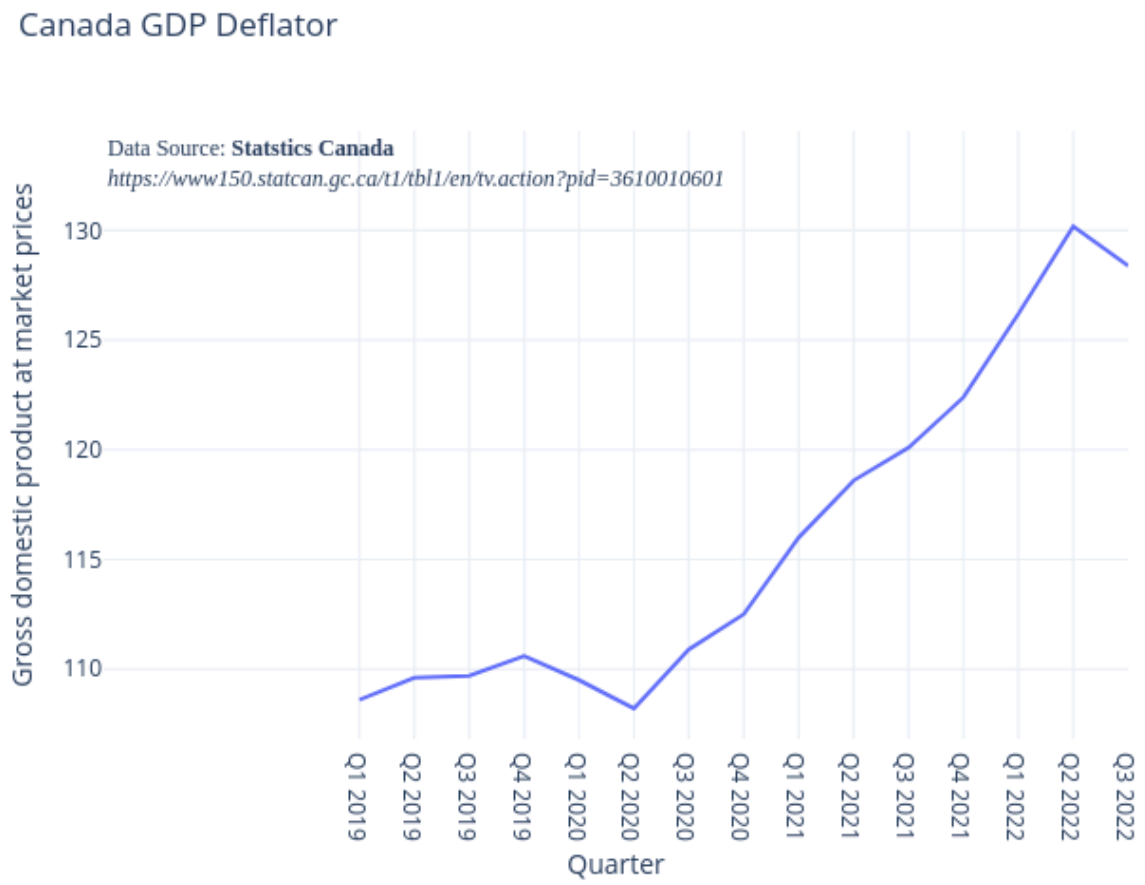


Fig 4.10 "Canada GDP Deflator" by Fanshawe College, all rights reserved (Source Data: Statistics Canada)

Data Table for Fig 4.10

2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3
108.6	109.6	109.7	110.6	109.5	108.2	110.9	112.5	116.0	118.6	120.1	122.4	126.2	130.2	128.4

The graph and table above show that the GDP Deflator in Canada decreased to 128.40 points in the third quarter of 2022 from 130.20 points in the second quarter of 2022.

The GDP deflator is calculated as:

$$\text{GDP Deflator} = 100 \times \left(\frac{\text{Nominal GDP}}{\text{Real GDP}} \right)$$

We multiply by 100 to make it an index. An index is an easy-to-use value that we can use to compare different years easily. The goal of the deflator is to keep track of price levels from one year to the next.

Again, using 2018 as our base year, our GDP deflators are:

$$\text{GDPDef}_{18} = 100 \times \left(\frac{470}{470}\right) = 100 \times (1) = 100$$

$$\text{GDPDef}_{19} = 100 \times \left(\frac{695}{615}\right) = 100 \times (1.13) = 113$$

$$\text{GDPDef}_{20} = 100 \times \left(\frac{975}{665}\right) = 100 \times (1.47) = 147$$

It should be noted that the GDP deflator in the base year is 100. This will always be the case. As mentioned earlier, the nominal GDP and the real GDP will be equal in the base year. The GDP deflator in 2019 was 113, which means prices have risen by 13 percent between 2018 and 2019. Similarly, prices have risen 47 percent over the two-year period between 2018 and 2020.

4.7 GNP – An alternative measure of Output

While GDP represents the most commonly used measure of an economy's output, economists sometimes use an alternative measure. Gross national product (GNP) is the total value of final goods and services produced during a particular period with production factors owned by a particular country's residents.

The difference between GDP and GNP is a subtle one. A country's GDP equals the value of the final output produced within the borders of that country; the GNP of a country equals the value of the final output produced using factors owned by residents of the country operating outside the geographical boundary. So, which, out of the two estimates, do you think is a better indicator of a country's economic performance?

Example

Suppose, for example, a Bellingham, Washington, resident owns and operates a watch repair shop across the Canadian–U.S. border in Victoria, British Columbia. The value of watch repair services produced at the shop would be counted as part of Canada's GDP because they are produced in Canada. That value would not, however, be part of the U.S. GDP because it is produced outside the U.S. However, because the watch repair services were produced using capital and labour provided by a resident of the United States, they would be counted as part of GNP in the United States and not as part of GNP in Canada.

"watch repair" by Eden, Janine and Jim, CC BY 2.0

4.8 Business Cycles

Figure 4.11, "**Phases of the Business Cycle**," shows a stylized picture of a typical business cycle. It shows that economies go through periods of increasing and decreasing real GDP but that, over time, they generally move toward increasing real GDP. A sustained period in which real GDP is rising is an *expansion*; a sustained period in which real GDP is falling is a *recession*. An economy is typically in a recession when real GDP drops for two consecutive quarters. Typically, a business cycle has two phases: expansion and recession and two turning points, *peak* and *trough*.

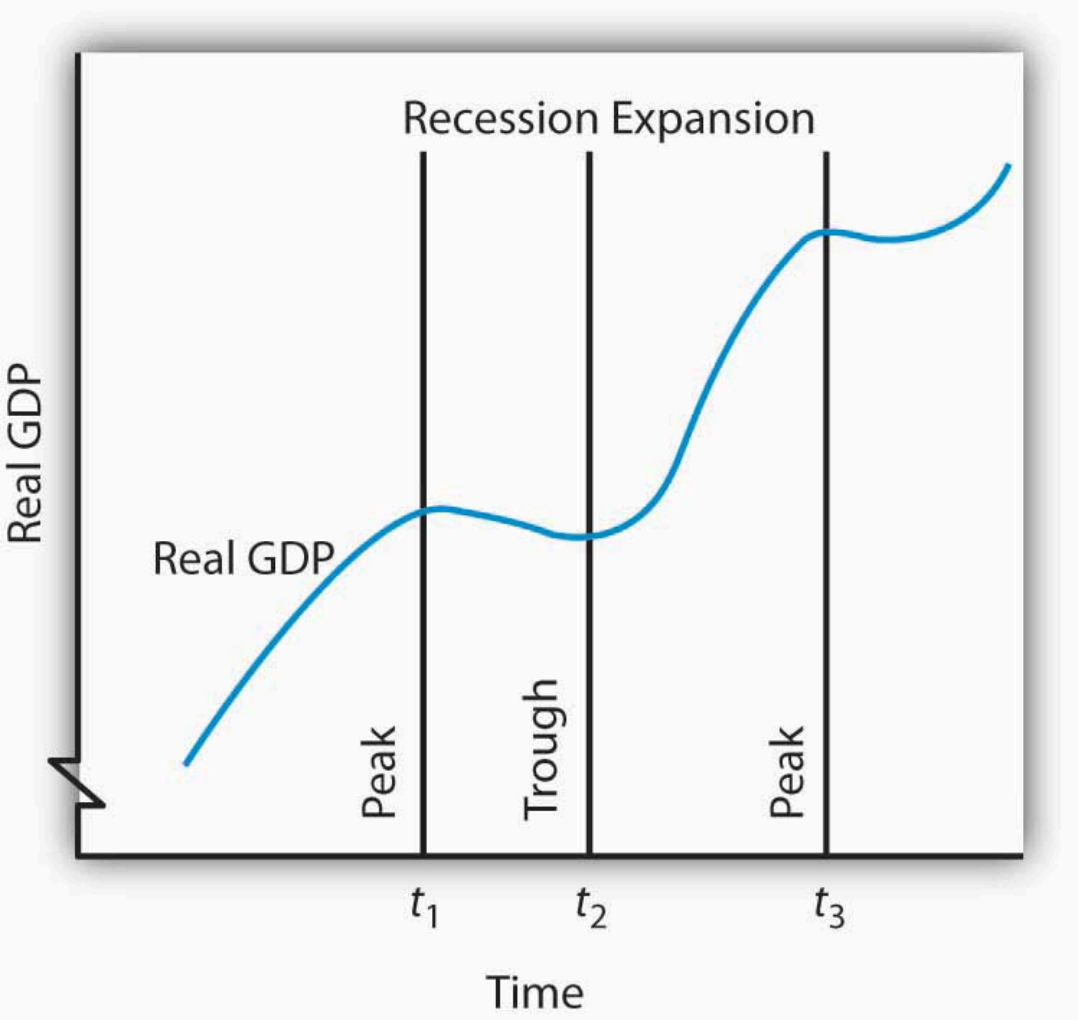


Fig. 4.11 The business cycle is a series of expansions and contractions in real GDP. The cycle begins at a peak and continues through a recession, a trough, and an expansion. A complete business cycle is defined by the passage from one peak to the next. A new cycle begins at the next peak. Here, the first peak occurs at time t1, the trough at time t2, and the next peak at time t3. Notice that there is a tendency for real GDP to rise over time.

At time $t1$ in Fig 4.11, an **expansion** ends, and real GDP turns downward. The point at which an expansion ends and a recession begins is called the **peak** of the business cycle. Real GDP then falls during a period of **recession**. Eventually, it starts upward again (at time $t2$). The point at which a recession ends and an expansion begins

is called the **trough** of the business cycle. The expansion continues until another peak is reached at time $t3$. A complete business cycle is defined by the passage from one peak to the next.

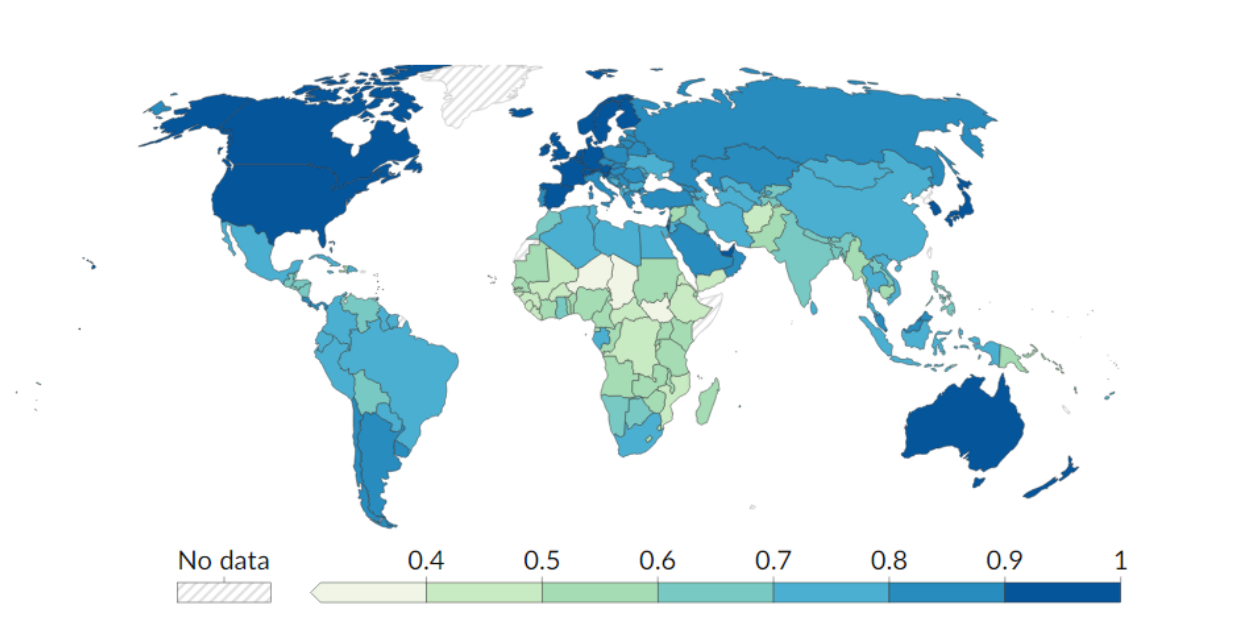
4.9 GDP and Human Happiness

More GDP cannot necessarily be equated with more human happiness. But more GDP does mean more of the goods and services we measure. It means more jobs. It means more income. And most people seem to place a high value on these things. But as we mentioned before, GDP has its faults because it includes only goods and services that can be bought or sold in the marketplace, as discussed in section 4.3 shortcomings of GDP. GDP does measure the production of most goods and services. And goods and services get produced, for the most part, because we want them. We might thus be safe in giving two cheers for GDP—and holding back the third in recognition of the conceptual difficulties inherent in using a single number to summarize the output of an entire economy.

Rather than using GDP, another measure called GDP per capita may be a relatively better indicator of human happiness because GDP per capita implies the economic output produced per person. In other words, it is the average income a person in the country earns. We measure it by dividing real GDP by the country's population. Although happiness is not tied to income entirely, earnings do determine a person's well-being to a certain extent. We will discuss GDP per capita in more detail in the subsequent chapters.

The Human Development Index (HDI) constructed by the United Nations is a more comprehensive measure of human well-being because it includes factors that GDP fails to consider, such as access to education measured by years of schooling, life expectancy at birth, mortality rates, social justice and political freedom.

Interactive Tool: Human Development Index



"Human Development Index" by Our World In Data, CC BY 4.0

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4.10 Key Terms

Key Terms

Base Year

Consumption

Expansion

Export

Flow Variable

Import

Investment

Recession

Stock Variable

Intermediate Goods

Final Goods

Gross Domestic Product (GDP)

Value Added

Gross National Product (GNP)

GDP Deflator

Nominal GDP

Real GDP

Recession

Business Cycle

CHAPTER 5: UNEMPLOYMENT AND INFLATION

Chapter Outline

5.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Measure different labour market indicators
- Identify different types of unemployment
- Explain the shortcomings of unemployment measures
- Calculate the Consumer Price Index
- Measure the inflation rate
- Discuss the difference between Real and Nominal Interest Rates

For an economy to produce all it can and achieve a solution on its production possibilities curve, the factors of production in the economy must be fully employed. Failure to fully employ these factors leads to a solution inside the production possibilities curve in which society is not achieving the output it can produce.

In thinking about the employment of society's factors of production, we place special emphasis on labour. The loss of a job can wipe out a household's entire income; it is a more compelling human problem than, say, unemployed capital, such as a vacant apartment. In measuring unemployment, we thus focus on labour rather than on capital and natural resources. As of October 2023, Canada's official unemployment rate is 5.7%, measured by Statistics Canada.

5.1 The Labour Force

Should we count everyone without a job as unemployed? Of course not. For example, we should not count children as unemployed. Surely, we should not count the retired as unemployed. Many full-time college students have only a part-time job or no job at all, but it seems inappropriate to count them as suffering the pains of unemployment. Some people are not working because they are rearing children, ill, on vacation, or on parental leave.

The point is that we do not just divide the adult population into employed and unemployed. The adult population is called the working-age population. Anyone aged 15 and over is included in the working-age population, as defined by Statistics Canada (2022). Apart from the people employed or unemployed within the working age group, a third group exists: people who do not have a job, and for some reason—retirement, looking after children, taking a voluntary break before a new job—are not interested in having a job. It also includes those who want a job but have quit looking, often due to discouragement due to their inability to find suitable employment. Economists refer to this third group of those who are not working and not looking for work as out of the labour force or not in the labour force.

The Canadian unemployment rate, which is based on a monthly labour force survey carried out by Statistics Canada, asks a series of questions to divide the adult population into employed, unemployed, or not in the labour force. To be classified as unemployed, a person must be without a job, currently available to work, and actively looking for work in the previous four weeks. Thus, a person who does not have a job but who is not currently available to work or has not actively looked for work in the last four weeks is counted as out of the labour force.

Therefore,

"Construction workers" by Acabashi, CC BY-SA 4.0

- *Employed:* currently working for pay
- *Unemployed:* out of work and actively looking for a job
- *Out of the labour force:* out of paid work and not actively looking for a job
- *Labour force:* the number of employed plus the unemployed

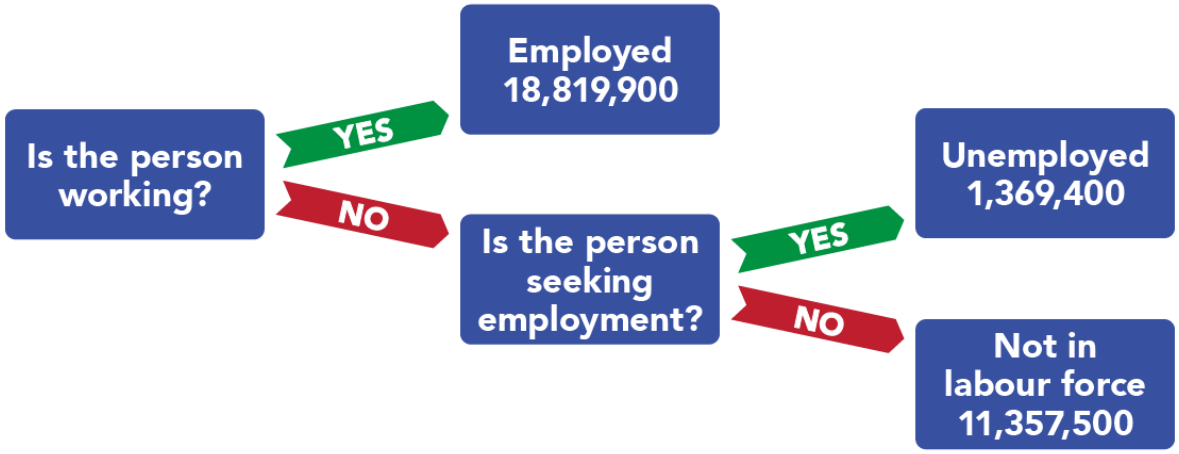


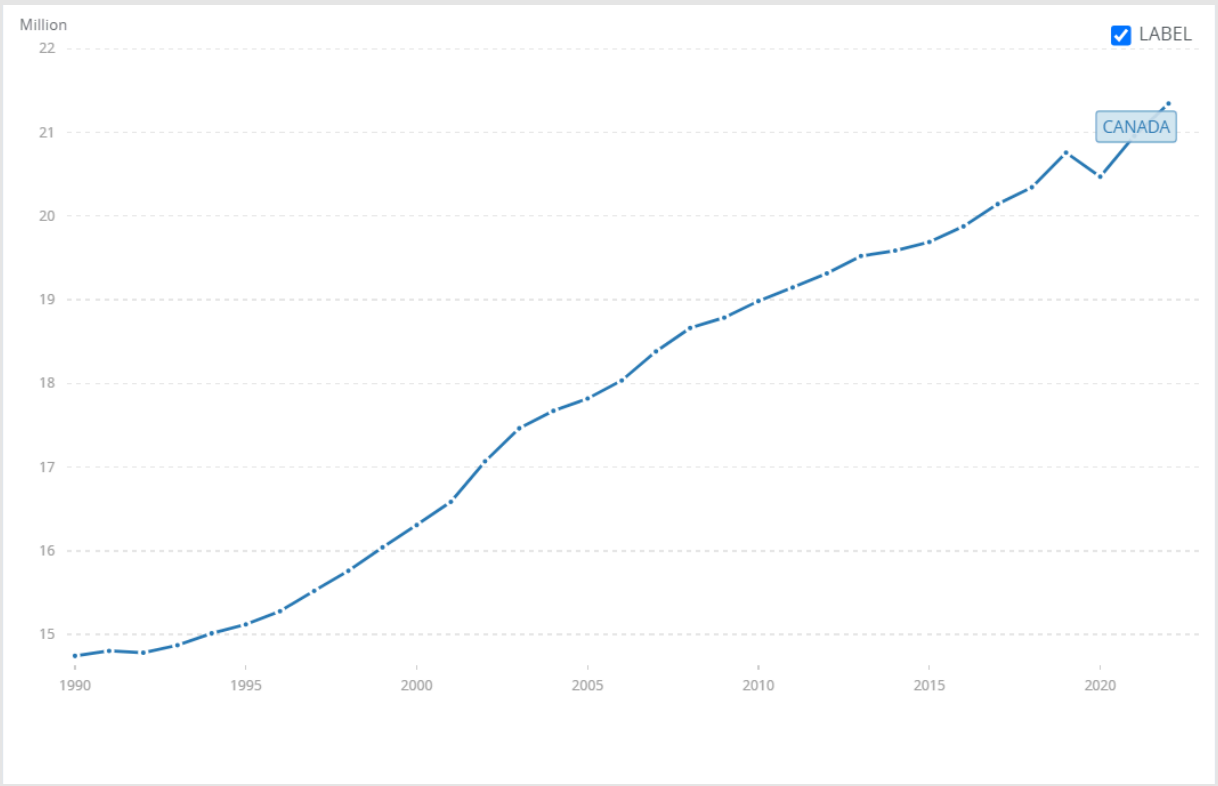
Fig 5.1 Computation of Unemployment Rate

Fig 5.1 above shows how the unemployment rate is computed. A monthly survey of households divides the civilian adult population into three groups. Those who have jobs are counted as employed; those who do not have jobs but are looking for them and are available for work are counted as unemployed; and those who are not working and are not looking for work are not counted as members of the labour force. The unemployment rate equals the number of people looking for work divided by the sum of the number of people looking for work and the number of people employed. Values are for February 2012, and all numbers are in thousands:

$$\begin{aligned}\text{Unemployment Rate} &= \frac{\text{Looking For Work}}{\text{Looking For Work} + \text{Employed}} \\ &= \frac{1,369,400}{18,819,900 + 1,369,400} \\ &= 0.083 \\ &= 6.7\%\end{aligned}$$

The unemployment rate in January 2022 was 6.7%.

Interactive Tool: Canada Labour Force



"Labour Force, Canada – Total" by The World Bank, CC BY 4.0.

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"8.1 How Economists Define and Compute Unemployment Rate" from Principles of Macroeconomics 3e by OpenStax-Rice University is licensed under a Creative Commons Attribution 2.0 license except where otherwise noted.

5.2 Labour Force Indicators

Definitions

The Labour Force (LF) is the total number of people working or unemployed.

The Unemployment Rate (UNR) is the percentage of the labour force that is unemployed.

The Labour Force Participation Rate (LFPR) is the percentage of the working-age population that is in the labour force.

The Employment Population Ratio (EPR) is the percentage of the **working-age population (WAP)** that is employed or has some form of paid work.

The formulae are shown below:

Labour Force Participation Rate

$$\text{LFPR} = 100 \times \frac{\#\text{ in LF}}{\text{WAP}}$$

$$= 100 \times \frac{\text{Employed} + \text{Unemployed}}{WAP}$$

In January 2022, if the working age population in Canada was 31.11 M, and the labour force was 20 M, therefore,

the labour force participation rate in May 2020 = (20M ÷ 31.11M) × 100 = 64.2 percent.

Unemployment Rate

$$\text{UNR} = 100 \times \frac{\#\text{ Unemployed}}{\text{LF}}$$

$$= 100 \times \frac{\#\text{ Unemployed}}{\text{Employed} + \text{Unemployed}}$$

If in January 2022, the number of unemployed people in Canada was 1.36 M, and the labour force was 20 M, therefore,

the unemployment rate in Jan 2022 = (1.36M ÷ 20M) × 100 = 6.8 percent.

Employment-Population Ratio

$$\text{EPR} = 100 \times \frac{\#\text{ Employed}}{WAP}$$

Next, if the number of people employed in Canada in January was 18 M and the working age population was 31.11 M, then

the employment-population ratio in Jan 2022 = (18M ÷ 31.11M) × 100 = 57.8 percent.

5.3 Other Classifications of Employment and Shortcomings of the Unemployment Measure

Photo by Yan Krukau, Pexels License

Some people are still mislabeled in the categorization of employed or unemployed. Those who have only part-time jobs and are looking for full-time employment are counted as employed, although they are not employed in the way they would like or need to be. This group is called *involuntary part-time workers* or *employed part-time for economic reasons*.

Additionally, some individuals are underemployed. This includes those trained or skilled for one type or level of work but working in a lower-paying job or one that does not utilize their skills. For example, we would consider an individual with a college degree in finance working as a sales clerk underemployed. They are, however, also counted in the employed group. All of these individuals fall under "*hidden unemployment*." Involuntary part-time workers also add to the underemployment category.

Another group is the *Discouraged workers* who have stopped looking for employment and, hence, are no longer counted as unemployed, fall into this group. According to Stats Canada, people who have not looked for jobs in the past four weeks are categorized as discouraged workers because they are not "actively" looking for jobs. As we will see in the following example, when a large number of people become discouraged, all else equal, the unemployment rate can actually fall!

Example

Consider the following example. Assume that each adult member of a population is represented in exactly one of the classifications in Fig 5.2. Let us calculate the labour force participation rate and the unemployment rate. Then, we will re-calculate both of these when workers become discouraged.

Fig 5.2 "An Example" by Penn State University, CC BY-SA 4.0

Group	People (millions)
Full-time employed	120
Part-time employed by choice	40
Employed part-time for economic reasons	60
No job but actively looking for work	30
No job but choosing not to work	80
Discouraged worker	20

Let us classify each group. The first three groups are all employed. Regardless of whether you work full-time or part-time and regardless of whether you want full-time work when working part-time, you are employed. In our example, we consider only one group to be unemployed: "no job but actively looking for work." The next group, "no job but choosing not to work," is not considered to be unemployed because they are not searching for work. Therefore, they are not in the labour force. The final group, the "discouraged worker," is also not part of the labour force. The members of this group would like a job but have given up searching for work.

The calculations for this example are as follows:

$$\text{Employed} = 120 + 40 + 60 = 220$$

$$\text{Unemployed} = 30$$

$$\text{Labour Force} = 220 + 30 = 250$$

$$\text{Not in Labour Force} = 80 + 20 = 100$$

$$\text{Working Age (Adult) Population} = 220 + 30 + 80 + 20 = 350$$

$$\text{Labour Force Participation Rate} = 100 \times \frac{250}{350} = 100 \times 0.714 = 71.4\%$$

$$\text{Unemployment Rate} = 100 \times \frac{30}{250} = 100 \times 0.12 = 12.0\%$$

Now, let us adjust the data. Suppose the country is currently in a relatively deep recession, and it is almost impossible to find a job because companies are only cutting jobs and not hiring. What if, of the 30 million unemployed, 20 million become discouraged? This means they give up searching for work because of poor economic conditions. So, the number of discouraged workers now increases.

$$\text{Employed} = 120 + 40 + 60 = 220$$

$$\text{Unemployed} = 10$$

$$\text{Labour Force} = 220 + 10 = 230$$

$$\text{Not in Labour Force} = 80 + 20 = 100$$

$$\text{Adult Population} = 350$$

$$\text{Labour Force Participation Rate} = 100 \times \frac{(230)}{(350)} = 100 \times (0.657) = 65.7\%$$

$$\text{Unemployment Rate} = 100 \times \frac{(10)}{(230)} = 100 \times (0.043) = 4.3\%$$

We understand the major shortcomings of the official unemployment measure. By not including discouraged workers, the unemployment statistics are underestimated. Although these people have given up job search due to repeated failures in finding a job, nevertheless, they would accept a job if offered. Also, part-time workers looking for full-time jobs but unable to find one are included as employed. They might be actively seeking full-time work and should have been included in the unemployed measure. Then there lies the underemployed people, considered the "hidden unemployment" group. If the above statistics were included, this would have increased the official unemployment figure.

5.4 Types of Unemployment

Below, we will look at some graphs that show the labour market indicators:

Fig 5.3 Canada Labour Force Participation 2014 – 2021, by Fanshawe College, CC BY-NC-SA. Data source: The World Bank

Fig 5.4 Labour Force Participation 1960-2021, by Fanshawe College, CC BY-NC-SA. Data source: The World Bank

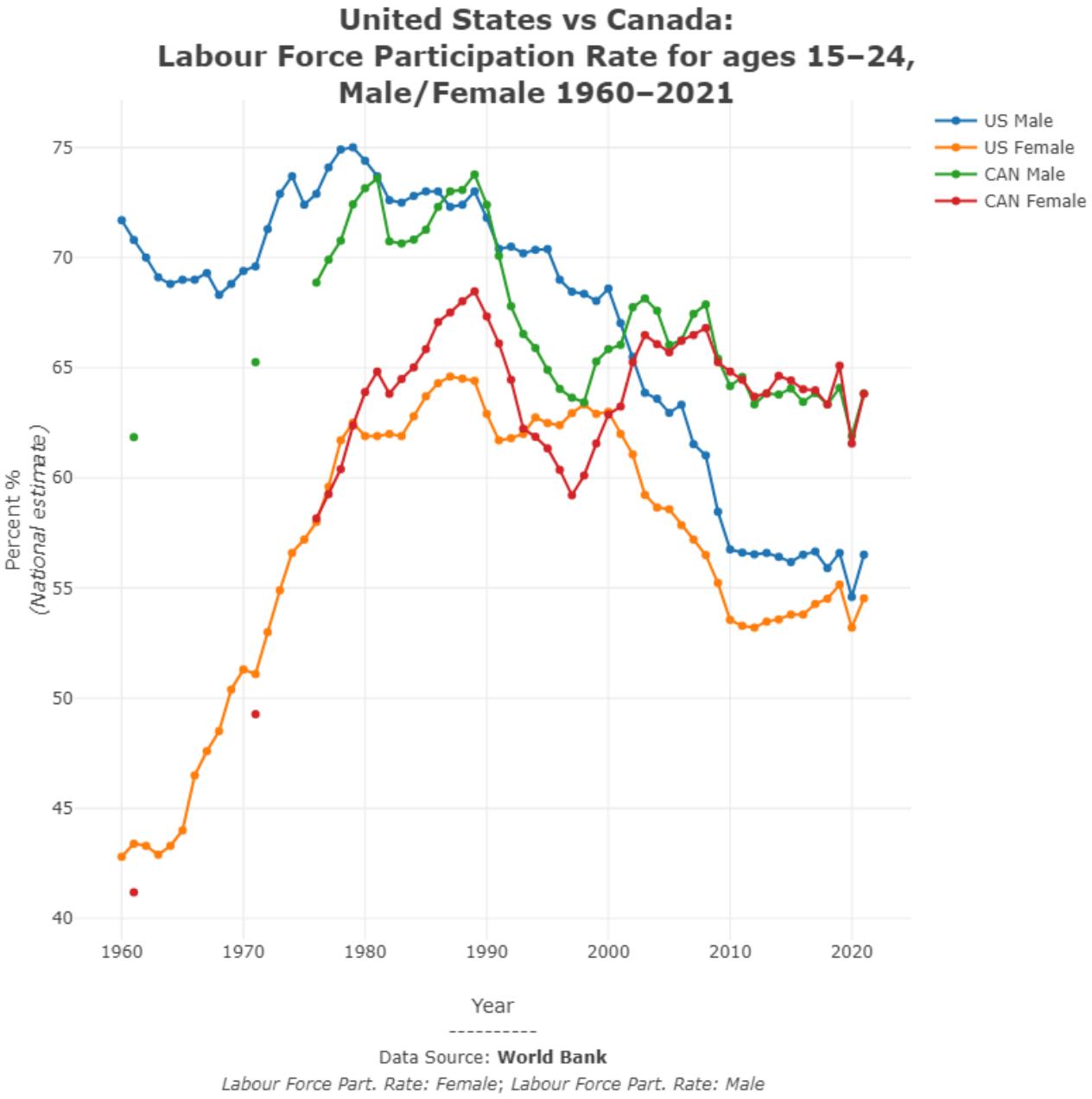

Fig 5.5 United States vs Canada: Labour Force Participation Rate for ages 15–24, Male/Female 1960–2021, by Fanshawe College, CC BY-NC-SA 4.0. Data source: The World Bank. "The patterns for women show notable differences from men in both the timing and the magnitude of the disparity in participation rates. First, the rate divergence between U.S. and Canadian prime-age women started in the mid-1990s. Second, the emerging gap resulted from steady increases in labour force participation among Canadian women and steady declines in participation among U.S. women. In 1997, participation among women in the United States and Canada was nearly identical, close to 77%. By 2017, participation for Canadian women had risen to 83% while that for U.S. women had fallen to 75%, leaving an 8 percentage point gap. Three-fourths of the divergence in labour market participation rates of prime-age workers between the two countries is explained by the gap in the participation rates of women" (Daly et al, 2018)

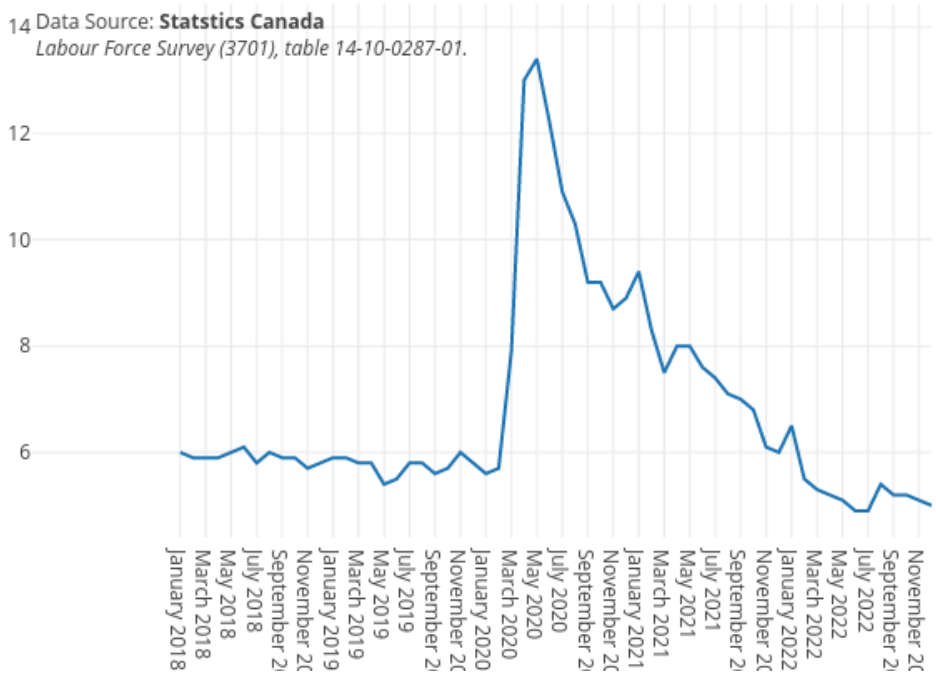

Fig 5.6 Canada Unemployment Rate, by Fanshawe College, CC BY-NC-SA. Data Source: Statistics Canada

Explore Further

Statistics Canada: Labour force characteristics by province, monthly, seasonally adjusted data

Workers may find themselves unemployed for different reasons. Each source of unemployment has quite different implications, not only for the workers it affects but also for public policy.

Frictional Unemployment

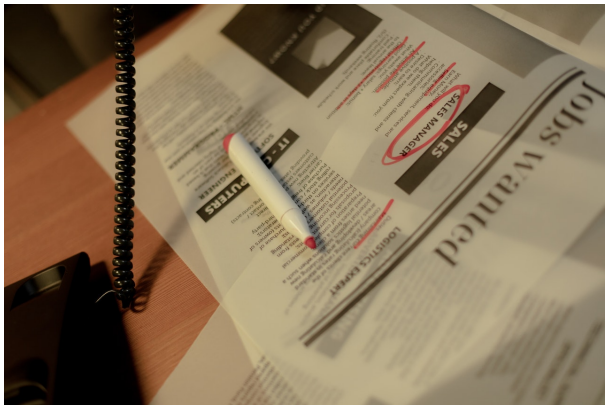

Photo by Ron Lach, Pexels License

There's always a situation where some workers are looking for jobs, and some employers are looking for workers. The workers remain unemployed during the time it takes to match them up. Unemployment that occurs because it takes time for employers and workers to find each other is called frictional unemployment.

The case of college graduates engaged in job searches is a good example of frictional unemployment. Those who did not land a job while still in school will seek work. Most of them will find jobs, but it will take time. During that time, these new graduates will be unemployed. If information about the labour market were costless, firms and potential workers would instantly know everything they needed to know about each other, and there would be no need for searches on the part of workers and firms. There would be no frictional unemployment. But information is costly. Job searches are needed to produce this information, and frictional unemployment exists while the searches continue. The frictional unemployment that results from people moving between jobs in a dynamic economy may account for one to two percentage points of total unemployment.

The government may attempt to reduce frictional unemployment by focusing on its source: information costs. Many provincial agencies, for example, offer job search assistance. They encourage firms seeking workers and workers seeking jobs to register with them. To the extent that such efforts make labour-market information more readily available, they reduce frictional unemployment.

Structural Unemployment


Photo by Ekrulila, Pexels License

The structurally unemployed are individuals who have no jobs because they lack skills valued by the labour market, either because demand has shifted away from the skills they do have or because they never learned any skills. An example of the former would be the unemployment among aerospace engineers after the U.S. space program downsized in the 1970s. An example of the latter would be high school dropouts.

Some people worry that technology causes structural unemployment. In the past, new technologies have put lower-skilled employees out of work, but at the same time, they create demand for higher-skilled workers to use the new technologies. Education seems to be the key in minimizing the amount of structural unemployment. Individuals who have degrees can be retrained if they become structurally unemployed. That option is more limited for people with no skills and little education.

Structural unemployment can also result from geographical mismatches. Economic activity may be booming in one region and slumping in another. It will take time for unemployed workers to relocate and find new jobs. And poor or costly transportation may block some urban residents from obtaining jobs only a few miles away.

Public policy responses to structural unemployment generally focus on job training and education to equip workers with the skills firms demand. The government publishes regional labour-market information, helping

to inform unemployed workers of where jobs can be found. Although government programs may reduce frictional and structural unemployment, they cannot eliminate it.

Cyclical Unemployment

The economy faces a boom and bust, which we call the business cycle. In certain periods, real GDP increases, and in other periods, real GDP decreases. You may recall from Chapter 4 that the increase in GDP is called economic expansion, and the decrease in GDP is called economic recession. Unemployment changes with changes in GDP. People will likely be laid off from jobs when the economy faces a recession. This triggers cyclical unemployment. Therefore, cyclical unemployment is a type of unemployment that changes with the business cycle. During a recession, cyclical unemployment increases, and cyclical unemployment decreases during the expansionary or recovery phase of the economy.

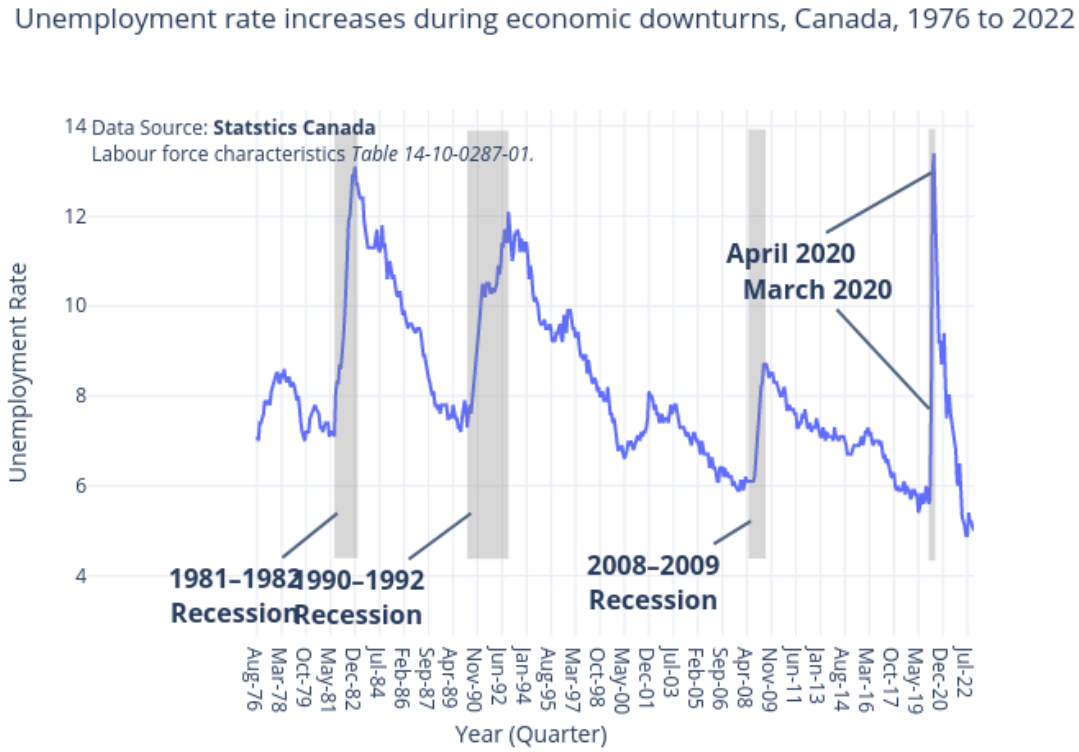

Fig 5.7 Unemployment rate increases during economic downturns, Canada, 1976 to 2022, by Fanshawe College, CC-BY-NC-SA. Data Source: Statistics Canada

Seasonal Unemployment

Seasonal unemployment may be seen as a kind of structural unemployment since it is a type of unemployment that is linked to certain kinds of jobs (construction work, migratory farm work, and fishing). The most-cited official unemployment measures erase this kind of unemployment from the statistics using "seasonal adjustment" techniques.

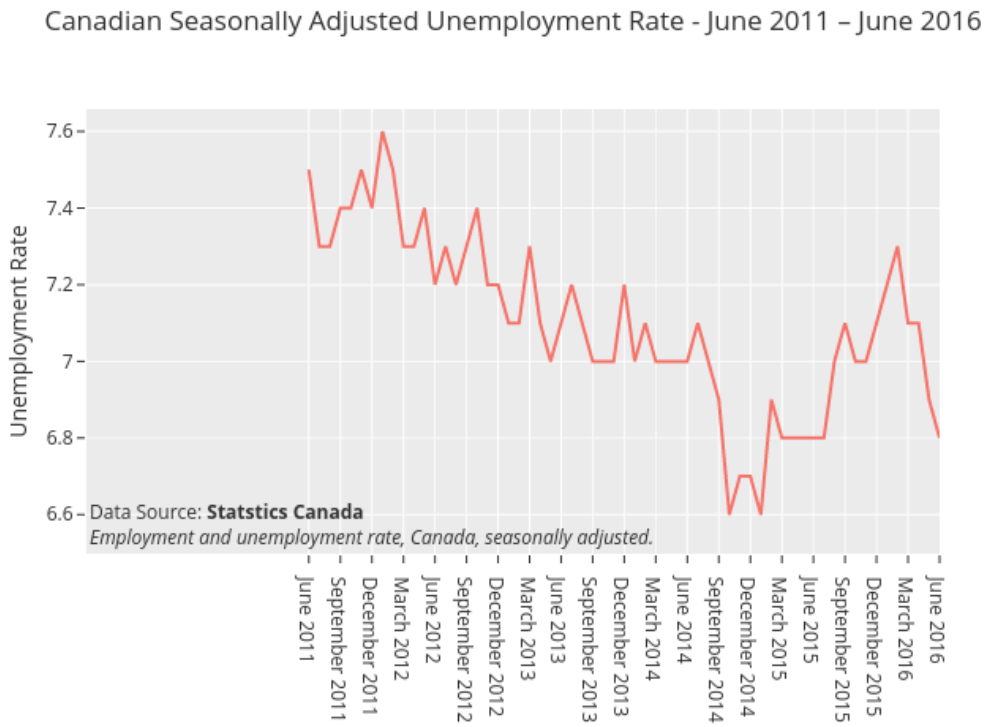

Fig 5.8 Seasonally Adjusted Unemployment Rate, by Fanshawe College, CC-BY-NC-SA. Data Source: Statistics Canada

Natural Rate of Unemployment

When the aggregate economy faces only frictional and structural unemployment, we call that kind of unemployment the Natural Rate of Unemployment. When the economy operates at a Natural Rate of Unemployment, there is *NO* cyclical Unemployment; all the existing unemployment is *only* frictional and structural.

The natural unemployment rate is related to two other important concepts: full employment and potential real GDP. Economists consider the economy to be at *full employment* when the actual unemployment rate is *equal* to the natural unemployment rate. In other words, full employment implies a situation when the economy faces only frictional and structural unemployment. So, the economy operating at natural unemployment means the economy is at full employment. 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 the potential. Finally, when the economy is above full employment, the unemployment rate is less than the natural unemployment rate, and the real GDP is greater than the potential. Operating above potential is only possible briefly since it is analogous to all workers working overtime.

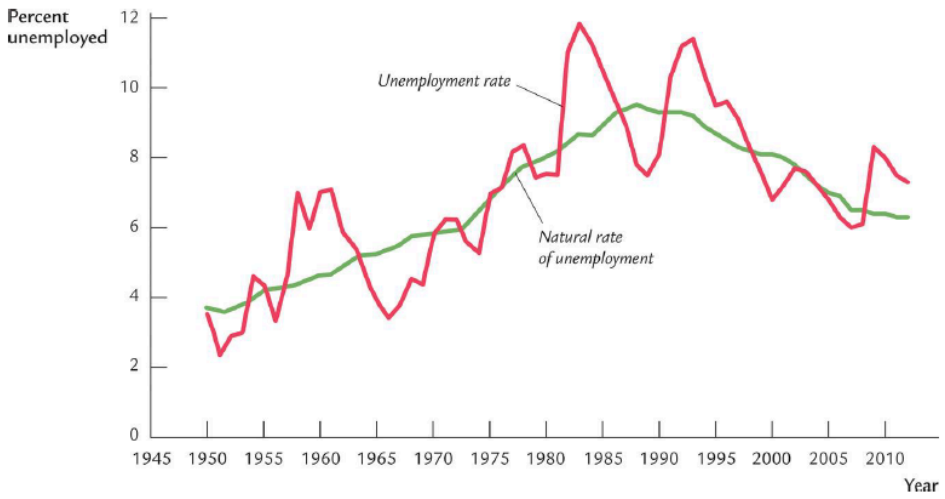

Fig 5.9 Unemployment Rate and the Natural Rate of Unemployment in Canada, Mankiw and Scarth: Macroeconomics, Canadian Fifth Edition Copyright © 2014 by Worth Publishers

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5.5 Inflation

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 economic markets. 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. If inflation happened for one year and then stopped, it would no longer be inflation. Similarly, a consistent fall in the average price level is called deflation.

Photo by Josh Appel, Unsplash Licence

Concern about changes in the price level has dominated economic discussion since 2022. With inflation in Canada generally averaging only between 2% and 3% each year since 1990, it is not surprising how much attention it has been getting ever since the average inflation rate in Canada rose to 8.1% in June of 2022. As of October 2023, Canada's average inflation rate has come down to 3.1% (Statistics Canada).

5.6 Why Do We Care About Inflation?

What difference does it make if the average level of prices changes? First, consider the impact of inflation.

