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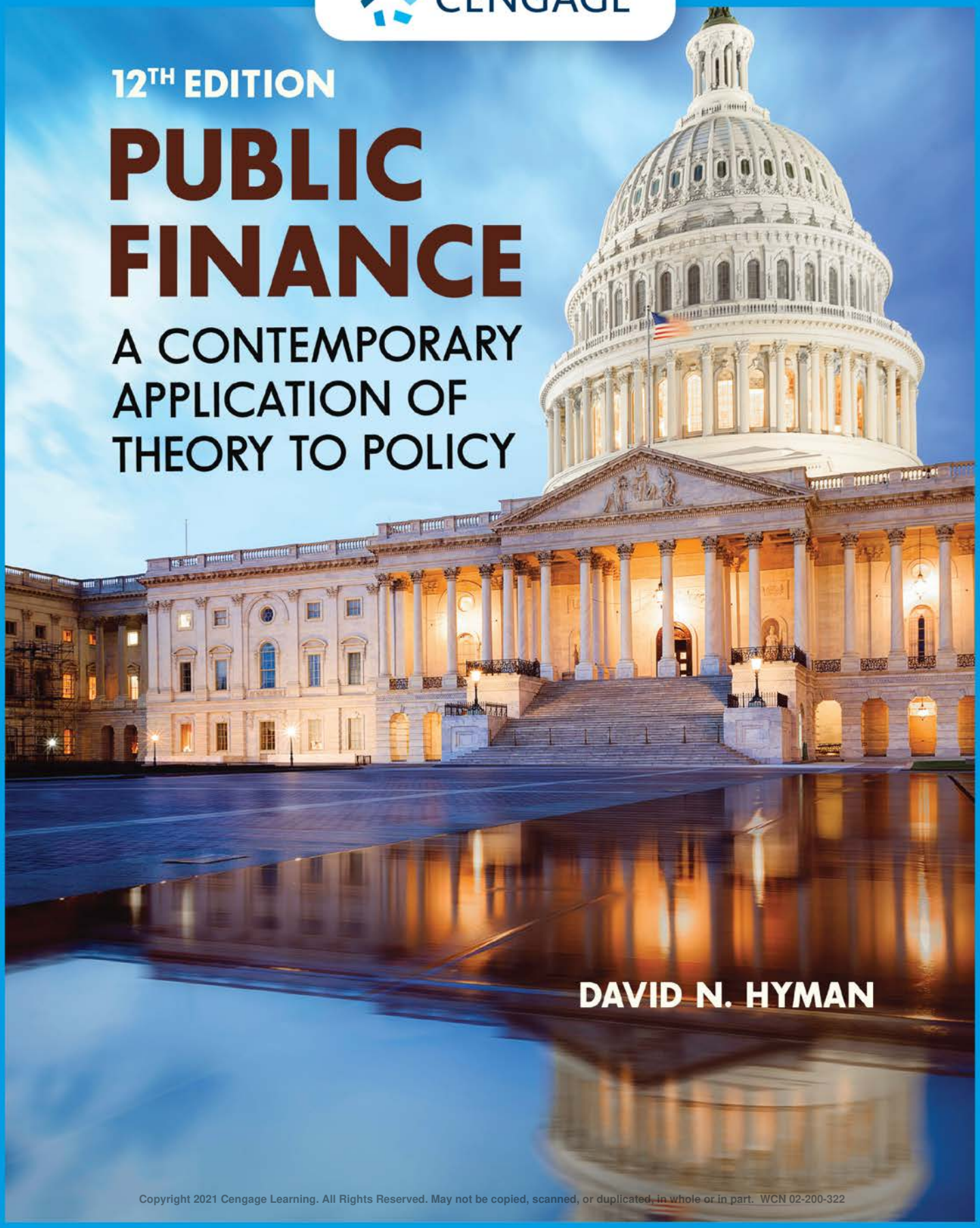
12TH EDITION