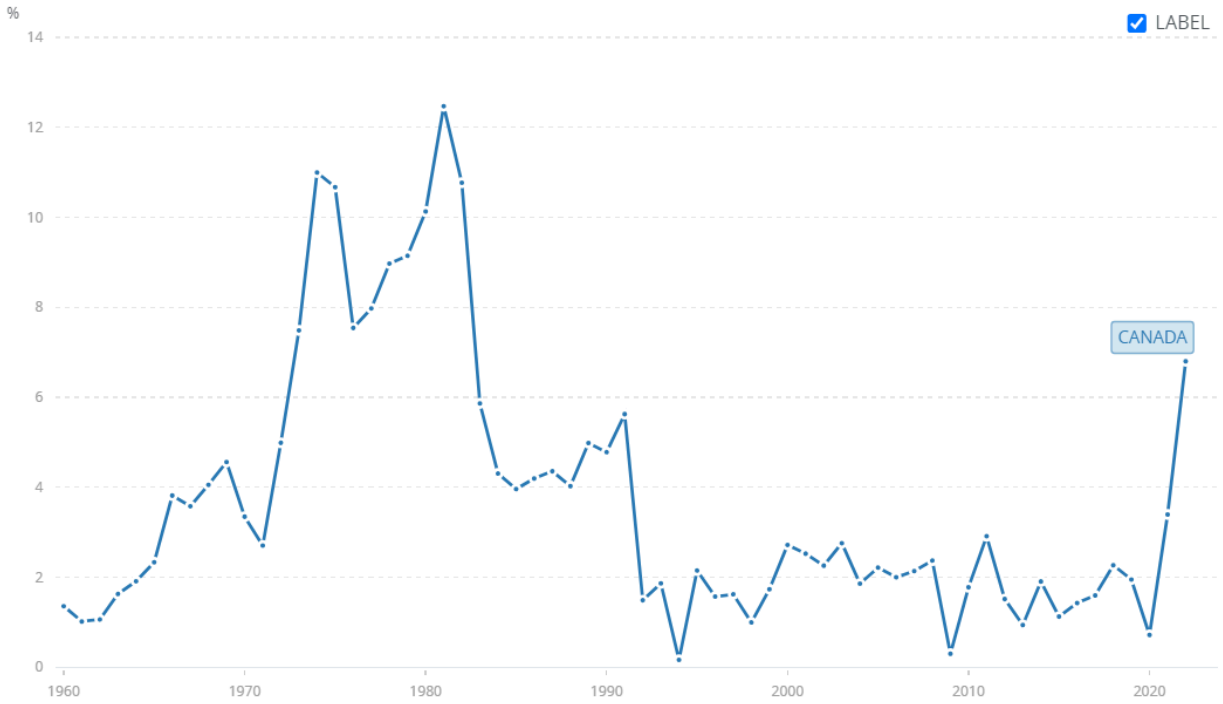

Fig 5.10 Inflation, Consumer Prices (annual %) – Canada by World Bank, CC-BY 4.0.

Whether one regards inflation as a "good" thing or a "bad" thing depends very much on one's economic situation. If you are a borrower, unexpected inflation is a good thing—it reduces the value of money you must repay. It isn't good if you are a lender because it reduces the value of future payments you will receive. Whatever a particular person's situation may be, inflation always produces the following effects on the economy: it reduces the value of money and the value of future monetary obligations. It can also create uncertainty about the future.

Suppose you have borrowed $100 from a friend and have agreed to pay it back in one year. During the year, however, prices doubled. That means that when you pay the money back, it will buy only half as much as it could have bought when you borrowed it. That is good for you but tough on the person who lent you the money. Of course, if you and your friend had anticipated such rapid inflation, you might have agreed to pay back a larger sum to adjust for it. When people anticipate inflation, they can adjust for its consequences in determining future obligations. However, *unanticipated* inflation helps borrowers and hurts lenders. Money loses value when its purchasing power falls. Since inflation is a rise in the level of prices, the amount of goods and services a given amount of money can buy falls with inflation.

Because inflation reduces the purchasing power of money, the threat of future inflation can make people reluctant to lend for long periods. From a lender's point of view, the danger of a long-term commitment of

funds is that future inflation will wipe out the value of the amount that will eventually be paid back. Lenders are reluctant to make such commitments.

"Zimbabwe Dollars" by Rob, Unsplash License

Uncertainty can be particularly pronounced in countries where extremely high inflation is a threat. *Hyperinflation* is generally defined as an inflation rate in excess of 200% per year.

Several countries have endured episodes of hyperinflation. The worst case was in Hungary immediately after World War II, when Hungary's price level was tripling *every day*. The second-worst case of hyperinflation belongs to Zimbabwe, the first country to have experienced hyperinflation in the 21st century. Zimbabwe's price index was doubling daily: a loaf of bread that cost 200,000 Zimbabwe dollars in February 2008 cost 1.6 trillion Zimbabwe dollars by August (CNN.com, 2018).

Is Deflation good?

As stated by Kate Ashford and Courtney Reilly-Larke (2022),

> While deflation may seem like a good thing, it can signal an impending recession and hard economic times. When people feel prices are headed down, they delay purchases in the hopes that they can buy things for less at a later date. But lower spending leads to less income for producers, which can lead to unemployment and higher interest rates due to rising debt. Times of recession or depression often seem to be 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. There were a few months in 2009 that were deflationary, but not at an annual rate. High levels of unemployment typically accompany recessions, and the total demand for goods falls, pulling the price level down.

5.7 Understanding How Inflation Changes the Value of the Dollar

Fig 5.11 shows the conversion of 1970 dollars to 2019 dollars. $40,000 in 1970 is equivalent in purchasing power to about $267,508.20 in 2019, an increase of $227,508.20 over 49 years. The Canadian dollar had an average inflation rate of 3.95% per year between 1970 and 2019, producing a cumulative price increase of 568.77%.

This means that prices in 2019 are 6.69 times as high as average prices since 1970, according to Statistics Canada Consumer Price Index (Webster, n.d.).

Fig 5.11 Value of 1970 amounts in 2019 dollars. Data Source: Bank of Canada

$10 in 1970	$66.88 in 2019
$50 in 1970	$334.39 in 2019
$100 in 1970	$668.77 in 2019
$500 in 1970	$3,343.85 in 2019
$1,000 in 1970	$6,687.70 in 2019
$5,000 in 1970	$33,438.52 in 2019
$10,000 in 1970	$66,877.05 in 2019
$50,000 in 1970	$334,385.25 in 2019
$100,000 in 1970	$668,770.49 in 2019
$500,000 in 1970	$3,343,852.46 in 2019
$1,000,000 in 1970	$6,687,704.92 in 2019

5.8 Price Indexes: Consumer Price Index and Inflation Rate

How do we measure inflation and deflation (that is, changes in the price level)? Price-level change is measured as the percentage rate of change in the level of prices. But how do we find a price level?

Economists measure the price level with a price index. A price index is a number whose movement reflects movement in the average level of prices. If a price index rises 10%, it means the average level of prices has risen 10%.

There are four steps one must take in computing a price index:

1. Select the kinds and quantities of goods and services to be included in the index. A list of these goods and services, and the quantities of each, is the "market basket" for the index.
2. Determine what it would cost to buy the goods and services in the market basket in some period that is the base period for the index. A base period is a time period against which costs of the market basket in other periods will be compared in computing a price index. Most often, the base period for an index is a single year. If, for example, a price index had a base period of 1990, the costs of the basket in other periods would be compared to the cost of the basket in 1990. However, we will encounter one index with a three-year base period.
3. Compute the cost of the market basket in the current period.
4. Compute the price index. It equals the current cost divided by the base-period cost of the market basket.

The Price of a Basket of Goods

Consider the simple basket of goods with only three items, represented in Fig 5.12. Say that a college student spends money on 20 hamburgers, one bottle of aspirin, and five movies in any given month. The table provides prices for these items over four years. Prices of some goods in the basket may rise while others fall. In this example, the price of aspirin does not change over the four years, while movies increase in price and hamburgers bounce up and down. The table shows the cost of buying the given basket of goods at prevailing prices.

Fig 5.12 Example Data

	Hamburgers	Aspirin	Movies
Quantity	20	1	5
2017	$3.10	$10.00	$6.00
2018	$3.20	$10.00	$6.50
2019	$3.10	$10.00	$7.00
2020	$3.50	$10.00	$7.50

We can calculate the price of this basket of goods for each year. We will refer to the basket price as BP.

$$\text{BP}_{17} = (\$3.10)(20) + (\$10.00)(1) + (\$6.00)(5) = \$62.00 + \$10.00 + \$30.00 = \$102.00$$

$$\text{BP}_{18} = (\$3.20)(20) + (\$10.00)(1) + (\$6.50)(5) = \$64.00 + \$10.00 + \$32.50 = \$106.50$$

$$\text{BP}_{19} = (\$3.10)(20) + (\$10.00)(1) + (\$7.00)(5) = \$62.00 + \$10.00 + \$35.00 = \$107.00$$

$$\text{BP}_{20} = (\$3.50)(20) + (\$10.00)(1) + (\$7.50)(5) = \$70.00 + \$10.00 + \$37.50 = \$117.50$$

Consumer Price Index

To simplify the task of interpreting the price levels for more realistic and complex baskets of goods, economists typically report the price level in each period as an index number rather than as the dollar amount for buying the basket of goods. Economists create price indices to calculate an overall average change in relative prices over time. We refer to this as the consumer price index (CPI). Although price indices can be of different types, the most commonly used of price index that Stats Canada uses to report in the inflation rate is computed using the CPI, because CPI forms the broadest and the most comprehensive measure of consumers' costs of living.

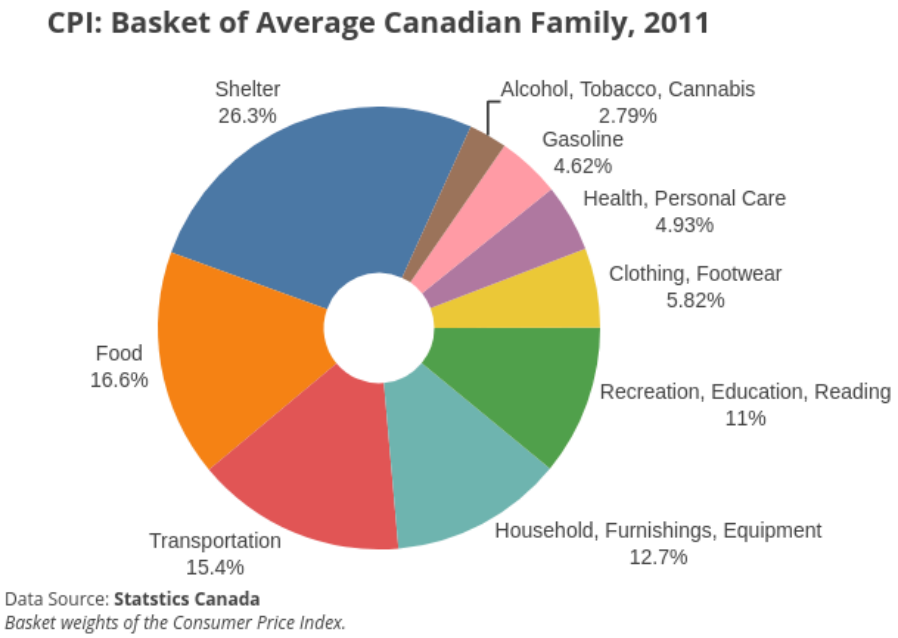

Fig 5.13 CPI: Basket of Average Canadian Family, 2011, by Fanshawe College, CC BY-NC-SA 4.0

The figure below shows the CPI basket of an average Canadian family in 2011.

To convert the money spent on the basket to an index number, economists arbitrarily choose one year as the base year or starting point from which we measure price changes. The base year, by definition, has an index number equal to 100. This sounds complicated, but it is really a simple math trick. We calculate the CPI using the following equation:

$$\text{CPI}_{\text{current year}} = 100 \times \frac{\text{BP}_{\text{current year}}}{\text{BP}_{\text{base year}}}$$

In the example above, we choose 2017 as the base year.

$$\text{CPI}_{2017} = 100 \times \frac{102.00}{102.00} = 100 \times 1 = 100.00$$

$$\text{CPI}_{2018} = 100 \times \frac{106.50}{102.00} = 100 \times 1.044 = 104.4$$

$$\text{CPI}_{2019} = 100 \times \frac{107.00}{102.00} = 100 \times 1.049 = 104.9$$

$$\text{CPI}_{2020} = 100 \times \frac{117.50}{102.00} = 100 \times 1.152 = 115.2$$

CPI in 2020 turns out to be 115, thus implying the price of a basket of goods is about 15% higher in 2020 than the same basket measured in 2017, that is, at the base year prices. Similarly, the basket's price is about 5% higher in 2019 compared to the same basket measured in 2017.

Inflation Rates (IR)

We can also calculate the inflation rates using the CPI values. IR is just a percentage change in the CPIs.

$$\text{IR}_{\text{from last year to current year}} = \frac{\text{CPI}_{\text{current year}} - \text{CPI}_{\text{last year}}}{\text{CPI}_{\text{last year}}} \times 100$$

Therefore, looking at the above data:

$$\text{IR}_{2017-2018} = 100 \times \frac{104.4 - 100.00}{100} = 100 \times 0.044 = 4.4\%$$

$$\text{IR}_{2018-2019} = 100 \times \frac{104.9 - 104.4}{104.4} = 100 \times 0.005 = 0.5\%$$

$$\text{IR}_{2019-2020} = 100 \times \frac{115.2 - 104.9}{104.9} = 100 \times 0.098 = 9.8\%$$

The advantage is that indexing allows easier eyeballing of the inflation numbers. If you glance at two index numbers like 107 and 110, you know automatically that the rate of inflation between the two years is about, but not quite exactly equal to, 3%. By contrast, imagine that we express the price levels in absolute dollars of a large basket of goods so that when you look at the data, the numbers were $19,493.62 and $20,040.17. Most people find it difficult to eyeball those kinds of numbers and say that it is a change of about 3%. However, the two numbers expressed in absolute dollars are exactly in the same proportion of 107 to 110 as in the previous example.

Index numbers have no dollar signs or other units attached to them. Although we can use index numbers to calculate a percentage inflation rate, the index numbers themselves do not have percentage signs. Index numbers mirror the proportions that we find in other data. They transform the other data so that it is easier to work with.

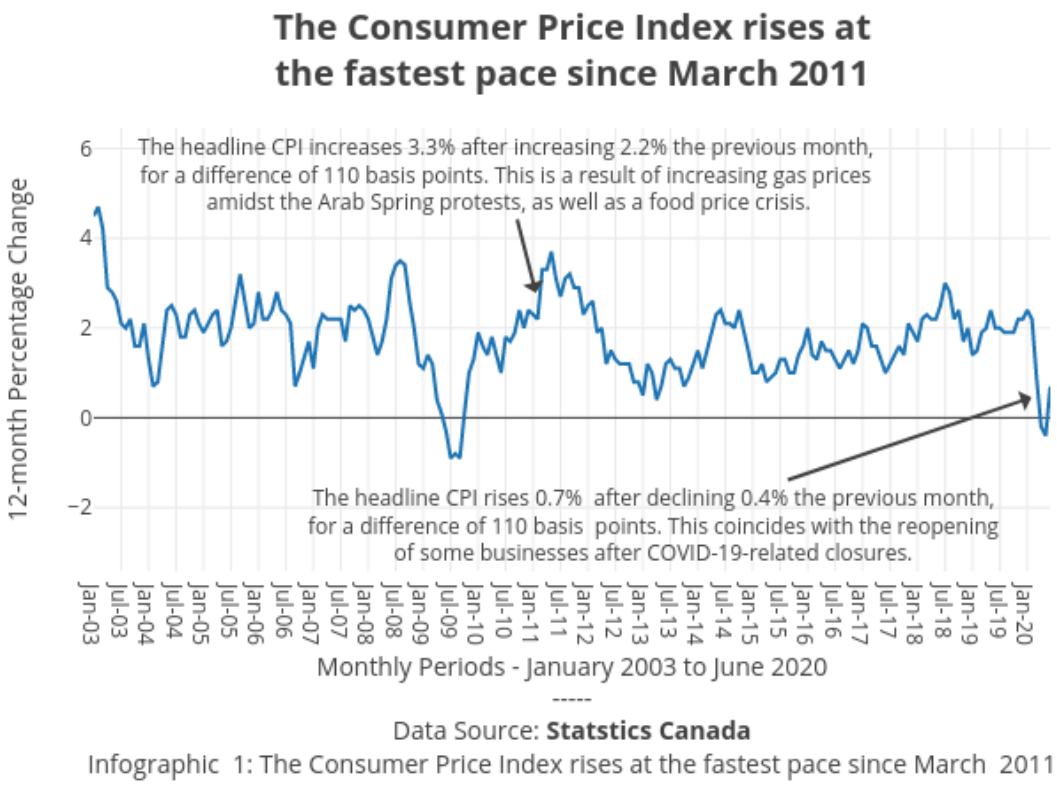

Fig 5.14 "The Consumer Price Index rises at the fastest pace since March 2011", by Fanshawe College, CC BY-NC-SA 4.0 (Data Source: StatCan). In 2021, Canada's Consumer Price Index ("CPI") rate grew at the fastest pace in 30 years, primarily driven by widespread supply chain issues. The CPI increased by 3.4 percent, according to Statistics Canada. A healthy inflation rate, as defined by the Bank of Canada, is between 1 and 3 percent, with 2 percent being the midpoint target.

Attribution

5.9 The Flaws in the Consumer Price Index

Consumer Price Indexes that employ fixed market baskets are likely to overstate inflation (and understate deflation) for four reasons:

1. Because the components of the market basket are fixed, the index does not incorporate consumer responses to changing relative prices.
2. A fixed basket excludes new goods and services.
3. Quality changes may not be completely accounted for in computing price-level changes.
4. The type of store in which consumers choose to shop can affect the prices they pay, and the price indexes do not reflect changes consumers have made in where they shop.

Photo by Michael Burrows, Pexels License

To see how these factors can lead to inaccurate measures of price-level changes, suppose the price of chicken rises and the price of beef falls. The law of demand tells us that people will respond by consuming less chicken and more beef. But if we use a fixed market basket of goods and services in computing a price index, we will not be able to make these adjustments. The market basket holds constant the quantities of chicken and beef consumed. The importance in consumer budgets of the higher chicken price is thus overstated, while the importance of the lower beef price is understated. More generally, a fixed market basket will overstate the importance of items that rise in price and understate the importance of items that fall in price. This source of bias is referred to as the *substitution bias*.

The *new-product bias*, a second source of bias in price indexes, occurs because it takes time for new products to be incorporated into the market basket that makes up the CPI. A good introduced to the market after the basket has been defined will not be included in it. But a new good, once successfully introduced, will likely fall in price. For example, when VCRs were first introduced, they generally cost more than $1,000. Within a few years, an equivalent machine cost less than $200. But when VCRs were introduced, the CPI was based on a market basket defined in the early 1970s. There was no VCR in the basket, so the impact of this falling price was not reflected in the index. The DVD player was introduced into the CPI within a year of its availability.

A third price index bias, the *quality-change bias*, comes from improvements in the quality of goods and services. Suppose, for example, that Ford introduces a new car with better safety features and a smoother ride than its previous model. Suppose the old model costs $20,000 and the new model costs $24,000, a 20% increase in price. Should economists at the Bureau of Labor Statistics (BLS) record the new model as 20% more expensive than the old one? The new model is not the same product as the old model. BLS economists faced with such changes try to adjust for quality. To the extent that such adjustments understate quality change, they overstate any increase in the price level.

Photo by Caique Morais, Unsplash Licence

The fourth source of bias is called the *outlet bias*. Households can reduce some of the impact of rising prices by shopping at superstores or outlet stores (such as T.J. Maxx, Wal-Mart, or factory outlet stores). However, this often means they get less customer service than at traditional department stores or smaller retail stores. However, since such shopping has increased in recent years, it must be that for their customers, the price reduction has been more valuable to them than loss of service. Prior to 1998, the CPI did not account for a change in the number of households shopping at these newer kinds of stores in a timely manner, but the BLS now does quarterly surveys and updates its sample of stores much more frequently. Another form of this bias arises because government data collectors do not collect price data on weekends and holidays when many stores run sales.

According to the Bank of Canada, a total CPI bias in Canada is roughly 0.5 percentage points per year, with an upper bound of about 0.6 percentage points per year. From this total, slightly more than half seems to result from the CPI basket being fixed.

5.10 CPI and Core Inflation

Photo by Gabriel Santos, Unsplash License

Imagine driving a company truck across the country – you probably would care about things like the prices of available roadside food and motel rooms and the truck's operating condition. However, the manager of the firm might have different priorities. He would care mainly about the truck's on-time performance and much less about the food you were eating and the places you were staying. In other words, the company manager would pay attention to the firm's production while ignoring transitory elements that impacted you but did not affect the company's bottom line.

In a sense, a similar situation occurs with regard to measures of inflation. We've learned that CPI measures prices as they affect everyday household spending. Economists typically calculate a core inflation index by taking the CPI and excluding volatile economic variables, such as food and energy, whose prices show more swings. In this way, economists have a better sense of the underlying price trends that affect the cost of living.

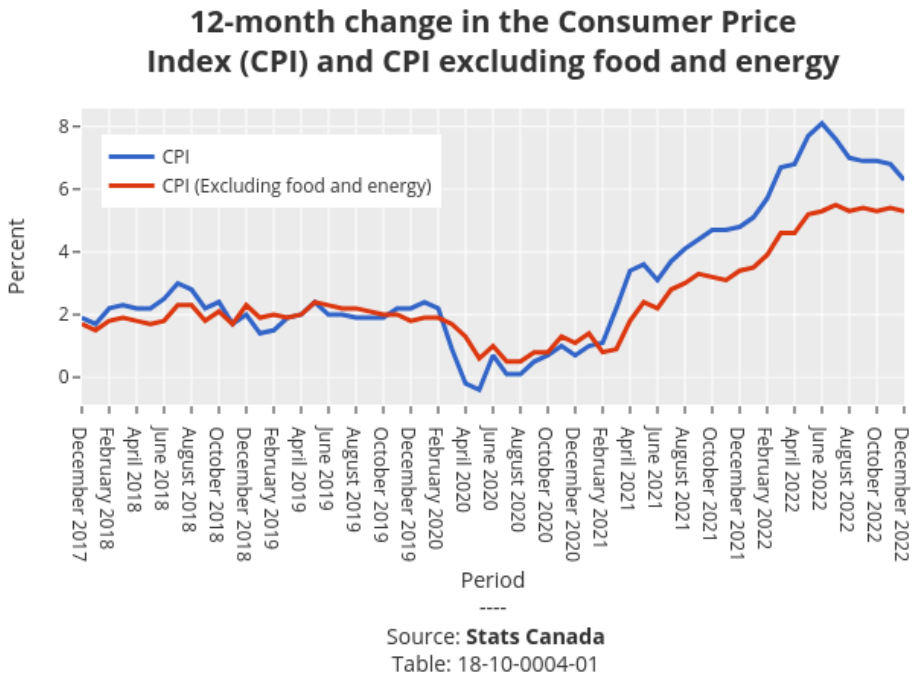

Fig 5.15 12-month change in the Consumer Price Index (CPI) and CPI excluding food and energy by Fanshawe College, CC-BY-NC-SA (Data source: StatCan)

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5.11 Other Price Indexes

The basket of goods behind the Consumer Price Index represents an average hypothetical Canadian household's consumption, which is to say that it does not exactly capture anyone's personal experience. When the task is to calculate an average level of inflation, this approach works fine. What if you are concerned about inflation experienced by a certain group, like older people, low-income people, or single-parent families with children? In specific situations, a price index based on the buying power of the average consumer may not feel quite right.

This problem has a straightforward solution. If the Consumer Price Index does not serve the desired purpose, then invent another index based on a basket of goods appropriate for the group of interest. Statistics Canada publishes several experimental price indices: some for particular groups like older people or people experiencing poverty, some for different geographic areas, and some for certain broad categories of goods like food or housing.

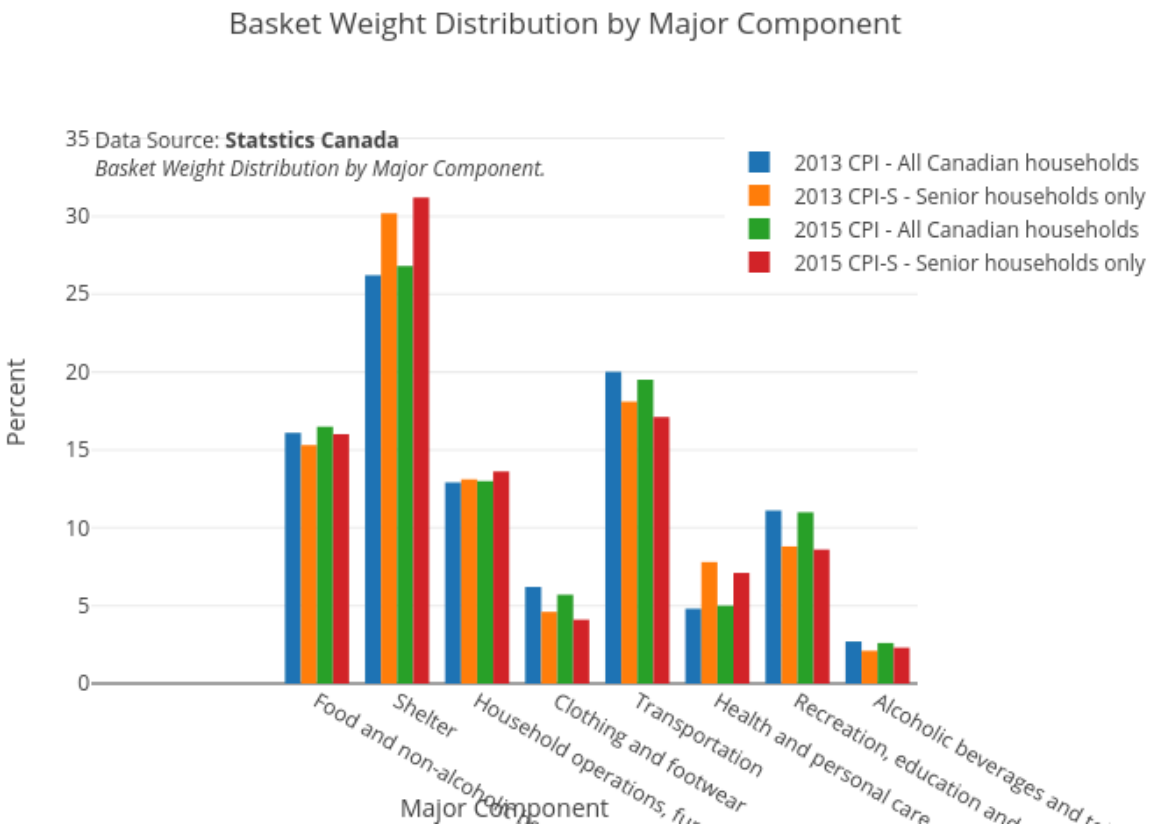

Fig 5.15 Basket Weight Distribution by Major Component, by Fanshawe College, CC-BY-NC-SA. Data Source: Statistics Canada

Statistics Canada also calculates several price indices that are not based on baskets of consumer goods. For example, the *Producer Price Index* (PPI) is based on prices paid for supplies and inputs by producers of goods and services. We can break it down into price indices for different industries, commodities, and stages of processing (like finished goods, intermediate goods, or crude materials for further processing). There is an International Price Index based on the prices of exported or imported merchandise. An *Employment Cost Index*

measures wage inflation in the labour market. The *GDP deflator*, which Statistics Canada measures, is a price index that includes all the GDP components (consumption plus investment plus government plus exports minus imports).

What's the best measure of inflation?

If one is concerned with the most accurate measure of inflation, one should use the GDP deflator as it picks up the prices of goods and services produced. However, it is not a good measure of the cost of living as it includes prices of many products not purchased by households (for example, aircraft, fire engines, factory buildings, office complexes, and bulldozers). If one wants the most accurate measure of inflation as it impacts households, one should use the CPI, as it only picks up the prices of products purchased by households. That is why economists sometimes refer to the CPI as the cost-of-living index.

5.12 Real vs Nominal Interest Rates

Inflation influences our interest rates for car loans or personal lines of credit. For instance, imagine you borrowed $100 from your bank one year ago at 8% interest on your loan. When you repay the loan, you must repay the $100 you borrowed plus $8 in interest—a total of $108. This 8% interest rate is the stated interest rate on the loan you must pay back, called the *nominal interest rate*.

But the nominal interest rate doesn't take inflation into account. In other words, it is unadjusted for inflation. To continue our scenario, suppose on your way to the bank, a newspaper headline caught your eye stating: "Inflation at 5% This Year!" Inflation is a rise in the general price level, as you know. A 5% inflation rate means that an average basket of goods you purchased this year is 5% more expensive when compared to last year. This leads to the concept of the **real**, or inflation-adjusted, **interest rate**. The *real interest rate* measures the percentage increase in purchasing power the lender receives when the borrower repays the loan with interest. In our earlier example, the lender earned 8% or $8 on the $100 loan. However, because inflation was 5% over the same period, the lender earned only 3% in real purchasing power or $3 on the $100 loan. The real interest rate is the "true" cost of borrowing.

The diagram below illustrates the relationship between nominal interest rates, real interest rates, and the inflation rate. As shown, the nominal interest rate equals the real interest rate plus the inflation rate.

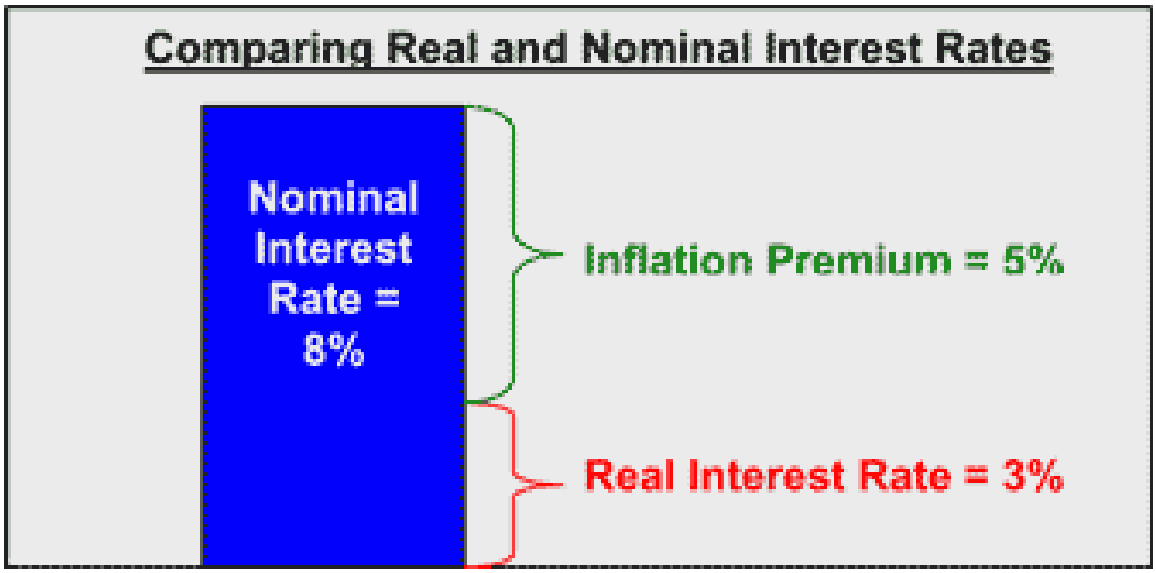

Fig 5.16 Comparing Real and Nominal Interest Rates

A comparison of the nominal and real interest rates for Canada is shown in the figure below:

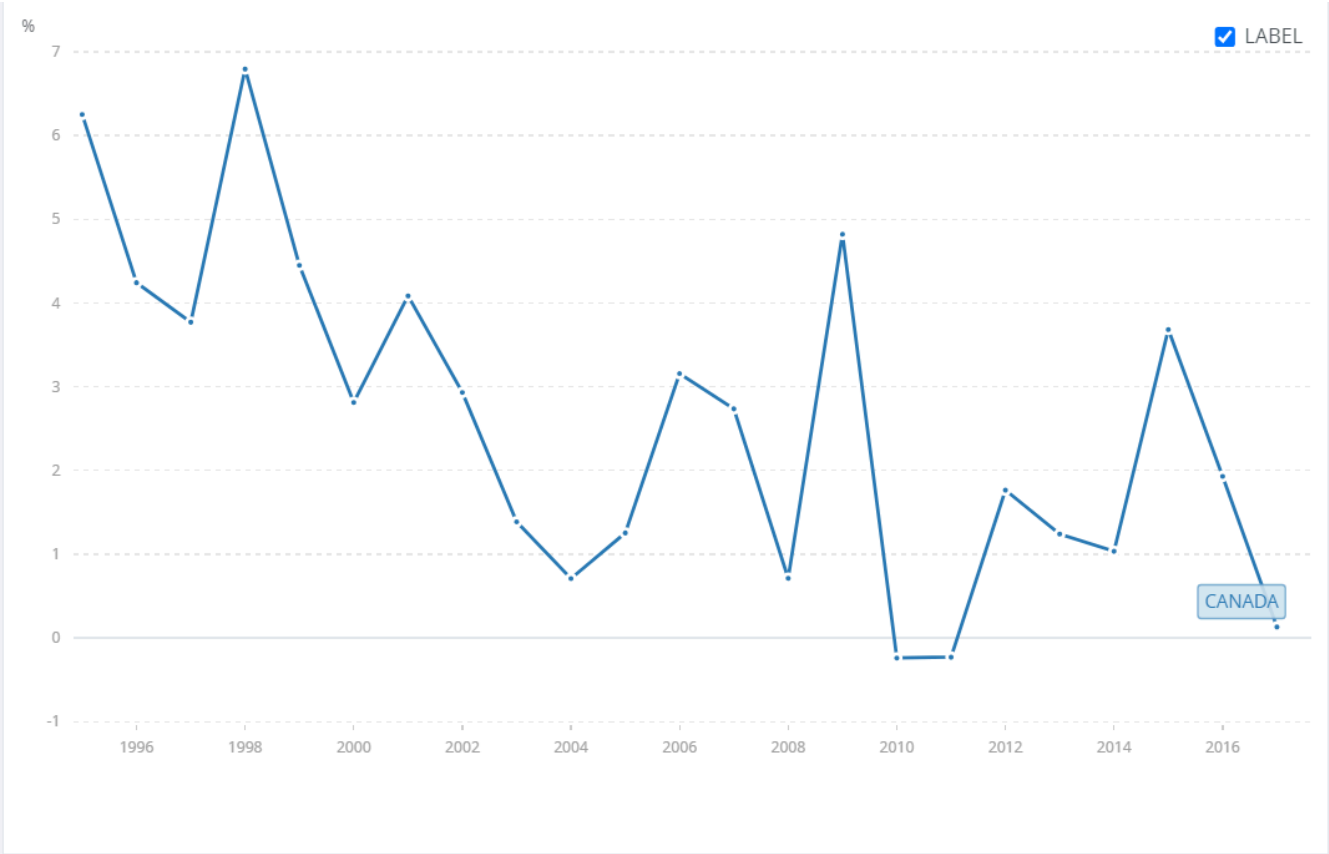

Fig 5.17 Real Interest Rate by The World Bank, CC BY 4.0

Advertised interest rates that you may see at banks or other financial service providers are typically nominal interest rates. This means it's up to you to estimate how much of the interest rate a bank may pay you on a savings deposit is an increase in your purchasing power and how much is simply making up for yearly inflation.

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"What it the difference between the real interest rate and the nominal interest rate?" by Federal Reserve Bank of San Francisco, © 2023 Federal Reserve Bank of San Francisco, used in accordance with the FRBSF Site Policy.

5.13 Key Terms

Key Terms

Cyclical Unemployment

Consumer Price Index

Employment population ratio (EPR)

Frictional Unemployment

Full Employment

Inflation

Labour force (LF)

Labour force participation rate (LFPR)

Menu costs

Natural Rate Unemployment

New Product Bias

Nominal Interest Rate

Price Index

Real Interest Rate

Seasonal Unemployment

Structural Unemployment

Substitution Bias

Unemployment rate (UNR)

CHAPTER 6: ECONOMIC GROWTH AND FINANCIAL SYSTEMS

Chapter Outline

6.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

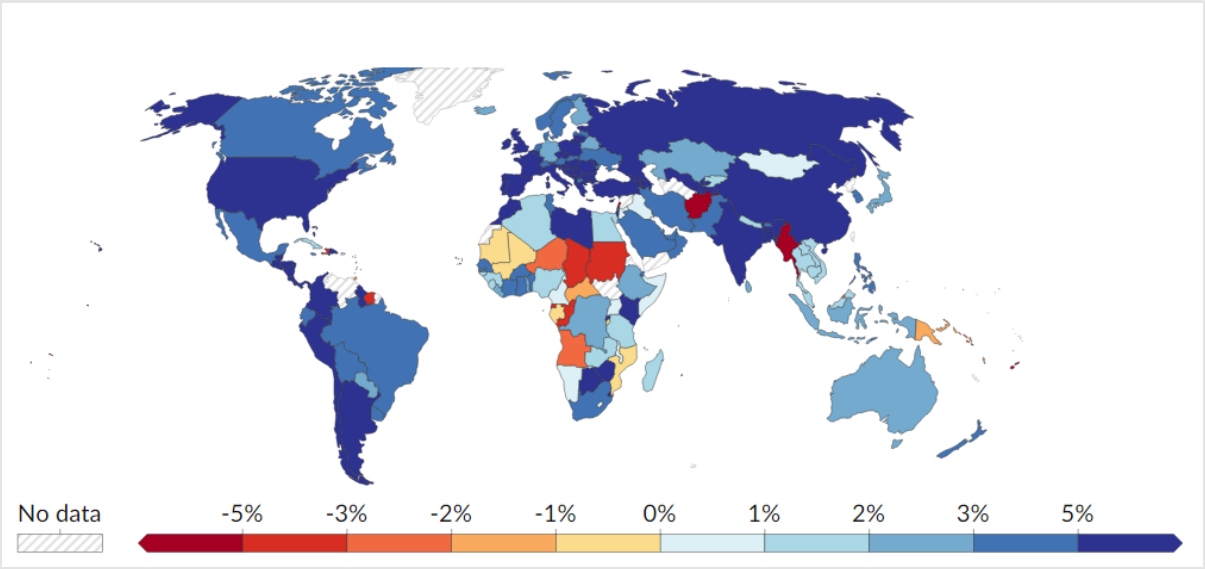
- Measure Economic Growth
- Explain Long Run Economic Growth & Growth Policies
- Analyze The Business Cycle

On average, humans need about 2,500 calories a day to survive, depending on height, weight, and gender. The economist Brad DeLong estimates that the average worker in the early 1600s earned wages that could afford him 2,500 food calories. This worker lived in Western Europe. Two hundred years later, that same worker could afford 3,000 food calories. However, between 1800 and 1875, in a time span of just 75 years, economic growth was so rapid that Western European workers could purchase 5,000 food calories daily. By 2012, a low-skilled worker in an affluent Western European/North American country could afford to purchase 2.4 million food calories daily.

What caused such a rapid rise in living standards between 1800 and 1875 and thereafter? Why can many countries, especially those in Western Europe, North America, and parts of East Asia, feed their populations more than adequately while others cannot? We will look at these and other questions as we examine long-run economic growth.

6.1 Global Economic Growth

Interactive Tool



Annual Growth of GDP Per Capita by Our World in Data, CC-BY 4.0

Every country worries about economic growth. In Canada and other high-income countries, the question is whether economic growth continues to provide the same remarkable gains in our standard of living as it did during the twentieth century. Meanwhile, can middle-income countries like India, Brazil, Egypt, or Poland catch up to the higher-income countries? Or must they remain in the second tier of per capita income? Of the world's population of roughly 6.7 billion people, about 2.6 billion are scraping by on incomes that average less than $2 per day, not that different from the standard of living 2,000 years ago. Can the world's poor be lifted from their fearful poverty? As the 1995 Nobel laureate in economics, Robert E. Lucas Jr., once noted: "The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else."

Dramatic improvements in a nation's standard of living are possible. After the Korean War in the late 1950s, the Republic of Korea, often called South Korea, was one of the poorest economies in the world. Measured by total GDP in 2012, South Korea is the thirteenth-largest economy in the world. For a nation of 49 million people, this transformation is extraordinary.

South Korea is a standout example but is not the only case of rapid and sustained economic growth. Other East Asian nations, like Thailand and Indonesia, have also seen very rapid growth. China has grown enormously since market-oriented economic reforms were enacted around 1980. GDP per capita in high-income economies like Canada also has grown dramatically, albeit over a longer time frame. Since the Civil War, the U.S. economy has been transformed from a primarily rural and agricultural economy to an economy based on services, manufacturing, and technology.

Attribution

6.2 Measuring Economic Growth

What is Canada's economic growth rate as of 2022? According to Statistics Canada, Canada's real GDP grew by 3.8% in 2022. How is this growth rate measured? Economic Growth is measured as a percentage change in real GDP between different time periods. If Canada's real GDP for 2019 is $1.3 trillion and in 2020, real GDP changed to $1.22 trillion, then the economic growth rate between this one year would be:

$$\left[\frac{(1.22-1.3)}{1.3}\right] = -6\%$$

In our example, we find the annual economic growth rate declining during this time period. Suppose the real GDP in 2021 is $1.28 trillion; in 2022, the real GDP increases to $1.31 trillion. Then, how do we measure the *average annual growt*h rate over this time period between *2019 and 2022*? We would need to find the annual growth rate between 2019 and 2020 (i.e., −6%), between 2020 and 2021 (i.e. +4.9%), and finally, that of between 2021 and 2022 (i.e. +2.3%). The average *annual approximate growth rate* over this four-year time period would be an average of the individual growth rates during the three different one-year time periods:

$$\frac{[(-6) + (+4.9) + (+2.3)]}{3} = 0.4\%$$

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6.3 The Significance of Economic Growth

To demonstrate the impact of economic growth on a nation's living standards, we must start with a clear definition of economic growth and then study its impact over time. We will also see how population growth affects the relationship between economic growth and the standard of living an economy can achieve.

Economic growth is a long-run process that occurs as an economy's potential output increases. Earlier, we defined economic growth as the process through which an economy achieves an outward shift in its production possibilities curve. How does a shift in the production possibilities curve relate to a change in potential output? To produce its potential level of output, an economy must operate *on* its production possibilities curve. An increase in potential output thus implies an outward shift in the production possibilities curve.

There are three key points about economic growth to keep in mind:

1. Growth is a process. It is not a single event; rather, it is an unfolding series of events.
2. We define growth in terms of the economy's ability to produce goods and services, as indicated by its level of potential output.
3. Growth suggests that the economy's ability to produce goods and services is rising. Economic growth is thus a discussion of the series of events that increase the economy's ability to produce goods and services.

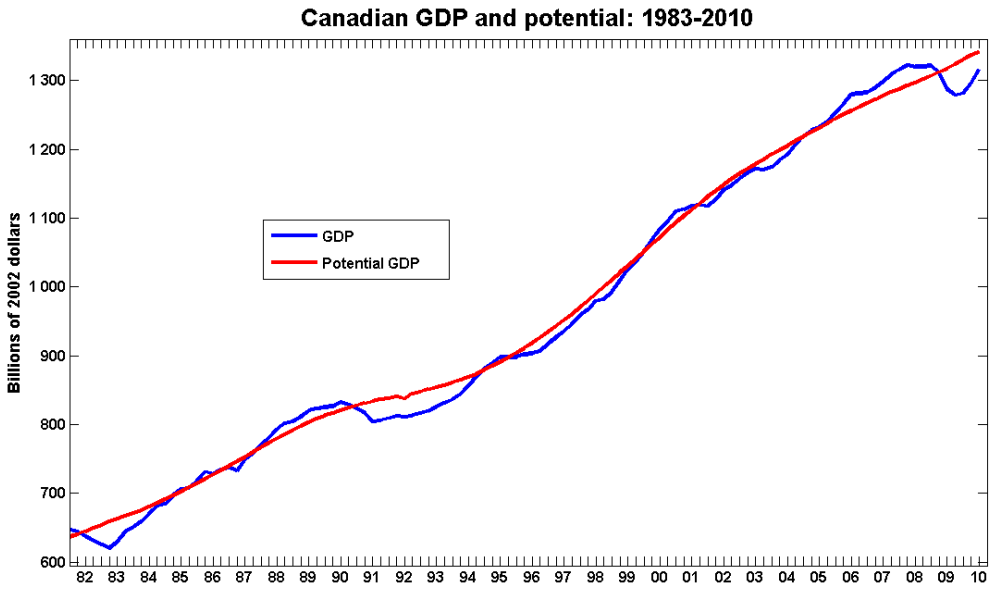

Fig 6.1 "Canadian GDP and potential: 1983-2010", from "On Canada's Exit Strategy" by Stephen Gordon, Worthwhile Canadian Initiative, © 2010, used under fair dealing

The graph (fig 6.1) shows annual levels of actual real GDP and potential output. The economy has experienced dramatic growth over the past forty years; potential and real output have soared. The figure also reminds us of a central theme of our macroeconomics analysis: real GDP fluctuates around potential output. Real GDP sagged well below its potential during the mid-'90s and rose well above its potential during 2005-06 before falling below its potential again during the financial crisis of 2008-09.

The graph below (Fig 6.2) shows the fluctuations around the potential GDP, and the changes in real GDP show the different phases of the business cycle (as discussed in Chapter 4). The rise in real GDP is the expansionary phase of the business cycle, and the fall in real GDP corresponds to the recessionary phase of the business cycle.

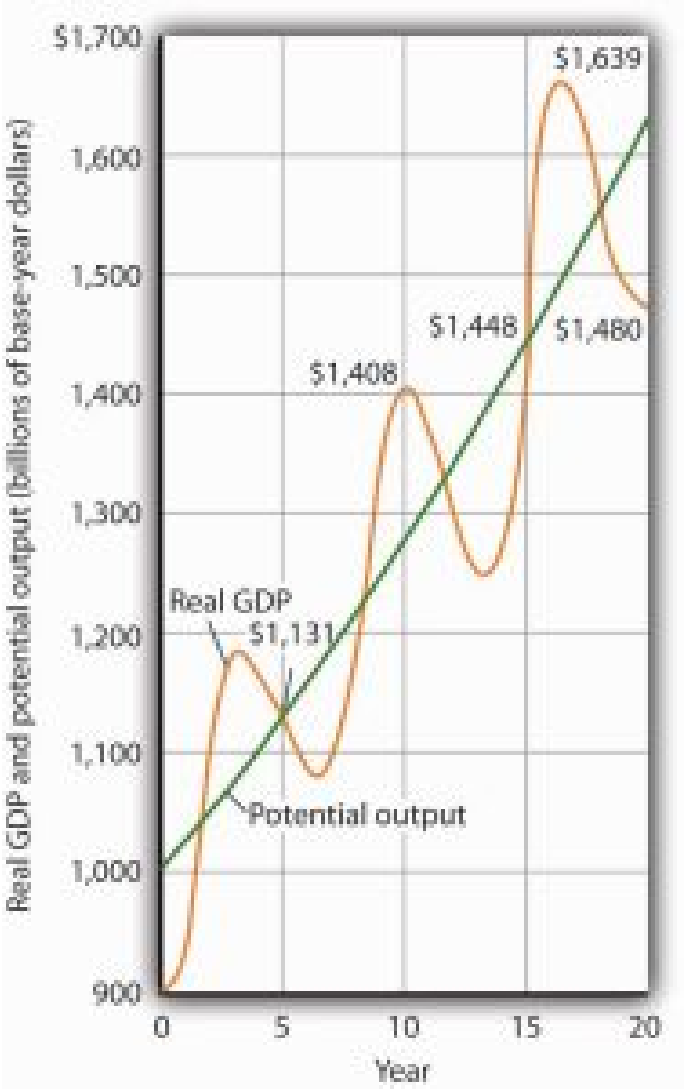

Fig 6.2 Cyclical Change Versus Growth. Here, an economy's potential output (shown in green) grows at a steady rate of 2.5% per year, with actual values of real GDP fluctuating about that trend. If we measure growth in the first ten years as the annual rate of change between the beginning and ending values of real GDP, we get a growth rate of 3.5%. The rate for the second decade is 0.5%.

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6.4 Growth in Output or real GDP per Capita

Of course, it is not just how fast the real or potential output grows that determines how fast the average person's material standard of living rises. For that purpose, we examine economic growth on a per capita basis. An economy's output per capita equals real GDP per person.

If we denote N as population, then

$$\text{Real GDP per capita} = \frac{\text{real GDP}}{N}$$

In Canada, for example, real GDP in 2021 was CA $2,185,910 million (annual rate). The Canadian population was 38.25 million. Real GDP per capita thus equaled 2,185,910 m ÷ 38.25 m = CA $57,147. As of 2023, real GDP per capita for Canada has been declining because Canada is experiencing a faster rate of populate growth relative to real GDP growth.

We use output per capita to gauge an economy's material standard of living. If the economy's population is growing, then output must rise as rapidly as the population if real GDP per capita is to remain unchanged. If, for example, the population increases by 2%, then real GDP would have to rise by 2% to maintain the current level of output per capita. If real GDP rises by less than 2%, output per capita will fall. If real GDP rises by more than 2%, output per capita will rise. More generally, we can write:

$$\%\text{ rate of growth of real GDP per capita} \cong \%\text{ rate of growth of real GDP} - \%\text{ rate of growth of population}$$

For economic growth to translate into a higher standard of living on average, economic growth must exceed population growth. From 1970 to 2004, for example, Sierra Leone's population grew at an annual rate of 2.1% per year, while its real GDP grew at an annual rate of 1.4%; its real GDP per capita thus fell at a rate of 0.7% per year. Over the same period, Singapore's population grew at an annual rate of 2.1% per year, while its real GDP grew 7.4% per year. The resultant 5.3% annual growth in output per capita transformed Singapore from a relatively poor country to a country with one of the highest per capita incomes in the world.

6.5 Rule of 70 and Difference in Growth Rates

Suppose two economies with equal populations start at the same level of real GDP but grow at different rates. Economy A grows at a rate of 3.5%, and Economy B grows at a rate of 2.4%. In how many years will each of the two economies double in size? If the GDP of Economy A is $1.3 trillion in 2019, in how many years will the real GDP grow to $2.6 at its current growth rate of 3.5%? Similarly, if the GDP of Economy B is $1.3 trillion in 2019, in how many years will the real GDP grow to $2.6, at its current growth rate of 2.4%?

The doubling time is given by the **Rule of 70**, which states that a variable's approximate doubling time equals 70 divided by the growth rate, stated as a whole number. If the level of income were increasing at a 9% rate, for example, its doubling time would be roughly 70 ÷ 9, or 7.7 years.

So, given the Rule of 70, Economy A would double in size in $\frac{70}{3.5} = 20$ years, and Economy B would double in $\frac{70}{2.4} = 29$ years. The Rule of 70 gives an approximation of exponential growth's impact, not an exact measure.

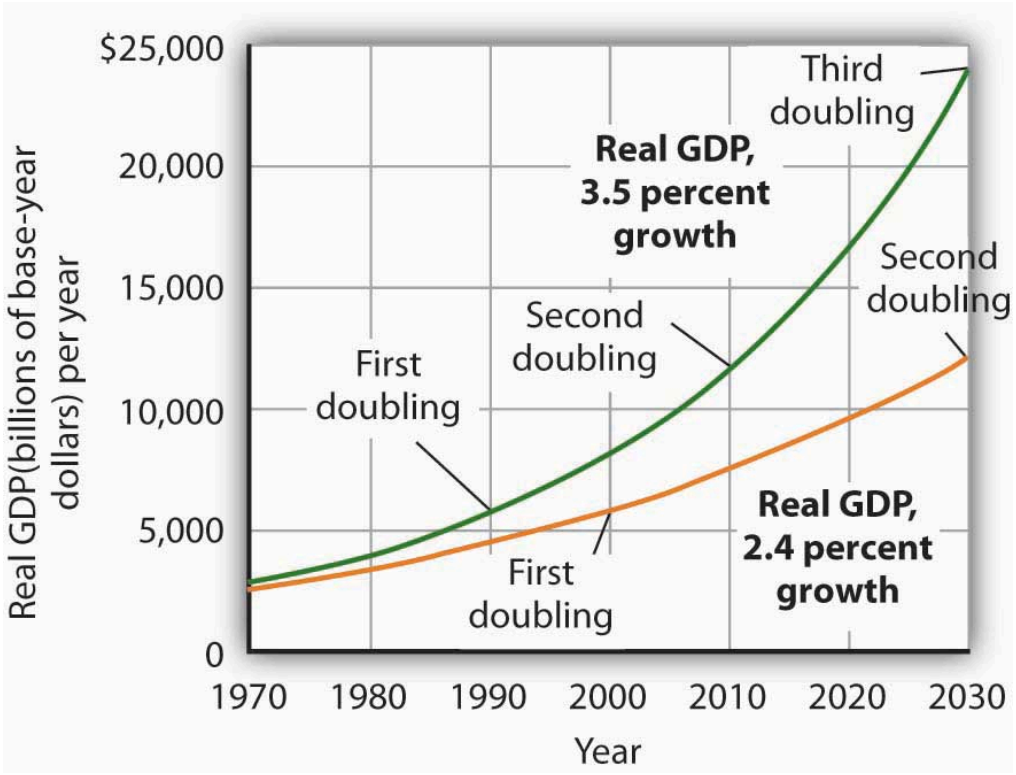

Fig 6.3 Differences in Growth Rates. We began in 1970 when real GDP equalled $2,873.9 billion. If real GDP grew at an annual rate of 3.5% from that year, it would double roughly every 20 years: in 1990, 2010, and 2030. However, growth at a 2.4% rate implies doubling every 30 years, in 2000 and 2030. By 2030, the 3.5% growth rate leaves real GDP at twice the level that would be achieved by 2.4% growth.

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6.6 Determinants of Economic Growth in the Long Run

Labour Productivity

Sustained *long-term* economic growth comes from increases in worker productivity, which essentially means how well we do things. In other words, how efficient is your nation with its time and workers? Labour productivity is the value each employed person creates per unit of their input. The easiest way to comprehend labour productivity is to imagine a Canadian worker who can make ten loaves of bread in an hour versus a U.S. worker who, in the same hour, can make only two loaves of bread. In this fictional example, the Canadians are more productive. More productivity means you can do more in the same amount of time. This, in turn, frees up resources for workers to use elsewhere.

What determines how productive workers are? The answer is pretty intuitive. The *first* determinant of labour productivity is human capital. *Human capital* is the accumulated knowledge (from education and experience), skills, and expertise that the average worker in an economy possesses. Typically, the higher the average level of education in an economy, the higher the accumulated human capital and the higher the labour productivity.

Photo by Scott Graham, Unsplash Licence

The *second* factor that determines labour productivity is technological change. *Technological change* is a combination of *invention*—advances in knowledge—and *innovation*, which puts that advance to use in a new product or service. For example, the transistor was invented in 1947. It allowed us to miniaturize the footprint of electronic devices and use less power than the tube technology that came before it. Innovations since then have produced smaller and better transistors that are ubiquitous in products as varied as smartphones, computers, and escalators. The development of the transistor has allowed workers to be anywhere with smaller devices. These devices can be used to communicate with other workers, measure product quality or do any other task in less time, improving worker productivity.

The *third* factor that determines labour productivity is economies of scale. Recall that economies of scale are industries' cost advantages due to size. Consider again the case of the fictional Canadian worker who could produce ten loaves of bread in an hour. If this difference in productivity was due only to economies of scale, it could be that Canadian workers had access to a large industrial-size oven while the U.S. worker was using a standard residential-size oven.

Sources of Economic Growth: The Aggregate Production Function

To analyze the sources of economic growth, it is useful to think about a *production function*, which is the process of turning economic inputs like labour, machinery, and raw materials into outputs like goods and services used by consumers. A microeconomic production function describes the inputs and outputs of a firm or perhaps an industry. In macroeconomics, the connection from inputs to outputs for the entire economy is called an *aggregate production function*.

Components of the Aggregate Production Function

Figure 6.4 presents two examples of aggregate production functions. In the first production function, shown in Figure 6.4 (a), the output is GDP; in Fig 6.4 (b), the output is GDP per capita.

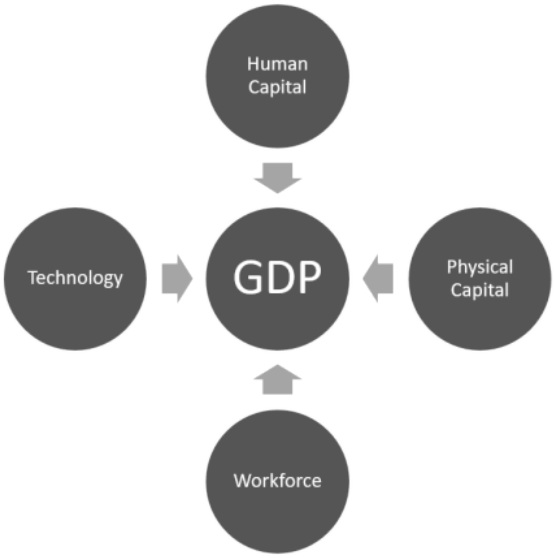

Fig 6.4(a) Determinants of GDP

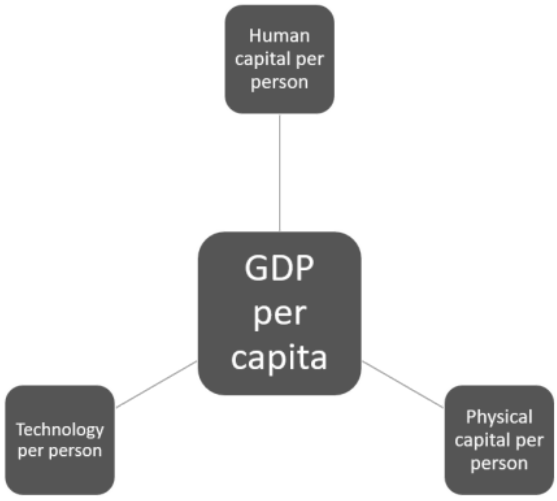

Fig 6.4(b) Determinants of GDP Per Capita

Recall that one way to measure human capital is to look at the average levels of education in an economy. Figure 6.5 illustrates the *deepening of human capital* for Canadian workers by showing that the proportion of Canada's population aged 25 to 34 years with a high college degree or diploma has risen between 2006 and 2016, as shown in the graph below. Not only does the current Canadian economy have better-educated workers

with more and improved physical capital than it did several decades ago, but these workers have access to more advanced technologies.

When society increases the level of capital per person, we call the result *capital deepening*. The idea of capital deepening can apply both to additional human capital per worker and to additional physical capital per worker.

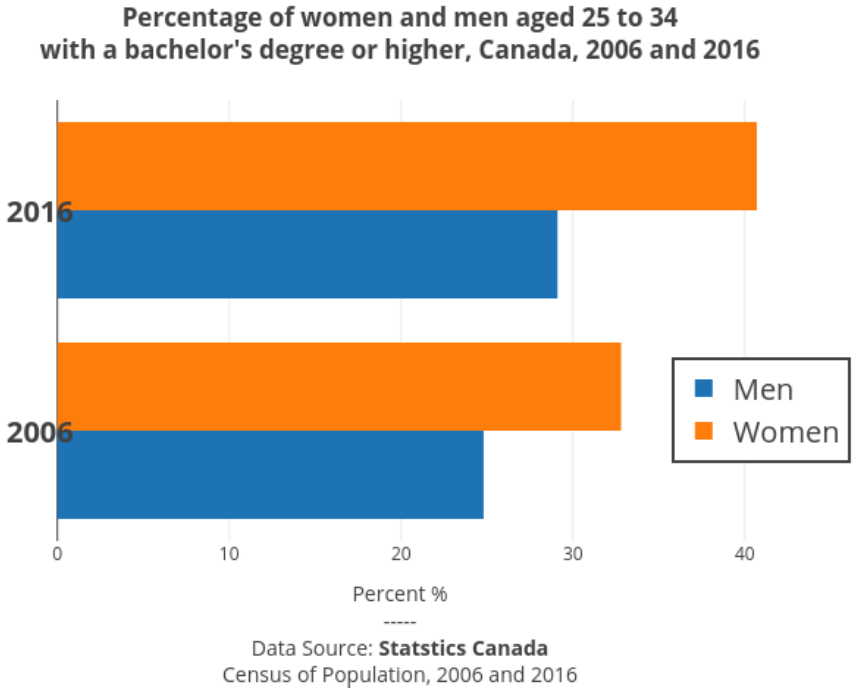

Fig 6.5 Percentage of women and men aged 25 to 34 with a bachelor's degree or higher, Canada, 2006 and 2016 (Data Source: StatCan) by Fanshawe College, CC-BY-NC-SA

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6.7 Measuring Productivity

An economy's rate of productivity growth is closely linked to the growth rate of its GDP per capita, although the two are not identical. For example, if the percentage of the population who holds jobs in an economy increases, GDP per capita will increase, but the productivity of individual workers may not be affected. Over the long term, the only way that GDP per capita can grow continually is if the average worker's productivity rises or if there are complementary increases in capital. A common measure of Canadian productivity per worker is the dollar value per hour the worker contributes to the employer's output. The link below provides further information on changes to labour productivity for Canadian businesses. It discusses the changes across certain sectors, such as manufacturing, oil and gas, and mining, to name a few.

Explore Further

Trading Economics: Canada Productivity

"Before the 2008 recession hit, the overriding concern for the Canadian macroeconomy was our poor record of productivity growth . . . When we talk about the importance of productivity, the point is invariably made that increasing output per worker is the only sustainable way of generating long-run gains in real purchasing power" (Gordon, 2010). Meanwhile, output per worker in the US has been growing almost twice as fast.

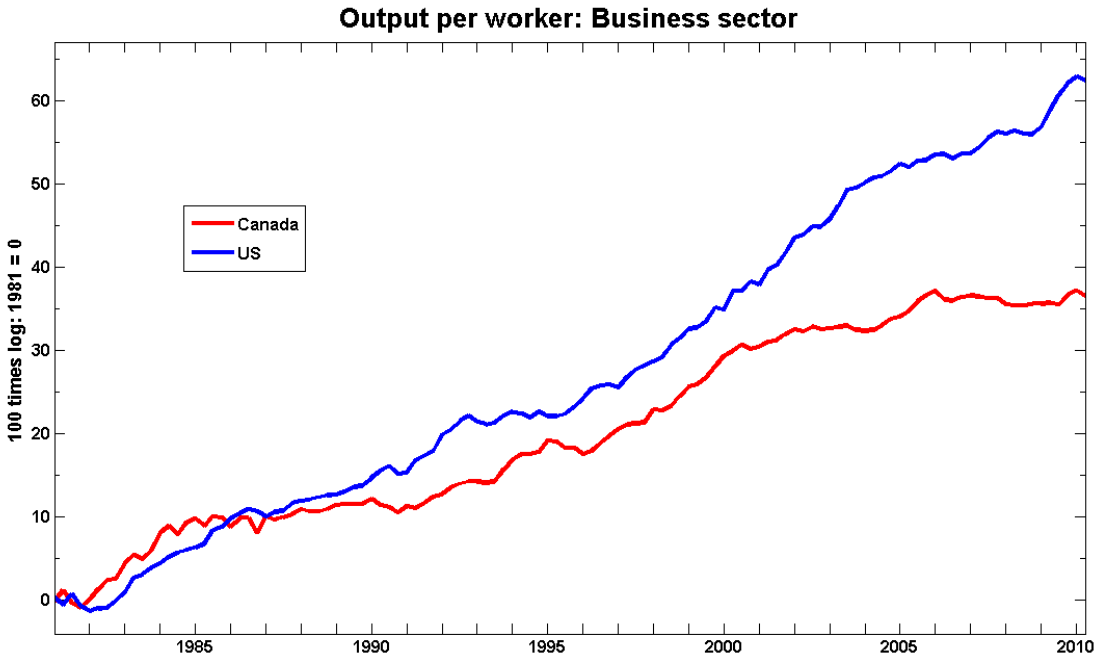

Fig 6.6 "Output per worker: Business sector" (Gordon, 2010).

Technology and Productivity

If the economy's growth depended only on the deepening of human capital and physical capital, then we would expect that economy's growth rate to slow down over the long run because of diminishing marginal returns. However, another crucial factor in the aggregate production function is technology.

Developing new technology can provide a way for an economy to sidestep the diminishing marginal returns of capital deepening. Fig 6.7 below demonstrates that.

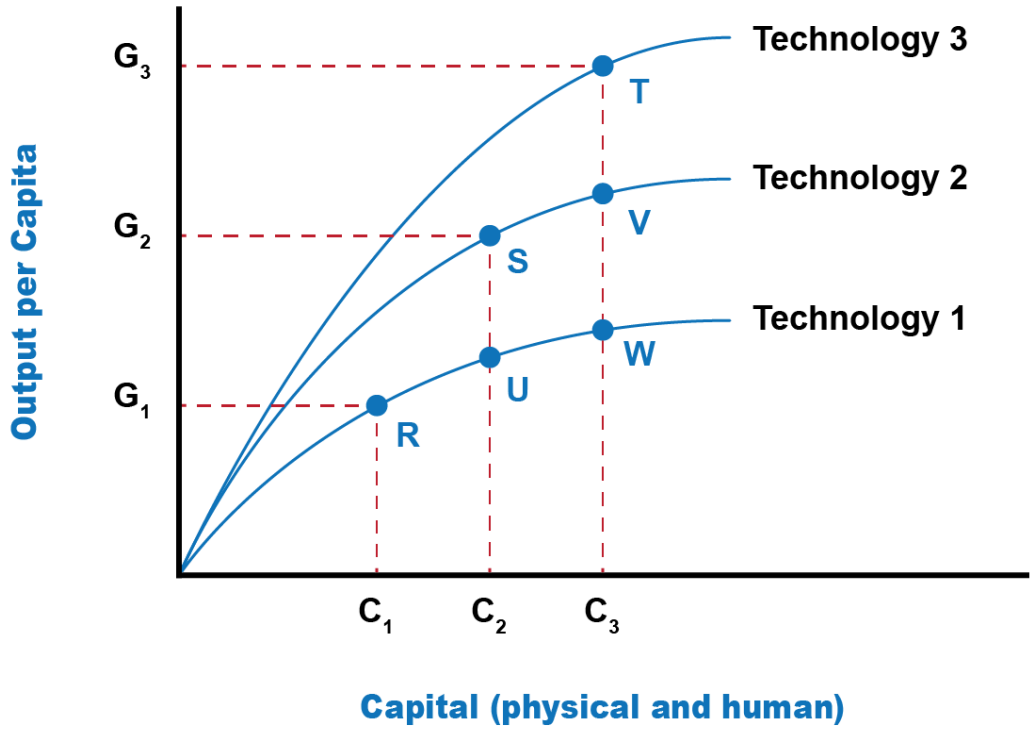

Fig 6.7

The horizontal axis measures the deepening of both physical and human capital. The amount of human and physical capital per worker increases as one moves from left to right, from C1 to C2 to C3—the vertical axis measures per capita output. We consider the lowest aggregate production function in this diagram, labelled Technology 1. Along this aggregate production function, the level of technology is held constant, so the line shows only the relationship between capital deepening and output. As capital deepens from C1 to C2 to C3 and the economy moves from R to U to W, per capita output does increase—but how the line starts out steeper on the left but then flattens as it moves to the right shows the diminishing marginal returns, as additional marginal amounts of capital deepening increase output by ever-smaller amounts. The shape of the aggregate production line (Technology 1) shows that the ability of capital deepening to generate sustained economic growth is limited since diminishing returns will eventually set in.

Now, let us consider improvements in technology. Improved technology means that more output is possible with a given set of inputs. The production function labelled Technology 1 in the figure is based on one level

of technology, but Technology 2 is based on an improved level of technology, so for every level of capital deepening, it produces a higher level of output on the vertical axis. In turn, production function Technology 3 represents a still higher level of technology so that for every level of inputs, it produces a higher output level than the other two aggregate production functions.

Most healthy, growing economies are deepening their human and physical capital and increasing technology simultaneously. As a result, the economy can move from a choice like point R on the Technology 1 aggregate production line to a point like S on Technology 2 and a point like T on the still higher aggregate production line (Technology 3). With the combination of technology and capital deepening, the rise in GDP per capita does not need to fade away because of diminishing returns. The gains from technology can offset the diminishing returns involved with capital deepening.

6.8 Economic Convergence and Catch-Up

This recipe for economic growth—investing in labour productivity, with investments in human capital and technology, as well as increasing physical capital—also applies to other economies.

Some low-income and middle-income economies worldwide have shown a pattern of convergence in which their economies grow faster than those of high-income countries. GDP increased by an average rate of 2.7% per year in the 1990s and 2.3% per year from 2000 to 2008 in the world's high-income countries, including the United States, Canada, the European Union countries, Japan, Australia, and New Zealand.

Photo by Nataliya Vaitkevich, Pexels Licence

Countries can be put in an informal "fast growth club" or "slow growth club." Fast-growth countries averaged GDP growth (after adjusting for inflation) of at least 5% per year in both the time periods from 1990 to 2000 and from 2000 to 2008. When the economic growth rate in certain countries exceeds the average growth rate of the world's high-income economies, the middle-income or developing countries (often called emerging economies) may converge with the high-income countries. Slow-growth countries averaged GDP growth of 2% per year or less (after adjusting for inflation) during the same time periods.

Every country has its unique story of investments in human and physical capital, technological gains, market forces, and government policies, but an overall convergence pattern is clear. The low-income countries have GDP growth that is faster than that of the middle-income countries, which in turn have GDP growth that is faster than that of the high-income countries. Two prominent members of the fast-growing club are China and India, which have nearly 40% of the world's population. Some prominent members of the slow-growth club are high-income countries like France, Germany, Italy, and Japan.

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An argument in favour of low-income countries achieving greater worker productivity and economic growth in the future is based on diminishing marginal returns. Even though deepening human and physical capital will tend to increase GDP per capita, the law of diminishing returns suggests that as an economy continues to increase its human and physical capital, the marginal gains to economic growth will diminish. For example, raising the average education level of the population by two years from a tenth-grade level to a high school diploma (while holding all other inputs constant) would produce a certain increase in output. An additional two-year increase, so that the average person had a two-year college degree, would increase output further, but the marginal gain would be smaller. Yet another additional two-year increase in the level of education, so that the average person would have a four-year bachelor's degree, would increase output further. Still, the marginal increase would again be smaller. A similar lesson holds for physical capital. If the quantity of physical capital available to the average worker increases by $5,000 to $10,000 (again, while keeping all other inputs constant),

it will increase the output level. An additional increase from $10,000 to $15,000 will increase output further, but the marginal increase will be smaller.

Low-income countries like China and India tend to have lower levels of human capital and physical capital, so an investment in capital deepening should have a more significant marginal effect in these countries than in high-income countries, where levels of human and physical capital are already relatively high. Diminishing returns implies that low-income economies could converge to the levels that the high-income countries achieve. Additionally, low-income countries may find it easier to improve their technologies than high-income countries. High-income countries must continually invent new technologies, whereas low-income countries can often find ways of applying technology that has already been invented and is well understood.

Optimists argue that many countries have observed the experience of those who have grown more quickly and have learned from it. Moreover, once the people of a country begin to enjoy the benefits of a higher standard of living, they may be more likely to build and support the market-friendly institutions that will help provide this standard of living.

Catch-Up Effect Definition

Catch-up implies circumstances under which relatively low-income countries grow at a faster rate than high-income or advanced economies. Due to this more rapid growth rate, eventually, low-income countries will be able to “catch up” to high-income countries in terms of their per capita GDP.

Overview of Catch-Up Effect

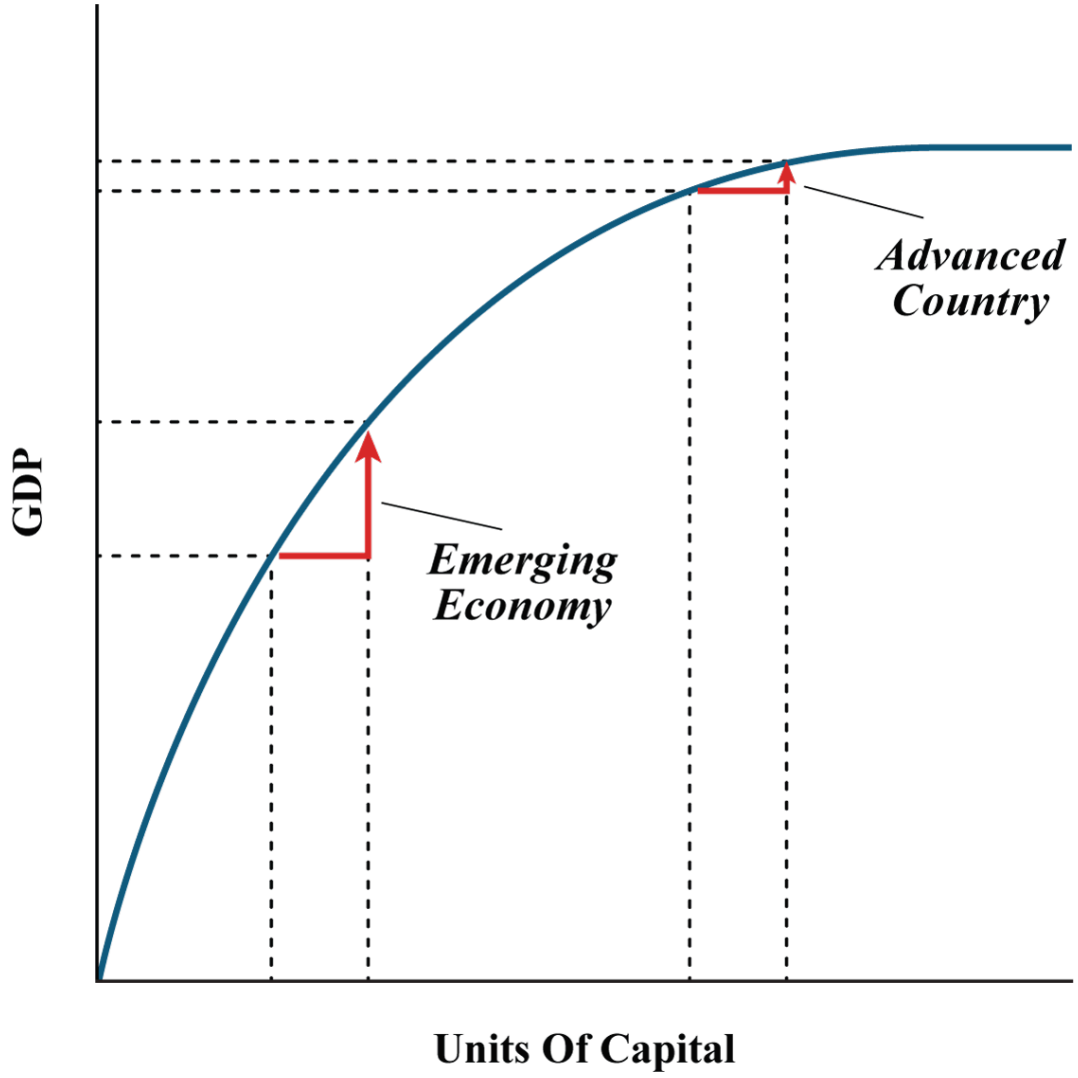

Fig 6.8 "Comparison of Catch-Up Effect in Emerging Economies Versus Advanced Countries" by Fanshawe College, CC BY-NC-SA 4.0

The theory of catch-up effects is also known as the theory of convergence, which argues that relatively low-income or developing economies can achieve the same level of per capita income because adding technology and capital generates higher rates of returns for these countries. Promoting technological advancement yields higher productivity growth, which raises per capita GDP. For example, a company with newly installed computers and skilled workers will experience greater returns than what they used to generate with typewriter machines. An organization operating in an advanced country could upgrade from Dual Core to i9 processor machines, generating greater returns. Still, the rate of productivity growth would not be as high as switching from typewriters to computers.

Following the growth trajectory of developed countries, developing economies can achieve the same growth level in a shorter period by embracing technology and capital deepening.

Fig 6.9. "Catch-Up, Convergence, and GDP Growth Rate" by Fanshawe College, CC BY-NC-SA 4.0

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6.9 Key Terms

Key Terms

Aggregate production function

Capital deepening

Catch Up effect

Economies of Scale

Human capital

Potential GDP

Labour productivity

Long run economic growth

Output per capita

Rule of 70

Technological change

CHAPTER 7: THE MARKET FOR LOANABLE FUNDS

Chapter Outline

7.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Explain Saving, Investment and the Financial System
- Describe the Loanable Funds Market
- Define the Crowding Out Effect

In any given period, some households, businesses and governments earn more income than they spend. What do they do with their savings? Usually, it doesn't make sense to put savings under your mattress or bury them in your backyard. Neither of those options will help your savings grow.

Other households, businesses and governments spend more than they earn. Households borrow money for new homes and new cars. Businesses borrow money to finance new physical capital investments. Governments borrow money to finance budget deficits and/or make new expenditures. Where can these households, businesses and governments find the money to finance their expenditures?

The answer to each of these questions is financial markets. In financial markets, savers put their savings to work, and borrowers find funding to borrow. This chapter will provide an overview of financial markets to provide context for the subsequent discussion of money and the banking system.

7.1 Financial Markets

Definitions

Financial Markets are marketplaces where money is invested and borrowed, or in other words, where securities are traded.

Securities are a synonym for financial assets or a certificate or other financial instrument that has monetary value and can be traded. These can be debt securities like bonds or equity securities like stocks.

Bond is a financial contract through which a borrower like a corporation, a city or state, or the federal government agrees to repay the amount that it borrowed and also a rate of interest over a period of time in the future; usually long-term (greater than 10 years) debt instruments.

We know individuals can either consume or save their income. We also noted that business investment in physical capital is primarily how they grow. Where do individuals put their savings, and where do businesses obtain the funding for investment expenditure? The answer to both of these questions is *financial markets*.

Canadian households saved almost $159 billion in 2021. Where did that savings go, and what was it used for? Some of the savings ended up in banks, which in turn loaned the money to individuals or businesses that wanted to borrow money. Some was invested in private companies or loaned to government agencies that wanted to borrow money to raise funds for purposes like building roads or mass transit. Some firms reinvested their savings in their own businesses.

Financial markets include the banking system, equity markets like the Toronto Stock Exchange, bond markets, and commodity markets. In the 21st Century, financial markets are global; Canadians put their savings into foreign and domestic bank accounts, foreign and domestic stocks, and foreign and domestic bonds. All financial assets are called *securities*. Equities (i.e. stocks) give savers ownership in a company in return for dividends (a regular payment from the company) and/or capital gains (e.g. when you sell the stock at a profit). Bonds are a type of debt in which a saver lends money to a borrower for an interest payment.

Loans, Bonds, and Stocks

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A *bank loan* for a firm works much the same way as a loan for an individual buying a car or a house. The firm borrows an amount of money and then promises to repay it, including some rate of interest, over a predetermined period of time. If the firm fails to make its loan payments, the bank (or banks) can take the firm to court and require it to sell its buildings or equipment to pay its debt.

A *bond* is a financial contract like a loan. Typically, bond interest rates are lower than loan interest rates, and there are organized secondary markets for bonds, making them more liquid to bondholders than loans. Bonds are issued by major corporations and also by various levels of government. For example, cities borrow money by issuing municipal bonds, and the federal government borrows money when the Canadian Department of Finance issues Treasury bonds.

A *corporation* is a business that "incorporates"—that is owned by shareholders with limited liability for the company's debt but shares in its profits (and losses). Corporations may be private or public and may or may not have publicly traded *stock*. They may raise funds to finance their operations or new investments by raising capital through selling stock or issuing bonds.

7.2 Savings and Investment

If you recall, investment, in the GDP sense, includes business fixed expenditures, new residential construction, and changes in inventories. By and large, these types of expenditures require large amounts of money. But where does this money come from? To discover the answer, we need to set up a system of equations. From Chapter 4, we recall that the GDP identity is:

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

To simplify, we are going to assume we have a closed economy. This occurs when we do not trade with other economies, leading to $NX = 0$.

In a closed economy, our new GDP identity is:

$$Y = C + I + G$$

But we are interested in investment, so let us re-arrange the equation by solving for investment (I):

$$I = Y - C - G$$

This tells us that investment will be an economy's income minus consumption and government spending.

Now, let us consider savings. We can split savings into two components: private savings, which refers to savings by households, and public savings, which refers to savings by governments.

In the private sector, households receive income by providing their factors of production, like labour, to firms (Y). They also receive money from the government, which we call transfer payments in Chapter 4 (TR). But households also spend money. Money spent on goods and services is classified under consumption (C). Additionally, households must also pay taxes to the government (T). Therefore, the private savings function can be written as:

Photo by Tima Miroshnichenko, Pexels License

$$S_{\text{private}} = Y + TR - C - T$$

But the government will also engage in saving. The government earns money through the collection of taxes but spends money on its purchases (the "G" in the GDP identity) and transfer payments. Therefore, the public savings function can be written as:

$$S_{\text{public}} = T - G - TR$$

Putting the two equations together, we then get total national (or aggregate) savings:

$$
\begin{aligned}
S &= S_{\text{private}} + S_{\text{public}} \\
&= (Y + TR - C - T) + (T - G - TR) \\
&= Y + TR - TR + T - T - C - G \\
&= Y - C - G
\end{aligned}
$$

But where have we seen this before? In the investment function from earlier. Therefore,

$$S = I$$

This means that for a country with a closed economy, the total savings in an economy will be equal to the total value of investments. In other words, savings *finances* investment. This is called *macroeconomic identity*. This identity implies that the primary fund for business investment comes from the total savings generated in the economy by households and governments.

7.3 Government Budget

A budget surplus is defined as a situation where the government collects more money than it spends. This occurs when

$$T > G + TR$$

On the other hand, the government can also spend more money than it collects. This occurs when

$$T < G + TR$$

When the government runs a surplus, public savings is positive. On the other hand, when the government runs a deficit, public savings is negative.

When public savings are negative, total savings in the economy will be smaller than it otherwise could have been. A reduction in total savings will lead to a reduction in total investment since savings equals investment. When savings fall, so does investment.

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7.4 The Loanable Funds Market

Definitions

Interest Rate is the "price" of borrowing in the financial market, a rate of return on an investment.

A **consumer price index** (**CPI**) is a price index, the price of a weighted average market basket of consumer goods and services purchased by households.

The **GDP deflator** (**implicit price deflator**) is a measure of the money price of all new, domestically produced, final goods and services in an economy in a year relative to the real value of them.

We aggregate the market for loans, bonds, and stocks as the market for loanable funds. The market has a demand side and a supply side, where the demand and supply interact to determine the rate of return on the loanable funds. In the market for loanable funds, the demand is measured by the willingness of firms to borrow to engage in large-scale construction projects. This could include constructing a new manufacturing facility, researching a new product line, or upgrading existing physical capital and technology.

On the other hand, the supply of loanable funds is determined by the willingness of households to save in addition to the savings, or dissavings, of the government.

Demand and Supply in the Loanable Funds Market

The simplest example of a rate of return is an *interest rate*. For example, when you put money into a savings account at a bank, you receive interest on your deposit. The interest payment expressed as a percent of your deposits is the interest rate. Similarly, if you demand a loan to buy a car or a computer, you will need to pay interest on the money you borrow.

Figure 7.2 illustrates demand and supply in the financial market for loanable funds. The horizontal axis of the financial market shows the quantity of money that is loaned or borrowed in this market. The vertical axis measures the real rate of interest. Recall the "real interest rate" in an economy is often considered to be the rate of return minus an index of inflation, such as the rate of change of the CPI or GDP deflator.

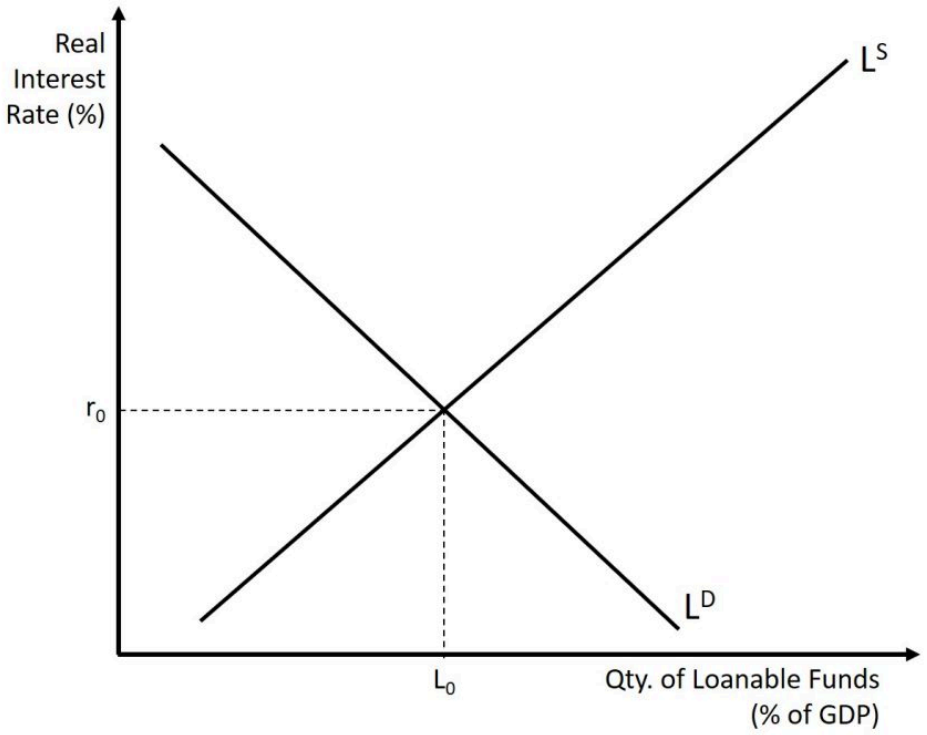

Fig 7.2 The Market for Loanable Funds in Equilibrium

The laws of demand and supply continue to apply in the financial markets. According to the law of demand, a higher price will decrease the *quantity* demanded (that is, people will buy less), and all else is constant. Similarly, in the financial markets, as the interest rate rises, consumers will reduce the quantity they borrow, and the quantity of loanable funds demanded will decrease (because loans get more costly). According to the law of supply, a higher price increases the quantity supplied, ceteris paribus. Consequently, as the interest rate paid on borrowing rises, more firms will be eager to issue loans. Conversely, if the interest rate on loans falls, the *quantity* of loanable funds supplied will decrease, and the quantity of loanable funds demanded will increase as loans get less costly.

In the financial market for loanable funds shown in Fig 7.2, the supply curve (L^S) and the demand curve (L^D) cross at the equilibrium point. The equilibrium occurs at a real interest rate where the quantity of loanable funds demanded and the quantity of loanable supplied are equal.

If the real interest rate (remember, this measures the "price" in the financial market) is above the equilibrium level, then an excess supply, or a surplus, of financial capital will arise in this market. As a result, some banks will lower the interest rates (or other fees) they charge to attract more business. This strategy will push the interest rate down toward the equilibrium level.

If the interest rate is below the equilibrium, then excess demand or a shortage of funds occurs in this market. At a low interest rate, the quantity of funds borrowed will increase, but the quantity of loanable funds supplied will decrease. In this situation, banks will perceive that they are overloaded with eager borrowers and conclude that they have an opportunity to raise interest rates.

Attribution

7.5 Shifts in Demand and Supply for Loanable Funds

Change in Demand for Loanable Funds

Suppose that some event causes households and businesses to demand more loans. This may be caused by increased consumer optimism, which causes people to buy (and need to finance) more. It could be because of an uptick in business leading to increased confidence in investment projects businesses seek. It could be caused by a tax credit encouraging households or businesses (or both) to buy (and borrow) more. Whatever the cause, the result will be an outward shift of the demand curve.

The interest rate will adjust until the market is in a new state of equilibrium. The real interest rate and quantity of loanable funds will increase compared to the initial equilibrium. This is shown in Figure 7.3.

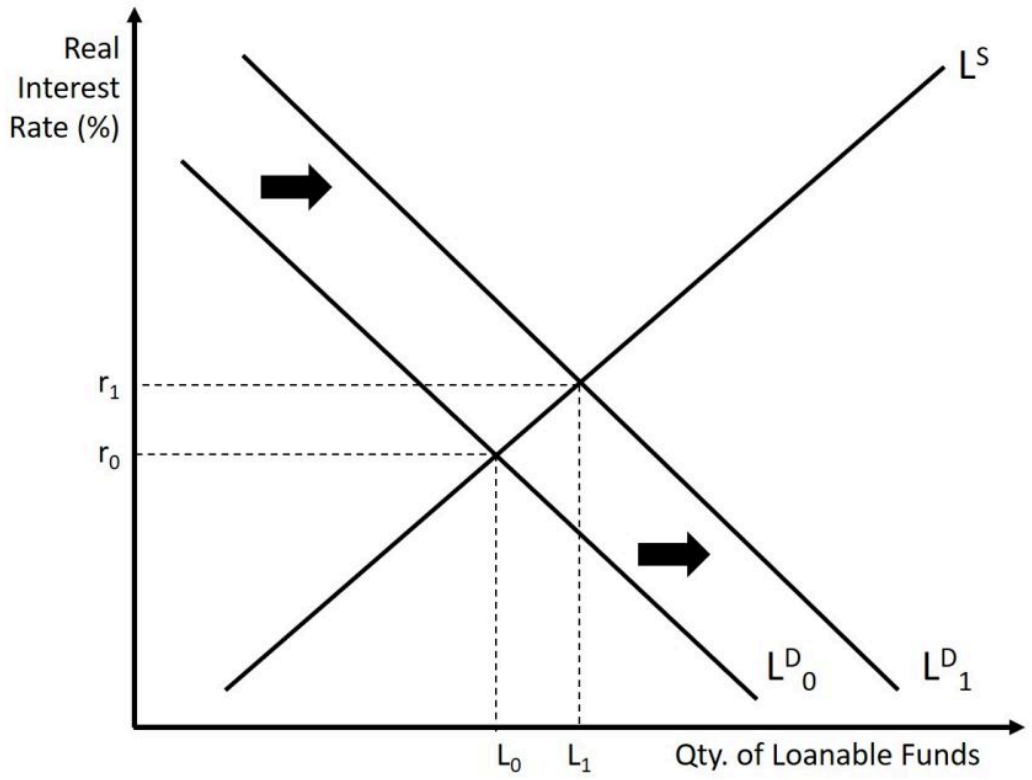

Fig 7.3 An Increase in the Demand for Loanable Funds

Suppose that some event causes households and businesses to demand fewer loans. This may be caused by increased consumer pessimism, which causes people to buy (and the need to finance) less. It could be because of a downturn in business leading to decreased confidence in investment projects businesses seek. Whatever the cause, the result will be an inward shift of the demand curve. The interest rate will adjust until the market

is in a new state of equilibrium. The real interest rate and quantity of loanable funds will decrease compared to the initial equilibrium. This is shown in Figure 7.4.

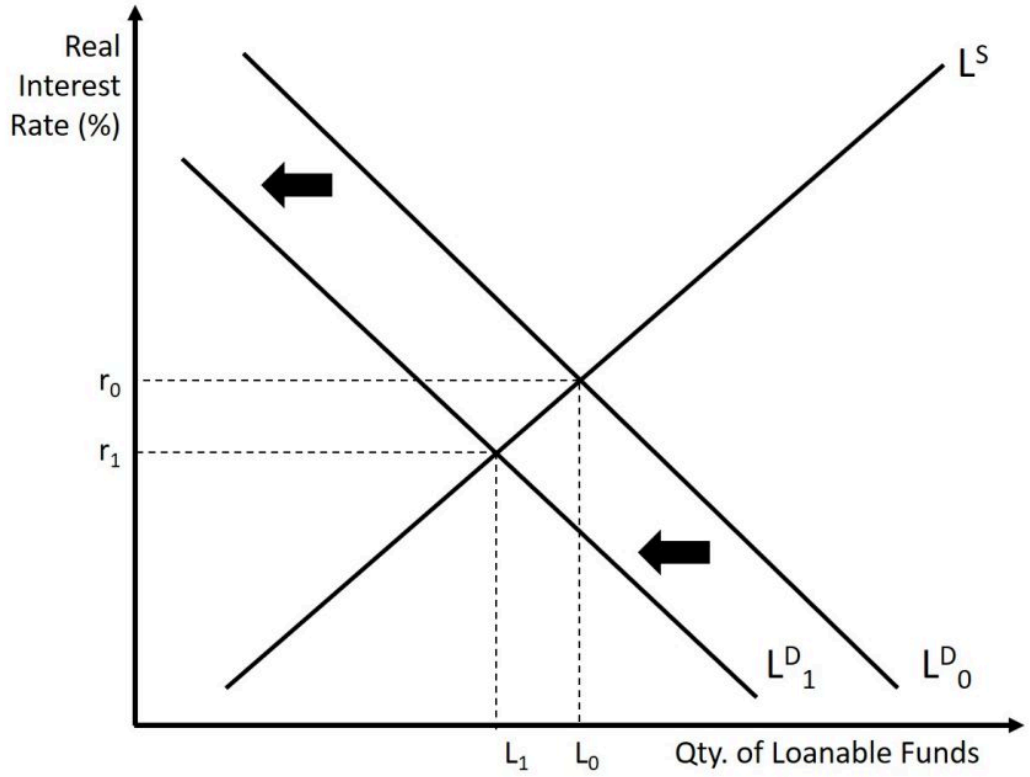

Fig 7.4 A Decrease in the Demand for Loanable Funds

Change in Supply of Loanable Funds

Suppose that some event causes households to save more. Such as, if there is a speculation that the economy may experience a slowdown in the near future, people tend to cut spending and are inclined to save more. The result will be an outward shift of the supply curve. This causes an increase in private savings, which increases national savings. At this point, more money is coming into the bank than going out. The interest rate will adjust until the market is in a new state of equilibrium. Compared to the initial equilibrium, the real interest rate will now be lower even though the quantity of loanable funds is now greater. This is shown in Figure 7.5.

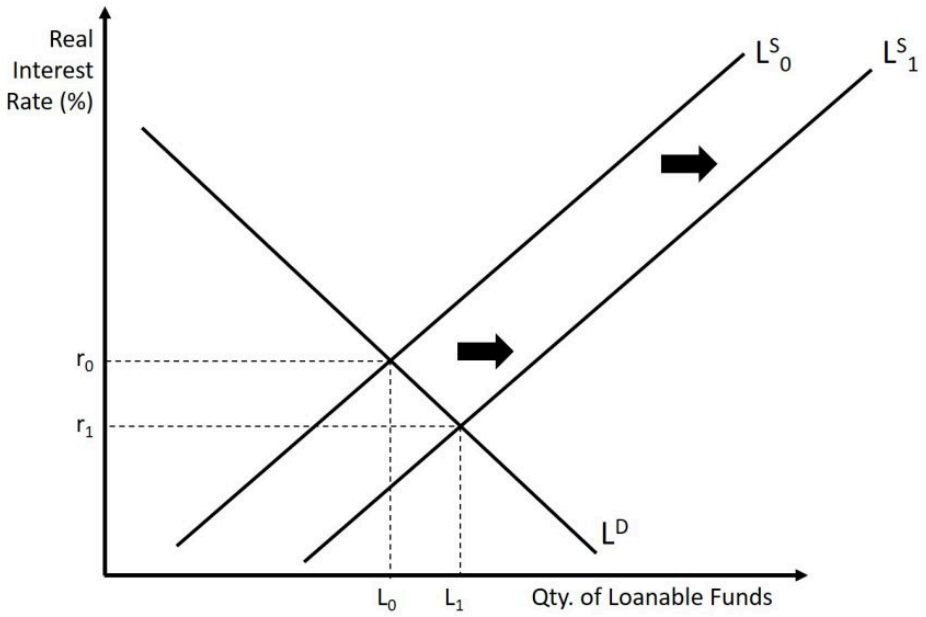

Fig 7.5 An Increase in the Supply of Loanable Funds

Suppose that some event causes households and businesses to save less. This may be caused by a desire to consume more (and hence save less), or a government policy may cause it. For example, suppose that the government raises the marginal tax rates on incomes, which means disposable income decreases. Therefore, households tend to save less. The result will be an inward shift of the supply curve. A decrease in private savings causes a decrease in national savings. The interest rate will adjust until the market is in a new state of equilibrium. The real interest rate and quantity of loanable funds will increase compared to the initial equilibrium. This is shown in Figure 7.6.

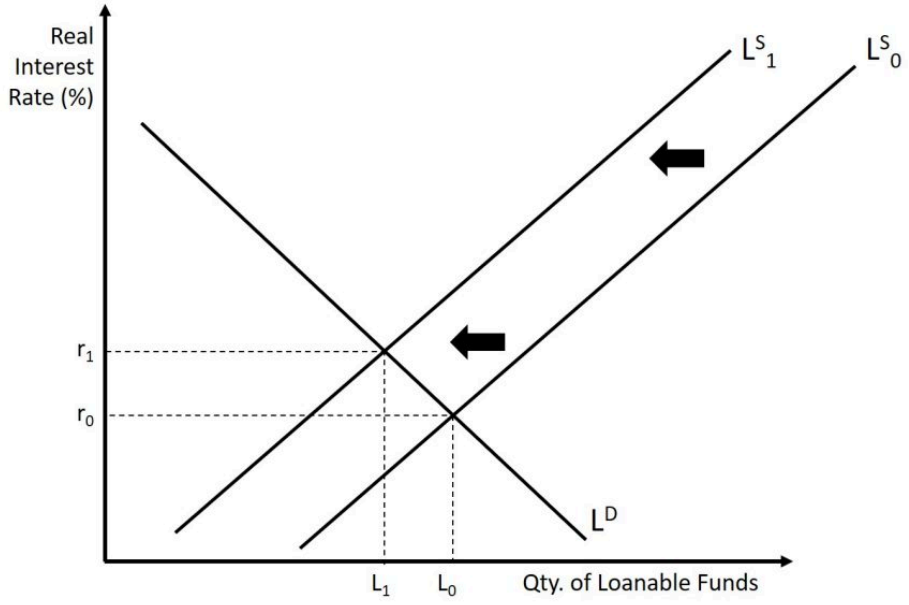

Fig 7.6 A Decrease in the Supply of Loanable Funds

A Decrease in the Supply of Loanable Funds (Public Sector) – Crowding Out

When the government needs more money for its operations than it has collected in revenues, it must run a deficit. As we saw earlier, when the deficit increases, the gap between G and $T + TR$ increases. Therefore, the level of government dissavings increases. As this occurs, public savings decreases, leading to a decrease in national savings. Graphically, the outcome is the same as when there is a decrease in the supply of loanable funds from Figure 7.6, but the cause is different. The result is shown below in Figure 7.7, but it is the same as the graph from Figure 7.6.