PUBLIC FINANCE

A CONTEMPORARY APPLICATION OF THEORY TO POLICY



DAVID N. HYMAN

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PUBLIC FINANCE

A CONTEMPORARY APPLICATION OF THEORY TO POLICY

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North Carolina State University

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About the Author

David N. Hyman, Professor of Economics and Alumni Distinguished Undergraduate Professor at North Carolina State University, has taught both undergraduate and graduate courses in public finance there since 1969. Professor Hyman received his Ph.D. in Economics from Princeton University. He has held Woodrow Wilson, Earhart, and Ford Foundation fellowships and was a Fulbright senior research scholar in Italy in 1980. From 1976 to 1977, he was visiting research professor at the University of Turin in Italy, and in 1997 he was visiting professor of economics at the University of Ferrara in Italy. Professor Hyman is a member of the Academy of Outstanding Teachers at North Carolina State University and received the Alumni Association Outstanding Teacher Award in 1982 and 1996. In 2006 and 2019, he was a recipient of the North Carolina State University Department of Economics College of Management Teaching Excellence Award. In 2010 and 2012, Professor Hyman was the College of Management recipient of the Board of Governors Award for Excellence in Teaching. He is the author of several widely used textbooks in economics and has published scholarly articles in the *National Tax Journal*, *Public Choice*, *Journal of Economic Education*, and other respected academic journals. In 2005, his *Public Finance* text was translated into Chinese and published by the Peking University Press. Professor Hyman served on the President's Council of Economic Advisers as a consultant and as a senior staff economist from 1988 to 1989. He has also been a guest scholar at the Brookings Institution and has worked as a government budget analyst and as an economist for the Board of Governors of the Federal Reserve System and the U.S. Comptroller of the Currency.

Professor Hyman is also a photographer whose palladium and platinum prints are in the Corcoran Legacy Collection at the American University Museum in Washington, D.C., and the Gregg Museum of Art and Design at North Carolina State University. His photographs have been exhibited by galleries and museums in New York, North Carolina, California, and in China at the Pingyao International Photography Festival and in Beijing, and they have been published in art books and on the covers of several novels.

Preface

The study of public finance is more important than ever. Since the last edition of *Public Finance: A Contemporary Application of Theory to Policy*, the U.S. economy has been growing steadily until the coronavirus pandemic began. By 2019, the U.S. economy was running at full employment with historically low inflation. Congress enacted major federal tax cuts in 2017 effective for 2018 and at the same time federal government spending has been increasing. As a result, the federal budget deficit has also increased to a level of $1 trillion and was approaching 5 percent of gross domestic product (GDP) in 2019. Over the long term, net federal debt will also increase. However, the burden of debt has been kept low by historically low interest rates.

The pandemic-induced recession of 2020 is having profound effects on public finance in the United States and throughout the world. As real GDP and aggregate income have fallen as a result of government ordered lock downs and stay at home orders, tax collections have declined and spending for social insurance programs and income support have increased. In addition, Congress in the U.S has approved extraordinary government spending to support the unemployed and business owners impacted by the pandemic. As tax revenue falls and government spending rises the federal deficit will increase to historically high levels. The federal debt will also soar. The impact on public finance will depend on how long it takes to control the pandemic and get economic activity back to normal levels. There could be permanent changes in behavior and government programs that will have long lasting effects on the economy. Future tax policy could also be impacted.

The fastest-growing area of government spending in recent years has been health care. Government spending on health care has been increasing rapidly both on the federal and state levels. The new edition of this text continues to discuss issues related to the provision of health care and the role of government in that sphere with an entire chapter devoted to the subject.

Fundamental controversies still rage about how to deal with the Social Security system as the population ages. The role of government in supporting education remains an important issue. All of these perennial, as well as newer, government issues are covered in this 12th edition. There is a separate chapter (Chapter 12) on government budget balance and debt. This unique feature focuses on the implications of government borrowing for the economy and is of major importance in view of the fact that the federal budget deficit and debt have exploded in recent years and must eventually be brought down to avoid future negative consequences for the economy.

The text retains its in-depth coverage of tax theory and policy issues. Sections on taxation have been updated to discuss issues in tax reform and the impact of taxes on incentives and economic growth. The provisions of Tax Cut and Jobs Act of 2017 (TCJA) are discussed in detail for both personal and corporate income taxation. The latest data on tax rates and the distribution of tax burden are included. Pressures for reform of the tax code and new revenue are likely to result in a continuing political debate about taxation in the United States at the federal, state, and local levels. The distribution of the tax burden remains a controversial issue, with many people arguing that TCJA disproportionately reduced the tax burden of the highest income groups. The basic theoretical framework developed in this book to analyze taxes on income, consumption, and wealth can provide a basis for evaluating alternative proposals for changes in tax policy.

CHANGES IN THIS EDITION

The 12th edition continues to provide comprehensive coverage of theoretical and applied issues in public finance. The latest data are used to make sure all charts, tables, and analyses are timely and relevant. A new section on mandatory versus discretionary federal government spending has been added to Chapter 1. The discussion of the fiscal implications of aging of populations has been updated. Environmental protection issues, such as recent changes in "cap-and-trade" policies to reduce acid rain and greenhouse gases, in both the United States and the European Union, are discussed. Data and analysis relating to poverty and health insurance coverage in the United States have all been updated.

Information on Social Security pensions in the United States has been updated, and the analysis of replacement rates has been expanded. There is more discussion of the relative importance of Social Security pensions in the budgets of low-income retirees and labor force participation of the elderly. There is more discussion of the implications of the aging of populations on both pensions systems and health care spending. Data on health care spending in the United States have been updated. Material on the Medicare and Medicaid programs has been updated. The discussion of unemployment insurance has been expanded. There is also an updated discussion of lagging public investment in infrastructure in the United States.

In the chapters on taxation (Part 4), recent data on the distribution of tax burden and tax rates are included. The provisions of the Tax Cut and Jobs Act of 2017 (TCJA) enacted by Congress are also discussed. The impact of new provisions of the law, including the elimination of the personal exemption and changes that will decrease the incentive for taxpayers to itemize deductions, are analyzed. The chapter on Taxation of Corporate Income has been updated to reflect the sharp reduction of corporate tax rates under TCJA and other changes in the rules for taxation of business income. The impact of the lower tax rates on business income for investment is analyzed. The long-term fiscal and economic implications of government budget deficits as well trends in the use of borrowing as a means of public finance receive expanded coverage. Statistics on corporate income taxes, sales taxes, property taxes, and intergovernmental fiscal assistance statistics have been updated.

SPECIAL FEATURES OF THIS BOOK

In addition to the boxed features on international issues and public policy, each chapter has pedagogical features such as Learning Objectives and Concept Checks.

To facilitate learning, important concepts are set in colored bold type when first introduced, and every chapter concludes with a summary, a list of important concepts, and a short "Looking Ahead" that explains the relationship between the chapter and those that follow. Also, each chapter includes questions for review. These questions are not problem sets; rather, they are designed to help students review the material covered in the chapter by presenting questions related to its major points or ideas. Several problems follow the review questions. Each chapter also has an annotated bibliography offering suggestions for further reading and in-depth study. The bibliography should prove particularly useful in courses in which term papers are assigned. All chapters have references to Internet sites. Liberal use is made of footnotes throughout the book to provide additional source material and to explain and document material. A glossary at the end of the book lists and defines all important concepts for easy reference.

I have attempted to make this book as self-contained as possible; even students with only a minimal background in economics can use it. Appendixes to several chapters facilitate this process. For example, Chapter 1 includes an appendix that can be used as a convenient reference tool for students unfamiliar with basic microeconomic theory. It features simple, concise explanations of concepts such as indifference curves, income and substitution effects, consumer surplus, producer surplus, cost, and production theory. Although the appendix is not designed as course material, it will help students understand, as well as review, the analyses used throughout the book.