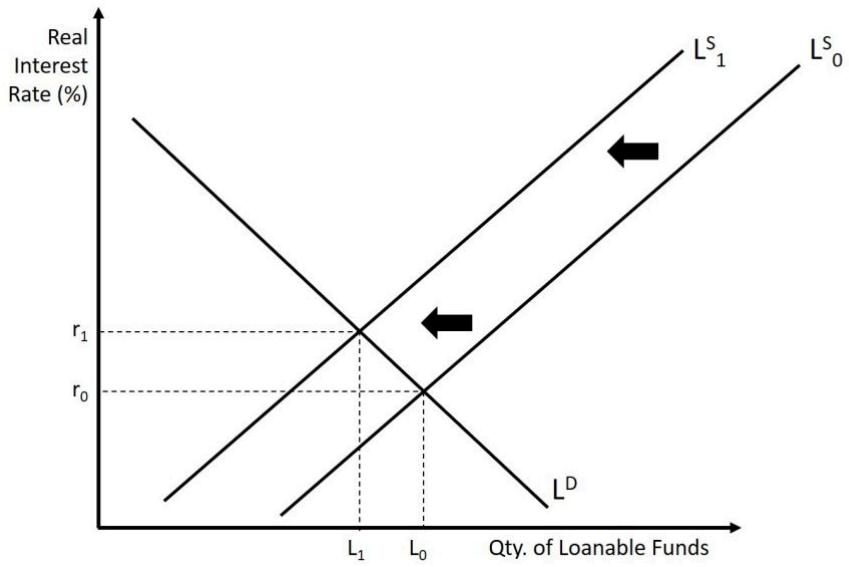

Fig 7.7 A Decrease in the Supply of Loanable Funds

As the equilibrium interest rate rises due to a decrease in loanable funds, private investment could decrease as loans get more costly. When the government enacts policies that require borrowing, there is potentially less private investment, which is a hindrance. This phenomenon is called *crowding out*.

Crowding-out occurs when the government needs to spend additional money, so they spend money that the private sector could have spent instead. By reducing national savings through their dissaving, the quantity of loanable funds is less. As we will see in the chapter on Fiscal Policy, crowding out is a negative consequence of using fiscal policy; when the government enacts policies that require borrowing, there is potentially less private investment, which is a hindrance.

7.6 Key Terms

Key Terms

Bank Loan

Bond

Consumer Price Index (CPI)

Corporation

Crowding Out

Financial markets

GDP deflator

Interest rate

Investment

Loanable Funds Market

Securities

Stock

CHAPTER 8: AGGREGATE EXPENDITURE

Chapter Outline

8.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Explain the Aggregate Expenditure Model
- Determine the Level of Aggregate Expenditure in the Economy
- Define Macroeconomic Equilibrium
- Identify the Multiplier Effect

The Great Recession of 2008–2009 hit the U.S. economy hard. The Canadian economy was also severely affected. According to Statistics Canada, the unemployment rate in Canada rose to 8.7% in August 2009. Canadian productivity and output fell as well. Job losses, declining home values, declining incomes, and uncertainty about the future caused consumption expenditures to decrease. Canadians tightened their belts in the face of the weak economy, cutting spending on discretionary items or postponing outlays that weren't immediately necessary, as reported by Stats Canada.

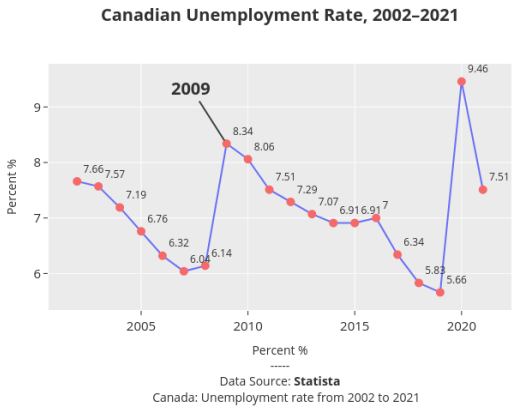

Fig 8.1 Canadian Unemployment Rate, 2002–2021 by Fanshawe College (Data Source: Statista), CC-BY-NC-SA

The meltdown in the financial markets called for immediate action by the Federal Government to help millions of people by extending unemployment benefits. The recession affected millions of people, cutting back on spending, filing for unemployment, and losing homes.

What caused this recession, and what prevented the economy from spiralling further into recession? Policymakers looked to the lessons learned from the Great Depression of the 1930s and the models developed by John Maynard Keynes to analyze the causes and find solutions to the country's economic woes. The Keynesian perspective is the subject of this chapter.

Attribution

8.1 Defining Aggregate Expenditure

Aggregate expenditure is the current value of all the finished goods and services in the economy.

It is the sum of all the expenditures undertaken in the economy by the factors during a specific time period. The equation for aggregate expenditure is:

$$\mathrm{AE} = \mathrm{C} + \mathrm{I} + \mathrm{G} + \mathrm{NX}$$

The equation is: aggregate expenditure equals the sum of the household consumption (C), investments (I), government spending (G), and net exports (NX).

- *Consumption* (C): The household consumption over a period of time.
- *Planned investment* (I): Planned spending on capital goods.
- *Government expenditure* (G): The amount of spending by federal, state, and local governments. Government expenditure can include infrastructure spending, which increase the total expenditure in the economy.
- *Net exports* (NX): Total exports minus the total imports.

The aggregate expenditure determines the total amount that firms and households plan to spend on goods and services at each level of income.

The aggregate expenditure is one of the methods used to calculate the total sum of all the economic activities in an economy, also known as the gross domestic product (GDP).

Actual vs Planned Investment

Recall from Chapter 4 that the investment component of GDP includes business fixed expenditures (such as a business purchasing new machinery, new vehicles, building a new factory, etc.), new residential construction, and inventory changes. A change in inventory occurs either when a company produces a product but does not sell it (causing an increase in inventory) or when a company sells a previously unsold good (causing a decrease in inventory). When a company decides on how much to spend on investment, we assume they are making a decision about business fixed expenditures. Therefore, we assume that the amount companies plan to spend on things like machinery and other physical capital will equal what they actually spend. An unexpected change in inventories will cause the difference between actual and planned investments.

Example

For example, suppose that Toyota produces 125,000 Tundra pick-up trucks. If they sell all of them, then there will be no change in inventory. But, if they only sell 100,000 Tundra pick-up trucks, those 25,000 trucks are added to inventory and result in an unexpected increase in investment. Therefore, inventory changes depend on actual sales, which can not always be accurately predicted. Using the above example, we call the production of 125,000 trucks as the actual investment spending and the sale of 100,000 trucks as the planned investment spending.

Photo by Christina Telep, Unsplash License

When actual investment spending (i.e. 125K trucks) exceeds planned investment spending (i.e. 100K trucks), we see an unexpected increase in inventories. This may not be a good sign for an economy because producers will cut production as sales are falling, which may result in some job losses. Conversely, when actual investment spending is less than planned investment spending, we see an unexpected decrease in inventories. That is, Toyota produces 125,000 pick-up trucks but they sell 130,000 trucks because people want to buy more, then we call the production of 125K trucks as the actual investment spending and the sale of 130K trucks as the planned investment spending. When actual investment spending is less than the planned investment spending, it implies a decrease in inventories. So Toyota would ramp up production to restock the depleted inventories which could result in job growth.

As we continue to discuss the aggregate expenditure model, investment will refer to the planned investment rather than the actual investment.

Equilibrium

A macroeconomy will be in equilibrium when

$$\text{Aggregate expenditure} = \text{GDP}$$

This occurs when what is being produced equals what is being sold.

When aggregate expenditure is *greater* than GDP, spending is greater than production. When this occurs, an individual store may realize that a product is being purchased faster than they can order a new product. A company would then recognize that new orders exceed their current production and may need to dip into existing inventories to fulfill orders. As Toyota realizes this, they will ramp up production and increase employment. If this occurs throughout an entire economy, then GDP will begin to increase as companies work to increase their production. Therefore, when aggregate expenditure is greater than GDP, inventories will decline, forcing companies to ramp up production to meet the now greater expenditures. This will lead to an *increase* in both real GDP and employment.

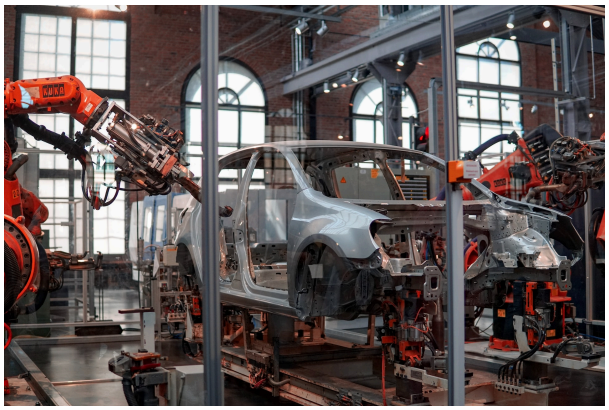

Photo by Lenny Kuhne, Unsplash Licence

When aggregate expenditure is *less* than GDP, spending is less than production. When this occurs, an individual store may realize that the product is not moving quickly off the shelves. As the store realizes this, they start to order less from their distributor. For example, if Toyota is barely selling any cars and continues to produce them, then dealership lots will be full, and there will be nowhere to deliver the cars. This leads to an increase in inventory. As Toyota realizes this, they will slow down production, which will result in a reduction in employment as well. If this occurs throughout an entire economy, then GDP will begin to decrease as companies work to slow their production. This will lead to a *decrease* in both real GDP and employment.

Fig 8.2 summarizes the three possibilities.

Fig 8.2: Aggregate Expenditure and GDP

When,	Then,	Therefore,
Aggregate expenditure = GDP	Inventories remain the same	The macroeconomy is in equilibrium.
Aggregate expenditure > GDP	Inventories shrink	GDP and employment will increase.
Aggregate expenditure < GDP	Inventories increase	GDP and employment will decrease.

8.2 The Components of Aggregate Expenditure

8.2.1 Consumption

Household consumption depends on several factors, such as:

- Disposable current and future income
- Household wealth
- The real interest rate
- Price levels

Keynes observed that consumption expenditure depends primarily on personal disposable income, i.e. one's take-home pay. Let's examine this relationship in more detail. People can do two things with their income: they can consume it, or they can save it. (For now, let's ignore the need to pay taxes with some of it). Each person who receives a raise in income faces this choice. Let's define the **marginal propensity to consume (MPC)** as the share (or percentage) of the additional income a person decides to consume (or spend). Similarly, the **marginal propensity to save (MPS)** is the share of the additional income the person chooses to save. Since the only options are to consume or save income, it must always hold true that:

$$\text{MPC} + \text{MPS} = 1$$

For example, if the marginal propensity to consume out of the marginal amount of income earned is 0.9, then the marginal propensity to save is 0.1.

Considering this relationship, consider the relationship among income, consumption, and savings shown in the table below.

Fig 8.3 The Consumption Function. For each increase in income of $1000, consumption increases by $800. Thus, the marginal propensity to consumer (MPC) is 0.80. Any additional income which isn't spent is saved, so for each increase in income of $1000, saving increases by $200. The MPS is 0.20.

Real GDP	Consumption (C)	Investment (I)	Government Spending (G)	Exports (X)	Imports (M)	Net Exports (X-M)	Aggregate Expenditure (AE)
$0	$600	$500	$1,300	$840	$0	$840	$3,240
$1,000	$1,160	$500	$1,300	$840	$100	$740	$3,700
$2,000	$1,720	$500	$1,300	$840	$200	$640	$4,160
$3,000	$2,280	$500	$1,300	$840	$300	$540	$4,620
$4,000	$2,840	$500	$1,300	$840	$400	$440	$5,080
$5,000	$3,400	$500	$1,300	$840	$500	$340	$5,540
$6,000	$3,960	$500	$1,300	$840	$600	$240	$6,000
$7,000	$4,520	$500	$1,300	$840	$700	$140	$6,460
$8,000	$5,080	$500	$1,300	$840	$800	$40	$6,920
$9,000	$5,640	$500	$1,300	$840	$900	-$60	$7,380

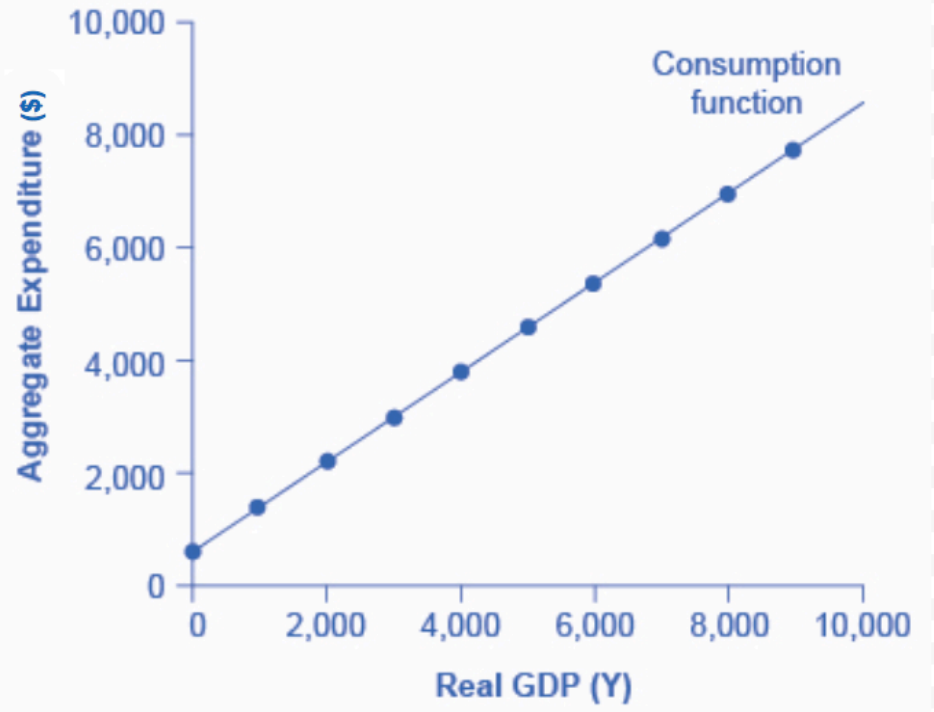

Fig 8.4 The Consumption Function. How does consumption increase with the level of national income? Output on the horizontal axis is conceptually the same as national income since the value of all final output that is produced and sold must be income to someone somewhere in the economy. At a national income level of zero, $600 is consumed.

To calculate the marginal propensity to consume,

$$\text{MPC} = \frac{\text{Change in Consumption}}{\text{Change in Disposable Income}}$$

A $1,000 increase in disposable income leads to an $800 increase in consumption, and then the MPC would be:

$$\text{MPC} = \frac{800}{1,000} = 0.8$$

The consumption pattern shown in Fig 8.3 (table) is plotted in Fig 8.4. The relationship between income and consumption is called the **consumption function**. Both the table and figure illustrate a typical consumption function. There are a couple of features to observe. First, consumption expenditure increases as income does. For every increase in income, consumption increases by the MPC times that increase in income. Thus, the slope of the consumption function is the MPC. Second, at low levels of income, consumption is greater than income. Even if income were zero, people would have to consume something. We call the level of consumption when income is zero **autonomous consumption** since it shows the amount of consumption independent of income. In this example, consumption would be $600 even if income were zero. Thus, to calculate consumption at any income level, multiply the income level by 0.8 for the marginal propensity to consume and add $600 for the amount consumed even if income was zero.

Now, how does this relate to the national economy? For simplicity, we will re-write

$$\text{Disposable income} = \text{National income} - \text{Net Taxes}$$

If we further re-write, we get

$$\text{National income} = \text{GDP} = \text{Disposable income} + \text{Net taxes}.$$

If we assume that net taxes will be constant based on a given income level (in reality, they are not, but let us keep this simple), then we see that any increase in national income will lead to an increase in consumption. The same holds for disposable income, as seen earlier.

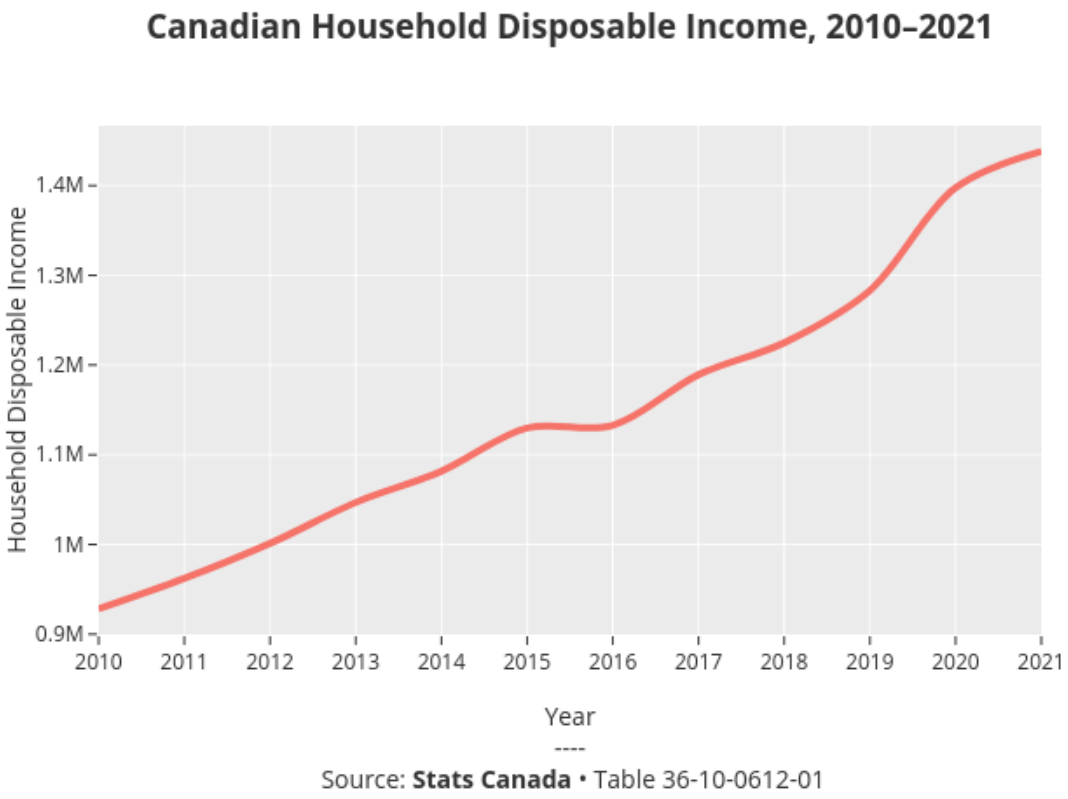

Fig 8.5 Canadian Household Disposable Income, 2010–2021 by Fanshawe College, CC-BY-NC-SA

Household Wealth

Wealth is defined as assets minus liabilities. Therefore, if the value of assets increases or the value of debt decreases, the household is wealthier. As household wealth increases, so will expenditure. Wealth can also encapsulate savings. A household with a larger safety net may be more likely to spend more knowing that if things go south, they can weather the storm. But, as wealth decreases, aggregate expenditure is likely to decrease as households cut spending and now has a smaller safety net.

Real Interest Rate

Spending on durable goods will likely be affected when the real interest rate changes. When purchasing a meal from a restaurant or hiring a lawyer, you rarely consider the interest rate. On the other hand, the interest rate will be important when purchasing a car or making some additional large purchases. Recall that the real interest rate is the difference between the nominal interest rate (what the bank charges you) and the inflation rate. As the real interest rate increases, the cost of borrowing will increase. This results in a decrease in aggregate expenditures as durable good purchases will fall. On the other hand, a decrease in the real interest rate makes it cheaper to borrow and will, therefore, increase aggregate expenditure, as people can increase their consumption.

Photo by Money Knack, Unsplash Licence

Price Level

As the price of a single good increases, consumers will simply change how they spend their money on the good and will not affect overall spending. But, as the national price level changes, expenditure may change. If the average price level increases, goods and services are now more expensive. If disposable income remains constant, then $1 buys you less. Therefore, the total quantity of goods and services will fall. On the other hand, if price levels fall, a dollar becomes more valuable, meaning consumers can purchase more than before.

8.2.2 Planned Investment

Planned investment is determined by the following:

- Expectations of future profitability
- The real interest rate
- Taxes
- Cash flow

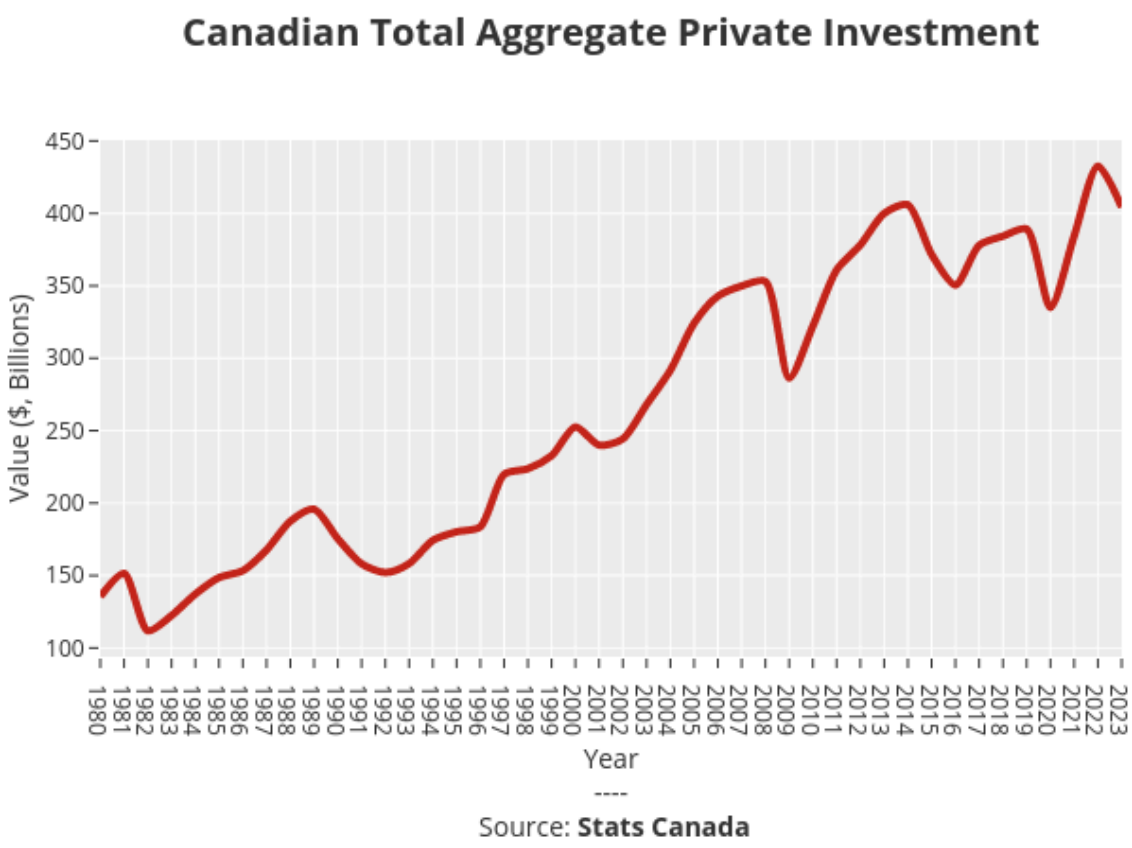

Fig 8.6 Canadian Total Aggregate Private Investment by Fanshawe College, CC-BY-NC-SA (Data Source: StatCan)

Expectation of Future Profitability

Investment does not yield immediate profit. Instead, investment requires a large upfront expenditure with the hope of earning future profits. But investment also requires a risk. Therefore, as firms expect greater future profitability, their appetite for investment risk will increase. Thus, an increase in expected future profit will lead to more investment while a decrease in expected future profit, such as during times of economic slowdown, will lead to a reduction in investment.

The Real Interest Rate

For the same rationale, as we saw with consumption, the real interest rate will dictate the cost of investment spending. Because investment can be costly, firms often must finance these investment activities. Again, the real interest rate gives the cost of borrowing. So, as the real interest rate increases, the borrowing cost increases, reducing investment spending. On the other hand, as the real interest rate decreases, the borrowing cost decreases, increasing investment spending.

Taxes

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When considering consumption spending, we investigated income versus disposable income. While considering investment., we consider business or corporate taxes. If corporate taxes increase, companies must spend more on their tax payments and will, therefore, have less to spend on investment projects. But, if taxes fall, companies now have more money, all else equal, to spend on investment projects.

Cash Flow

While some companies finance their investment projects, others use cash to finance them. Therefore, the greater the cash flow for a company, the greater the ability to engage in these investment projects.

Just as a consumption function shows the relationship between real GDP (or national income) and consumption levels, the investment function shows the relationship between real GDP and investment levels. When businesses decide whether to build a new factory or place an order for new computer equipment, their decision is forward-looking, based on expected rates of return and the interest rate at which they can borrow for the investment expenditure. Investment decisions do *not* depend primarily on the current year's GDP level. Thus, the investment function can be drawn as a horizontal line at a fixed level of expenditure. Because investment does not vary with real GDP, we call planned investment spending as *autonomous*.

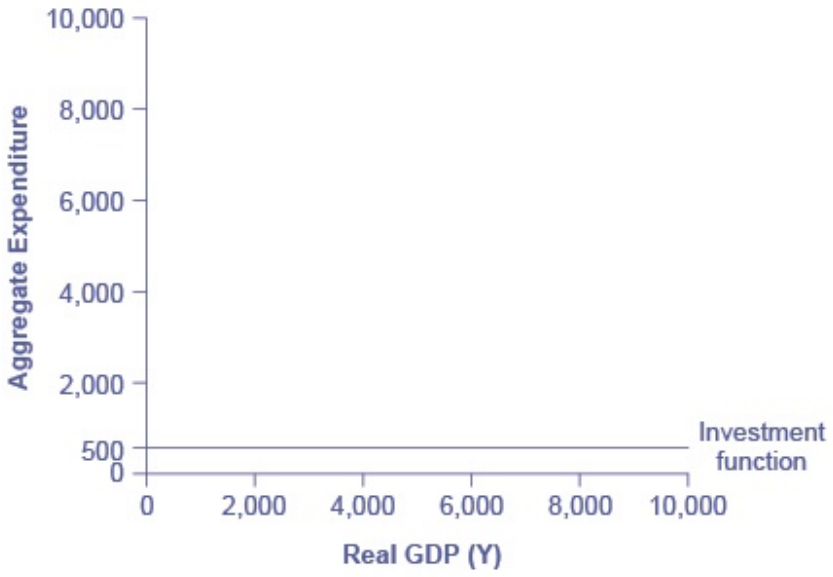

Fig 8.7 The Investment Function

8.2.3 Government Purchases

Federal, provincial, and local governments determine the level of government spending through the budget process. In the Keynesian aggregate expenditure model, government spending appears as a horizontal line,

as in Figure 8.8, where government spending is set at $1,300 regardless of the level of GDP. As in the case of investment spending, this horizontal line does not mean that government spending is unchanging, only that it is independent of GDP. Like planned investment, G does not vary with real GDP, therefore, we call G or Government purchases as *autonomous* spending.

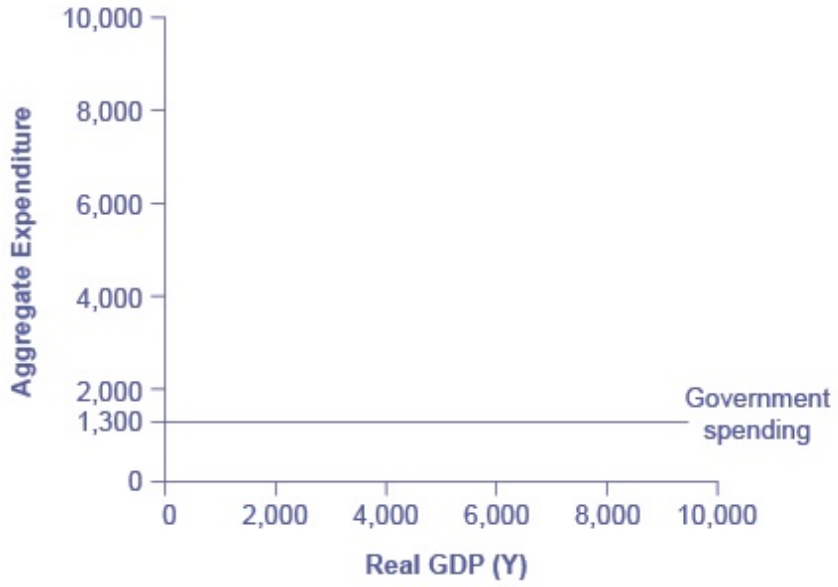

Fig 8.8 The Government Purchase Function

8.2.4 Net Exports

Exports are foreign purchases of domestically produced goods and services, meaning exports contribute to aggregate expenditure. Imports are purchases of foreign goods and services by domestic residents, which means that spending on imports takes away from spending on domestic goods and services. Let's consider how imports and exports can be graphed as a function of national income (or real GDP).

We've established that consumption expenditure increases with national income; thus, in a macroeconomic context, the same thing is true of imports—the purchase of imports increases with national income. The foreign demand for our exports depends on their national income, but it is independent of our domestic national income. We can draw these two relationships as the export and import functions, shown below in Figures 8.9a and 8.9b.

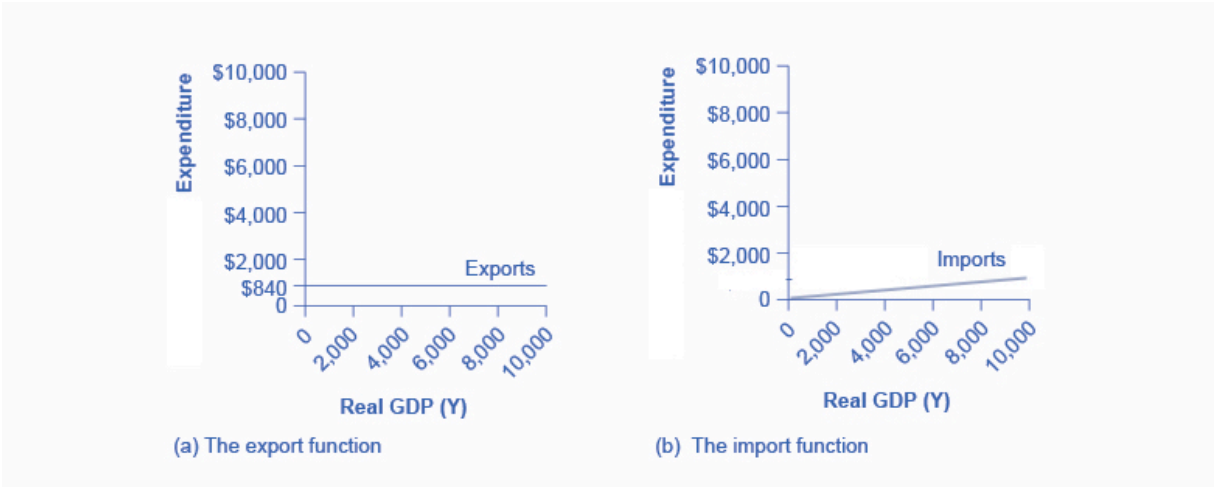

Fig 8.9 The Export and Import Functions. (a) The export function is drawn as a horizontal line because the buying power of other countries determines exports and, thus, does not change with the size of the domestic economy. In this example, exports are set at 840. However, exports can shift up or down depending on buying patterns in other countries. (b) The import function is drawn as an upward-sloping line because expenditures on imported products increase with income. In this example, the marginal propensity to import is 0.1, so imports are calculated by multiplying the income level by +0.1.

The export function, which shows how exports change with the level of a country's real GDP, is drawn as a horizontal line, as in the example in Figure 8.9a, where exports are drawn at a level of $840. Again, as in the case of investment spending and government spending, drawing the export function as horizontal does not imply that exports never change. It means they do not depend on a country's national income (or GDP). Therefore, export is also called *autonomous* spending, as exports do not vary with real GDP.

As explained above, the import function is an upward-sloping line, showing that as national income rises, so do import expenditures. The slope is given by the **marginal propensity to import (MPI)**, which is the percentage change in import spending when national income changes. As real GDP increases, the country's ability to import will likely go up. Import spending is *induced*, because just like consumption, imports *vary* with real GDP.

In Figure 8.9b, the marginal propensity to import is 0.1. Thus, if real GDP is $5,000, imports are $500; if real GDP is $6,000, imports are $600, and so on.

8.3 Putting It Together: The Aggregate Expenditure Function

The final step in deriving the **aggregate expenditure function**, which shows the total expenditures in the economy for each level of real GDP, is to sum the parts shown in Table 8.10.

Fig 8.10 The Aggregate Expenditure Function.

Real GDP	Consumption (C)	Investment (I)	Government Spending (G)	Exports (X)	Imports (M)	Net Exports (X-M)	Aggregate Expenditure (AE)
$0	$600	$500	$1,300	$840	$0	$840	$3,240
$1,000	$1,160	$500	$1,300	$840	$100	$740	$3,700
$2,000	$1,720	$500	$1,300	$840	$200	$640	$4,160
$3,000	$2,280	$500	$1,300	$840	$300	$540	$4,620
$4,000	$2,840	$500	$1,300	$840	$400	$440	$5,080
$5,000	$3,400	$500	$1,300	$840	$500	$340	$5,540
$6,000	$3,960	$500	$1,300	$840	$600	$240	$6,000
$7,000	$4,520	$500	$1,300	$840	$700	$140	$6,460
$8,000	$5,080	$500	$1,300	$840	$800	$40	$6,920
$9,000	$5,640	$500	$1,300	$840	$900	-$60	$7,380

Graphically, the aggregate expenditure function is formed by adding (or stacking on top of each other) the consumption function (after taxes), the investment function, the government spending function, and the net export function. In its most basic form, the graph of aggregate expenditures looks like the graph shown in Fig 8.11.

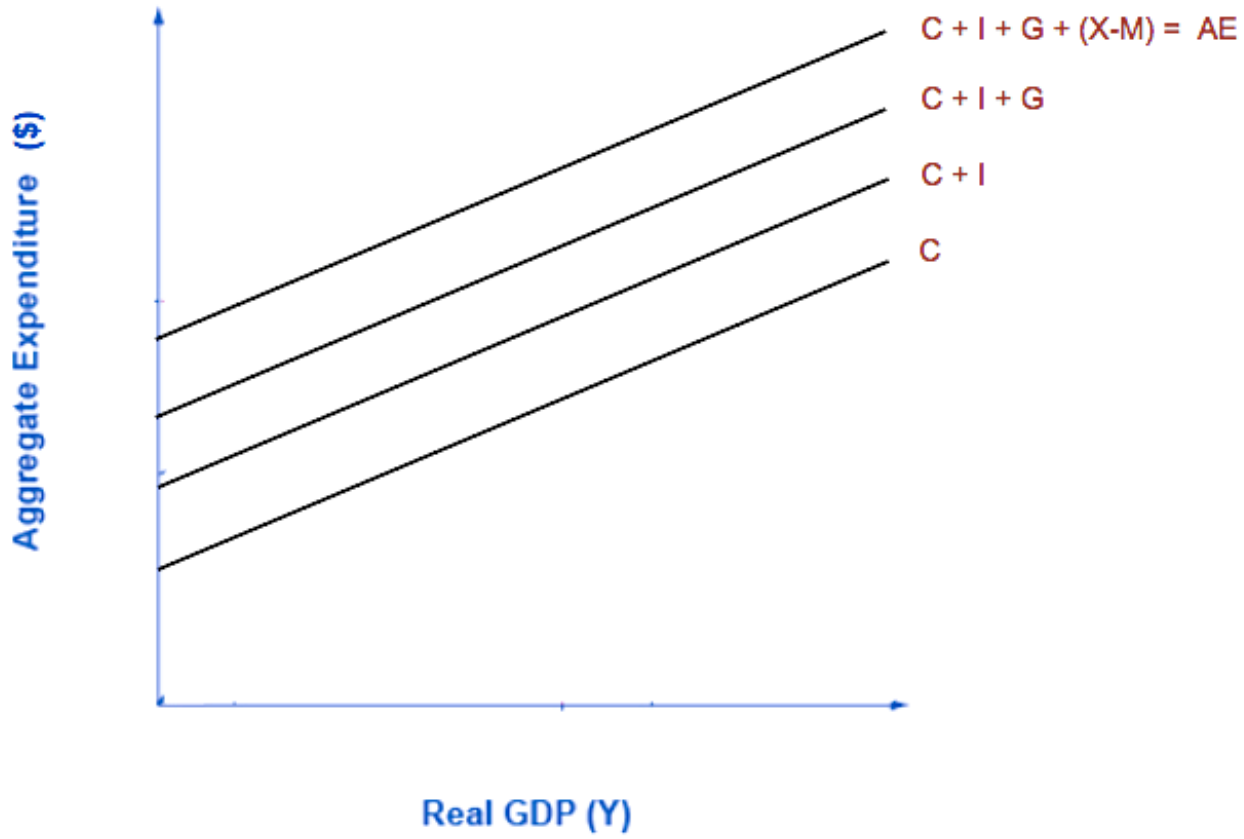

Fig 8.11 Aggregate Expenditure. The aggregate expenditure is the vertical sum of C + I + G + (X-M)

All the components of aggregate expenditure – consumption, investment, government spending, and net exports —are now in place to build the Keynesian cross diagram as shown below. The Keynesian cross diagram determines the equilibrium level of real GDP by the point where the total or aggregate expenditures in the economy are equal to the amount of output produced. The axes of the Keynesian cross diagram presented in Figure 8.12 show real GDP on the horizontal axis as a measure of output and aggregate expenditures on the vertical axis as a measure of spending. The 45-degree line illustrates that aggregate expenditure equals real GDP at every point on the line.

Note the vertical intercept of the aggregate expenditure function, that is, the point at which the aggregate expenditure function intersects the vertical axis is **autonomous expenditure**, i.e. all the components of aggregate expenditure (e.g. *autonomous* consumption, investment, government, and net export expenditures)—which do not vary with national income. The major part of consumption depends on national income, GDP, and imports. Therefore, consumption minus imports is called **induced expenditure**.

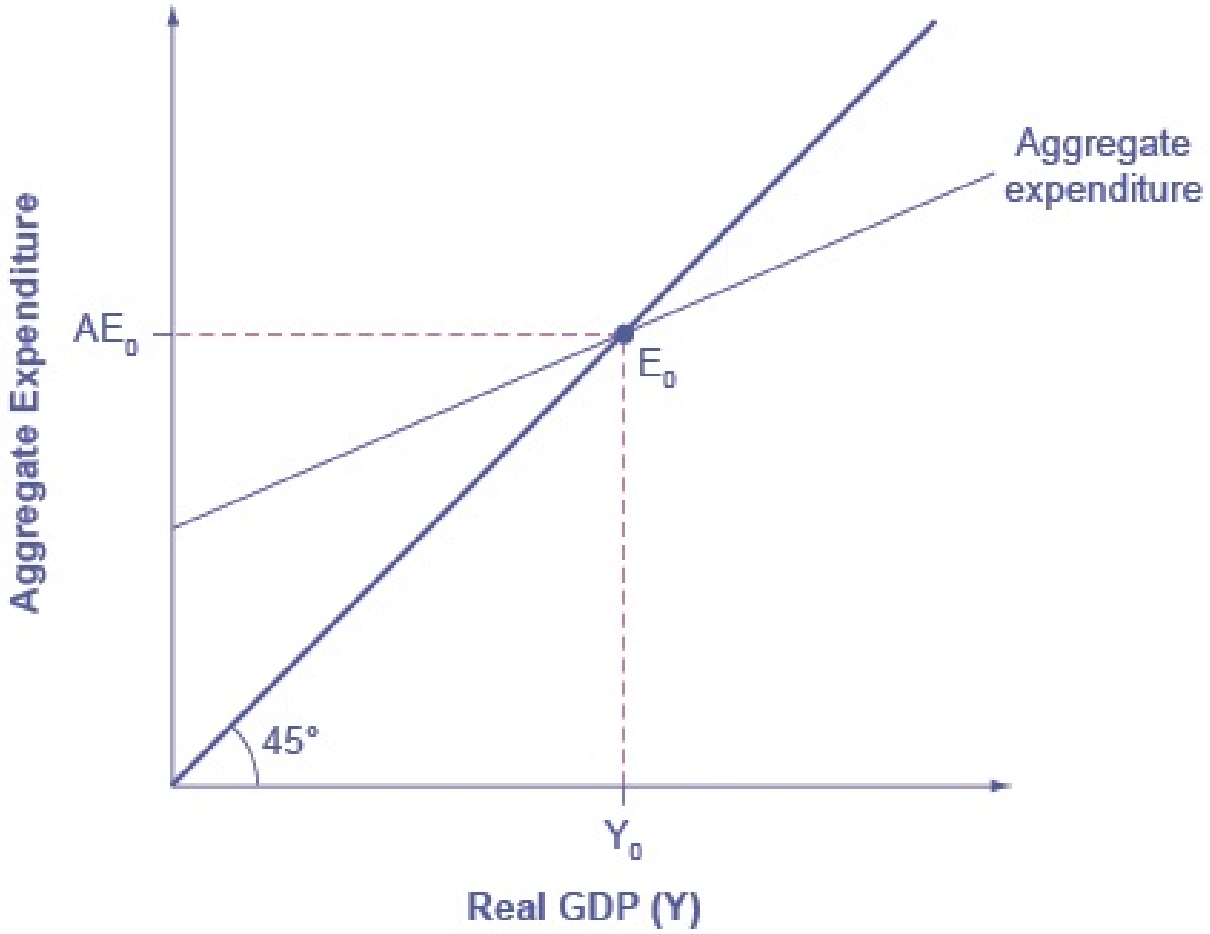

Fig 8.12

From Fig 8.12 above, the point where the aggregate expenditure line crosses the 45-degree line will be the equilibrium for the economy. It is the only point on the aggregate expenditure line where the total amount spent equals the total production level.

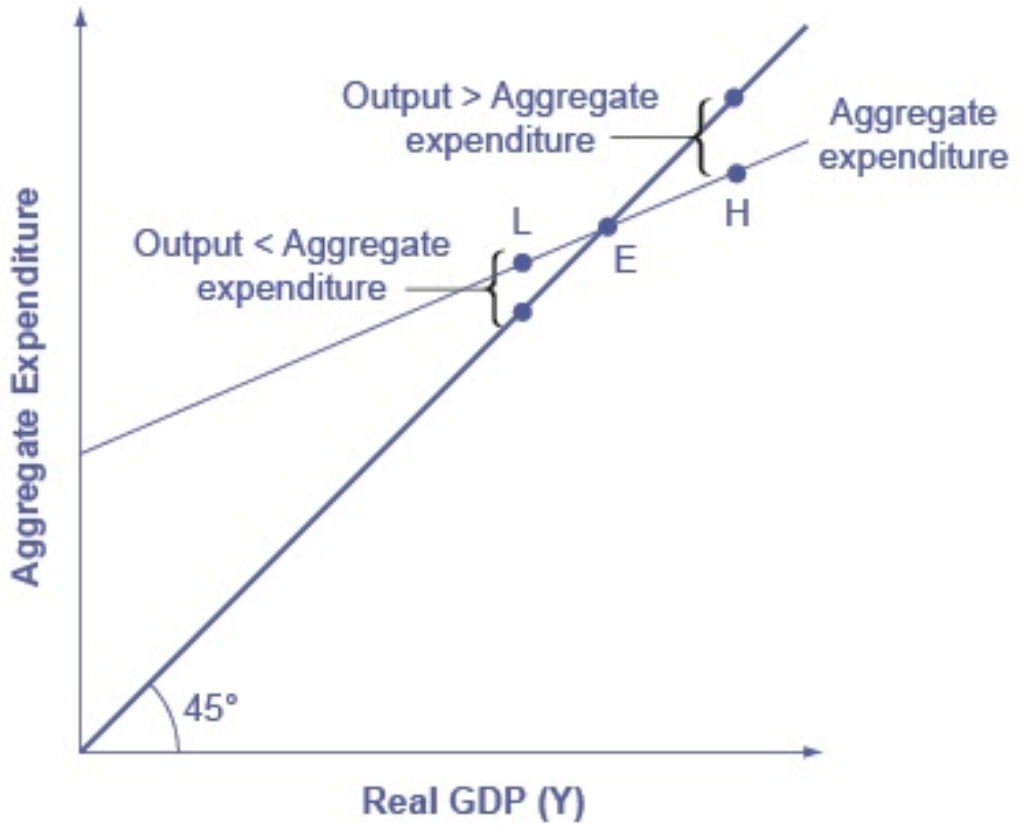

Fig 8.13 Equilibrium in the Aggregate Expenditure Model

To understand why the point of intersection between the aggregate expenditure function and the 45-degree line is a macroeconomic equilibrium, consider what would happen if an economy found itself to the right of the equilibrium point E, say point H in Figure 8.13, where output is higher than the equilibrium. At point H, the level of aggregate expenditure is below the 45-degree line so that the level of aggregate expenditure in the economy is less than the level of output. As a result, output is piling up unsold inventories at point H — not a sustainable state of affairs.

Conversely, consider the situation where the level of output is at point L—where real output is lower than the equilibrium. In that case, the level of aggregate expenditure in the economy is above the 45-degree line, indicating that the level of aggregate expenditure is greater than the level of output. When the level of aggregate expenditure has emptied the store shelves, it cannot be sustained, either. Firms will respond by increasing their level of production. Thus, the equilibrium must be the point where the amount produced and the amount spent are balanced at the intersection of the aggregate expenditure function and the 45-degree line.

8.4 The Multiplier

Suppose that the macro equilibrium in an economy occurs where the economy is operating at full employment. Keynes pointed out that even though the economy *starts* at full employment, because aggregate expenditure tends to bounce around, it is unlikely that the economy will stay at full employment. In 2020, Canadian investment expenditure collapsed with Covid 19. As a result, the economy went into a Recession. But how much did GDP fall? Suppose investment fell by $100 billion. You might expect the result would be that GDP would fall by $100 billion, too. If so, you would be wrong. It turns out that changes in any category of expenditure have a more than proportional impact on GDP. Or, to say it differently, the change in GDP is a multiple of (say 3 times) the change in expenditure. This is the idea behind the *multiplier*.

For example, when businesses lower investments, they downsize and cut production. This, in turn, raises unemployment, and as income levels fall, people start cutting their consumption spending – the induced part. Therefore, aggregate expenditure decreases. So, the impact on the economy is much larger than the initial decrease in business investment. Real GDP decreases by more than the change in expenditure, which resulted from the investment cut.

What happens if there is an increase in Government purchases or the Government invests $200 million into opening a new EV plant in BC? We can see in Figure 8.15 that the curve shifts upward from the increase in G. As G goes up. AE rises because G is a part of AE.

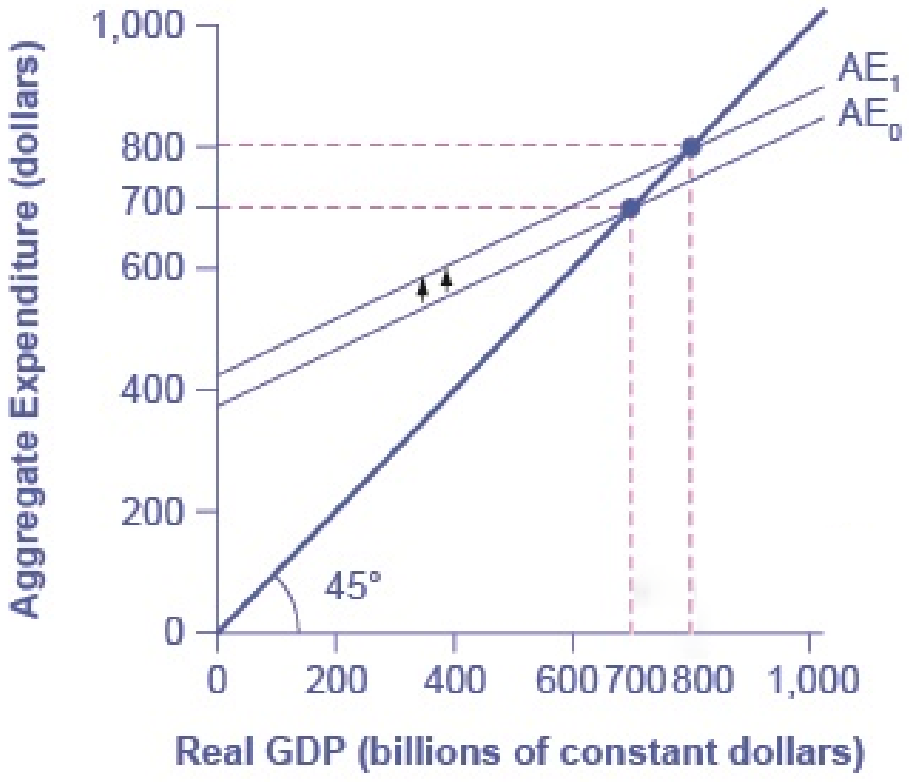

Fig 8.14

Changes in autonomous variables cause the AE curve to shift vertically upward or downward. In this case, there is an increase in Government expenditure. So AE curve shifts upward. We see there is a new equilibrium on the new AE curve where AE_1 intersects with the 45-degree line. Even more important, the increase in real GDP is greater than the increase in G. The multiplier effect we see in Fig 8.14 is explained below.