An appendix to Chapter 2 provides a more in-depth analysis of efficiency using Edgeworth box diagrams to derive efficiency loci. The appendix to Chapter 11 derives formulas for the excess burden of taxation and addresses the relevance of compensated demand and supply curves to tax analysis. The appendixes to Chapters 2 and 11 cover more advanced material and may be skipped without loss of continuity.

POSSIBLE COURSE OUTLINES

This book contains more material than could possibly be covered in a one-semester (or one-quarter) course in public finance. Instructors of one-semester courses will find enough material to adapt to their own needs and interests. Teachers of the two-semester sequence of the microeconomic aspects of public finance could cover Parts 1 and 2 (the expenditure aspects of public finance) in the first semester, and Parts 3, 4, and 5 (government finance and fiscal federalism) in the second. Instructors of the macroeconomic aspects of public finance could supplement the material in the text with excerpts from one of the many excellent macroeconomic books available.

I suggest four possible course outlines for a one-semester course, each outline having its own emphasis. Instructors may adjust these outlines according to their preferences.

Outline 1: Basic Principles of Public Finance

For intermediate economics courses, with students who have had at least one course in basic microeconomic theory:

1. Chapters 1–5: The economic basis for government activity. Efficiency, market failure, externalities, public goods, public choice, and political equilibrium.
2. Chapters 10–12: Principles of government finance.
3. Chapters 14–17: Application of tax theory to tax policy.
4. Selections from Chapters 6–9 and 18: Topics in public policy or state and local finance, used as time permits and according to the instructor's interests.

Outline 2: The Functions of Government and Government Expenditure

For courses focusing on public policy and government expenditure, with students who have had at least one course in economics:

1. Parts 1 and 2: The economic basis of government activity and application of that theory to selected policy issues.
2. Part 5: State and local government finance.

Outline 3: Tax Theory and Policy

For courses addressing taxation, with students who have had at least one course in economics:

1. Chapters 1 and 2: The functions of government and the concept of efficiency.
2. Chapters 10–17: Government finance, tax theory, and tax policy.

Outline 4: Public Policy

For courses in public affairs or public policy, with students who have had little or no background in economics:

1. Chapters 1 and 2: Efficiency, markets, and the economic basis for government activity.
2. Selections from Chapters 3–5: As appropriate to subject emphasis and student background. Topics could include externalities, public goods, and political equilibrium.
3. Selections from Chapters 6–9: Issues in public policy. The instructor may wish to omit some of the more advanced sections in these chapters.
4. Chapter 10: Introduction to government finance.
5. Selections from Chapters 11–17: Topics in tax policy, chosen according to depth of coverage.
6. Selections from Chapter 18: Topics in fiscal federalism, chosen according to course objectives. More advanced sections could be omitted.

ANCILLARY MATERIALS

Instructor's Manual/Test Bank

The Instructor's Manual includes instructional objectives, changes in this edition, chapter outlines, major points and lecture suggestions, and answers to text problems. The Test Bank for each chapter includes true/false, multiple-choice, and essay questions. This ancillary is available on the Instructor Companion Site.

Lecture Presentation in PowerPoint®

This text features a PowerPoint slide presentation that professors can use to save valuable class preparation time. This supplement covers all the essential topics presented in each chapter of the book, including graphs, tables, and examples. Slides are crisp, clear, and colorful. Instructors may adapt or add slides to customize their lectures. The slides are available on the Instructor Companion Site.

Textbook Support Web Site

Visit the support Web site for this textbook at www.cengage.com to find free Instructor and Student resources. Instructors can find the Instructor's Manual/Test Bank and PowerPoint slides.

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David N. Hyman
Raleigh, North Carolina

Brief Contents

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PART 1

Chapter 1

INDIVIDUALS AND GOVERNMENT

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Use a production-possibility curve to explain the trade-off between private goods and services and government goods and services.
- Describe how the provision of government goods and services through political institutions differs from market provision of goods and services and how government affects the circular flow of income and expenditure in a mixed economy.
- Explain the difference between government purchases and transfer payments and discuss the growth of government expenditures in the United States and other nations since 1929.
- Discuss the various categories of federal, state, and local government expenditures in the United States and the way those expenditures are financed.
- Determine some of the issues that must be addressed to evaluate the costs and benefits of government activities.