Photo by Alexander Grey, Unsplash Licence

Suppose the government spontaneously purchases $100 billion worth of goods and services, perhaps because they feel optimistic about the future. The producers of those goods and services see an increase in income by that amount. They use that income to pay their bills, pay wages and salaries to their workers, rent to their landlords, and pay for the raw materials they use. Any income left over is profit, which becomes income to their stockholders. Each economic agent takes their new income and spends some of it. Those purchases then become new income to the sellers, who turn around and spend a portion of it. That spending becomes someone else's income. The process continues, though, because economic agents spend only part of their income, the numbers get smaller in each round. The new income generated is multiple times the initial spending increase–hence, the spending multiplier. The table below shows how this could work with increased government spending. Note that the multiplier works the same way in reverse with a decrease in spending.

Fig 8.15 The Multiplier Effect

Original increase in aggregate expenditure from government spending	100
Save 10% of income. Spend 90% of income. Second-round increase of...	100–10=90
$90 of income to people through the economy: Save 10% of income. Spend 90% of income. Third-round increase of...	90–9=81
$81 of income to people through the economy: Save 10% of income. Spend 90% of income. Fourth-round increase of...	81–8.10=72.10

Fig 8.15 works through the process of the multiplier. Over the first four rounds of aggregate expenditures, the impact of the original increase in government spending of $100 creates a rise in aggregate expenditures of $100 + $80 + $60 + $40 = $280, which is larger than the initial increase in spending.

Fortunately, there is a formula for calculating the multiplier for everyone not carrying around a computer with a spreadsheet program to project the impact of an original increase in expenditures over 20, 50, or 100 rounds of spending.

- (a) $\mathrm{Multiplier} = \dfrac{1}{(1 - \mathrm{MPC})}$

Suppose the $\mathrm{MPC} = 90\%$; then the $\mathrm{MPS} = 10\%$. Therefore, the multiplier is:

$$\frac{1}{(1 - 0.9)} = \frac{1}{0.1} = 10$$

The second formula to calculate a multiplier is:

- (b) $\dfrac{\text{Change in GDP}}{\text{change in any autonomous expenditure (I, G, or X)}}$

The multiplier applies when expenditure decreases as well as when it increases. Say that business confidence declines and investment (autonomous expenditure) falls off or that the economy of a leading trading partner slows down so that export (autonomous expenditure) sales decline. Because of the multiplier effect, these changes will reduce aggregate expenditures and have an even larger effect on real GDP.

Suppose a decrease in investment expenditure by $100 billion decreases GDP by $150 billion. The multiplier is: $\dfrac{150}{100} = 1.5$, which implies GDP decreases by more than the initial fall in investment.

This chapter has looked at factors determining aggregate expenditure in the economy. In the next chapter, we can use the aggregate expenditure model to gain greater insight into understanding the aggregate demand model.

8.5 Key Terms

Key Terms

Aggregate expenditure

Autonomous consumption

Autonomous Expenditure

Consumption

Consumption function

Induced expenditure

Investment function

Macroeconomy equilibrium

Marginal propensity to consume (MPC)

Marginal propensity to import (MPI)

Marginal propensity to save (MPS)

Multiplier

Wealth

CHAPTER 9: AGGREGATE DEMAND-AGGREGATE SUPPLY

Chapter Outline

9.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Explain the determinants of Aggregate Demand
- Explain the determinants of Aggregate Supply
- Define Macroeconomic Equilibrium in the Long Run and the Short Run
- Identify Output Gaps

This may be the most important module in the Principles of Macroeconomics course. The module introduces the key macroeconomic model, the aggregate demand-aggregate supply model, that will be used in nearly every following module. Studying this module will be like learning how to cut and join wood for a carpenter, working with pipes for a plumber, or writing code for a programmer. In short, macroeconomics is all about using a model like AD-AS to analyze issues and problems in the macroeconomy. The effort you put into learning this module will be time well spent.

The AD-AS model shows how spending in the economy (AD) interacts with production (AS) to determine the aggregate price level and the level of real GDP. The model works like an ordinary market demand and supply model, but you will see that the way it is interpreted is quite different.

9.1 Aggregate Supply

The Aggregate Demand-Aggregate Supply model is designed to answer the questions of what determines the level of economic activity in the economy (i.e. what determines real GDP and employment) and what causes economic activity to speed up or slow down.

We can begin to answer these questions if we consider the aggregate production function concept, which we introduced in the context of economic growth. The aggregate production function shows the relationship between the resources (or factors of production) the economy has (e.g. labour, capital, technology, etc.) and the amount of output (i.e. real GDP) that can be produced. The resulting output is called Potential GDP if all resources are fully employed. (Over time, as the economy obtains more resources, the labour force and capital stock grow; as technology improves, the economy produces more GDP. We have described this process as economic growth.)

Firms decide what quantity of output to supply based on the profits they expect to earn. Profits, in turn, are also determined by the price of the outputs the firm sells and the price of the inputs, like labour or raw materials, the firm needs to buy.

Aggregate supply (AS) refers to the total quantity of output (i.e. real GDP) firms will produce. The **aggregate supply (AS) curve** shows the total quantity of output firms will produce and sell (i.e. real GDP) at each aggregate price level, holding the price of inputs fixed.

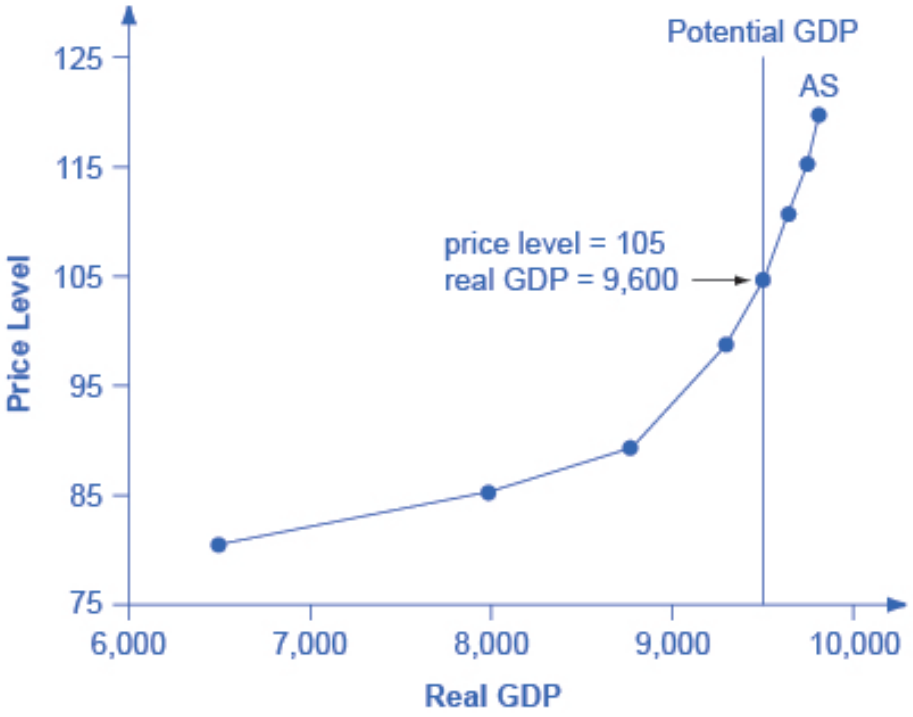

Fig 9.1. The Aggregate Supply Curve. Aggregate supply ([latex]AS[/latex]) slopes up because as the price level for outputs rises, with the price of inputs remaining fixed, firms have an incentive to produce more and earn higher profits. The potential GDP line shows the maximum the economy can produce with full employment of workers and physical capital.

Recall that the aggregate price level is an average of the prices of outputs in the economy. Suppose we define

the short run as the period of time that wages are *sticky*. In that case, we can describe the positive relationship between P & Q as the **short-run aggregate supply ($SRAS$) curve**, shown above in Figure 9.1 as AS. Aggregate supply (AS) slopes up because as the price level for outputs rises, with the price of inputs remaining fixed, firms have an incentive to produce more and earn higher profits. The AS curve describes how suppliers will react to a higher price level for outputs of goods and services while holding the prices of inputs like labour and energy constant.

If firms across the economy face a situation where the price level of what they produce and sell is rising, but their production costs are not rising, then the lure of higher profits will induce them to expand production.

A change in the price level produces a change in the aggregate quantity of goods and services supplied and is illustrated by the *movement along* the short-run aggregate supply curve, all else constant.

However, wages and prices are fully flexible in the long run. Consequently, all resources will be fully employed, and real GDP will equal potential, regardless of the price level. Thus, in the long run, real GDP will be independent of the price level, and the **long-run aggregate supply ($LRAS$) curve** will be a vertical line at the potential (or the full employment level of) GDP. This can be seen in Fig 9.1 as potential GDP ($PGDP$) or as $LRAS$. Rather than prices, what affects or influences an economy's growth potential would be the availability of resources, which we will discuss below and therefore, the LRAS is modelled as a vertical line, indicating that it is independent of the price level.

Photo by Leeloo Thefirst, Pexels Licence

In Fig 9.1, at the far left of the aggregate supply curve, the level of output in the economy is far *below* **the potential GDP.** At these relatively low levels of output, levels of unemployment are high, and many factories are running only part-time or have closed their doors. The economy produces an output level where real GDP is less than potential GDP.

At the far right, the economy's output level is *higher* than the potential GDP. The economy produces an output greater than the potential GDP. In this example, the vertical line in the exhibit shows that potential GDP occurs at a total output of 9,500. When an economy is operating at its potential GDP, machines and factories are running at capacity, and the unemployment rate is at its natural unemployment rate. For this reason, when real GDP equals potential GDP, we also call it **full-employment GDP**. That is, the economy operates at its capacity by fully employing its available resources.

Changes or Shifts in the Short Run Aggregate Supply Curve

Changes in the factors held constant in drawing the short-run aggregate supply curve will shift the curve. An increase in capital stock, an increase in natural resources, technological advancement, or a fall in the prices of factors of production will shift the Aggregate Supply curve rightward.

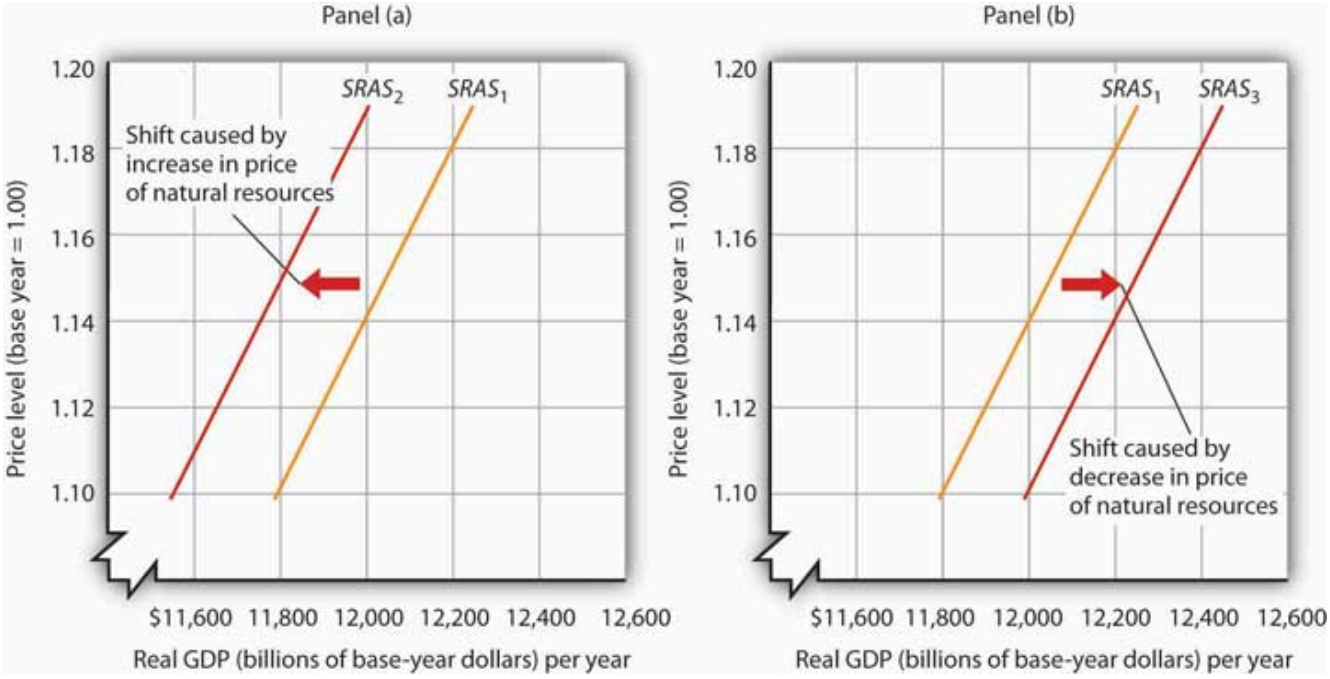

Fig 9.2a & Fig 9.2b. In Panel (a), [latex]SRAS_1[/latex] shifts leftward to [latex]SRAS_2[/latex], which is caused by an increase in the price of natural resources. A decrease in the price of a natural resource would lower the cost of production and, other things unchanged, would allow greater production from the economy's stock of resources and would shift the short-run aggregate supply curve to the right; such a shift is shown in Panel (b) by a shift from [latex]SRAS_1[/latex] to [latex]SRAS_3[/latex].

Changes or Shifts in the Long Run Aggregate Supply Curve (PGDP)

Growth in the labour force and improvements in labour productivity increase the economy's potential GDP or potential output over time. Labour productivity grows due to advances in technology and investments in capital equipment, acquiring education and training. We see the increase in potential GDP in Fig 9.3 below. When labour becomes more productive, the demand for labour increases, and firms are willing to pay more for a given number of hours. This likely increases the output the economy produces because the same labour can now produce more goods and services, with growth in human capital and with the availability of physical capital and/or technology. A resourceful labour force is the outcome of greater educational qualifications, skills, and on-the-job training. Remember that human capital, physical capital, and technological advancements not only increase the economy's growth potential but also enables the economy to produce more in the short run. In other words, the above factors would cause rightward shifts in the LRAS as well as the SRAS curves.

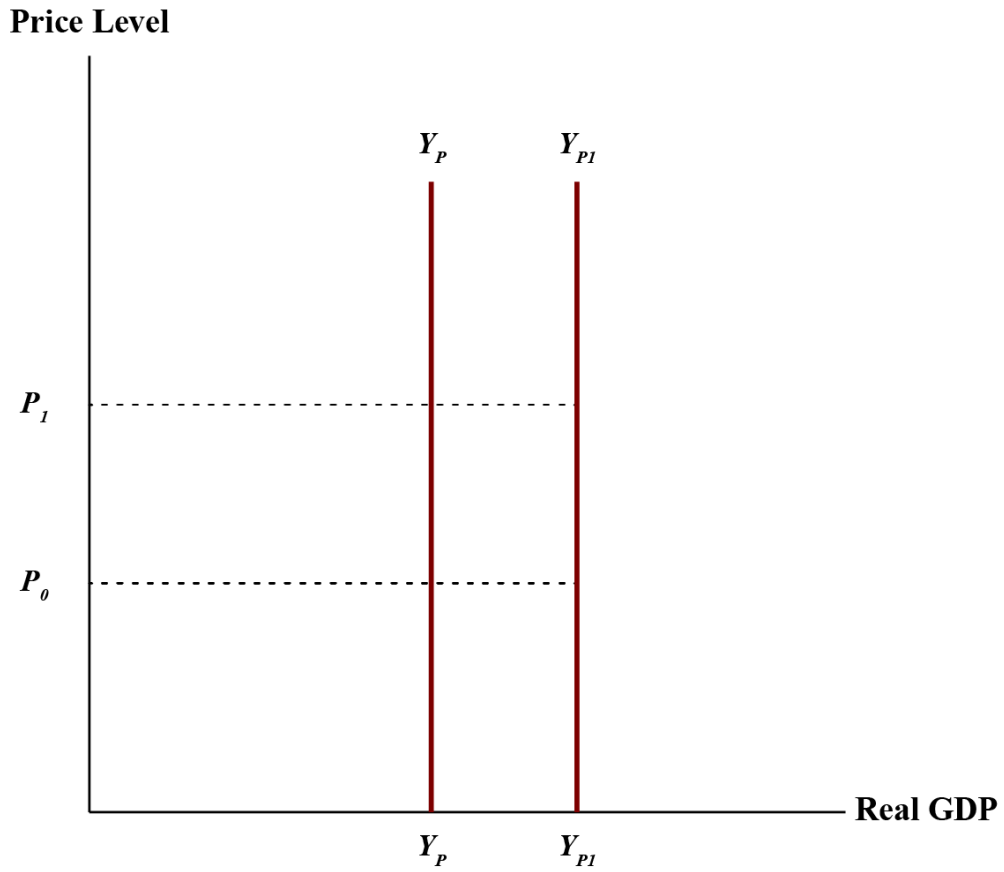

Fig 9.3 Potential GDP ([latex]Y_P[/latex]) is the real GDP the economy could produce on a sustained basis without putting pressure on costs and prices. [latex]Y_P[/latex] is independent of [latex]P[/latex].

Attribution

9.2 Aggregate Demand

Aggregate demand (AD) refers to total spending in an economy on domestic goods and services. It includes all four components of spending: consumption expenditure, investment expenditure, government expenditure, and net export expenditure (exports minus imports). Several factors determine this demand, but one is the aggregate price level. The **aggregate demand (AD) curve** shows the total spending on domestic goods and services at each price level.

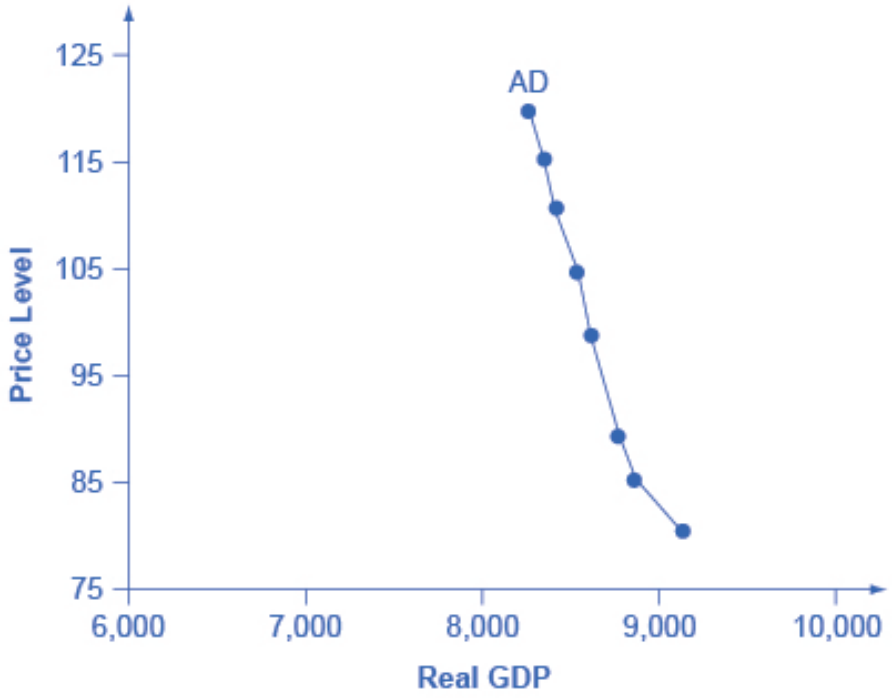

Fig 9.4. The Aggregate Demand Curve. Aggregate demand ([latex]AD[/latex]) slopes down, showing that, as the price level changes, the amount of total spending on domestic goods and services could also change, showing a movement along the AD curve

Figure 9.4 presents an aggregate demand (AD) curve. Like the aggregate supply curve, the horizontal axis shows real GDP, and the vertical axis shows the price level. The AD curve is downward sloping from left to right, which means that a decrease in the aggregate price level leads to an increase in the amount of total spending on goods and services. Even though the AD curve *looks* like a microeconomic demand curve, it doesn't operate the same way. Rather, the reasons behind this negative relationship are related to how changes in the price level affect the different components of aggregate demand. Recall that aggregate demand consists of consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M): $C + I + G + X - M$. When the price level falls, the quantity of aggregate demand could increase and vice versa. This is represented by a *movement along* the AD curve. We explain the relationship between the change in the price level and the AD quantity below.

There are three reasons why AD curves are downward sloping. These are the wealth effect, the interest rate effect, and the foreign price effect. Each of them tends to affect a different component of aggregate demand.

The **wealth effect** holds that as the price level increases, the buying power of savings stored up in bank accounts and other assets will diminish, eaten away to some extent by inflation. Because a rise in the price level reduces people's wealth, consumption spending will fall as the price level rises. Therefore, a rise in the price level decreases the quantity of aggregate demand and vice versa because consumption is a component of AD.

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The **interest rate effect** is that as prices for outputs rise, the same purchases will take more money or credit to accomplish. This additional demand for money and credit will push interest rates higher. In turn, higher interest rates will reduce borrowing by businesses for investment purposes and reduce borrowing by households for homes and cars—thus reducing consumption and investment spending. So, a rise in the price level decreases the quantity of aggregate demand through increases in borrowing costs and lowering private investments.

The **foreign price effect** points out that if prices rise in Canada relative to other countries, then goods in Canada will be relatively more expensive than those in the rest of the world. Canadian *exports* will be relatively more expensive, and the quantity of exports sold will fall. Canadian *imports* from abroad will be relatively cheaper, so the quantity of imports will rise. Thus, a higher domestic price level, relative to other countries' prices, will reduce net export expenditures and thus decrease the quantity of aggregate demand through net exports.

Changes or Shifts in the Aggregate Demand Curve

A change in the aggregate quantity of goods and services demanded at every price level changes aggregate demand, which shifts the aggregate demand curve. Increases and decreases in aggregate demand are shown in Fig 9.6 below. Changes occur when the price level is *constant*.

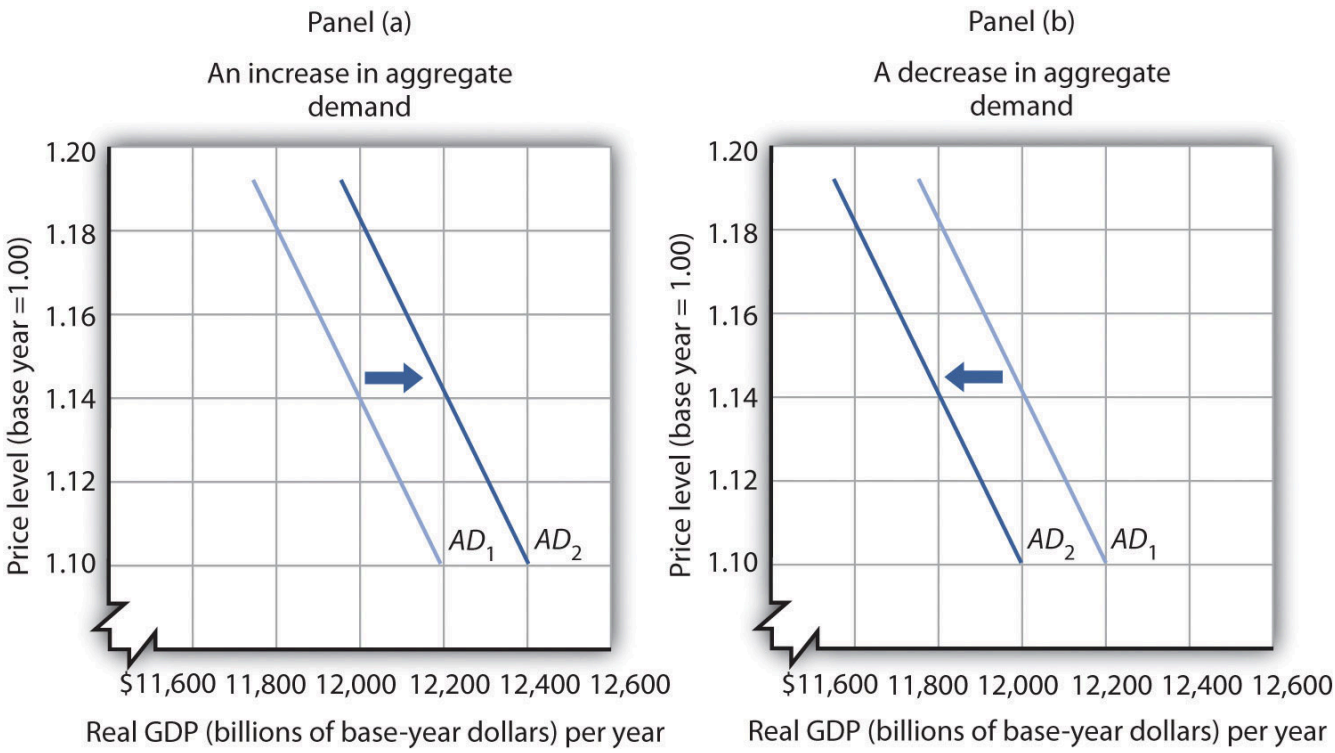

Fig 9.6a and 9.6b

Changes in Consumption

Several events could change the quantity of consumption at each price level and thus shift aggregate demand. One determinant of consumption is consumer confidence. If consumers expect good economic conditions and are optimistic about their economic prospects, they are likelier to buy major items such as cars or furniture. The result would be an increase in the real value of consumption at each price level and an increase in aggregate demand.

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Another factor that can change consumption and shift aggregate demand is *tax policy*. A cut in personal income taxes leaves people with more after-tax income, which may induce them to increase their consumption.

Transfer payments such as welfare and Social Security payments also affect the income people have available to spend. At any given price level, an increase in transfer payments raises consumption and aggregate demand, and a reduction lowers consumption and aggregate demand.

Changes in Investment

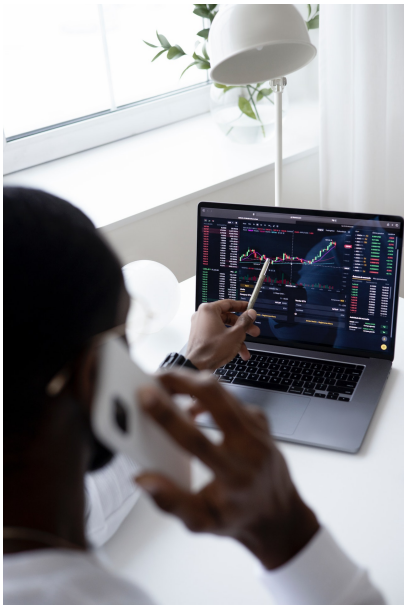

Photo by Anna Nekrashevich, Pexels Licence

Investment is the production of new capital that will be used for future production of goods and services. Firms make investment choices based on what they think they will be producing in the future. The expectations of firms thus play a critical role in determining investment. If firms expect their sales to increase, they will likely increase their investment to increase production and meet consumer demand. Such an increase in investment raises the aggregate quantity of goods and services demanded at each price level; it increases aggregate demand.

Changes in *interest rates* also affect investment as the cost of borrowing changes and thus affects aggregate demand.

Important Note: We must carefully distinguish such changes from the interest rate effect, which causes a movement along the aggregate demand curve. A change in interest rates that results from a change in the price level affects investment in a way that is already captured in the downward slope of the aggregate demand curve; it causes a movement along the curve. A change in interest rates shifts the curve for some other reason.

Changes in Net Exports

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An increase in foreign incomes or an increase in *foreign GDP* increases a country's net exports and aggregate demand; a slump in foreign incomes reduces net exports and aggregate demand. For example, several major Canadian trading partners in Asia suffered recessions in 2009. Lower real incomes in those countries reduced Canadian exports and tended to reduce aggregate demand.

Exchange rates also influence net exports, all other things unchanged. A country's exchange rate is the price of its currency in terms of another currency. A rise in the Canadian exchange rate means it takes more USD, for example, to purchase one Canadian dollar (CAD). Therefore, a rise in the Canadian exchange rate increases the price to foreigners for goods and services produced in Canada, thus reducing Canadian exports and increasing imports into Canada (a stronger CAD implies foreign goods get relatively cheaper). A higher exchange rate tends to reduce net exports, reducing aggregate demand. A lower exchange rate tends to increase net exports, increasing aggregate demand.

9.3 Equilibrium in the AD-AS Model

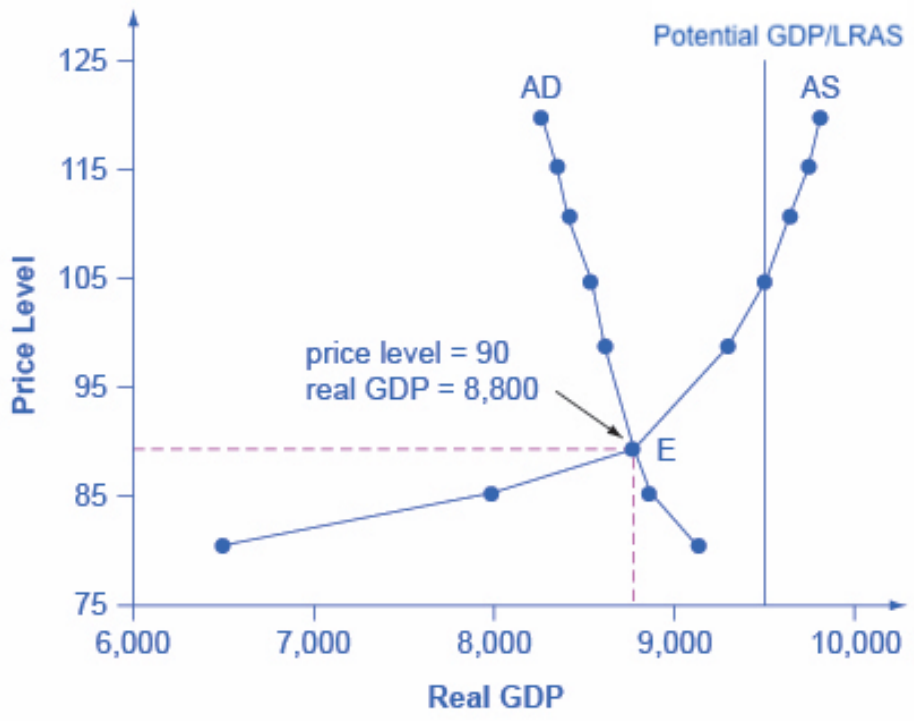

Figure 9.7. Aggregate Supply and Aggregate Demand. The equilibrium, where aggregate supply ([latex]AS[/latex]) equals aggregate demand ([latex]AD[/latex]), occurs at a price level of 90 and an output level of 8,800.

Figure 9.7 combines the short run AS curve and the AD curve from Figures 9.1 & 9.3 on the earlier pages and places them both on a single diagram. The intersection of the short-run aggregate supply and aggregate demand curves shows the equilibrium level of real GDP and the equilibrium price level in the economy. In this example, the equilibrium point occurs at point E, at a price level of 90 and an output level of $8,800$. This is called the *short-run* macro equilibrium.

Long-run macro equilibrium occurs when real GDP *equals* potential GDP. As discussed earlier, this is called the full employment level of output. At the long-run equilibrium, the short-run macro equilibrium point coincides with the potential GDP line. We will see this below.

Recessionary and Inflationary Gaps

At any time, real GDP and the price level are determined by the intersection of the aggregate demand and short-run aggregate supply curves. If employment is below the natural level of employment, real GDP will be below potential. The aggregate demand and short-run aggregate supply curves will intersect to the left of the long-run aggregate supply curve.

The aggregate demand and short-run aggregate supply curves, AD and $SRAS$, intersect to the left of the long-run aggregate supply curve $LRAS$ in Fig 9.8a. When real GDP is *less* than potential, the gap between

real GDP and potential output is called a recessionary gap. The economy operates *below* its full employment level.

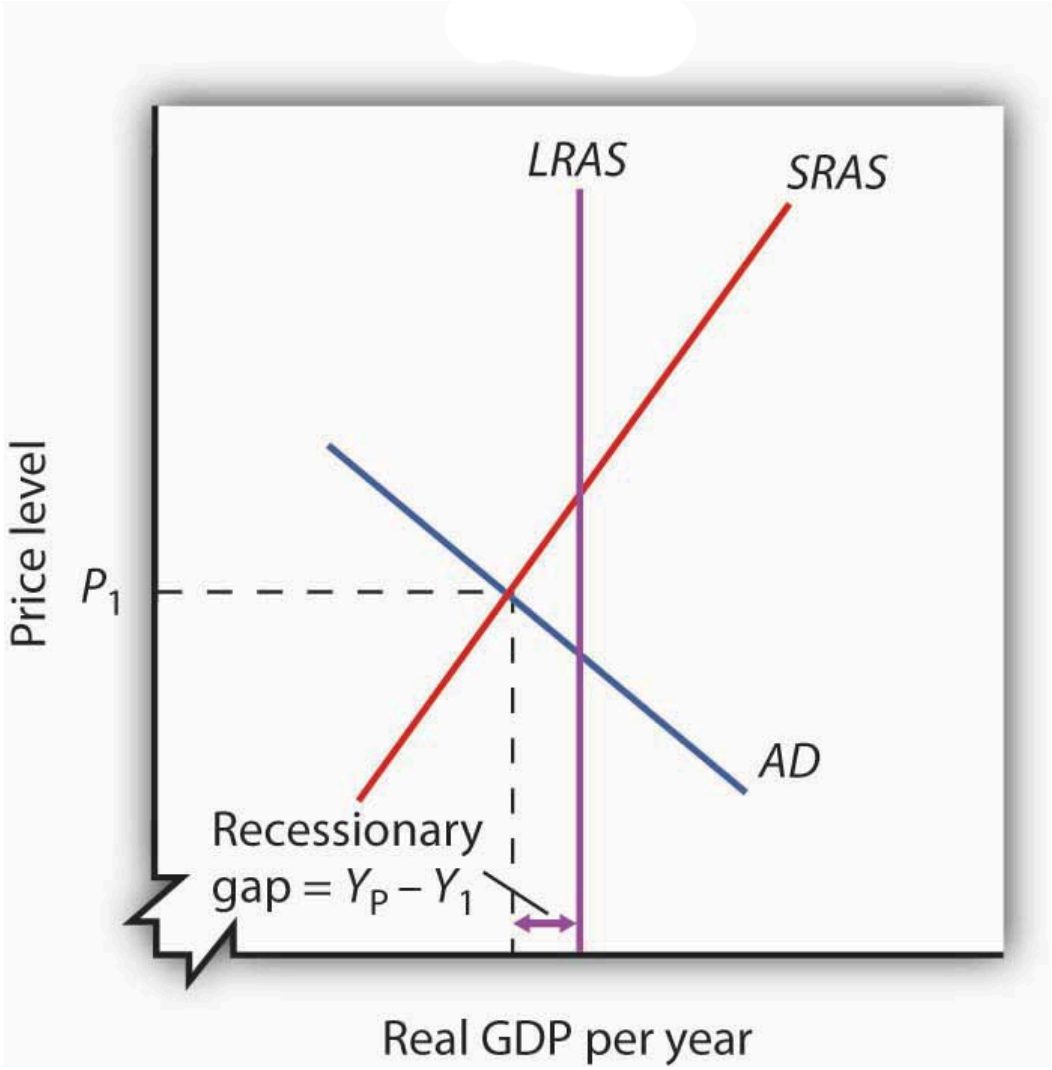

Fig 9.8a

The aggregate demand and short-run aggregate supply curves, *AD* and *SRAS*, intersect to the right of the long-run aggregate supply curve *LRAS* in Fig 9.8b. The gap between the level of real GDP and potential output, when real GDP is *greater* than potential, is called an *inflationary* gap. The economy operates *above* its full employment level.

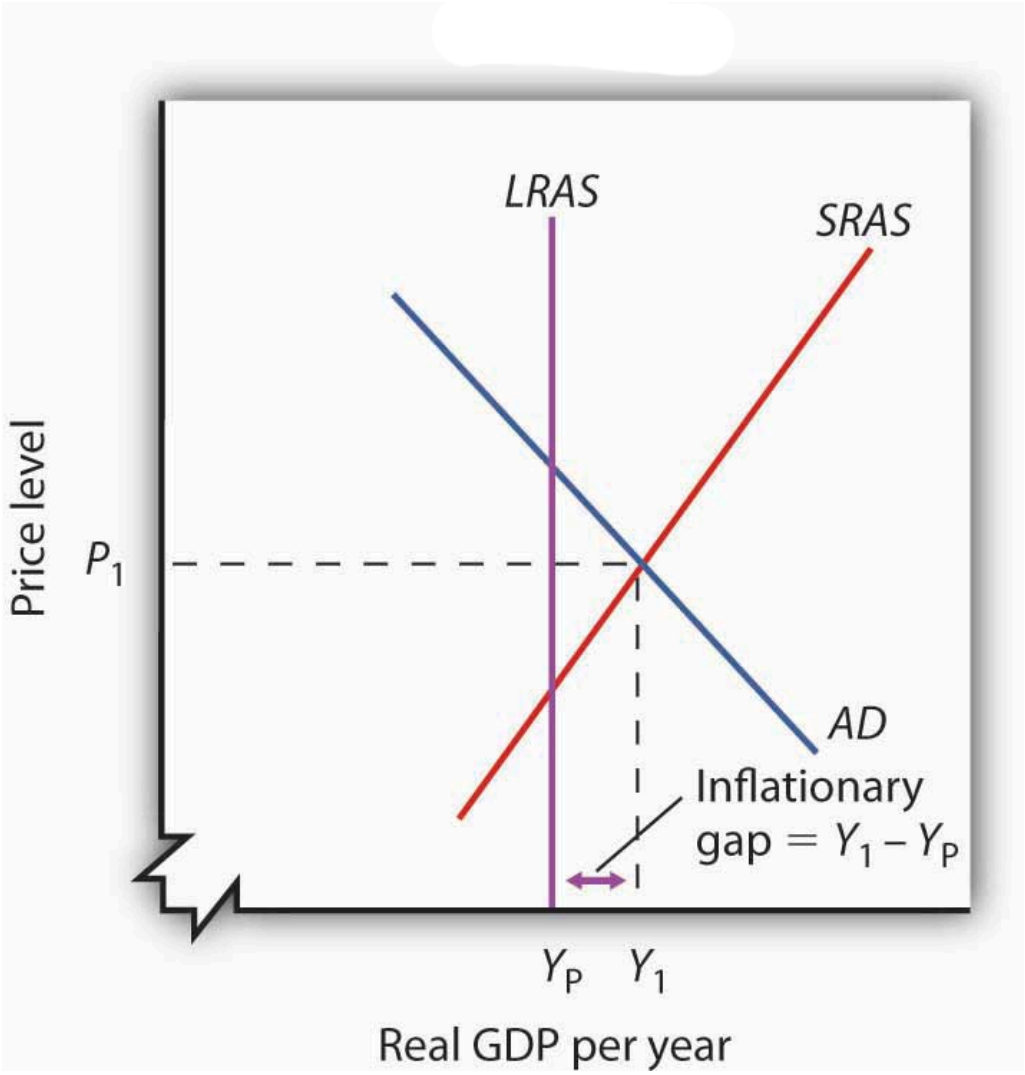

Fig 9.8b

A recessionary or inflationary gap is referred to as an output gap in the Canadian economy. Output gaps are calculated as actual GDP less potential GDP as a percent of potential GDP.

Figure 9.9 plots the Bank of Canada's estimates of the differences between actual and potential GDP for Canada, quarterly for each year from 1992_{Q1} to 2019_{Q1}, expressed as a percentage of potential GDP.

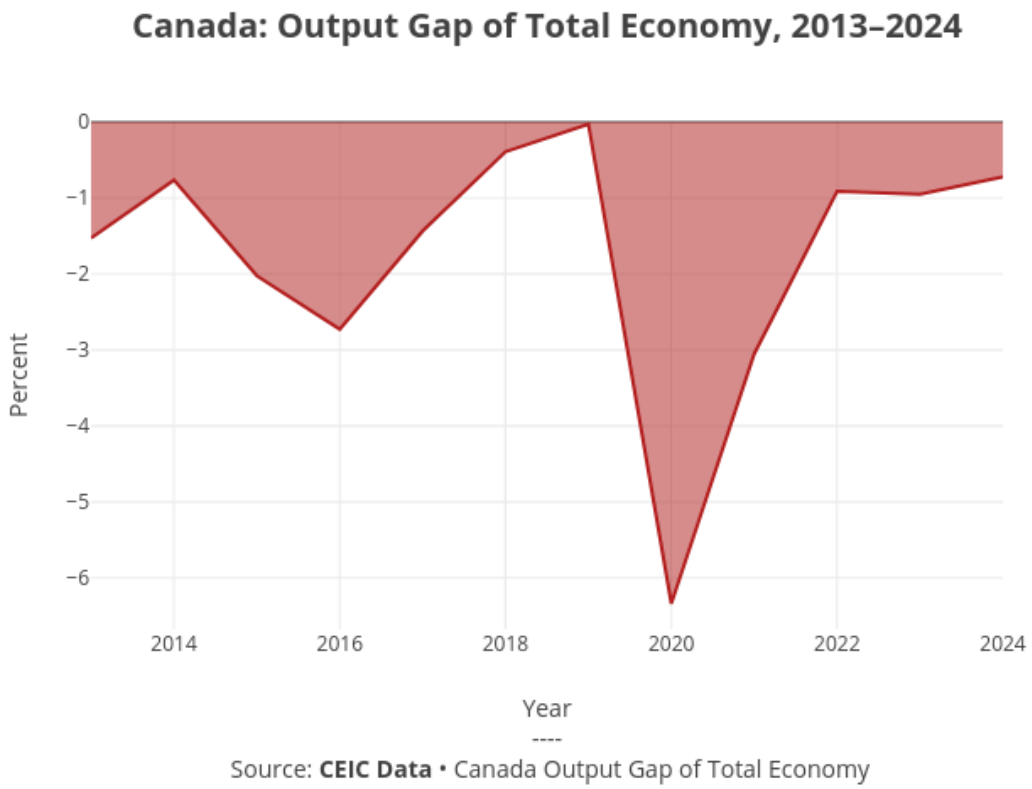

Fig 9.9 "Canada: Output Gap of Total Economy, 2013-024" by Fanshawe College, CC-BY-NC-SA

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9.4 Restoring Long-Run Macroeconomic Equilibrium

We have already seen that the aggregate demand curve shifts in response to a change in consumption, investment, government purchases, or net exports. The short-run aggregate supply curve shifts in response to changes in the prices of factors of production, the quantities of factors of production available, or technology. Now, we will see how the economy responds to a shift in aggregate demand or short-run aggregate supply. We will be able to distinguish the long-run response from the short-run response.

Shifts in Aggregate Demand

Suppose an economy is initially in equilibrium at potential output Y_P as in Fig 9.10 and operating at full employment where real $GDP = LRAS$ (potential GDP).

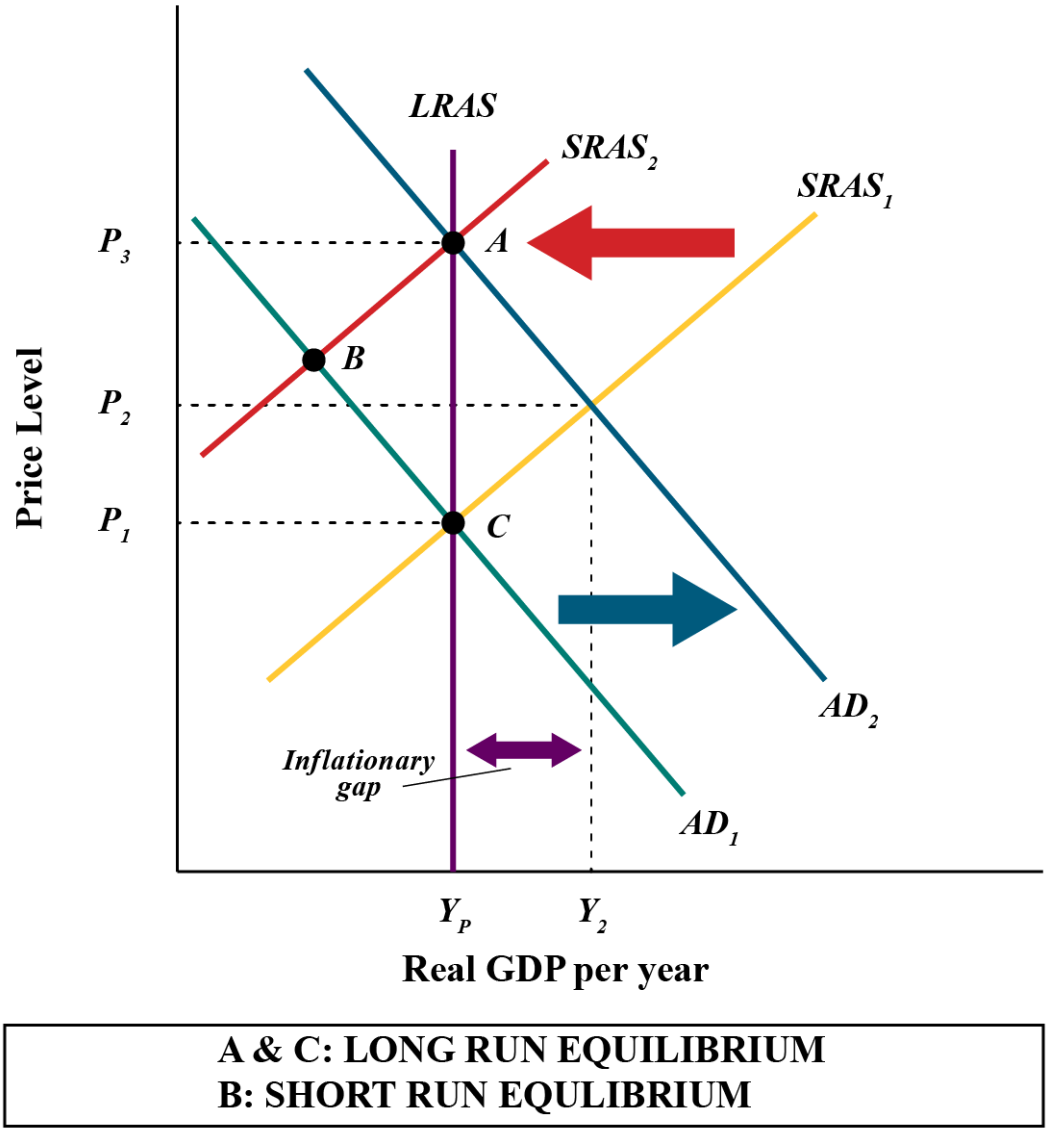

Fig 9.10. "Increase in Aggregate Demand" by Fanshawe College, CC BY-NC-SA 4.0. An increase in aggregate demand for AD_2 boosts real GDP to Y_2 and the price level to P_2, creating an inflationary gap of $Y_2 - Y_P$. In the long run, as price and nominal wages increase, the short-run aggregate supply curve moves to $SRAS_2$. Real GDP returns to potential.

Suppose aggregate demand **increases** because one or more components (consumption, investment, government purchases, and net exports) have increased at each price level. For example, suppose consumption increases. The aggregate demand curve shifts from AD_1 to AD_2, as shown in Fig 9.10 above. That will increase real GDP to Y_2 and force the price level up to P_2 in the short run.

The economy's new production level Y_2 exceeds potential output. Employment exceeds its natural level. The economy with output of Y_2 and price level of P_2 is only in short-run equilibrium; there is an inflationary gap equal to the difference between Y_2 and Y_P. Because real GDP is above potential. At this level of output, the economy is overusing its resources and therefore resources tend to get costly. Ultimately, the nominal wage will rise as workers demand higher wages to keep overworking and producing more. As the nominal wage rises, the short-run aggregate supply curve will shift to the left because firms face increased labour costs. When the

short-run aggregate supply curve reaches $SRAS_2$, the economy will have returned to its potential output, and employment will have returned to its natural level. These adjustments will close the inflationary gap. The price level rises to P_3 at the new equilibrium.