The role of government in society has been and will always be controversial. Some people believe government does too much while others believe it needs to do more. Many look to government to solve problems important to them but would rather not have it engage in activities that benefit others. No matter what your view of government is, it is clear that its programs and scope have grown significantly from a small share of the economy in the early 1900s to between 30 percent and 60 percent of the economy in modern industrial nations today. Citizens give up substantial amounts of their income each year to pay the taxes necessary to finance government expenditures.

This book is about the government sector of the economy. A framework for analyzing the role of government will be developed. That framework will be used to show why government has grown and the consequences of future growth. We will study both the economic and political aspects of government. Major government expenditure programs will be analyzed. Alternative mechanisms for financing government activity and their economic effects will be discussed, as will issues relating to the government budget deficits and debt.

A major factor influencing the growth of government spending in the United States is the expanding role of governments in financing health care. Government expenditures for health care have risen rapidly in recent years. If current trends continue, federal government spending on health care through its two major health insurance programs, Medicare and Medicaid, could account for more than 50 percent of federal government spending by 2080 as the population ages. State government expenditures for health care have also been increasing significantly. Either tax rates will increase in the future to finance growth in government spending or increased federal budget deficits could impact the economy in ways that either slow economic growth or cause inflation. Of course, another alternative would be to attempt to reduce the rate of growth of federal government spending. Given the projected importance of health care spending in the budget, this is unlikely to be possible without some curbs on spending for health care by governments and significant changes in the health care system in the United States. The government's role in health care is likely to remain a divisive issue.

INDIVIDUALS, SOCIETY, AND GOVERNMENT

What would it be like to live in a nation without government? There would be no system of courts to administer justice. Provision of national defense and homeland security would be difficult or disorganized with no central government to maintain and supply the armed forces. You could forget about such programs as Social Security, unemployment insurance, and welfare that provide income support to the elderly, the unemployed, and the poor or disabled. How would police and fire protection be provided? Driving on roads and over bridges that we take for granted could also be a problem because virtually all the highways, streets, and other public transportation infrastructure we use every day are supplied and maintained by governments or their agencies. There would be no publicly funded elementary and secondary schools. Higher education, which is heavily subsidized by both the federal and state governments, also would be in trouble. Our system of health care depends on government programs to pay the medical bills of many of the poor, the elderly, and veterans. Institutions ranging from medical schools to public clinics and hospitals would have their operations impaired without government support.

Now that you have finished reflecting on what your life would be like without governments, you can better appreciate how much you rely on government services each day. We all benefit from government activities and expenditures. Since 1980, annual government expenditures in the United States averaged one-third of gross domestic product (GDP).

In economics, we study the ways individuals make choices to use scarce resources to satisfy their desires. If you have taken an introductory economics course, you studied the role of markets as a means of establishing prices that influence individual choices to use resources. In this book, you will study the role governments play in allocating resources and how individual choices influence what governments do. You also will study how government policies affect the incentives of workers, investors, and corporations to engage in productive activities.

If you have completed an introductory economics course, one lesson you have learned already is that nothing of value can be obtained without some sacrifice. There are costs as well as benefits associated with the activities of governments. The role of government in society is so hotly disputed because we differ in our assessments of the costs and benefits of government programs. Many people think the role of government in the economy needs to be expanded and look to government to help solve their own problems. Others think the role of government in the economy is already excessive and would like to see its scale of influence reduced.

Government expenditures are financed mainly by taxes. U.S. taxpayers give up more of their income each year to support government activities than they do to satisfy their desires for such basic items as food, clothing, and shelter. Taxes collected by governments in the United States are nearly three times the annual expenditures on food, nearly eight times the annual expenditures on clothing, and more than three times the annual expenditures on housing. The average U.S. household devotes nearly four months of annual earnings to meet its total yearly federal, state, and local government tax obligations. Citizens benefit from the many goods and services made available by governments, but they also pay the costs of these services. We differ in our views about what governments should and should not be doing in part because our valuations of the benefits we get from government differ. We also disagree because of variation in the amount of taxes and other costs each of us pay.

GOVERNMENTS AND POLITICAL INSTITUTIONS

Public finance is the field of economics that studies government activities and the alternative means of financing government expenditures. As you study public finance, you will learn about the economic basis for government activities. A crucial objective of the analysis is to understand the impact of government expenditures, regulations, taxes, and borrowing on incentives to work, invest, and spend income. This text develops principles for understanding the role of government in the economy and its impact on resource use and the well-being of citizens.

Governments are organizations formed to exercise authority over the actions of people who live together in a society and to provide and finance essential services. Many citizens and resources are employed in the production of government services. Individuals pay taxes and, in many cases, receive income financed by those taxes. For example, Social Security pensions, unemployment insurance compensation, and subsidies to the poor are financed by taxes.

The extent to which individuals have the right to participate in decisions that determine what governments do varies from society to society. What governments do, how much they spend, and how they obtain the means to finance their functions reflect the political interactions of citizens. **Political institutions** constitute the rules and generally accepted procedures that evolve in a community for determining what government does and how government outlays are financed. Through these mediums, individual desires are translated into binding decisions concerning the extent and functions of government.

Such democratic institutions as majority rule and representative government offer citizens an opportunity to express their desires through voting and attempts to influence the voting of others. Under majority rule, one alternative (such as a political candidate or a referendum to increase spending for education) is chosen over others if it receives more than half the votes cast in an election. Just as economic theory is usefully applied to analyses of market interaction and individual choice, so can it be applied to political interaction and choices. Modern economics bases the study of government activity on a theory of individual behavior.

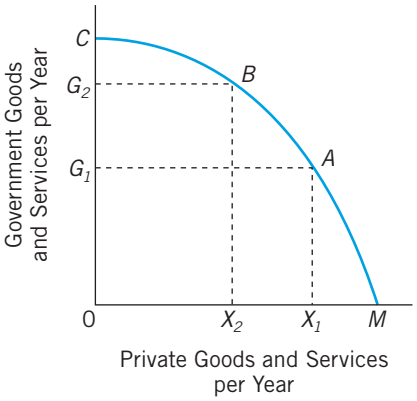
THE ALLOCATION OF RESOURCES BETWEEN GOVERNMENT AND PRIVATE USE

Government provision of goods and services requires labor, equipment, buildings, and land. The real cost of government goods and services is the value of private goods and services that must be sacrificed when resources are transferred to government use. When citizens pay taxes, their capacity to purchase goods and services for their own exclusive use (such as automobiles, clothing, housing, cameras, and dining out) is reduced. Resources that are thereby diverted from private use are purchased or otherwise obtained by government. Taxes also have indirect costs because they distort choices. Taxes affect prices of goods and services and the incentive to work, save, and allocate expenditures among goods and services. Taxes impair the operation of the economy by inducing individuals to make choices based not only on the benefits and costs of their actions but also on the tax advantages or disadvantages of their decisions. The distortion in resource use and loss in output that results from the effect of taxes on incentives is also part of the cost of government activity.

The resources governments obtain are used to provide citizens with goods and services, such as roads, police and fire protection, and national defense. These government goods and services are shared by all and cannot be used by any one citizen exclusively. Other goods and services provided by government are limited in availability to certain groups, such as the aged or children, as with Social Security pensions and public primary and secondary schooling.

The trade-off between government and private goods and services can be illustrated with the familiar production-possibility curve. As shown in Figure 1.1, this curve gives the alternative combinations of government goods and services and private goods and services that can be produced in an economy, given its productive resources and technology and assuming that resources are fully employed. **Private goods and services** are those items, such as food and clothing, that are usually made available for sale in markets. **Government goods and services**, such as roads, schooling, and fire protection, usually are not sold in markets. At point A in Figure 1.1, MX_1

FIGURE 1.1
Production-Possibility Curve



The production-possibility curve shows alternative combinations of government goods and services and private goods and services that can be produced in an economy. The curve assumes that productive resources and technology are given. An increase in government goods from $0G_1$ to $0G_2$ requires a sacrifice of X_1X_2 units of private goods per year.

units of private goods and services are forgone by individuals so that government can provide $0G_1$ units of goods and services. Resources that would have been employed in producing private goods and services are used by the government to provide services and exercise its functions.