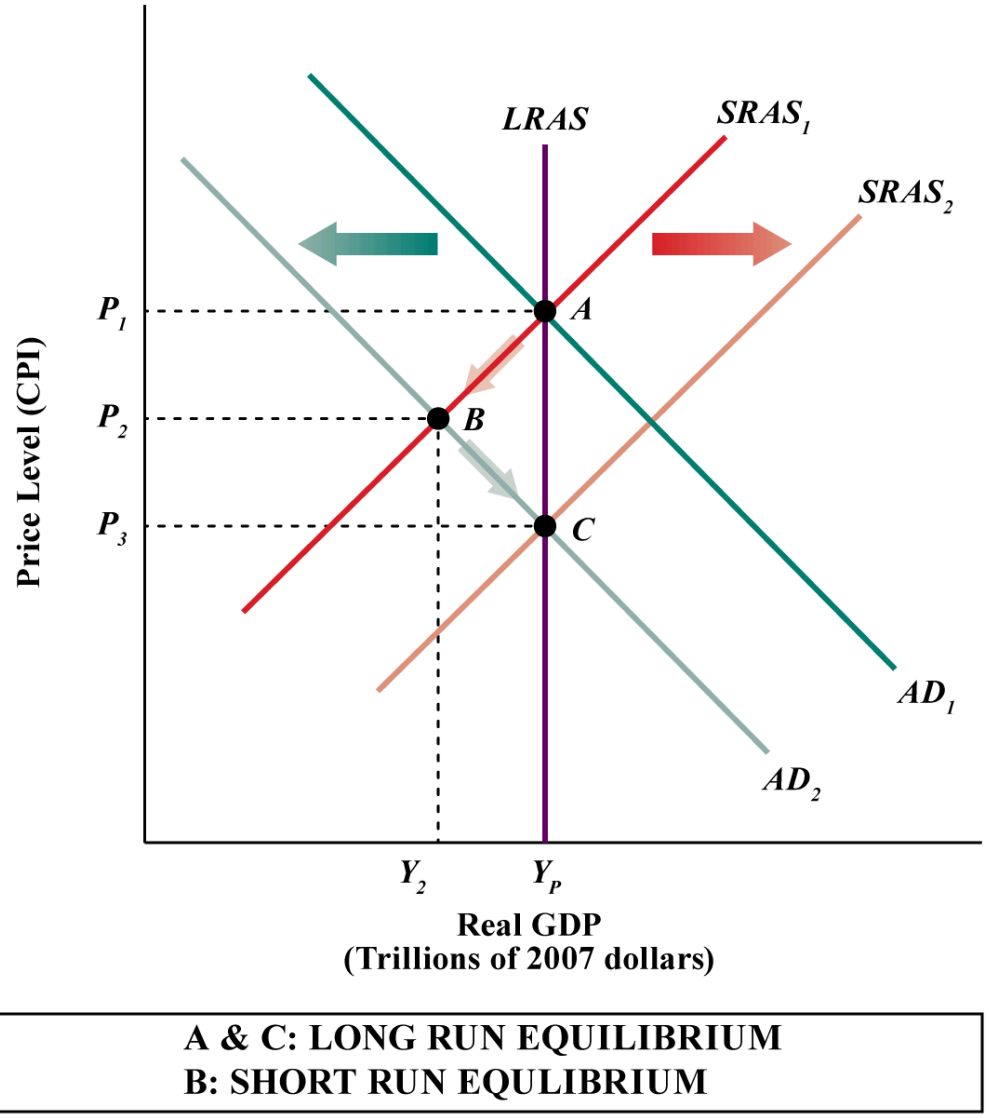

Fig 9.11. "Decrease in Aggregate Demand" by Fanshawe College, CC BY-NC-SA 4.0

Suppose aggregate demand **decreases** because one or more components (consumption, investment, government purchases, and net exports) have decreased at each price level. For example, let us assume consumption decreases. The aggregate demand curve shifts from AD_1 to AD_2, as shown in Fig 9.11 above. That will decrease real GDP to Y_2 and force the price level to fall to P_2 in the short run.

The economy's new production level Y_2 is less than the potential output. Employment is less than its natural level. The economy with output of Y_2 and price level of P_2 is only in short-run equilibrium; there is a recessionary gap equal to the difference between Y_2 and Y_P. Because real GDP is less than potential, and unemployment tends to rise due to falling production. This could result in workers demanding less wages to

retain jobs in such an economic crisis. As the nominal wage falls, the short-run aggregate supply curve will shift to the right because firms face decreased labour costs. When the short-run aggregate supply curve reaches $SRAS_2$, the economy will have returned to its potential output, and employment will have returned to its natural level. These adjustments will close the recessionary gap. The price level will fall to $P3$ at the new equilibrium.

Shift in Aggregate Supply (Supply Shock)

Again, suppose, with an aggregate demand curve at AD_1 and a short-run aggregate supply at $SRAS_1$, an economy is initially in equilibrium at its potential output Y_P, at a price level of P_1, as shown in Fig 9.12 below.

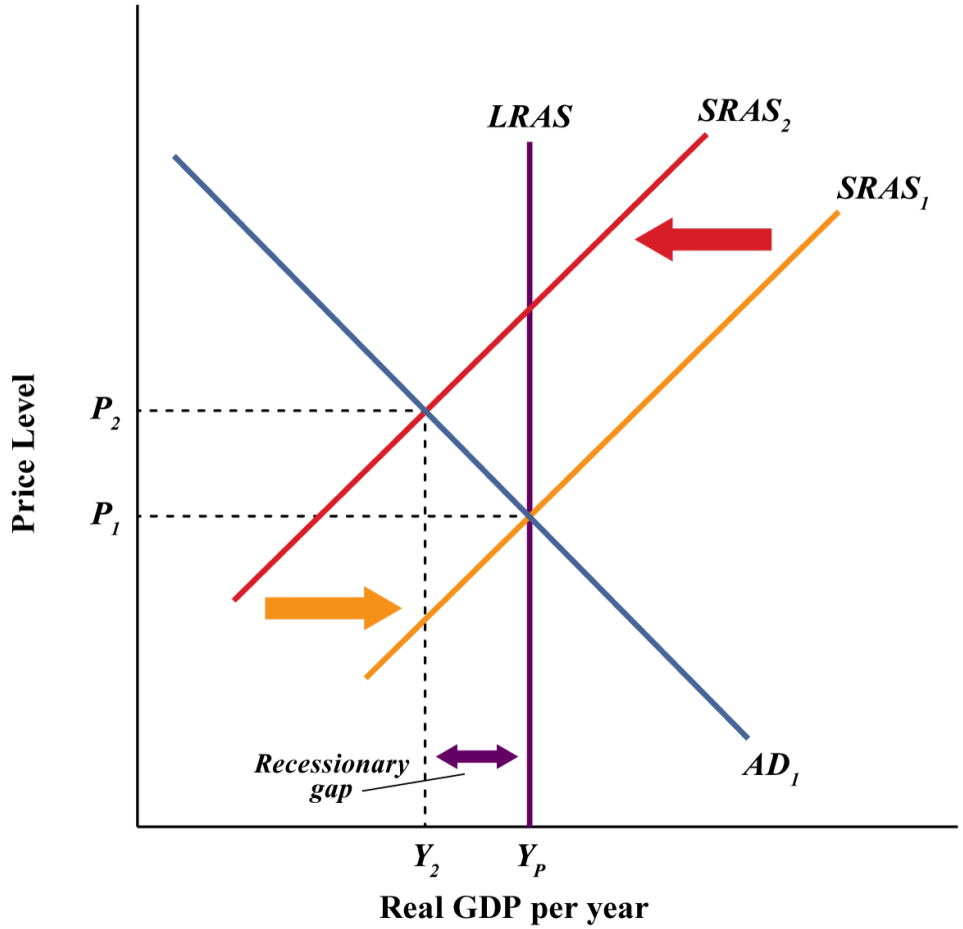

Fig 9.12 "Shift in Aggregate Supply" by Fanshawe College, CC-BY-NC-SA 4.0

Now, suppose that the short-run aggregate supply curve shifts owing to a rise in the price of oil. This raises the cost of production and causes a reduction in the short-run aggregate supply curve from $SRAS_1$ to $SRAS_2$. This decrease in the supply of oil is called a "*supply shock*." A supply shock shifts the SRAS curve leftward.

As a result, the price level rises to P_2, and real GDP falls to Y_2. The economy now has a recessionary gap

equal to the difference between Y_P and Y_2. This is called *stagflation*. Stagflation is when the economy faces a decrease in real GDP and rising inflation.

9.5 Gaps and Public Policy

If the economy faces a gap, how do we get from that situation to potential output?

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Gaps present us with two alternatives. First, we can do nothing. In the long run, real wages will adjust to the equilibrium level, employment will move to its natural level, and real GDP will move to its potential. Second, we can do something. Faced with recessionary or inflationary gaps, policymakers can undertake policies aimed at shifting the aggregate demand or short-run aggregate supply curves to move the economy to its potential. A policy choice to take no action to try to close a recessionary or an inflationary gap but to allow the economy to adjust on its own to its potential output is a non-intervention policy, such as the two situations discussed in section 9.4. A stabilization policy is a policy in which the government or central bank acts to move the economy to its potential output from the gaps. We will discuss these stabilization policies in the later Fiscal and Monetary Policy chapters.

9.6 Key Terms

Key Terms

Aggregate demand (AD)

Aggregate demand curve

Aggregate production function

Aggregate supply (AS)

Aggregate supply curve

Exchange rate

Foreign price effect

Full-employment GDP

Inflationary gap

Interest rate effect

Long run aggregate supply (LRAS) curve

Long run macro equilibrium

Recessionary gap

Short run aggregate supply (SRAS) curve

Short run macro equilibrium

Stagflation

Supply Shock

Wealth effect

CHAPTER 10: MONEY AND BANKING

Chapter Outline

10.0 Introduction

Learning Objectives

At the end of this chapter, learners will be able to:

- Explain what money is and why we need it.
- Describe how money is measured in Canada today.
- Outline how banks create money.
- Identify the roles of the Bank of Canada and its open market operations.
- Explain the Equation of Exchange.

It's a bit ironic that after all you have studied in this course about buying, selling, producing, and consuming, it's only now that we introduce money and the financial side of the economy. In an important sense, this module is similar to the previous one on budgets and fiscal policy. In this module, like the last one, we start with practical stuff:

- What is money?
- What are banks?
- How does credit work?
- What is the difference between a credit card and a debit card?

Understanding how these things work will provide a solid foundation for understanding how the government intervenes in the macroeconomy through monetary policy and bank regulations, which we'll investigate in another chapter. You use money nearly daily, but in this section, you will take a deeper look at what money is—what it represents, why it has value, and what purpose it serves.

10.1 Functions of Money

Money for the sake of money is not an end in itself. You cannot eat dollar bills or wear your bank account. Ultimately, the usefulness of money rests in exchanging it for goods and services. People regularly use money when purchasing or selling goods and services, and thus, both buyers and sellers must widely accept money.

To understand the usefulness of money, we must consider what the world would be like without money. How would people exchange goods and services? Economies without money typically use the barter system. **Barter**—literally trading one good or service for another—is highly inefficient for conducting transactions. In a barter economy, an exchange between two people requires a **double coincidence of wants**, meaning that what one person wants to buy is exactly what the other wants to sell. This is harder than it sounds.

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Suppose an accountant wants a new pair of shoes. The accountant doesn't just need to find someone with a pair of shoes in the correct size to sell, but they have to find someone willing to exchange the shoes for what the accountant has to offer, namely accounting services. Trades like these are likely to be difficult to arrange.

Another problem with the barter system is that it does not allow us to easily enter into future contracts to purchase many goods and services. For example, if the goods are perishable, it may be difficult to exchange them today for other goods in the future. Imagine a farmer wanting to buy a tractor in six months using a fresh crop of strawberries harvested today. Because the strawberries won't last, such a transaction is unlikely to occur.

Money solves the double coincidence of wants problem. First, since money is generally accepted as a **means of payment** (or **medium of exchange**), the accountant can pay for new shoes with money, which the shoe seller is willing to accept (even if they don't need accounting services) since they can use the money to purchase something they do need.

Photo by Oleksandr Pidvalnyi, Pexels Licence

Second, people are willing to sell something for money, even if they have no immediate need to purchase something else because money serves as a **store of value**. A store of value is anything that holds value. Some things are better stores of value than other things. Real estate has traditionally been a good store of value since it tends to increase in value over time. Money doesn't have to be a *perfect* store of value to be acceptable. In an economy with inflation, money loses some buying power each year, but it remains money.

Third, money serves as a **unit of account**, meaning it is the ruler by which other economic values are measured. If there were no unit of account, the price of every good or service would have to be expressed in terms of the price of every other good and service. "I paid $75 for this radio," or "I paid $15 for this pizza." People do not say, "I paid five pizzas for this radio." When we report the value of a good or service in units of money, we report what another person will likely have to pay to obtain that good or service.

Attribution

10.2 Commodity vs Fiat Money

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Money has taken a wide variety of forms in different cultures. Gold, silver, cowrie shells, cigarettes, and even cocoa beans have been used as money. These items are examples of **commodity money**, which means they also have a value from use as something other than money. Gold, for example, has been used throughout the ages as jewellery, art, and money. Gold is a good conductor of electricity used today in the electronics and aerospace industry.

Commodity-backed currencies are dollar bills or other currencies with values backed up by gold or some other commodity held at a bank. As economies grew and became more global, commodity monies became more cumbersome. Countries moved towards the use of **fiat money.** Fiat money has no intrinsic value but is declared by a government as a country's legal tender. Canadian paper money is a legal tender. In other words, by government decree, if you owe a debt, then legally speaking, you can pay that debt with the Canadian currency, even though it is not backed by a commodity. The only backing of our money is a universal faith and trust that the currency has value.

10.3 Measuring Money: M1 and M2

+The money supply is the total quantity of money in the economy at any one time. Economists measure the money supply because it affects economic activity. What should be included in the money supply?

Cash in your pocket certainly serves as money. But what about cheques or credit cards? Are they money, too? Rather than trying to state a single way of measuring money, economists offer broader definitions of money based on the concept of liquidity. **Liquidity** refers to how quickly an asset can be used to buy a good or service. Liquidity is a relative concept. For example, cash is very liquid. Your $10 bill can be easily used to buy a hamburger at lunchtime. However, the $10 you have in your savings account is not easy to use. You must go to the bank or ATM and withdraw that cash to buy your lunch. Thus, $10 in your savings account is *less* liquid. Stocks and bonds are even less liquid since they must be sold to convert them to means of payment, and they might suffer a loss in value in the process.

Photo by Victor Ballesteros, Unsplash Licence

Economists generally use two definitions of the supply of money: **M1** and **M2**.

M1 includes those assets that are the most liquid, such as cash, chequable (demand) deposits, and traveller's cheques. Chequable deposits are balances in chequing accounts**.** M1 is the narrowest definition of money supply. The bar graph in Fig 10.2 demonstrates the decline in M1 money in Canada over a certain period of time.

M2 includes M1 plus some less liquid (but still fairly liquid) assets, including savings and term deposits, certificates of deposit, and money market funds. **Savings deposits** in banks are bank accounts on which you cannot write a cheque directly. **Certificates of deposit (CDs)** or **term deposits** 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. 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 safely, such as in short-term government bonds. Therefore, M2 is a broader definition of money supply than M1. If you look at the bar graph in Fig 10.3, it is now well understood why the M2 values are greater than the M1 values in Fig 10.2. The bar graph shows changes in M2 money in Canada over a certain period of time.

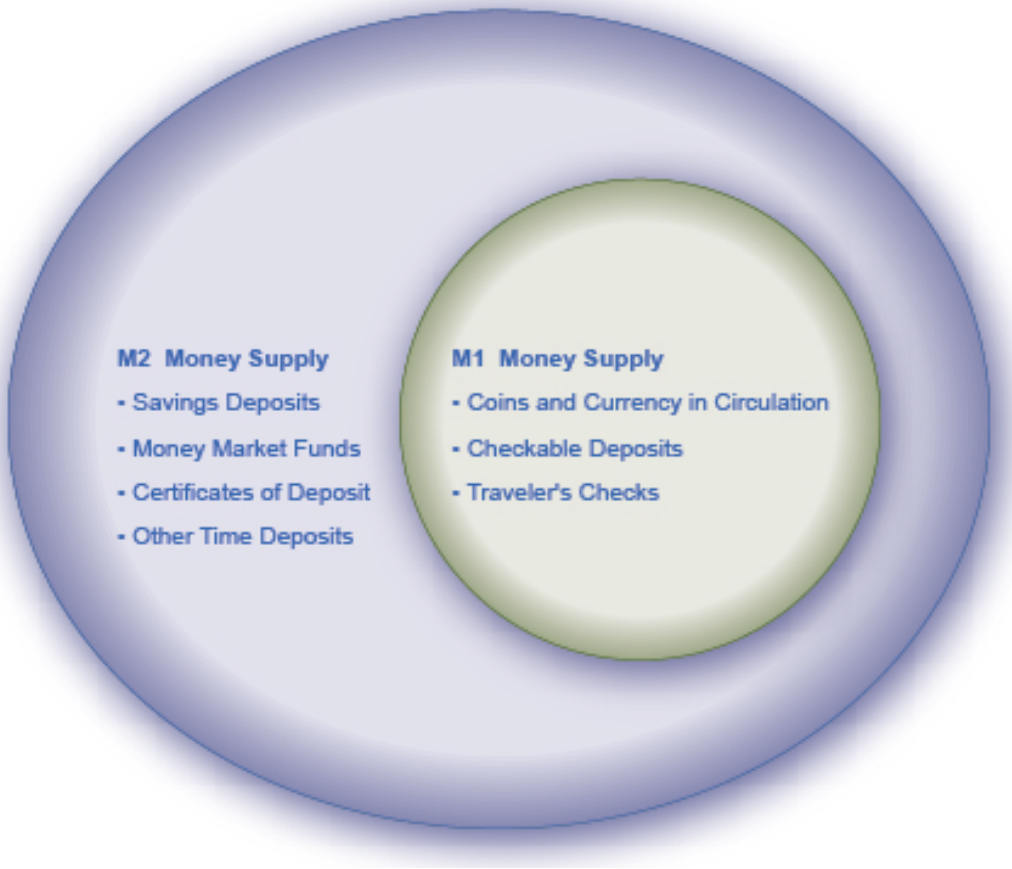

Fig 10.1. "The Relationship between M1 and M2 Money" from Macroeconomics by Lumen Learning, CC BY 4.0. M1 and M2 money are the two most commonly used definitions of money. M1 = coins and currency in circulation + chequable (demand) deposit + traveller's cheques. M2 = M1 + savings deposits + money market funds + certificates of deposit + other term deposits.

Look at the table below:

Consider the following statistics for the banking sector in Canada displayed in the table below (all numbers in billions of domestic currency).

Coins and Currency in Circulation	1400
Chequable Deposits	4
Traveller's Cheques	1200
Savings Accounts	8000
Money Market Mutual Funds	400
Term Deposits	500

Using the data above:

$$\text{M1} = 1400 + 4 + 1200 = \$2,604 \text{ billion}$$
$$\text{M2} = \$2,604 + 8000 + 400 + 500 = \$11,504 \text{ billion}.$$

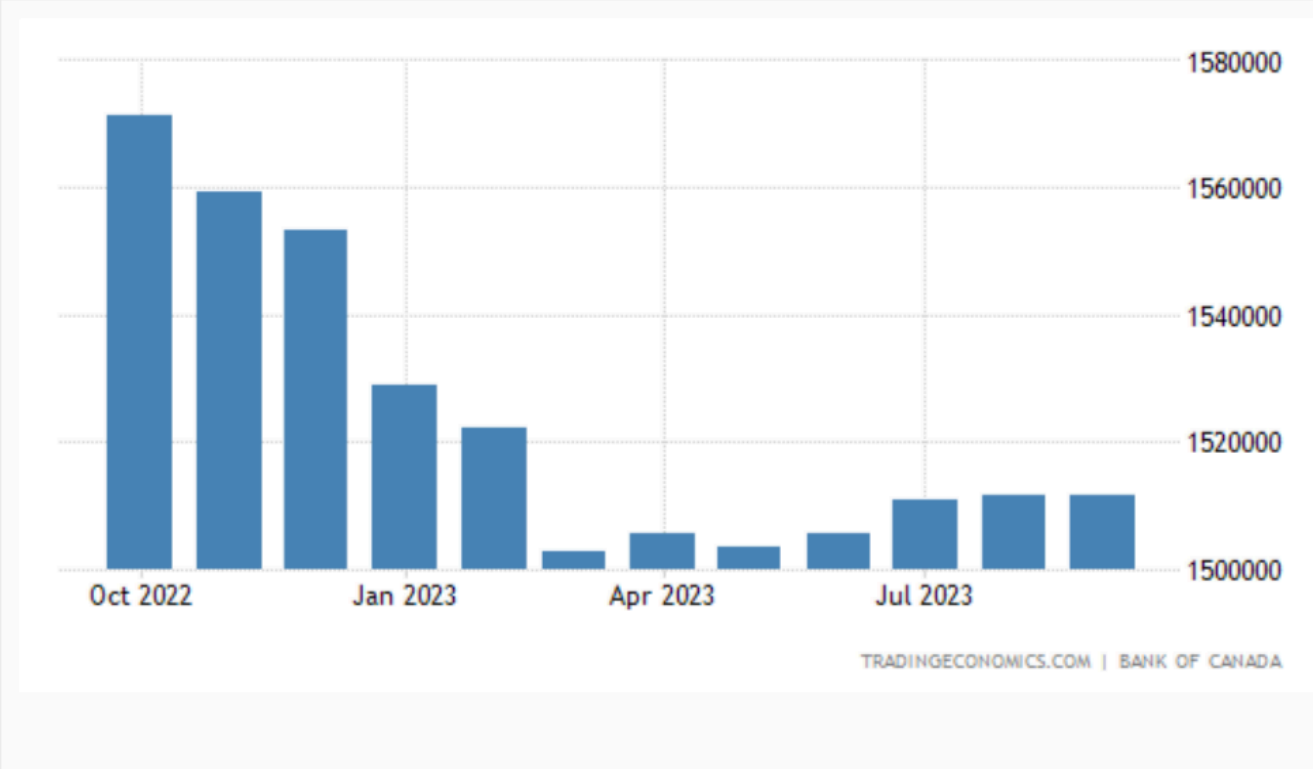

Fig 10.2 Money Supply M1 in Canada decreased to 1,557,237 CAD in November 2022 from 1,566,375 CAD in October 2022. Source: Bank Of Canada

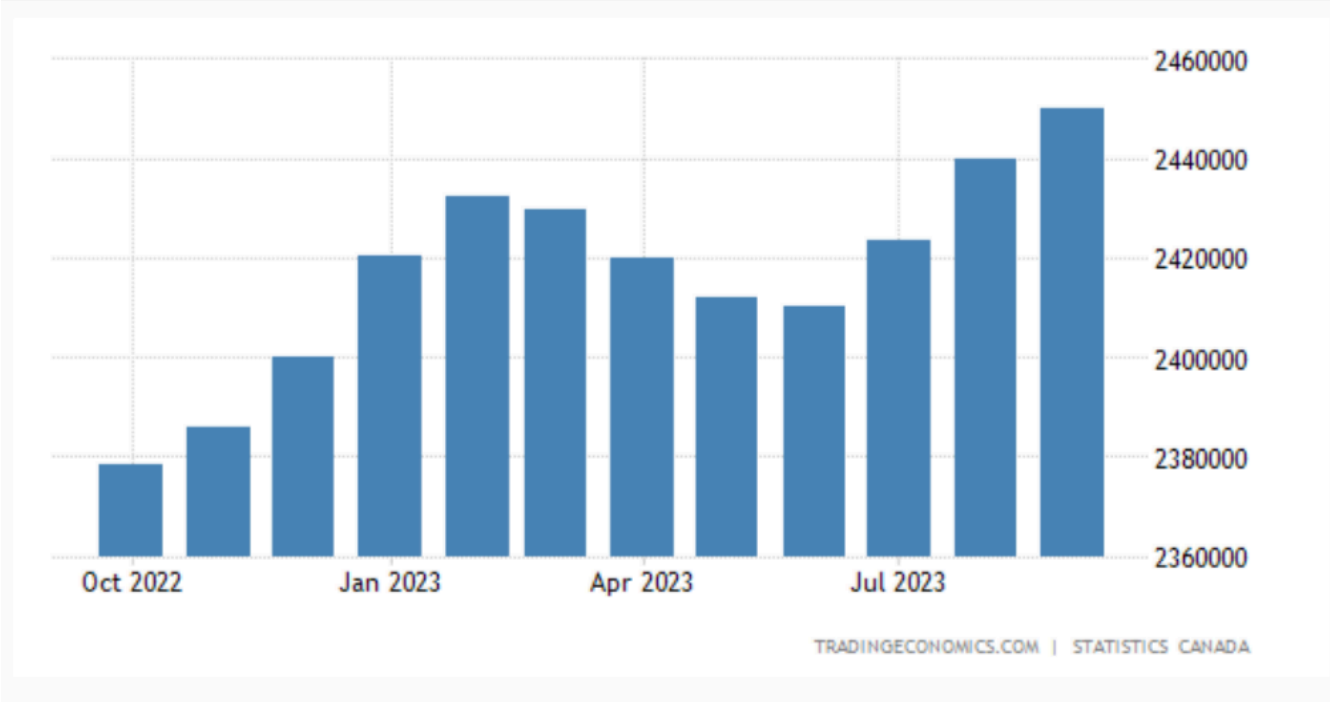

Fig 10.3 Money Supply M2 in Canada increased to 2,384,951 CAD in November 2022 from 2,376,916 CAD in October 2022. Source: Statistics Canada

Important Note:

Credit cards are not money. A credit card identifies you as someone with a special arrangement with the card issuer in which the issuer will lend you money and transfer the proceeds to another party whenever you want. Thus, if you present a MasterCard to a jeweller as payment for a $500 ring, the firm that issued you the card will lend you the $500 and send that money to the jeweller. You, of course, will be required to repay the loan later. But a card that says you have such a relationship is not money, just as your debit card is not money.

10.4 Banks and Financial Intermediaries

A financial intermediary is an institution that amasses funds from one group and makes them available to another. A pension fund is an example of a financial intermediary. Workers and firms place earnings in the fund for their retirement; the fund earns income by lending money to firms or by purchasing their stock. The fund thus makes retirement savings available for other spending.

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Insurance companies are also financial intermediaries because they lend some of the premiums paid by their customers to firms for investment. Banks play a vital role as financial intermediaries. Banks accept depositors' money and lend it to borrowers. With the interest they earn on their loans, banks can pay interest to their depositors, cover their operating costs, and earn a profit. One key characteristic of banks is that they offer their customers the opportunity to open chequing accounts, thus creating chequable deposits. These functions define a bank, as a financial intermediary that accepts deposits, makes loans, and offers chequing accounts.

10.4.1 How Banks Create Money: Fractional Reserve System

Banks and money are intertwined. It is not just that most money is in the form of bank accounts. The banking system can create money through the process of making loans. Let's see how.

A **balance sheet** is an accounting tool that lists assets and liabilities. An **asset** is something of value that is owned and can be used to produce something. For example, the cash you own can be used to pay your tuition. A home provides shelter and can be rented out to generate income. Loans are the largest assets of any bank because loans generate maximum earnings for the banks through interests. A **liability** is a debt or something you owe. Many people borrow money to buy homes. In this case, the house is the asset, but the mortgage (i.e. the loan obtained to purchase the home) is the liability. Deposits are the largest liability of a bank because the bank is liable to pay the deposits back to its customers.

Start with a hypothetical bank called Singleton Bank. The bank has $10 million in deposits. When it holds all the deposits in its vaults, the chequing account balance sheet for Singleton Bank is shown in Figure 10.4. A deposit is a liability because the bank is liable to pay the deposit back to its depositors. At this stage, Singleton Bank is simply storing money for depositors; it is not using these deposits to make loans, so it cannot pay its depositors interest either. This is called a ***100% reserve banking system.***

Fig 10.4 Singleton Bank's Balance Sheet: Receives $10 million in Deposits.

Assets		Liabilities + Net Worth	
Reserves	$10 million	Deposits	$10 million

Refer to Fig 10.5 below; Singleton Bank keeps 10% of its total deposits with the Bank of Canada, or $1 million, on reserve. This is called the ***reserve ratio***. It will loan out the remaining $9 million. The loan is an asset because the bank earns interest from the loan. By loaning out the $9 million and charging interest, it will be able to make interest payments to depositors and earn interest income for Singleton. Singleton Bank can become a financial intermediary between savers and borrowers. *In this example, the money supply is $10 million* (remember deposits are counted as Money Supply).

Fig 10.5 Singleton Bank's Balance Sheet: 10% Reserves, One Round of Loans

Assets		Liabilities + Net Worth	
Reserves	$1 million	Deposits	$10 million
Loan to Hank's Auto Supply	$9 million		

Singleton's assets have changed; it now has $1 million in reserves and a loan to Hank's Auto Supply of $9 million.

Singleton Bank lends $9 million to Hank's Auto Supply. Hank's Auto Supply obtained this loan and purchased auto parts from Ben's Company. Ben's Company has an account with First National Bank. When Hank pays the $9 million he lent from Singleton Bank to Ben's Company, Ben deposits this money into the First National Bank. Every loan creates a deposit. Therefore, now *money supply is* $\$10 \text{ million} + \$9 \text{ million} = \$19 \text{ million}$.

Below is *First National's balance Sheet*:

Fig 10.6 First National Balance Sheet

Assets		Liabilities + Net Worth	
Reserves	$900,000	Deposits	+$9 million
Loans	$8.1 million		

Suppose First National holds only 10% as reserves ($900,000) but can lend out the other 90% ($8.1 million) in a loan to Jack's Chevy Dealership, as shown in Figure 10.6. This $8.1 million loan goes as a deposit to Second National Bank.

Below is *Second National's balance sheet*:

Fig 10.7 Second National Balance Sheet

Assets		Liabilities + Net Worth	
Reserves	$810,000	Deposits	$7.29 million
Loans	$8.1 million		

$$\text{The new money supply} = \$10 \text{ million} + \$9 \text{ million} + \$7.29 \text{ million} = \$26.29 \text{ million}$$

.

This is the money-creating process. It is possible because there are multiple banks in the financial system; they are required to hold only a fraction of their deposits, and loans end up deposited in other banks, which increases deposits and, in essence, the money supply.

10.4.2 The Money Multiplier

In a multi-bank system, the amount of money the system can create is found using the money multiplier. The money multiplier tells us how many times a loan will be "multiplied" through the process of lending out deposits. Thus, the money multiplier is the ratio of the change in money supply to the initial change in bank reserves.

Fortunately, a formula exists for calculating the total of these many rounds of lending in a banking system. The **money multiplier formula** is:

$$\frac{1}{\text{Reserve Ratio}}$$

This is also called the simple deposit multiplier. In our example, the reserve ratio is 10%, so the money

multiplier is $\frac{1}{10\%} = 10$. Therefore, money grows 10 times the original deposit. The original deposit in Singleton Bank was $10 million. So

$$\text{total money supply} = 10 \times \$10 \text{ million} = \$100 \text{ million}.$$

The money multiplier will depend on the proportion of reserves that banks wish to hold. The Bank of Canada does not have a reserve requirement from commercial banks. However, banks may decide to hold in reserves with the Bank of Canada for two reasons: macroeconomic conditions and government rules. Banks are likely to hold a higher proportion of reserves when an economy is in recession because they fear loans are less likely to be repaid when the economy is slow. The process of how banks create money shows how the quantity of money in an economy is closely linked to the quantity of lending or credit in the economy. Indeed, all of the money in the economy, except for the original reserves, is a result of bank loans that are re-deposited and loaned out again and again.

10.5 Bank of Canada

The Bank of Canada is Canada's central bank.

The Governing Council leads the Bank of Canada, the Bank's policy-making body. The Governing Council comprises the Governor, the Senior Deputy Governor and four Deputy Governors. The current governor is Tiff Macklen. Here are the primary functions of the Bank of Canada:

1. Act as a Banker to the Federal Government
2. Act as a Banker to the private banks
3. Issue banknotes and coins
4. Act as a Lender of Last Resort
5. Conduct Monetary Policy

"Ottawa: Bank of Canada" by Taxiarchos228, CC BY-SA 3.0

Currently, the Council's main tool for conducting monetary policy is the target for the overnight rate (also known as the key policy rate). The Bank of Canada conducts open market operations to maintain the overnight policy rate.

10.5.1 Overnight Interest Rate

The Bank of Canada began to use *the overnight interest rate setting* as its monetary policy instrument, making changes in the interest rate, as necessary, to keep the Canadian inflation rate within a target range of 1 percent to 3 percent.

In Canada, the overnight rate is now the Bank of Canada's key policy instrument. This is the interest rate that large financial institutions receive or pay on loans from one day until the next. The Bank implements monetary policy by setting a target for the overnight rate at the midpoint of an *operating band*, plus or minus one-quarter of one percentage point, or 25 basis points, from the target rate. As of March 2023, the overnight interest rate target set by the Bank of Canada is 4.5%. Refer to Fig 10.8 below.

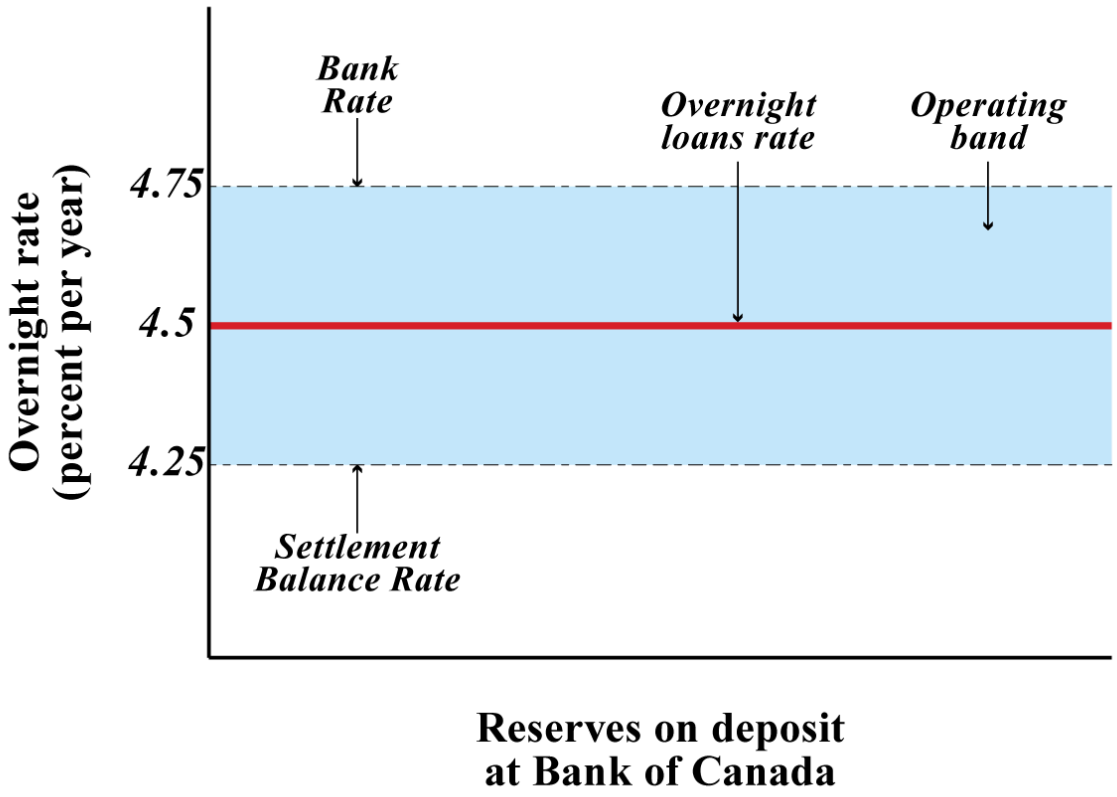

Fig 10.8. "Bank of Canada Overnight Interest Rate (March 2023)", by Fanshawe College, CC BY-NC-SA 4.0.

The top range of the overnight interest rate is called the *Bank rate*. It is the rate at which retail banks can borrow money from the Bank of Canada. The bottom range is called the *Settlement balance rate* – the rate offered by the Bank of Canada to any retail bank on reserve deposits they keep with the Bank.

Fig 10.9 (a) shows the changes in the Bank of Canada's overnight interest rate targets over a one-year, six-month period from October 2021 until March 2023. The table in Fig 10.9 (b) illustrates the changes in the target rates. Notice that from March 2022 until January 2023, the Bank consistently kept raising the interest rate (to fight inflation), using open market operations that we discuss in the next section below.

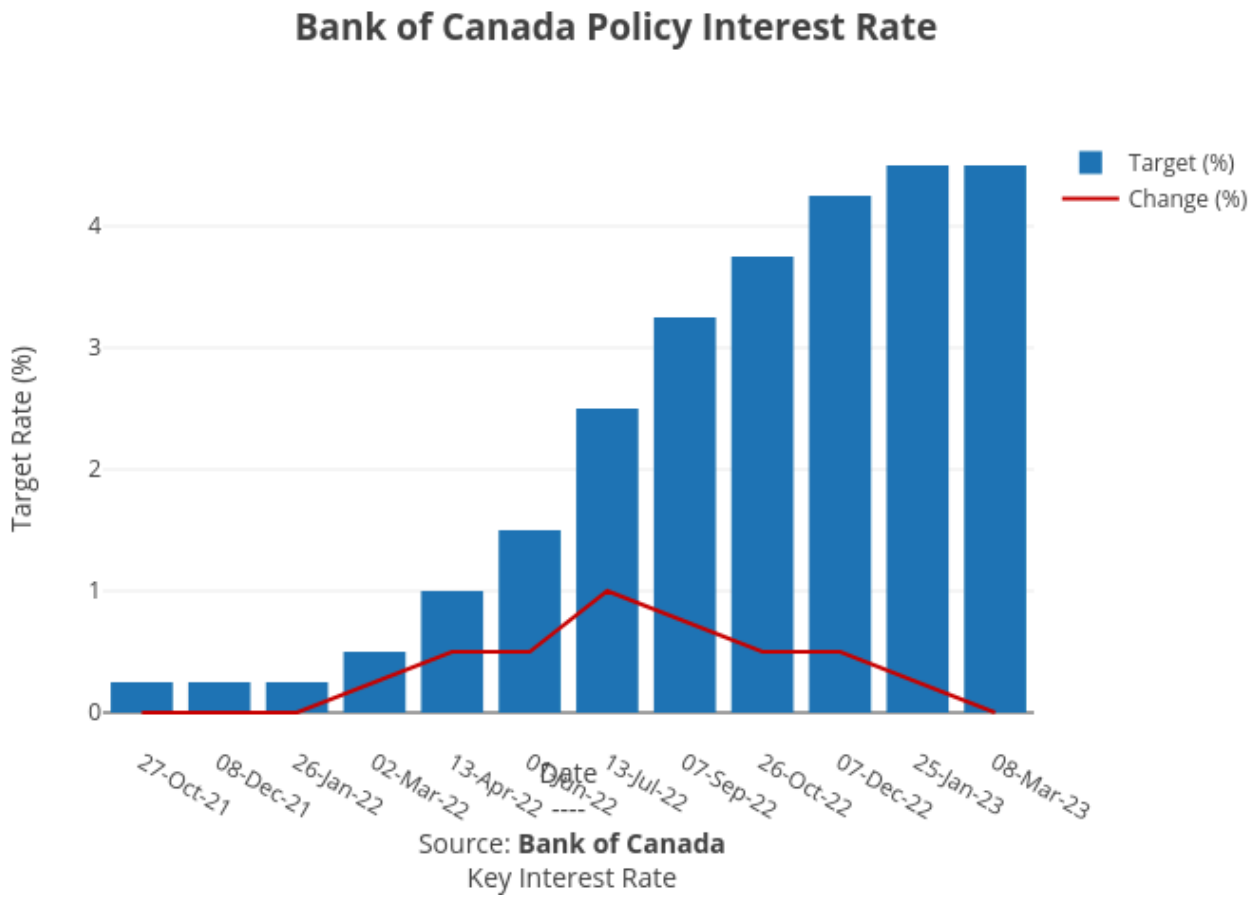

Fig 10.9

Fig 10.9(b)

Date	Target (%)	Change (%)	
1	27-Oct-21	0.25	0
2	08-Dec-21	0.25	0
3	26-Jan-22	0.25	0
4	02-Mar-22	0.5	0.25
5	13-Apr-22	1	0.5
6	01-Jun-22	1.5	0.5
7	13-Jul-22	2.5	1
8	07-Sep-22	3.25	0.75
9	26-Oct-22	3.75	0.5
10	07-Dec-22	4.25	0.5
11	25-Jan-23	4.5	0.25
12	08-Mar-23	4.5	0

10.5.2 Open Market Operations

Open market operations are central bank purchases or sales of government securities in the open financial market. They are the main technique used by central banks to manage the *size of the money supply.* Open market operations alter the money supply.

To maintain the overnight interest rate within the target band, the Bank of Canada must intervene in the market to cover any shortages or remove any surpluses of funds that would push rates beyond its target. The Bank has two tools it uses for this purpose.

One tool is the special purchase and resale agreement (SPRA).

In an SPRA, the Bank offers to buy Government of Canada securities from major financial institutions, agreeing to sell them back the next business day. Banks are willing to enter into these agreements with the Bank of Canada because the Bank of Canada provides cash for the banks. This cash injection increases the money supply and puts downward pressure on the overnight interest rate which helps in keeping the rate at its lower target. The operating band consequently lowers.

Photo by Maarten van der Heuvel, Pexels Licence

Lowering the policy rate (overnight interest rate) target lowers the prime lending rate. The Prime rate is the interest rate that banks and lenders use to determine the interest rates for many types of loans and lines of credit. As the prime rate lowers, most interest rates prevailing in the markets fall. Therefore, an open market purchase of government securities lowers the interest rate by increasing the money supply in the economy.

In the opposite case, the *second too*l is used, which is called a sale and repurchase agreement (SRA). This is a sale of securities to major financial institutions for one day combined with a repurchase the following day. It makes a one-day reduction in the money supply, putting upward pressure on the overnight rate, which helps to take the overnight rate at its higher target. The operating band consequently rises.

Raising the policy rate (overnight interest rate) target raises the prime lending rate. As the prime rate rises, most interest rates prevailing in the markets rise. Therefore, an open market sale of government securities raises the interest rate by decreasing the money supply in the economy.

In the next chapter, we will look at the monetary policy tools explaining the open market operations in further detail.

10.6 Overnight Rate and its Implications on the Economy

If the Bank of Canada (BoC) expects the economy to slow down, they would lower the overnight interest rate target and conduct an open market operation of SPRA. This lowers the prevailing market interest rates and increases the money supply. The value of the CAD decreases. Therefore, consumption and investment increase as borrowing cost lowers. Further, as CAD depreciates in value, exports increase relative to imports. As the components of the Aggregate demand (AD) function increase, AD increases, and this raises the price level. The BoC took this policy during 2020 and 2021 when the Canadian economy slowed down due to the Covid crisis. Look at the schematic fig 10.10 below that explains this policy of increasing money supply in the economy.

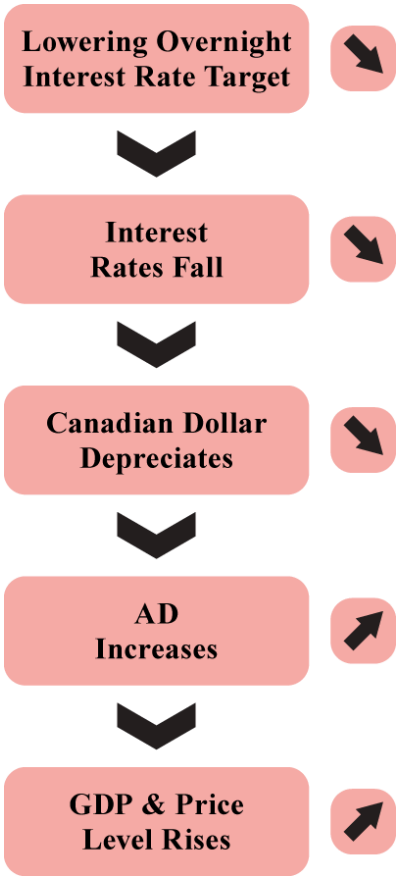

Fig 10.10 "Effect of Lowering OIR" by Fanshawe College, CC BY-NC-SA 4.0

If the Bank of Canada expects the economy to experience rising prices or inflation, they would raise the overnight interest rate target and conduct an open market operation of SRA. This raises the prevailing market interest rates and decreases the money supply. The value of the CAD increases. Therefore, consumption and investment decrease as borrowing cost rises. Further, as CAD appreciates in value, exports decrease relative to imports. As the components of the Aggregate demand (AD) function decrease, AD decreases and this lowers the price level. This is the policy the Bank of Canada has adopted from the early months of 2022 in an

attempt to control high inflation in Canada. The BoC attempts to cut spending in the economy to bring down prices through this policy that decreases money supply.

Look at schematic Fig 10.11 below.

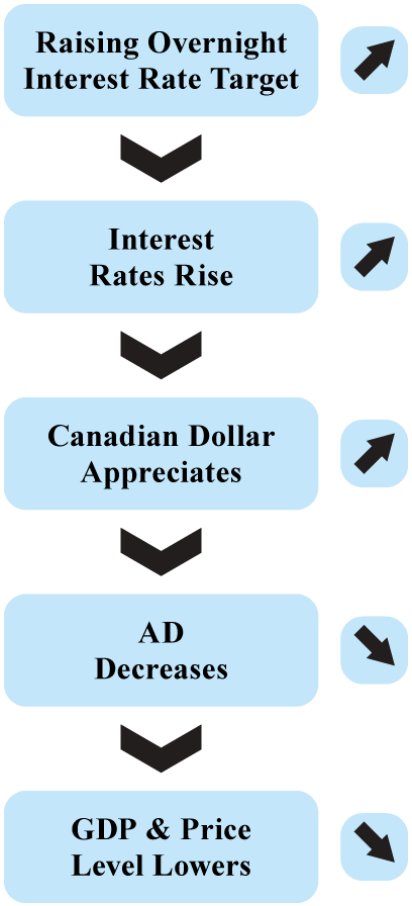

Fig 10.11 "Effect of Raising OIR" by Fanshawe College, CC BY-NC-SA 4.0

10.7 The Equation of Exchange

We can relate the money supply to the aggregate economy by using the equation of exchange:

$$MV = \text{Nominal GDP}$$

The equation of exchange shows that the money supply M times its velocity V equals nominal GDP. Velocity is the number of times the money supply is spent to obtain the goods and services that makeup GDP during a particular time period.

To see that nominal GDP is the price level multiplied by real GDP, recall from an earlier chapter that the GDP deflator equals nominal GDP divided by real GDP: We denote GDP deflator as P here:

$$P = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

Therefore,

$$\text{Nominal GDP} = P \times \text{Real GDP}$$

Letting Y equal real GDP, we can rewrite the equation of exchange as,

$$MV = PY$$

Photo by Adrian Dascal, Unsplash Licence

We shall use the equation of exchange to see how it represents spending in a hypothetical economy that consists of 50 people, each of whom has a car. Each person has $10 in cash and no other money. The money supply of this economy is thus $500. Now, suppose that the sole economic activity in this economy is car washing. Each person in the economy washes one other person's car once a month, and a car wash costs $10. In one month, then, 50 car washes are produced at a price of $10 each. During that month, the money supply is spent once.

Applying the equation of exchange to this economy, we have a money supply M of $500 and a velocity V of 1. Because the only good or service produced is car washing, we can measure real GDP as the number of car washes. Thus, Y equals 50 car washes. The price level P is the price of a car wash: $10. The equation of exchange for a period of 1 month is,

$$\$500 \times 1 = \$10 \times 50$$

Suppose that in the second month, everyone rewashes someone else's car. Over the full two-month period, the money supply has been spent twice—the velocity over a period of two months is 2. The total output in the economy is $1,000 — 100 car washes produced over two months at a price of $10 each. Inserting these values into the equation of exchange, we have

$$\$500 \times 2 = \$10 \times 100$$

Suppose this process continues for one more month. For the three-month period, the money supply of $500 has been spent three times, for a velocity of 3. We have,

$$\$500 \times 3 = \$10 \times 150$$

The essential thing to note about the equation of exchange is that it always holds. That should come as no

surprise. The left side, MV, gives the money supply times the number of times that money is spent on goods and services during a period. It thus measures total spending. The right side is nominal GDP. But that is also a measure of total spending on goods and services. Nominal GDP is the value of all final goods and services produced during a particular period. Those goods and services are either sold or added to inventory. If they are sold, then they must be part of total spending. If they are added to inventory, some firms must have either purchased them or paid for their production; thus, they represent a portion of total spending. In effect, the equation of exchange says simply that total spending on goods and services, measured as MV, equals total spending on goods and services, measured as PY (or nominal GDP). The equation of exchange is thus an identity, a mathematical expression that is true by definition.

To apply the equation of exchange to a real economy, we need measures of each of the variables in it. Three of these variables are readily available. Suppose we have the following data for an economy in a certain year:

$$M = \$7,635.4 \text{ billion}$$

$$P = 1.22$$

$$Y = 11,727.4 \text{ billion}$$

To solve for the velocity of money, V, we divide both sides of the exchange equation, $MV = PY$ by M:

$$V = \frac{PY}{M}$$

Using the data to compute velocity, we find that V was equal to 1.87. A velocity of 1.87 means that the money supply was spent 1.87 times in the purchase of goods and services in a particular year.

10.7.1 Money, Nominal GDP, and Price-Level Changes

We can rewrite the equation of exchange, $MV = PY$, in terms of percentage rates of change.

$$\%\Delta M + \%\Delta V \cong \%\Delta P + \%\Delta Y$$

Assume that velocity is constant, expressed as V, then the above equation becomes,

$$\%\Delta M \cong \%\Delta P + \%\Delta Y_P$$

Rewriting this as,

$$\%\Delta P \cong \%\Delta M - \%\Delta Y_P$$

That is,

$$\text{The rate of inflation} = \text{the growth in money supply} - \text{growth rate of real GDP}$$

The equation above helps us make the following predictions:

1. If money supply changes faster than that of GDP, the economy experiences inflation
2. If the growth rate of GDP changes faster than the money supply, the economy experiences deflation

3. When both money supply and GDP change in the same proportion, inflation remains unchanged.

Several recent studies that looked at all the countries on which they could get data on inflation and money growth over long periods found a very high correlation between the money supply growth rates and the price level for countries with high inflation rates. Still, the relationship was much weaker for countries with inflation rates of less than 10%. These findings support the **quantity theory of money,** which holds that in the long run, the price level moves in proportion to changes in the money supply, at least for high-inflation countries.