An increase in the amount of government goods and services provided per year from $0G_1$ to $0G_2$ requires a reduction in the amount of private goods available per year. In Figure 1.1, the annual amount of private goods available declines from $0X_1$ to $0X_2$ as the economy moves from point *A* to point *B* on the production-possibility curve. For example, suppose that individuals demand more environmental protection services. To make these services available, governments might raise taxes paid by firms that pollute the air or water or they could enact more stringent regulations that prevent pollution. The new regulations or taxes are likely to increase costs of production for business firms, causing the prices of products produced by these firms to increase and the quantities demanded in the marketplace by consumers to decline. The new policies will result in improved environmental quality—a government-supplied good—but will also require that households sacrifice consumption of private goods and services to pay for the cleaner environment.

How Government Goods and Services Are Distributed

Government goods and services are, by and large, distributed to groups of individuals through the use of **nonmarket rationing**. This means that government goods and services are not made available to persons according to their willingness to pay and their use is not rationed by prices. In some cases, the services are available to all, with no direct charge and no eligibility requirements. The provision of national defense services is one strong example of a good that is freely available to all and not rationed by prices. In other cases, criteria such as income, age, family status, residence, or the payment of certain taxes, fees, or charges are used to determine eligibility to receive benefits.

For example, to receive Social Security pensions in the United States, individuals must be of a certain age (or be disabled), have worked for a certain period of time (about 10 years) while covered by Social Security, and must have paid their share of Social Security taxes during that time. Similarly, a fare must be paid to use public transportation facilities in cities. If the fares paid do not cover the full cost of operating the system, then the deficit is made up by taxes levied by the government. To be eligible for elementary schooling in a given school district, children must reside within the boundaries of that district.

In public finance, we study how the means of rationing the use of government goods and services and financing their resource costs affect incentives, resource use, and production possibilities.

CHECKPOINT

1. What are political institutions?
2. Give four examples of government goods or services and discuss how they are distributed to citizens.
3. Use a production-possibility curve to show the cost of increasing government provision of medical service.

THE MIXED ECONOMY, MARKETS, AND POLITICS

The United States and most other nations today have mixed economies. In a **mixed economy**, government supplies considerable goods and services and regulates private economic activity. In such an economy, government expenditures typically amount to between one-quarter and one-half of GDP. Taxes absorb at least one quarter of national income in the typical mixed economy, and governments usually regulate private economic activities and use taxes and subsidies to affect incentives to use resources.

In a **pure market economy**, virt1ually all goods and services would be supplied by private firms for profit, and all exchanges of goods and services would take place through markets, with prices determined by free interplay of supply and demand. Individuals would be able to purchase goods and services freely, according to their tastes and economic capacity (their income and wealth), given the market-determined prices. In mixed economies, provision of a significant amount of goods and services takes place through political institutions.

In a market, buyers are not compelled to purchase something they do not want. Political decisions, however, often compel citizens to finance government services and programs, regardless of their personal preferences.