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10.8 Key Terms

Key Terms

Asset

Balance sheet

Barter

Certificates of deposit

Commodity-backed currencies

Commodity money

Double coincidence of wants

Fiat money

Financial intermediary

Liability

Liquidity

M1

M2

Money market funds

Money multiplier

Money supply

Overnight interest rate

Prime rate

Quantity theory of money

Savings deposits

Unit of account

CHAPTER 11: MONETARY POLICY

Chapter Outline

11.0 Introduction

Learning Objectives

After reading this chapter, learners will be able to:

- Answer the question, “What is Monetary Policy?”
- Explain the Money Market and the Bank of Canada’s Choice of Monetary Policy Targets
- Discuss Monetary Policy tools and Economic Activity
- Analyze Monetary Policy in the Aggregate Demand and Aggregate Supply Model

The Bank of Canada is Canada’s most powerful economic policymaker in many respects. The Bank sets and carries out monetary policy. Deliberations about fiscal policy can drag on for months, even years, but the Bank of Canada can, behind closed doors, set monetary policy in a day—and see that policy implemented within hours. The Board of Governors can change the overnight interest rate several times yearly. The impact of the Bank’s policies on the economy can be quite dramatic. It can promote a recession or an expansion. It can cause the inflation rate to rise or fall. The Bank wields enormous power.

With what tools are the Bank’s policies carried out? And what problems exist in trying to achieve the Bank’s goals? This chapter reviews the goals of monetary policy, the tools available to the Bank of Canada in pursuing those goals, and how monetary policy affects macroeconomic variables.

11.1 Goals of the Monetary Policy

The Central Bank or the Bank of Canada (BoC) has the following objectives:

1. Price stability: keeping annual inflation rate within 1-3% range
2. Low Unemployment: keeping the official unemployment rate less than 7%
3. Economic Growth: keeping the long-term economic growth rate around 2%

The most important objective of the BoC is to preserve the value of money by keeping inflation low, stable, and predictable. This allows Canadians to make spending and investment decisions more confidently, encourages longer-term investment in Canada's economy, and contributes to sustained job creation and greater productivity. This, in turn, leads to improvements in our standard of living.

Photo by Gerd Altmann, Pixabay License

The Inflation Control Target

At the heart of Canada's monetary policy framework is the inflation-control target, which is two percent, the midpoint of a 1 to 3 percent target range. First introduced in 1991, the target is set jointly by the Bank of Canada and the federal government and **reviewed every five years**. However, the day-to-day conduct of monetary policy is the responsibility of the Bank's **Governing Council**. The inflation-control target guides the Bank's decisions on the appropriate setting for the **policy interest rate**, which aims to maintain a stable price environment over the medium term. The Bank announces its policy rate settings on **fixed announcement dates** eight times yearly.

11.2 Monetary Policy Target

Recall from Chapter 10 that one of the most important functions of the Bank of Canada is to conduct monetary policy. To conduct the monetary policy, the Bank's main operating tool is open market operations. *One tool* is the special purchase and resale agreement (SPRA).

The *second tool* used is called sale and repurchase agreement (SRA). Using these tools, the BoC can directly influence the *overnight interest rate* and *money supply*.

Overnight Interest Rate Target

The **target for the overnight rate**, also known as the key policy interest rate, is the interest rate that the Bank expects to be used in financial markets for one-day (or "overnight") loans between financial institutions. This key rate serves as the benchmark that banks and other financial institutions use to set interest rates for consumer loans, mortgages, and other forms of lending.

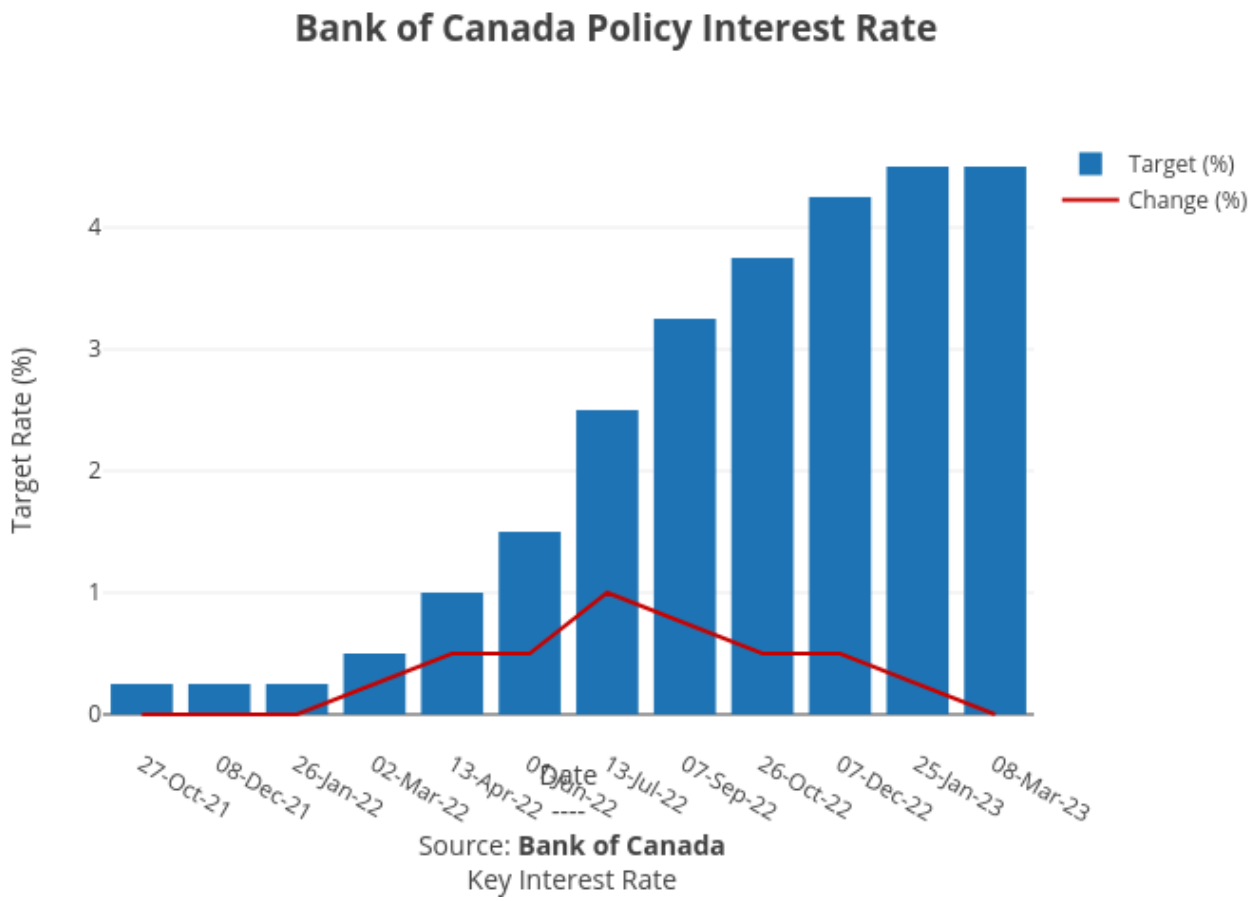

Fig 11.1

11.3 Demand for Money

To understand the conduct of Monetary Policy, we use the money market model that constitute the demand for money and supply of money.

Households and businesses could either hold money or other financial assets. Below is the demand for money graph.

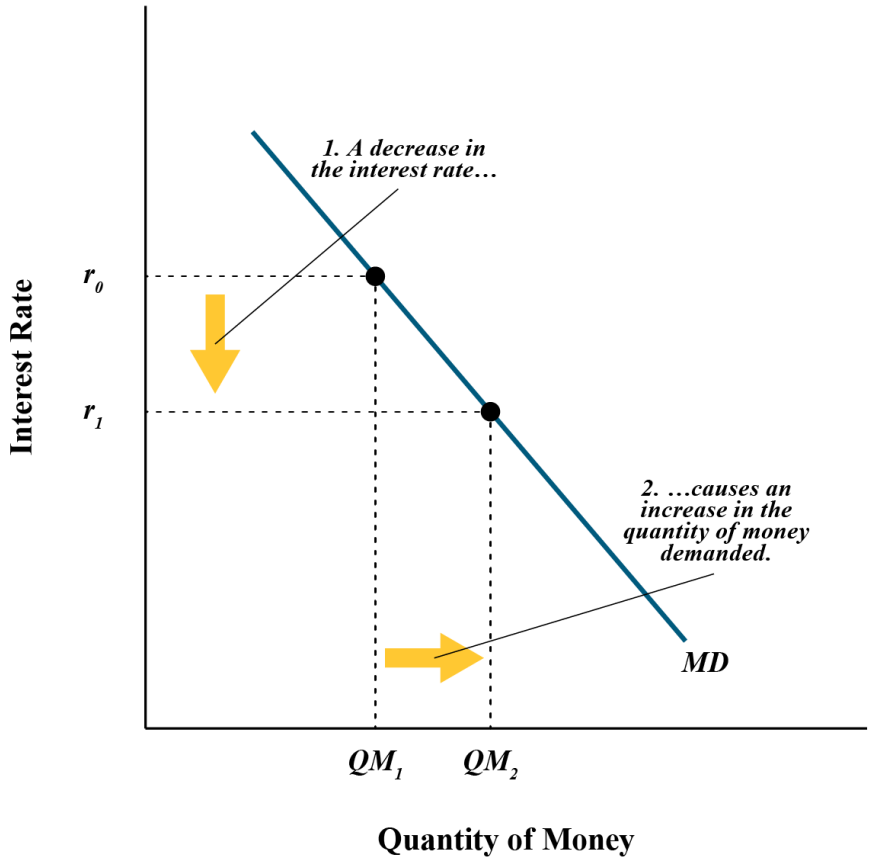

Fig 11.2 "Interest Rate Decrease and Money Demand" by Fanshawe College, CC BY-NC-SA 4.0

As the interest rate falls from r_0 to r_1, the quantity of money demand increases from QM_1 to QM_2, everything else held constant.

When the interest rate falls, the opportunity cost of holding money decreases, so people want to hold more money. At a lower interest rate, yields from other financial instruments go down, and therefore, the quantity of money demanded increases by households and businesses. Conversely, when the interest rate rises, the opportunity cost of holding money increases, so people want to hold less money. At a higher interest rate, earnings from other financial assets rise, and therefore, households and businesses decrease their quantity of money demand. The influence of the interest rate on the quantity of money demanded is represented by a movement along the money demand curve.

Changes in Money Demand

All else constant, two main factors that cause shifts in the money demand curve are changes in economic growth and inflation. An increase in GDP, for example, increases transactions, and with more trade in the marketplace, the demand for money increases and the MD curve shifts outward. When price levels rise, households and businesses need more money to pay for goods and services and the demand for money increases. MD curve shifts outward. The opposite would happen when the economy speculates a recession and households and businesses lower their spending and therefore decrease their demand for money.

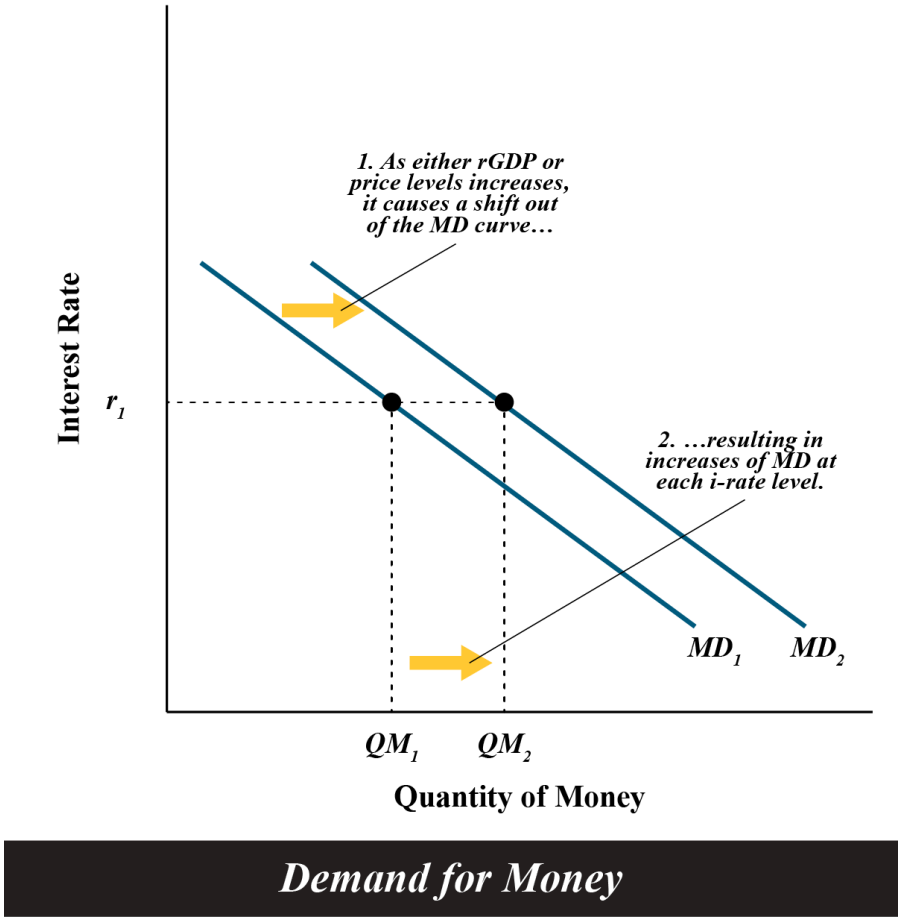

Fig 11.3 "Demand for Money" by Fanshawe College, CC BY-NC-SA 4.0

11.4 Supply of Money

The Bank of Canada regulates the supply of money. Therefore, we graphically represent the supply of money as a vertical line. The interest rate does not affect the quantity of money supplied. Rather the BoC controls the money supply that consequently influences the interest rate.

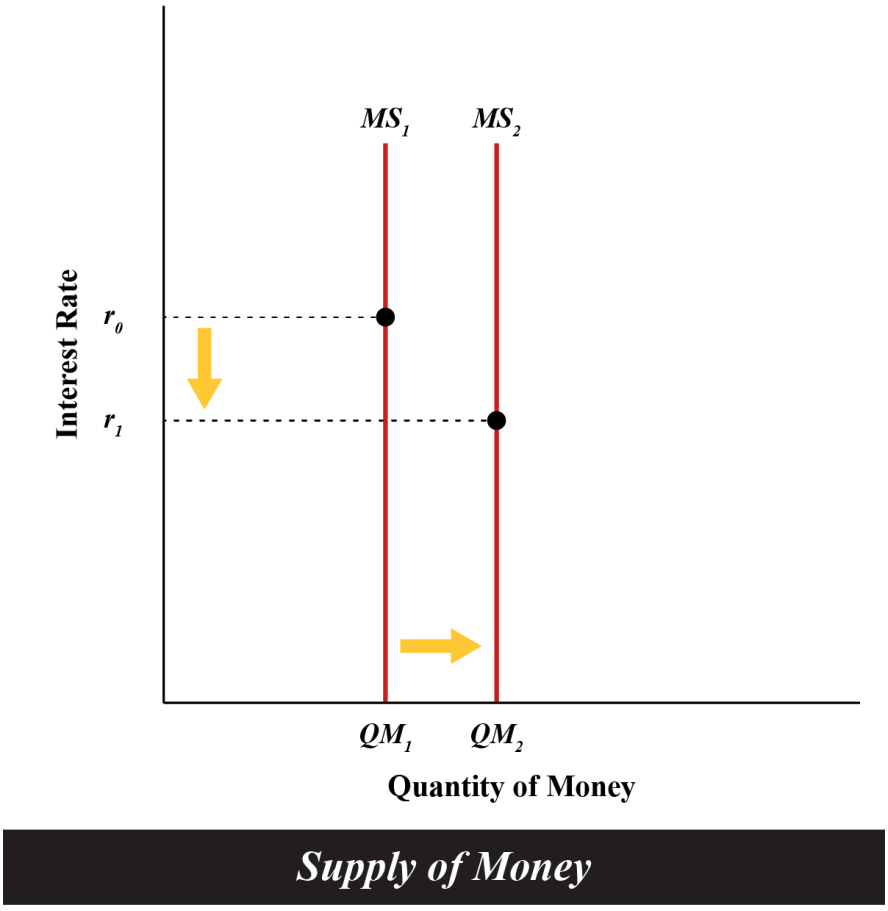

Fig 11.4a "Increase in Supply of Money" by Fanshawe College, CC BY-NC-SA

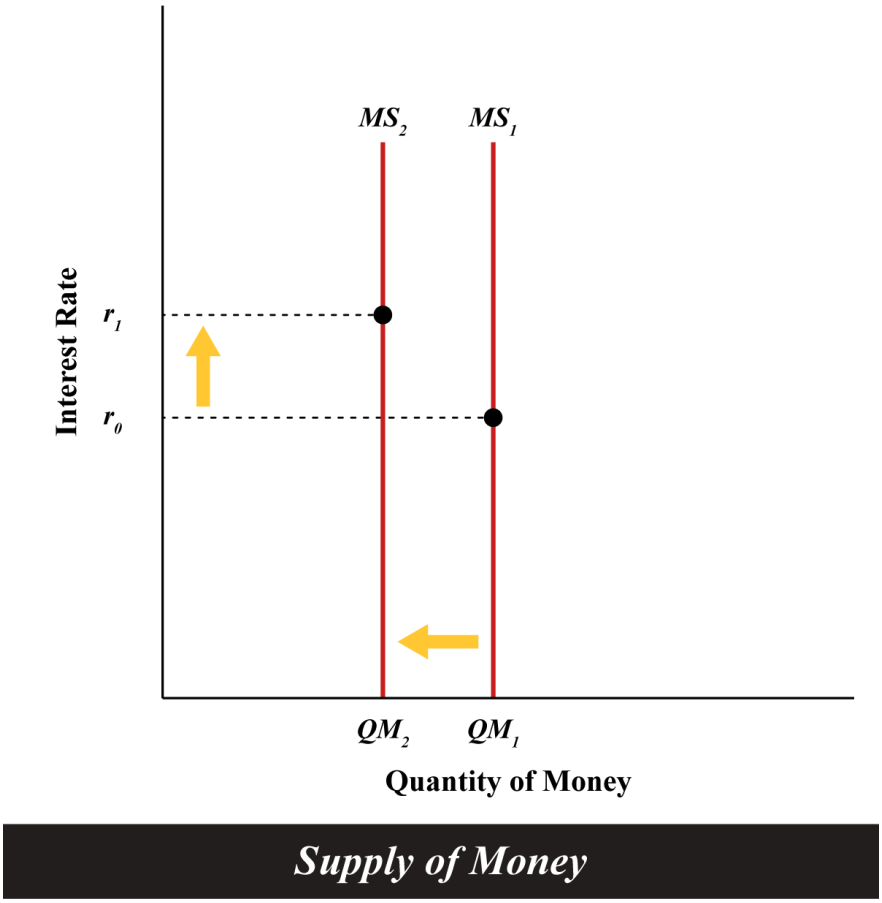

Fig 11.4b "Decrease in Supply of Money" by Fanshawe College, CC BY-NC-SA 4.0

When the Bank of Canada wants to increase the supply of money, the MS curve shifts rightward from MS_0 to MS_1. Recall that the Bank conducts an open market operation of purchasing securities when they want to increase the money supply in the economy. Conversely, when the Bank of Canada wants to decrease the supply of money, the MS curve shifts leftward. Recall that the Bank conducts an open market operation of selling securities when they want to decrease the money supply in the economy.

11.5 Money Market and Equilibrium

The money market consists of money demand and money supply functions, and the equilibrium in the money market occurs where the money demand curve intersects the money supply curve. In other words, at that point, the quantity of money demand equals the quantity of money supply that determines the equilibrium interest rate and the equilibrium quantity of money. This equilibrium interest rate determined in the money market is the short-term interest rate.

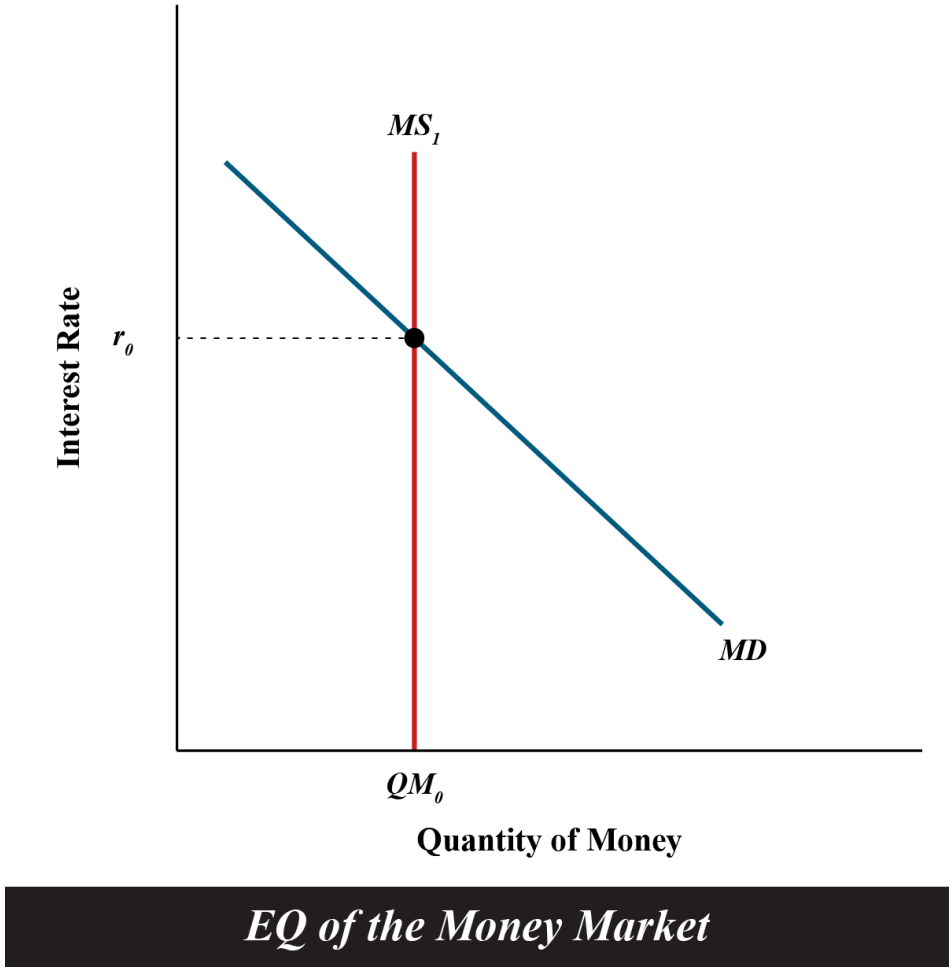

Fig 11.5 "EQ of the Money Market" by Fanshawe College, CC BY-NC-SA 4.0

Expansionary Monetary Policy

When the Bank of Canada wants to lower the overnight interest rate target, they conduct an open market operation of purchasing securities. This means the BoC injects money into the economy through banks and other financial institutions. This increase in money supply drives down the interest rate in the short term and keeps the rate close to the overnight target set by the BoC, as shown in Fig 11.6 below.

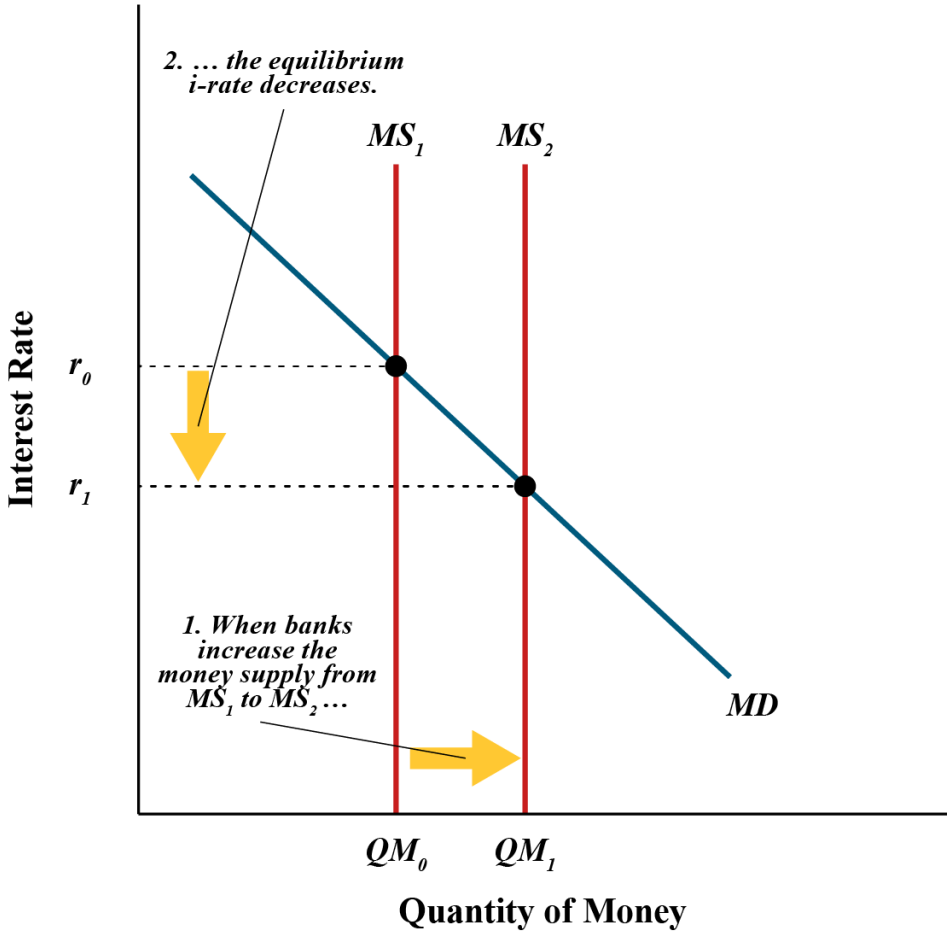

Fig 11.6 "Effect of Money Supply Increase on Equilibrium Interest Rate" by Fanshawe College, CC BY-NC-SA 4.0

As retail banks obtain money from the Bank of Canada, they can lend out more funds to households and businesses. Recall from Chapter 7 that this increases the supply of loanable funds (SLF) and helps reduce long-term interest rates. As interest rates lower, consumption, investment, and net exports increase. Recall from Chapter 10 that lower interest rates result in households and businesses borrowing funds because loans become less costly. Also, a lower interest rate decreases the value of the Canadian dollar, so exports increase relative to imports. This stimulates Aggregate Demand (AD) and GDP growth. At the same time, lower interest rates lower bond yields and therefore, shares or stocks become more attractive relative to bonds, thereby increasing stock prices as demand for stocks increases. Firms tend to issue more shares at higher prices as they produce more financial capital, increasing AD through investment. Refer to Fig 11.8 below.

This monetary policy tool of lowering the overnight interest rate target and increasing the money supply through an open market operation of purchasing securities will be conducted when the Bank finds the economy is growing slowly. They adopt this policy to boost economic growth. Therefore, we call this **Expansionary Monetary Policy**.

The Bank of Canada cannot eliminate a recession but can keep periods of recession smaller and milder by conducting expansionary monetary policy tools.

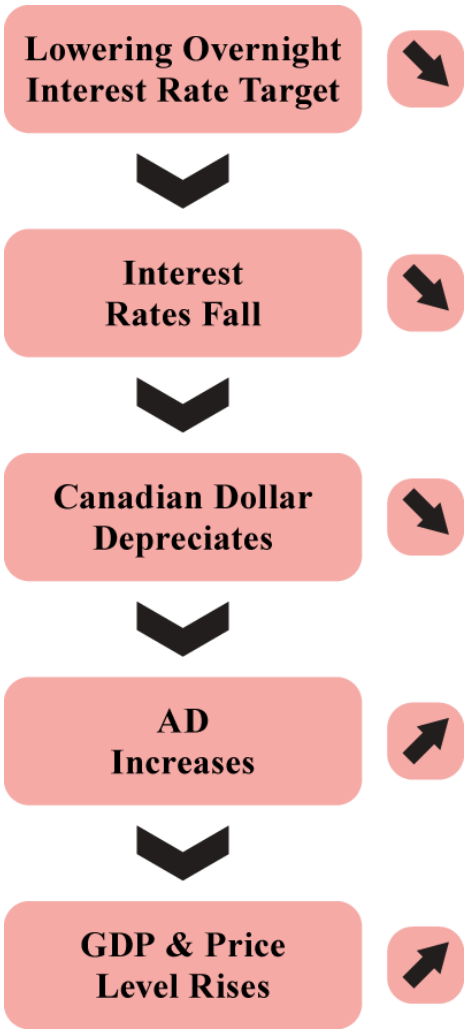

Fig 11.7 "Effect of Lowering OIR" by Fanshawe College, CC BY-NC-SA 4.0

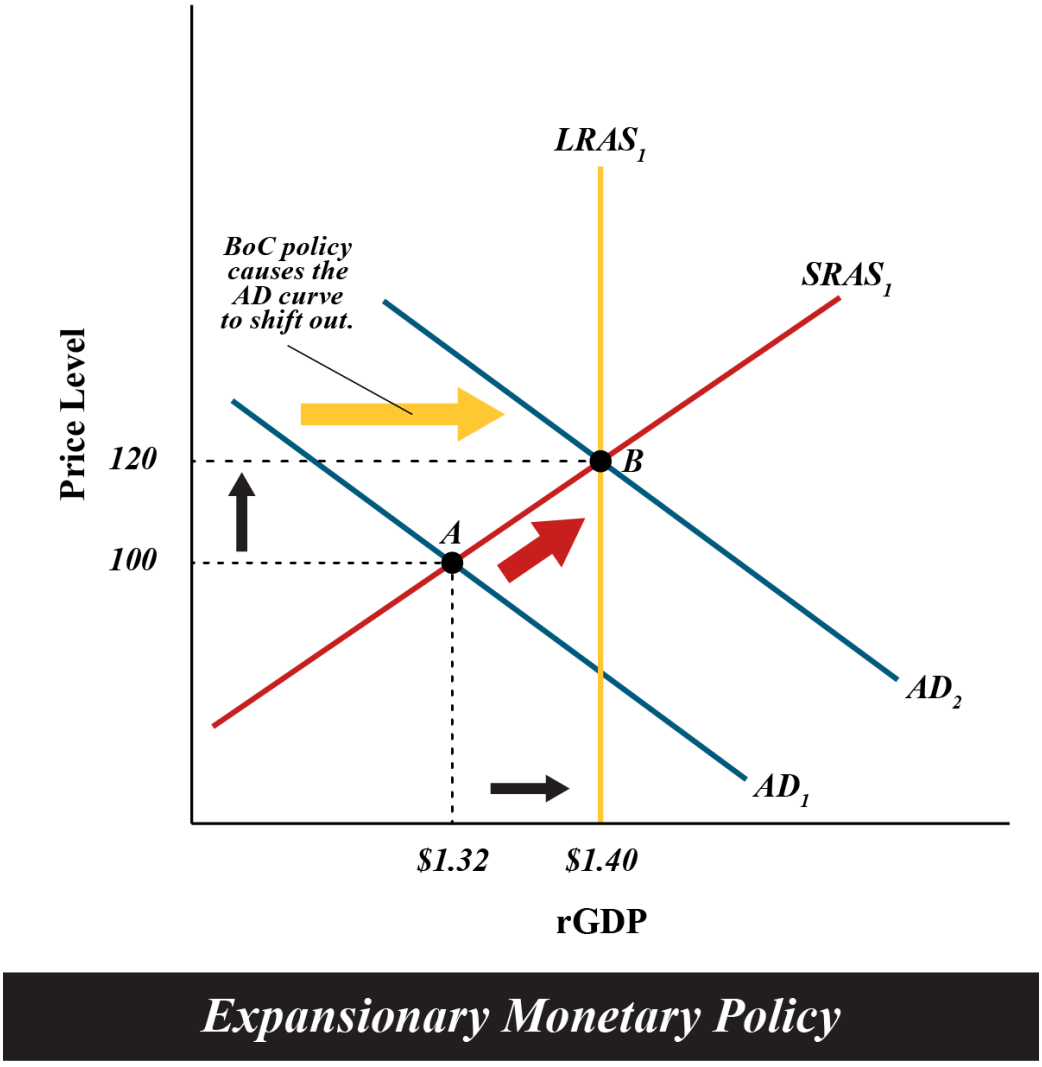

Fig 11.8 "Expansionary Monetary Policy" by Fanshawe College, CC BY-NC-SA 4.0

Contractionary Monetary Policy

When the Bank of Canada wants to raise the **overnight interest rate target**, they conduct an open market operation **selling government securities**. This means the BoC gets money from banks and other financial institutions. So, banks are left with less reserves. This decrease in the money supply in the economy drives up the interest rate in the short term and keeps the rate close to the overnight target set by the BoC, as shown in Fig 11.9 below. [sometimes the BoC raises money this way and lends the money to the Federal government to finance its expenses in case the government faces a budget deficit]

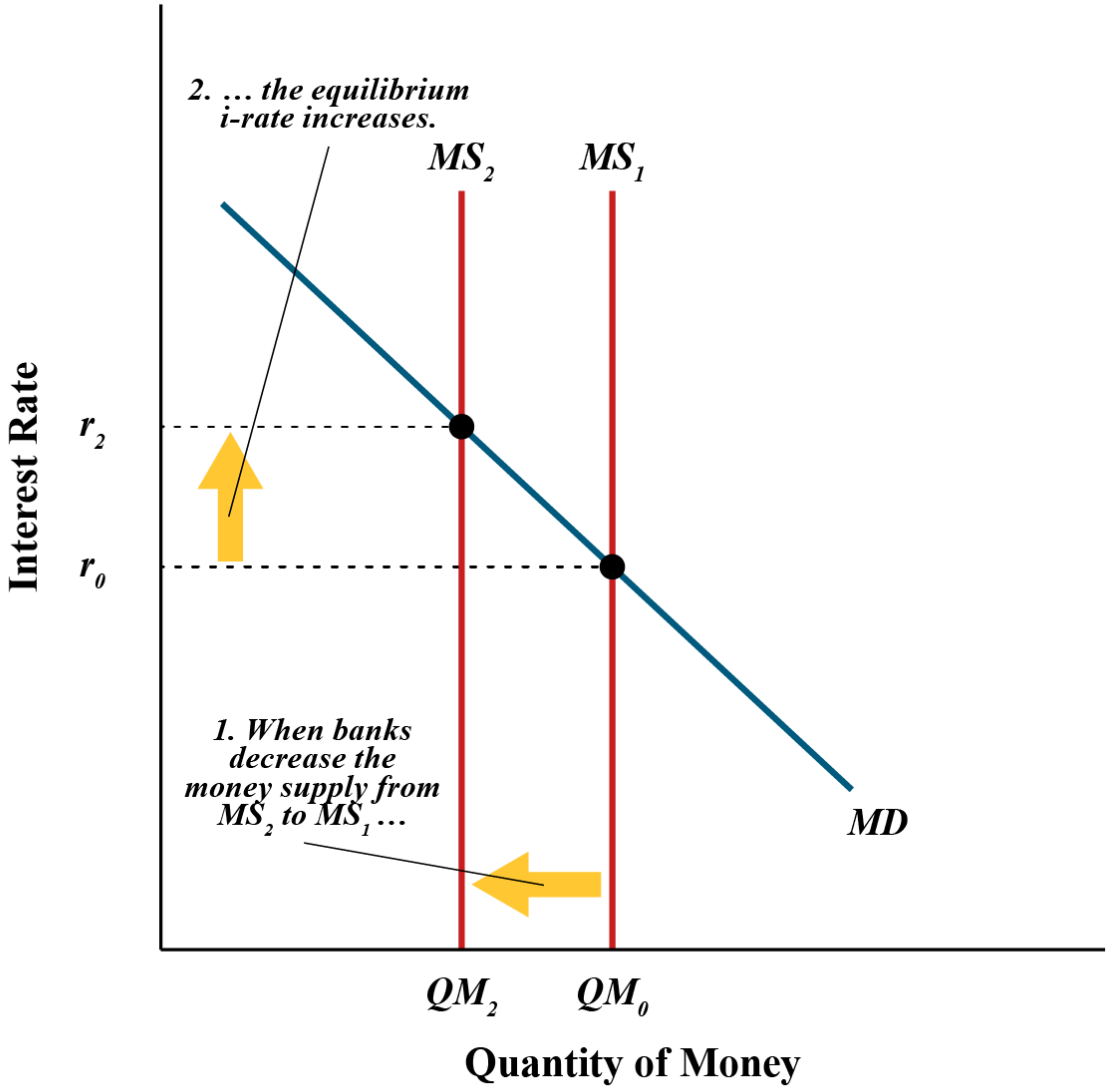

Fig 11.9 "Effect of Money Supply Decrease on Equilibrium Interest Rate" by Fanshawe College, CC-BY-NC-SA 4.0

As retail banks lend money to the Bank of Canada, they can lend out less funds to households and businesses. Recall from Chapter 7 that this decreases the supply of loanable funds (SLF) and drives up long-term interest rates. As interest rates rise, consumption, investment, and net exports decrease. Recall from Chapter 10 that higher interest rates result in households and businesses borrowing less funds as loans become more costly. Also, a higher interest rate increases the value of the Canadian dollar, so exports decrease relative to imports. This decreases Aggregate Demand (AD) and GDP growth, as shown in Fig 11.11 below.

This monetary policy tool of raising the overnight interest rate target and decreasing money supply through an open market operation of selling securities will be conducted when the Bank finds the economy is experiencing inflation. They adopt this policy to lower the price level, which at the same time results in contracting economic growth. Therefore, we call this **Contractionary Monetary Policy**.

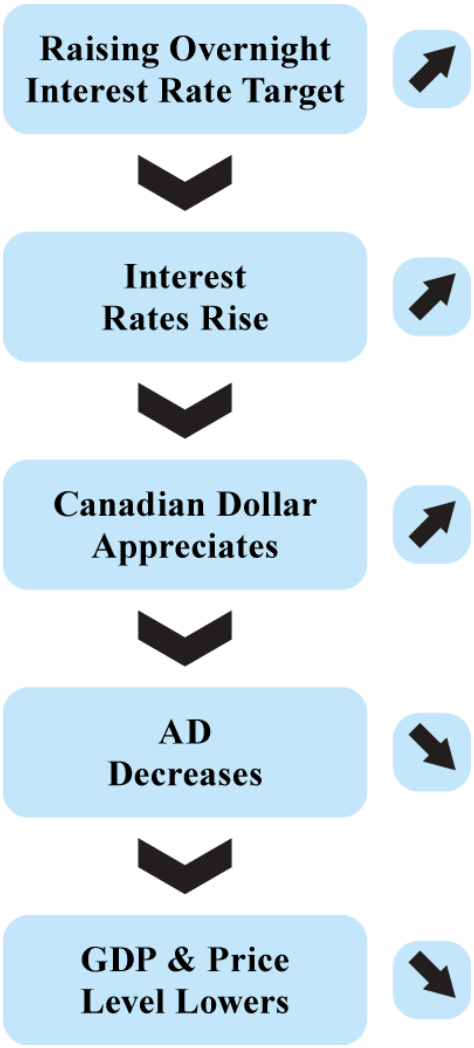

Fig 11.10 "Effect of Raising OIR" by Fanshawe College, CC BY-NC-SA 4.0

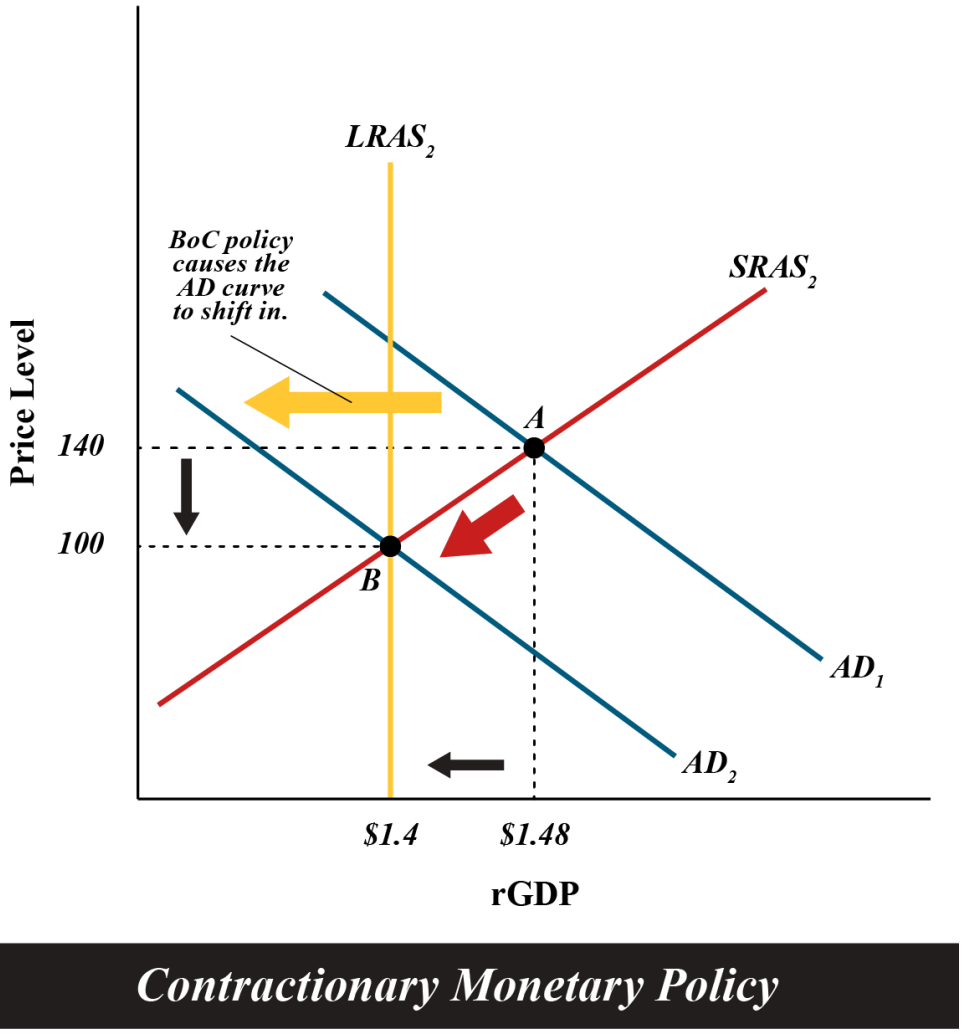

Fig 11.11 "Contractionary Monetary Policy" by Fanshawe College, CC BY-NC-SA 4.0

Inflation in Canada in 2022 and Bank of Canada's Monetary Policy

Canada's annual inflation rate reached 8.1% in June 2022 (Statistics Canada, 2022). This significant rise in the price level following the Covid outbreak in 2020-2021 was much beyond the Bank's annual inflation target of 2%. Therefore, the Bank consistently kept raising the overnight interest rate throughout 2022. In March 2022, the Bank's overnight rate target was 0.5%, which rose to 5.0% in October 2023. This has been the highest overnight interest rate target since Nov 2007, as reported by the Bank of Canada. The rise in interest rates also helped in cooling down the overheated Canadian housing market. Following this regular rise in the overnight interest rate targets during 2022, the CPI inflation rate started going down slowly, from 8.1% in June to 6.8% in October 2022 and 3.1% in October 2023 (Stats Canada).

11.6 Key Terms

Key Terms

Contractionary monetary policy

Expansionary monetary policy

Monetary policy

Money market

Inflation control target

Key policy interest rate

Policy interest rate

Selling securities

CHAPTER 12: FISCAL POLICY

Chapter Outline

12.0 Introduction

Learning Objectives

By the end of this chapter, learners will be able to:

- Define the term “Fiscal Policy.”
- Discuss Federal Government budgets and debts.
- Analyze the Effects of Fiscal Policy on Real GDP in the AD-AS model.
- Explain Government Purchase and Tax Multipliers.
- Discuss Fiscal Policy during Covid 19.

Federal and provincial government budgets generate a lot of media coverage and public debate. In broad terms, these debates involve the government’s effectiveness and efficiency in providing public services and the government’s fiscal management of the economy based on:

- the size of government and the composition of government expenditures,
- the tax system and policies used to finance expenditures,
- the budget deficit or surplus, and
- the size of the public debt.

12.1 Government of Canada and its Budget

The Budget is a blueprint for how the government wants to set the annual economic agenda for Canada. And it's the job of the Department of Finance to prepare it. A basic government budget has two components:

1. Government expenditures on goods and services, G, and transfer payments ($G + TR$).
2. Taxes are set to generate revenue to finance expenditure (T).

The budget is estimated as the difference between ($G + TR$) and (T).

The Canadian government faces three budget situations:

1. Budget deficit
2. Budget surplus
3. Budget balance

In case of budget deficit, total expenses exceed total revenues ($G + TR > T$). In case of budget surplus, total revenues exceed total expenditures ($G + TR < T$). When total expenditure and revenues match, we say the government faces a balanced budget ($G + TR = T$). A budget deficit increases the government's debt, and a budget surplus reduces public debt.

The following graph shows the government's budgetary balance since 1995-96.

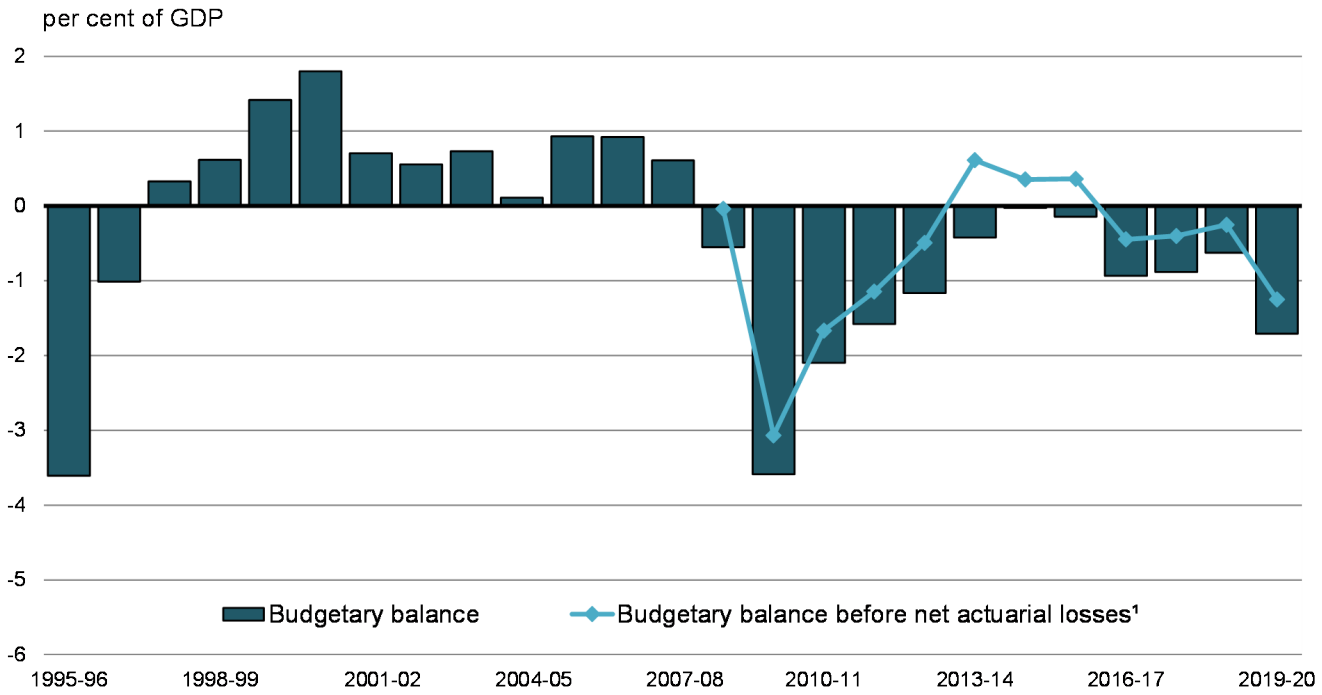

Fig 12.1 "Budgetary Balance" by Department of Finance Canada. Reproduced in accordance with the Finance Canada website Terms and Conditions

Table 12.1 Data Table for Fig 12.1. Reproduced in accordance with the Finance Canada website Terms and Conditions

Fiscal Year	Budgetary Balance (% of GDP)	Budgetary balance before net actuarial losses (% of GDP)
1995-96	-3.6	
1996-97	-1.0	
1997-98	0.3	
1998-99	0.6	
1999-00	1.4	
2000-01	1.8	
2001-02	0.7	
2002-03	0.6	
2003-04	0.7	
2004-05	0.1	
2005-06	0.9	
2006-07	0.9	
2007-08	0.6	
2008-09	-0.6	0.0
2009-10	-3.6	-3.1
2010-11	-2.1	-1.7
2011-12	-1.6	-1.1
2012-13	-1.2	-0.5
2013-14	-0.4	0.6
2014-15	0.0	0.4
2015-16	-0.1	0.4
2016-17	-0.9	-0.4
2017-18	-0.9	-0.4
2018-19	-0.6	-0.3
2019-20	-1.7	-1.2

The pie charts below show the composition of Canada's recent fiscal outlays and revenues.

Federal expenses can be divided into four main categories. The first is **transfer payments**, which account for roughly two-thirds of all federal spending: net actuarial losses, other direct program expenses, and public debt charges. The main category of transfer payments is major transfers to persons, which made up 28.7 percent of total expenses in 2019-20 (up from 27.8 percent in 2018-19). This category consists of the elderly, EI and children's benefits, and Canada Emergency Response Benefit given out during COVID-19.

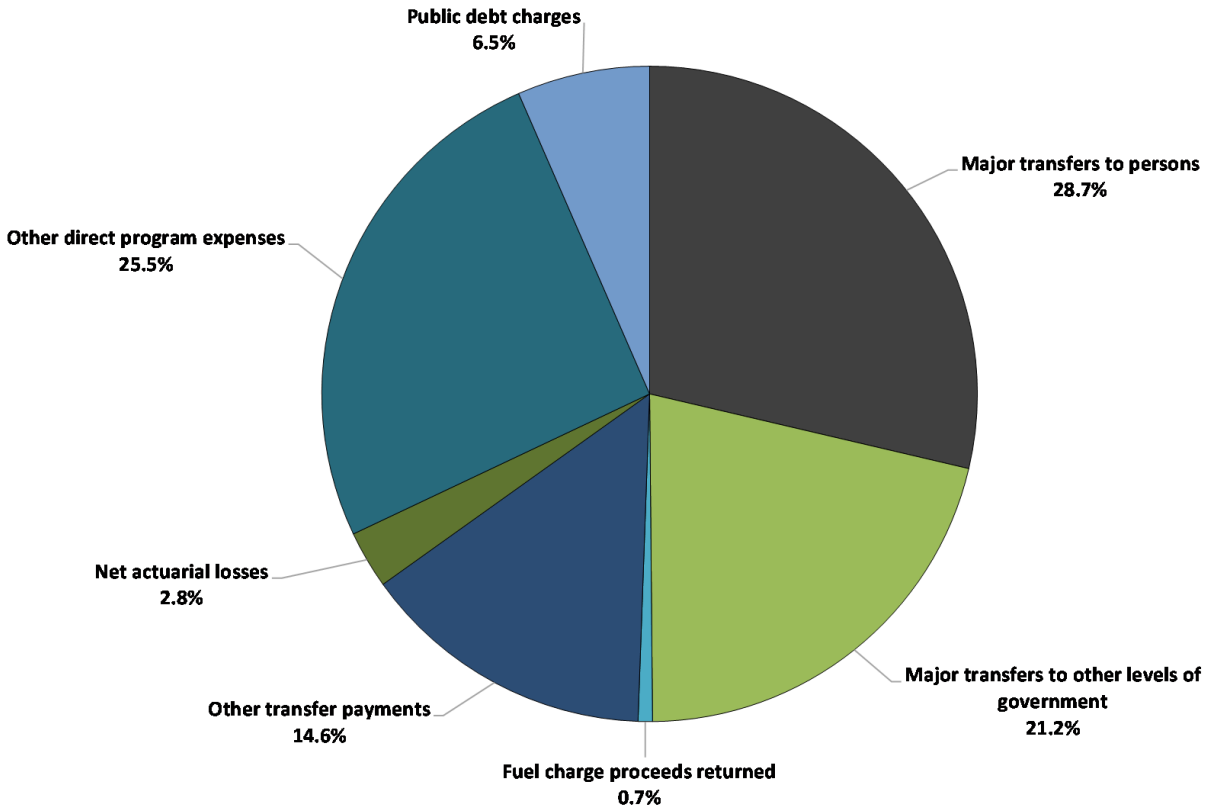

Fig 12.2 "Composition of Expenses for 2019–20" by Department of Finance Canada. Reproduced in accordance with the Finance Canada website Terms and Conditions

Table 12.2 Data Table for Fig 12.2. Reproduced in accordance with the Finance Canada website Terms and Conditions

Composition of expenses for 2019-20	Percent
Major transfers to persons	28.7
Major transfers to other levels of government	21.2
Fuel charge proceeds returned	0.7
Other transfer payments	14.6
Net actuarial losses	2.8
Other direct program expenses	25.5
Public debt charges	6.5

Federal revenues can be divided into five main categories: income tax revenues, other taxes and duties, Employment Insurance (EI) premium revenues, fuel charge proceeds, and other revenues. Within the income tax category, **personal income tax revenues** are the largest source of federal revenues, accounting for 50.2 percent of total revenues in 2019-20.

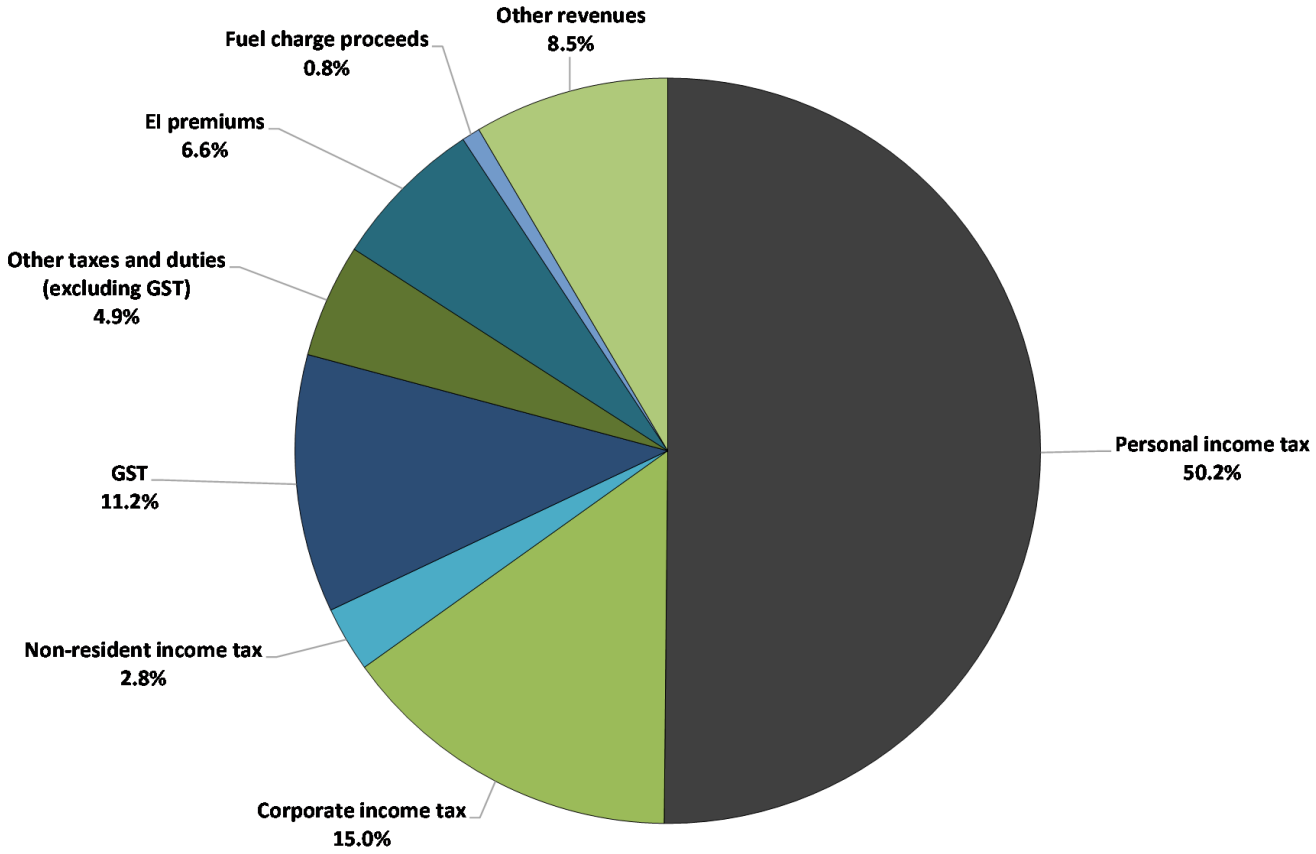

Fig 12.3 "Composition of Revenues for 2019–20" by Department of Finance Canada. Reproduced in accordance with the Finance Canada website Terms and Conditions

Table 12.3 Data Table for Fig 12.3. Reproduced in accordance with the Finance Canada website Terms and Conditions

Composition of Revenues for 2019–20	per cent
Personal income tax	50.2
Corporate income tax	15.0
Non-resident income tax	2.8
GST	11.2
Other taxes and duties (excluding GST)	4.9
EI premiums	6.6
Fuel charge proceeds	0.8
Other revenues	8.5

The following chart shows the federal debt since 1997–98. The federal debt stood at 45.5 percent of GDP in 2021–22, down from 47.5 percent in 2020–21. As its key fiscal anchor, the government is committed to reducing the accumulated deficit-to-GDP ratio over the medium term.

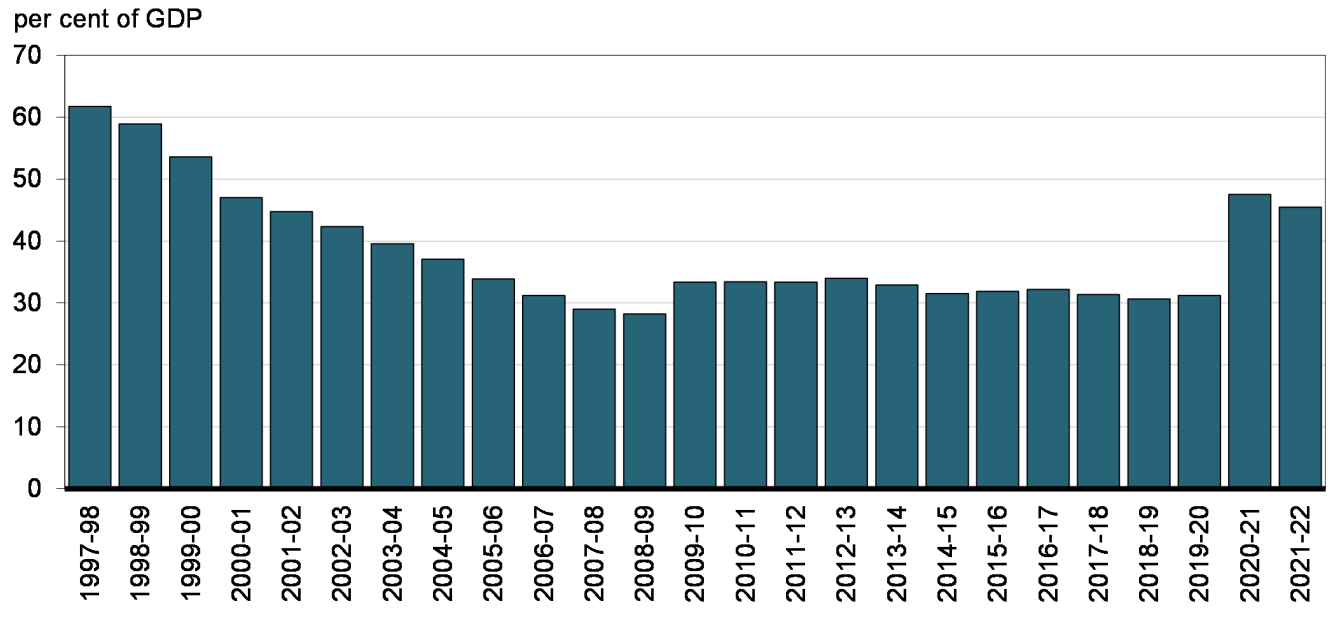

Fig 12.4 "Federal Debt (Accumulated Deficit)" by Department of Finance Canada. Reproduced in accordance with the Finance Canada website Terms and Conditions

Table 12.4 "Data Table" for Fig 12.4. Reproduced in accordance with the Finance Canada website Terms and Conditions

Year	Percent of GDP
1997-98	61.7
1998-99	58.9
1999-00	53.6
2000-01	47.0
2001-02	44.7
2002-03	42.3
2003-04	39.5
2004-05	37.0
2005-06	33.9
2006-07	31.2
2007-08	29.0
2008-09	28.2
2009-10	33.4
2010-11	33.4
2011-12	33.4
2012-13	34.0
2013-14	32.9
2014-15	31.5
2015-16	31.9
2016-17	32.2
2017-18	31.4
2018-19	30.7
2019-20	31.2
2020-21	47.5
2021-22	45.5

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"Composition of Revenues for 2019–20" by Department of Finance Canada. Reproduced in accordance with the Finance Canada website Terms and Conditions.

12.2 Fiscal Policy Tools

The Federal Government's fiscal policy tools mainly aim to stimulate the economy out of a recession by increasing GDP or controlling rising inflation.

The government controls GDP and/or price levels through:

1. Government purchases, G
2. Taxes, T
3. Transfer payments, TR

Federal, provincial, and local governments could spend tax dollars to stimulate the economy at their discretion. Generally, these expenses are provided by the government sector and not by the private sector.

12.2.1 Automatic vs Discretionary Policies

Recall from Chapter 4, the "Phases of the Business Cycle." It shows that economies go through periods of increasing and decreasing real GDP. Recall a sustained period in which real GDP is rising is an *expansion*; a sustained period in which real GDP is falling is a *recession*. Some types of government expenses and taxes change with respect to the business cycle. During the expansionary phase of the business cycle, unemployment falls, and therefore, the government's revenue generation would likely increase. At the same time, EI claims decrease with more people having jobs, and transfer payments decrease as well, so government expenses are reduced. This may reduce budget deficits.

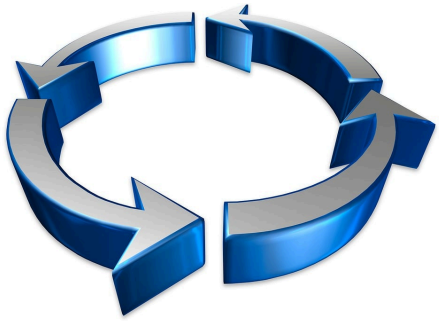

Image by Pete Linforth, Pixabay License

Conversely, during a recession, unemployment increases and therefore, the government's tax collection (or revenues) tends to decrease. Claims for unemployment benefits go up, and thus, government expenditures increase simultaneously. This increases budget deficits. These are also known as "*automatic stabilizers*." These changes in government expenses occur based on the state of the economy and *does not* require any action by the government.

When the government changes taxes or spending to address public policy goals, those policies are known as *discretionary policies*. These policy actions need to be passed by the Canadian Parliament. Governments use G, T, or TR as their discretionary fiscal policy tools. Governments can either use each tool at a time or a combination of them.

12.2.2 Expansionary Fiscal Policy

If the economy is experiencing recession and the government wants to stimulate the economy by increasing Aggregate demand (AD) and real GDP, it would,

- Increase G
- Decrease T
- Increase TR

Recall from Chapters 4 & 9 GDP & AD includes all four components of spending: consumption expenditure (C), investment expenditure (I), government expenditure or purchases (G), and net export expenditure (exports, X, minus imports, M). When the government increases G, it will increase AD and real GDP because such public expenditure on goods and services directly gets added to the AD and GDP equations.

Similarly, if the government decides to lower tax rates such as income taxes, disposable income increases, increasing household consumption spending. An increase in C increases AD and real GDP. At the same time, lowering corporate tax rates boost firms' net profitability, which could stimulate investment spending by the private sector. AD and real GDP could increase.

Finally, an increase in welfare payments or transfer payments supplements household income. Therefore, AD and real GDP increase as consumption spending increases from additional income.

In each of the above scenarios, both aggregate demand and GDP expand, and therefore, these policy measures are called *Expansionary Fiscal Policy* tools as they help increase economic growth. At the same time, the price level rises due to an increase in AD, as seen in Fig 12.5 below. The economy faces a recessionary gap at point A. An increase in AD eliminates the gap and takes the economy to full employment at point B. Expansionary policies help in eliminating recessionary gaps but might result in inflation. Also, an increase in government expenditure could widen a budget deficit or reduce a budget surplus.

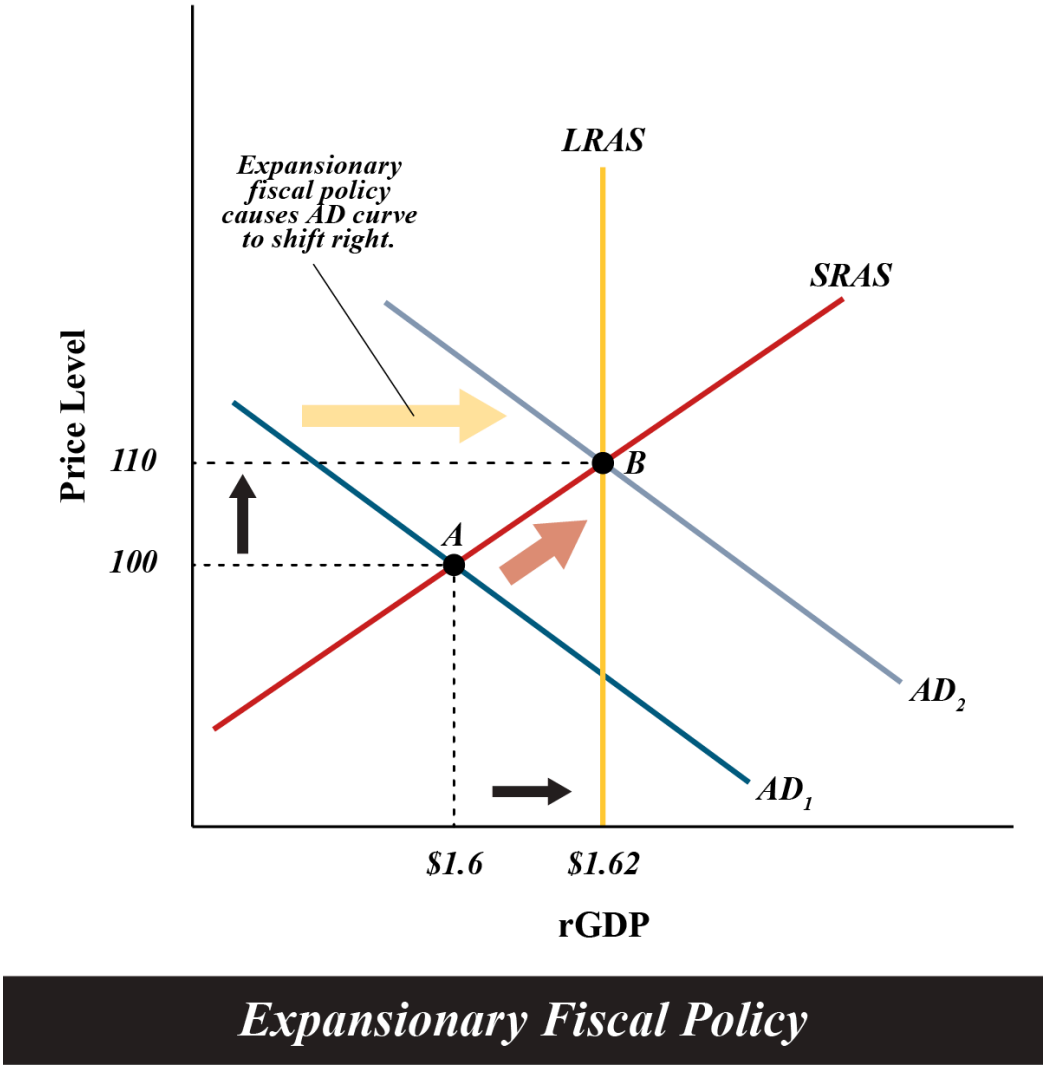

Fig 12.5 "Expansionary Fiscal Policy" by Fanshawe College, CC BY-NC-SA 4.0

12.2.3 Contractionary Fiscal Policy

If the economy is experiencing inflation and the government wants to bring down prices, it would,

- Decrease G
- Increase T
- Decrease TR

When the government decreases G, it will decrease AD and real GDP because the amount of public expenditure on goods and services decreases.

Then, if the government decides to increase tax rates, such as income taxes, disposable income decreases as net earnings go down, decreasing household consumption spending. A decrease in C decreases AD and real GDP. At the same time, raising corporate tax rates lowers firms' net profitability, which could negatively affect private-sector investment spending. AD and real GDP could decrease.

Finally, a cut in welfare payments or transfer payments reduces household income. Therefore, AD and real GDP also decrease as consumption spending decreases due to less income. Decrease in AD helps to lower the price level, as shown in Fig 12.6 below. The economy faces an inflationary gap at point A. A decrease in AD eliminates the gap and brings the economy back to full employment at point B.

In each of the above scenarios, aggregate demand and real GDP contract. Therefore, these policy measures are called *Contractionary Fiscal Policy* tools as they tend to decrease economic growth to lower inflation. However, decreasing government expenditure could also help reduce a budget deficit. Sometimes, if the government is facing huge public debt, they might take contractionary policies called "austerity" measures to reduce budget gaps, as we saw with the Greek economy in 2010.

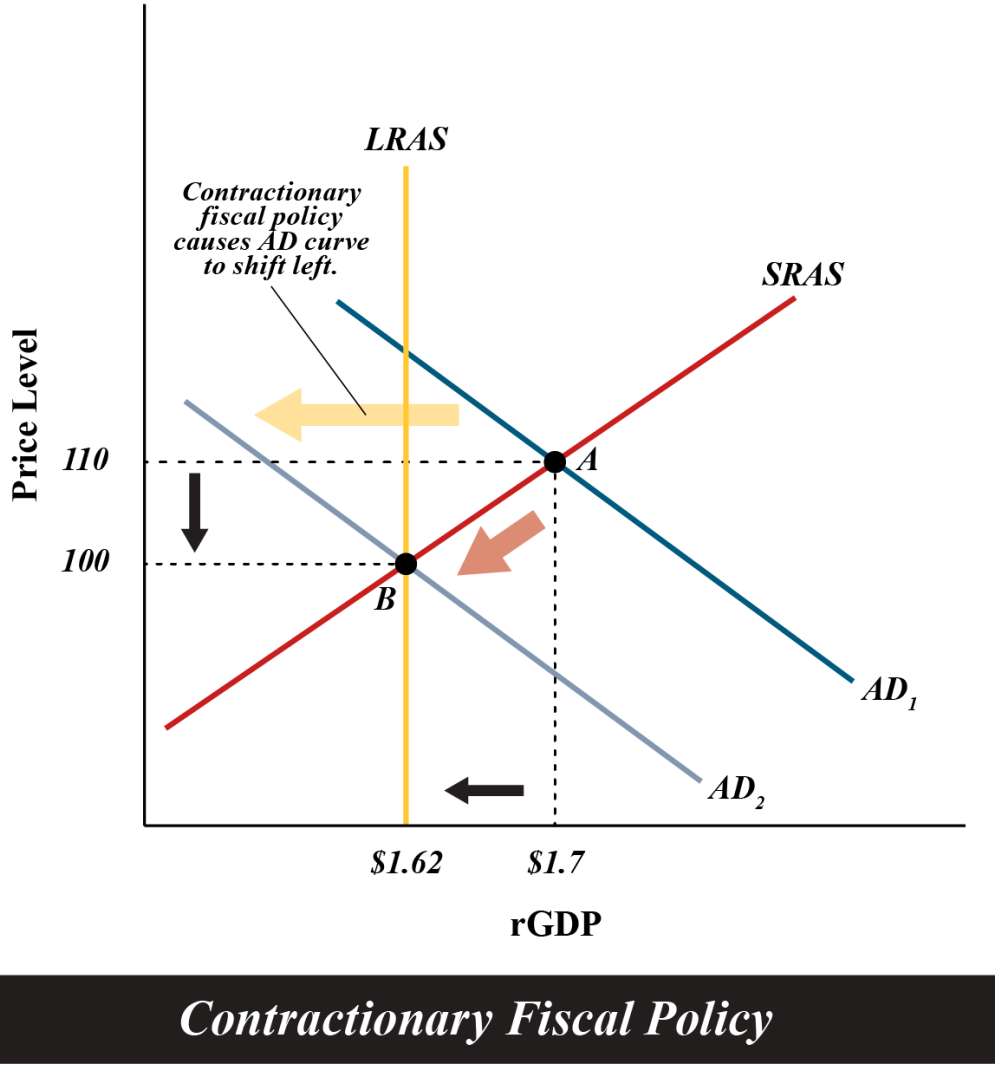

Fig 12.6 "Contractionary Fiscal Policy" by Fanshawe College, CC BY-NC-SA 4.0

12.3 Government Purchases (Spending) Multiplier

Recall from Chapter 8 that government spending on goods and services, G, is an autonomous expenditure. This increase in autonomous spending is directly added to the Aggregate demand (AD) equation and increases real GDP. Such increases in autonomous spending bring increases in induced expenditure because government investment spending is spent and re-spent. Therefore, spending in successive rounds will result in further increases in real GDP through additional induced expenditure, and the overall effect on GDP will likely be much greater than the initial Government spending. This is the multiplier effect.

The *multiplier effect* is a series of increases in induced consumption expenditure from an initial increase in autonomous spending. This increase in consumption spending comes from an increase in G.

The increase in real GDP over successive rounds is determined using the following multiplier formula:

$$\text{Multiplier} = \frac{1}{(1 - MPC)}$$

Suppose the $MPC = 75\%$, therefore, the multiplier is:

$$\frac{1}{(1 - 0.75)} = \frac{1}{0.25} = 4$$

This implies a dollar increase in G increases GDP by $\$4$.

The multiplier can also be calculated as:

$$\frac{\text{Change in real GDP}}{\text{Change in } G}$$

Suppose a government increase in G by $\$100 \text{ billion}$ (expansionary fiscal policy) increases real GDP by $\$400 \text{ billion}$, the multiplier is:

$$\frac{\$400 \text{ billion}}{\$100 \text{ billion}} = 4$$

which implies a dollar increase in G increases real GDP by $\$4$.

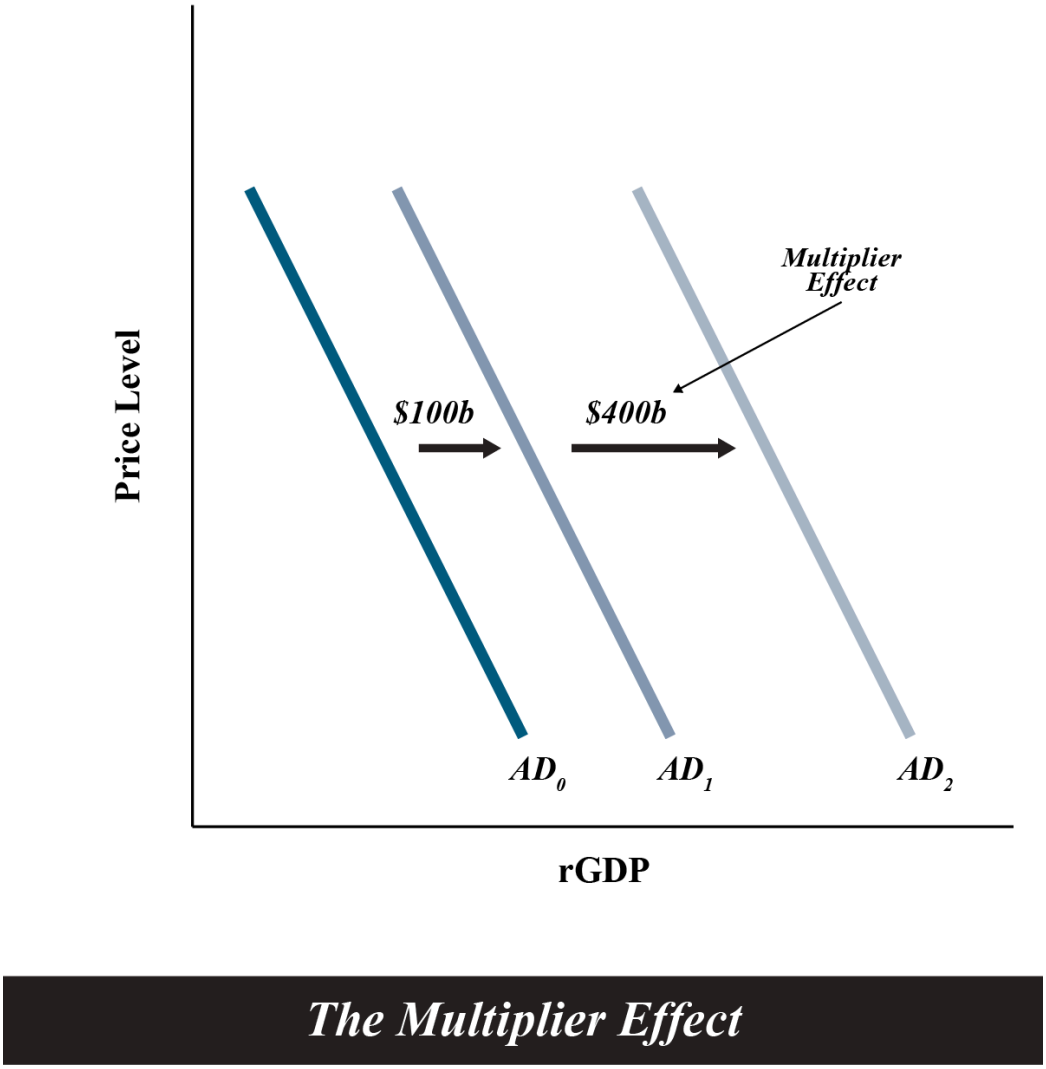

Fig 12.7 "The Multiplier Effect" by Fanshawe College, CC BY-NC-SA 4.0

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12.4 Tax-Cut Multiplier

The government can also induce economic spending through tax cuts, such as income tax cuts increasing net earnings. So, the government expects people to have more disposable income, which could increase consumption spending. The initial benefits of the tax cuts could generate more spending for the overall economy. Therefore, tax cuts also generate a multiplier effect.

The tax-cut multiplier is calculated using the following formula:

$$\frac{\text{Change in real GDP}}{\text{Change in Taxes}}$$

A $\$15 \text{ billion}$ tax cut results in an increase in real GDP by $\$20 \text{ billion}$, therefore

$$\text{Tax Multiplier} = \frac{\$20 \text{ billion}}{-\$15 \text{ billion}}$$

$$= -1.3$$

so a dollar cut in taxes will increase real GDP by $\$1.3$.

Note the tax multiplier is negative because a cut in taxes causes an increase in GDP.

The two graphs below show the effect of an expansionary policy in lowering the recessionary gap (Fig 12.8a) and the effect of a contractionary policy in widening the recessionary gap (Fig 12.8b).

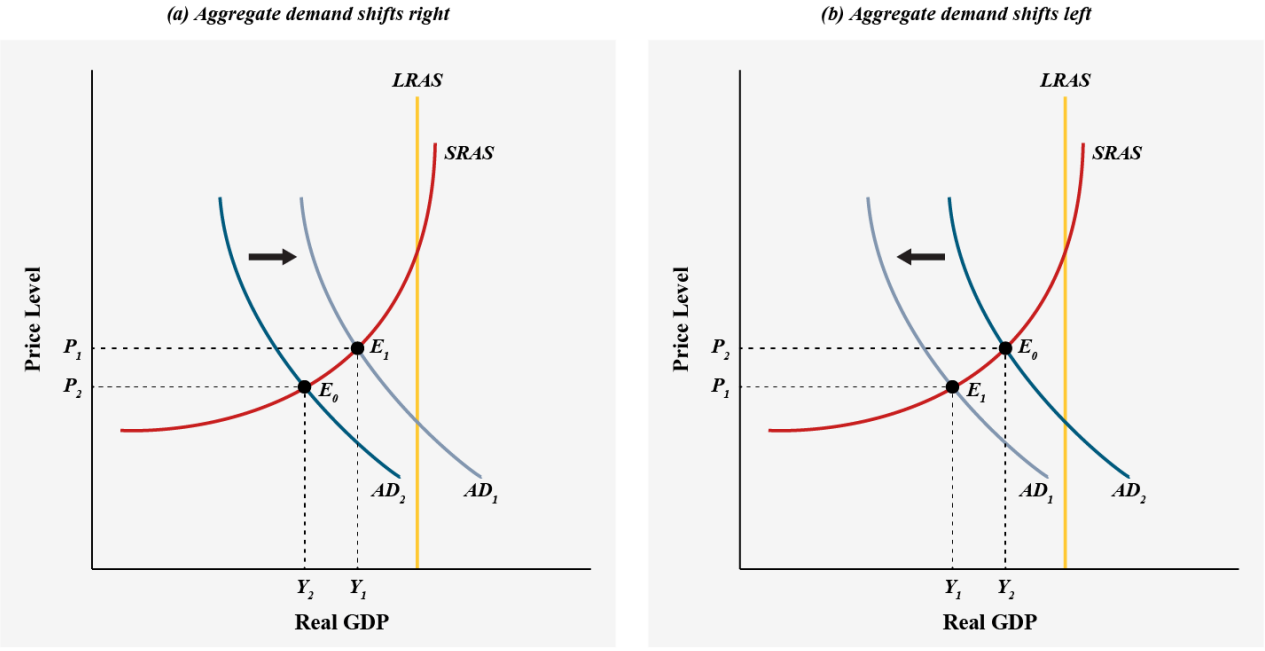
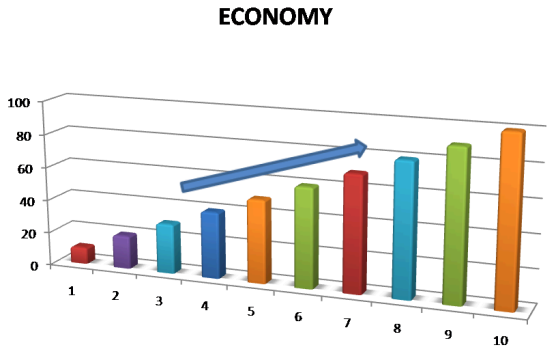


Fig 12.8 "Aggregate Demand Shifts" by Fanshawe College, CC BY-NC-SA 4.0. At E_0, in both graphs, the economy is facing a recession as the LRAS curve lies to the right of the equilibrium point E_0. In (a), the gap lessons as the AD shifts to the right; in (b), the gap widens as AD shifts to the left.

Government Expense Multiplier Vs Tax-cut Multiplier

The government expense multiplier is more effective in generating economic growth than the tax cut multiplier because any increase in public investment spending is expected to generate more induced consumption spending through job creation as the government spends money on infrastructure such as roads, schools, or healthcare. On the other hand, the tax cut multiplier does help generate economic growth, but tax cuts may not directly help add jobs to the economy. So, from a policy perspective, an expansionary fiscal policy using G is more effective for the economy in the long run than lowering taxes.



"Economic growth." by Jerine Victor, CC BY-SA 4.0

Note: the multiplier applies when G decreases or taxes increase, as well as when G increases or taxes decrease. Consumer confidence decreases when G decreases, or people face rising taxes. These changes will reduce aggregate expenditure and have an even larger effect on real GDP than the initial changes because of the multiplier effect.

12.5 Possible Obstacles to Fiscal Policy measures

In the case of expansionary fiscal policy measures, the government increases G and transfers payments to lower the effects of a recession. If the government faces a budget deficit, it must borrow money to finance such expenditure. Recall from Chapter 7: When the government needs more money for its operations than it has collected in revenues, it must run a budgetary deficit. As we saw earlier, when the deficit increases, the gap between $G + T$ and TR increases. Therefore, the level of public dissavings increases. In this case, the demand for loanable funds increases as the government increases its borrowings. An increase in the demand for loanable funds raises the interest rate, as seen in Fig 12.9 below. Compared to the initial equilibrium, both the real interest rate and quantity of loanable funds increase from r_0 to r_1 and L_0 to L_1, respectively.

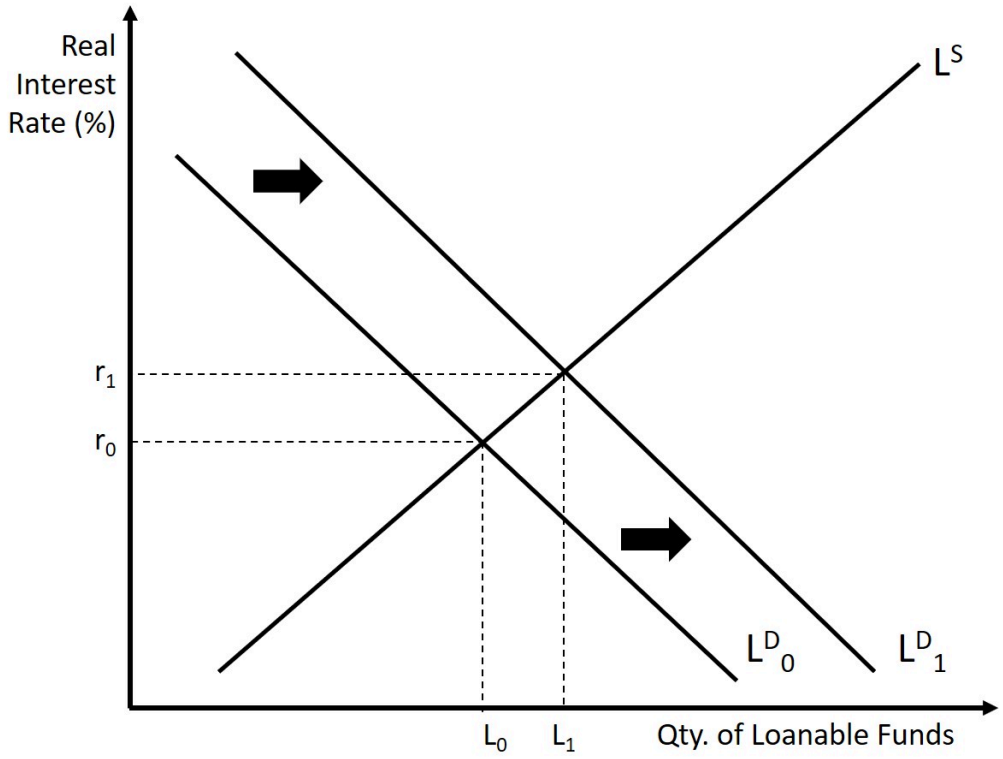


Fig 12.9 A Decrease in the Demand for Loanable Funds

A rise in the interest rate tends to lower investments by the private sector as loans get more costly. This reduction in investment due to higher interest rates is known as the *crowding-out effect*. So, businesses may scale back investments or expansion plans because of the crowding-out effect, which might lower the outcome of the multiplier effect to a certain extent. On the one hand, while expansionary fiscal policy could result in an increase in AD and GDP, on the other hand, a rise in the interest rate may partially offset that increase as businesses and consumers cut back some of their expenditure plans due to higher interest rates.

Our example under Section 12.3 above shows an increase in G by $\$100 \text{ billion}$ (expansionary fiscal policy) increases real GDP by $\$400 \text{ billion}$, the multiplier is:

$$\frac{\$400 \text{ billion}}{\$100 \text{ billion}} = 4$$

which implies a dollar increase in G increases real GDP by $\$4$. However, due to the presence of the crowding out effect, we might see an increase in G by $\$100 \text{ billion}$ increases real GDP by $\$50 \text{ billion}$, so the multiplier is:

$$\frac{\$50 \text{ billion}}{\$100 \text{ billion}} = \frac{1}{2}$$

This implies a dollar increase in G increases real GDP by $\$0.50$. Crowding out partially offsets the impact of the multiplier effect.

However, it is possible that the Bank of Canada could increase the money supply to offset the rise in the interest rates when the government and the Bank together fight to lower the effects of a recession.

Photo by PiggyBank, Unsplash License

Another *obstacle* to fiscal policy measures is the three lags in conducting fiscal policy tools: recognition lag, implementation lag, and impact lag. Recognition lag refers to identifying the correct economic circumstance to identify the appropriate policy tool for data collection, which might take between three to six months. Once the government makes a plan for implementing the policy tool, the Ministry of Finance formulates a budget presented to the Parliament. Implementation lag results from the approval of the tool through discussions and arguments by Members of the Parliament to decide on the appropriate course of action. This process takes a great deal of time as certain policy changes have political consequences. However, once the government implements the plan of action after consultations and approvals, it takes time to assess its impact on our economy, which is the impact lag. For example, after the fiscal policy legislation of lowering taxes is enacted, it takes a few months for people to see that effect on their paycheques. Similarly, if the legislation is about increasing G, for example, on public infrastructure such as transit and highways, that effect is much longer, as it takes time to develop plans, secure permissions, grant contracts, and begin work. Fiscal policy could take several months or years to have the desired effect on the economy.

12.6 Supply-Side Effects of Fiscal Policy

In section 12.1 above, the fiscal policy tools emphasize the effects of the measures on the demand side of the economy, such as an increase in G or a reduction in taxes, which increases aggregate demand and real GDP. The fiscal policy on the supply side of the economy has important effects on the demand side. Suppose the government lowers corporate tax rates. This would increase firms' net profitability and, in turn, provide them with a greater incentive for capital formation, which tends to increase productivity. To a large extent, labour productivity depends on workers' access to capital. Productivity growth brings an increase in short-term aggregate supply ($SRAS$) as well as long-run aggregate supply ($LRAS$) or potential GDP. Similarly, an increase in G towards Research and Development (R&D) also increases long-term economic growth by stimulating productivity. Similarly, when the government lowers capital gains taxes, that stimulates people's incentive to save and invest (in the financial markets, such as on bonds and securities), which tends to increase capital formation that is, in turn, used by private businesses to improve productivity.

On the contrary, a higher income tax rate, such as raising the marginal tax rate, reduces people's incentive to work, which affects labour productivity. Lower productivity affects businesses negatively and, at the same time, reduces their incentive to future investments and production. These affect an economy's short and long-term supplies or productive capacities. Higher-income tax rates could also increase tax evasion and underground economic activities. Similarly, a rise in capital gains tax reduces people's incentive to invest in the capital markets and tends to decrease capital formation. So many people believe that saving and investment could be encouraged through lower taxes, which stimulates the supply side of the economy.

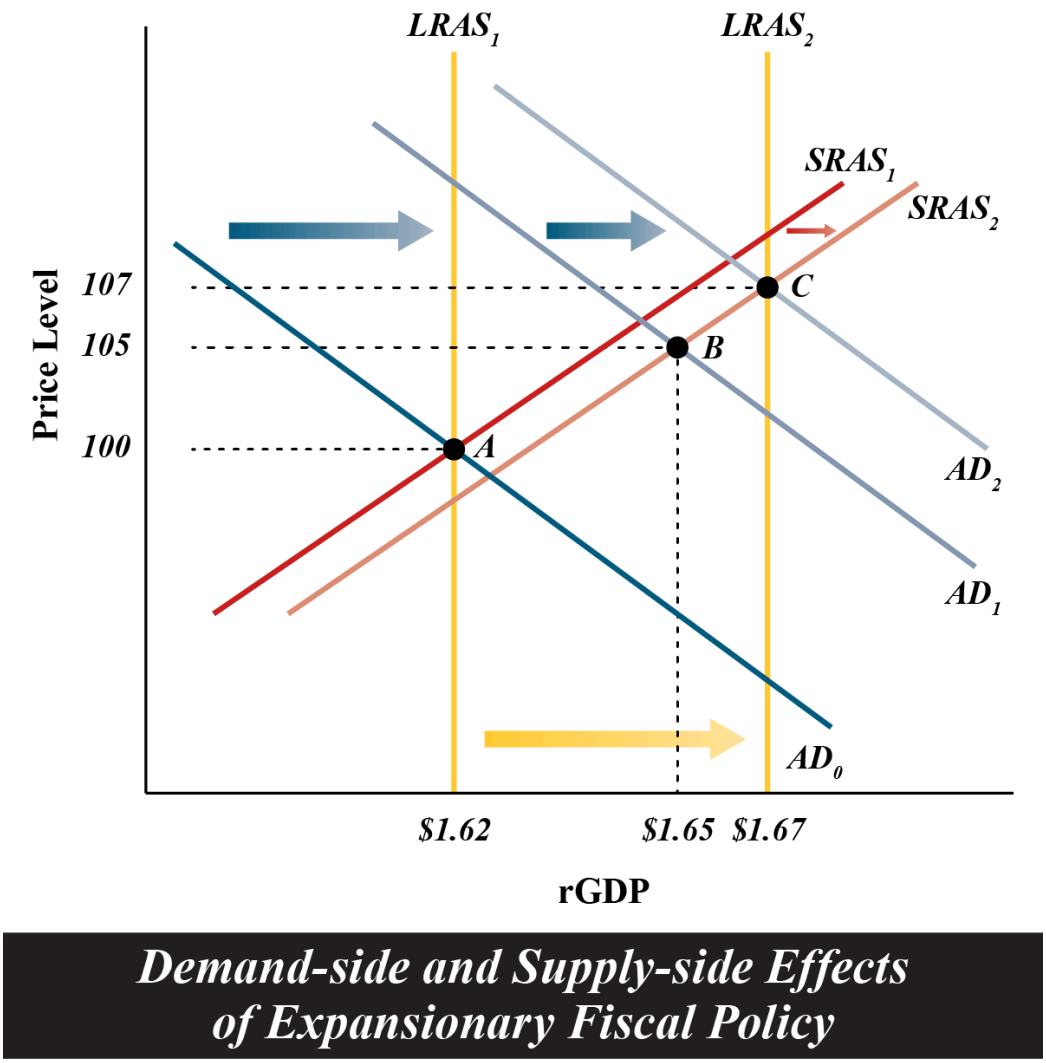
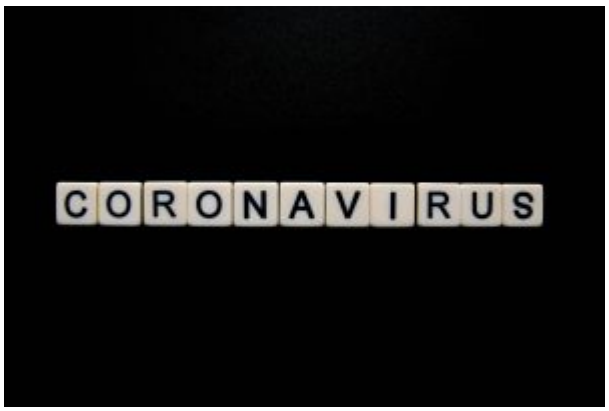


Fig 12.10 "Demand-side and Supply-side Effects of Expansionary Fiscal Policy" by Fanshawe College, CC BY-NC-SA 4.0

Fig 12.10 above shows the demand-side and supply-side effects of an expansionary fiscal policy where we see that if the government lowers corporate taxes, AD increases through larger investment expenditure as firms' net earnings increase. At the same time both short and long run AS also increase through greater productivity from capital creation (Both $SRAS$ and $LRAS$ curves shift rightward). The economy moves from full employment point A to a full employment level of output at C, where real GDP increases and the price level also rises.

12.7 Covid 19 and Fiscal Policy



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In March 2020, the World Health Organization classified the outbreak of COVID-19 disease as a global pandemic. In response, as reported by the Ministry of Finance, the Canadian government enacted emergency measures to combat the spread of the virus and announced the COVID-19 Economic Response Plan to help stabilize the economy during the pandemic. This was a part of their Expansionary Fiscal Policy. The emergency measures introduced by the government are intended to protect the health and safety of Canadians and provide direct support to Canadian workers and businesses. Legislation was enacted to provide the government with additional borrowing authority to fund the response to the crisis. Between April 1 and July 2020, the government increased its debt by $323 billion to meet the government's projected financial requirements under the Economic Response Plan up to that date. The reported budgetary deficit was $327.7 billion for the fiscal year ending March 2021. Federal revenues decreased in 2021 compared to 2020, largely due to the economic impacts of the COVID-19 crisis on both employment levels and business activity. Compared to the 2019–20 fiscal year, revenues decreased by $17.7 billion, or 5.3 percent, in the 2020-2021 fiscal year, primarily reflecting lower excise taxes and duties, particularly due to COVID-19 shutdowns and the one-time enhanced Goods and Services Tax (GST) credit payment.

As of the financial year ending in March 2022, the government posted a budgetary deficit of $90.2 billion compared to a deficit of $327.7 billion in the previous fiscal year, which was primarily due to an increase in tax revenues as the economy reopened and markets started functioning normally during the most of 2021.

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12.8 Key Terms

Key Terms

Automatic stabilizers

Balanced budget

Budget deficit

Budget surpluses

Contractionary fiscal policy

Crowding out effect

Discretionary policies

Expansionary fiscal policy

Impact lag

Implementation lag

Multiplier effect

Recognition lag

Tax-cut multiplier

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Ancillary Resources

Instructor Slide Decks

- Chapter 1 – Macroeconomics
- Chapter 2 – Macroeconomics
- Chapter 3 – Macroeconomics
- Chapter 4 – Macroeconomics
- Chapter 5 – Macroeconomics
- Chapter 6 – Macroeconomics
- Chapter 7 – Macroeconomics
- Chapter 8 – Macroeconomics
- Chapter 9 – Macroeconomics
- Chapter 10 – Macroeconomics
- Chapter 11 – Macroeconomics
- Chapter 12 – Macroeconomics

Version History

This page provides a record of changes made to the open textbook since its initial publication. If the change is minor, the version number increases by 0.1. If the change involves substantial updates, the version number increases to the next full number.

Version	Date	Change	Affected Web Rage
1.0	December 14, 2023	Publication	N/A