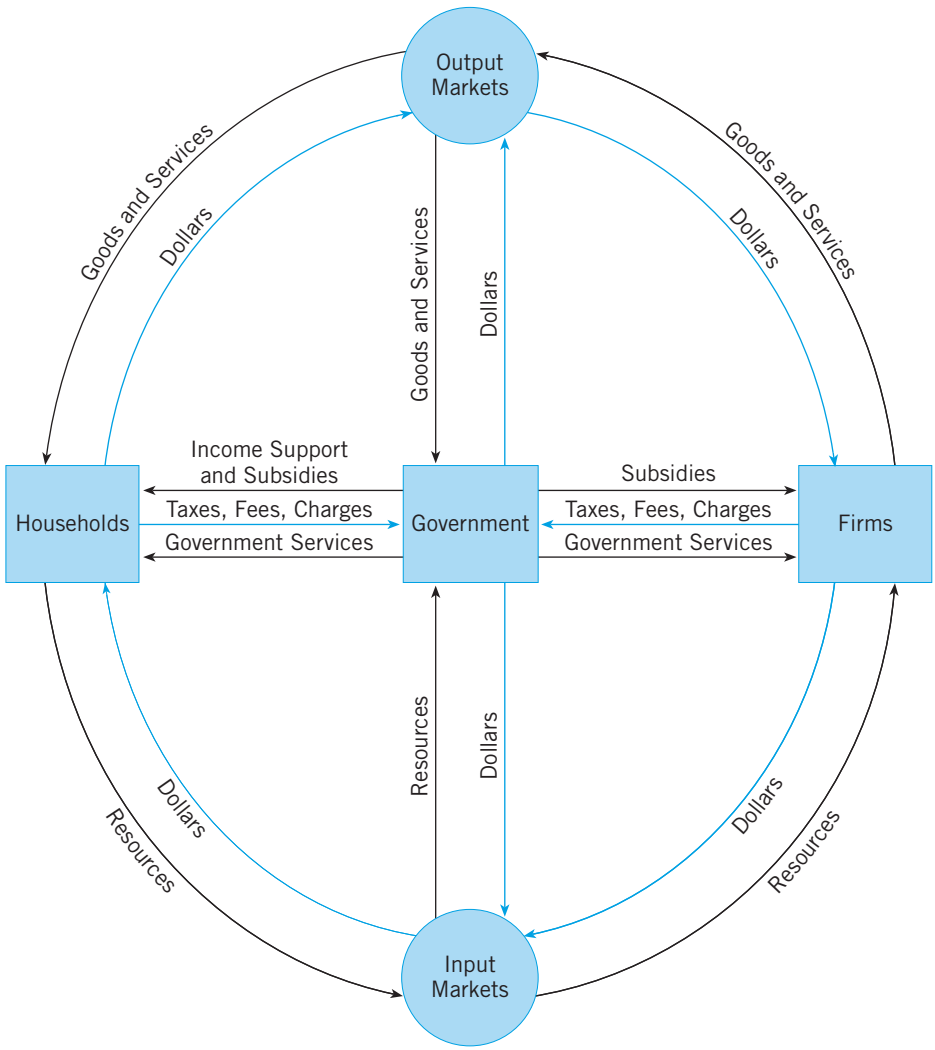
Circular Flow in the Mixed Economy

In a pure market economy, all productive resources are privately owned by individuals who decide how to use these resources. These individuals, together with others living in their households, make decisions about how to use the resources they own. Their decisions are influenced in part by market prices for goods and services. They offer their resources for sale as inputs in the marketplace.

Private business firms are organized to hire resources in input markets to produce goods and services desired by household members. The products, in turn, are sold by businesses to households in output markets.

In a perfectly competitive market economy, no seller can influence prices. Instead, prices are determined by free play of the forces of supply and demand. Given market prices, households decide to sell the resources they own, and firms decide which inputs to buy and what outputs to produce. This process is summarized as a simple circular flow diagram in Figure 1.2. Let's first look at the relationships that would exist in the economy if there were no governments. The lower loop of the

FIGURE 1.2 Circular Flow in the Mixed Economy



The upper and lower loops represent transactions between households and business firms in markets. Households use the income they earn from the sale of productive services to purchase the outputs of business firms. The inner loop represents transactions between households and government and between business firms and government. Governments purchase productive services from households and outputs of business firms. These purchases are financed with taxes, fees, and charges levied on persons and firms, and the inputs acquired are used to provide government services and transfers.

diagram represents the input markets, where households sell the resources to firms for market-determined prices. The upper loop is the output market, where an array of outputs is offered for sale to households, which, in turn, pay for them with the dollars earned from the sale of their members' productive resources. The distribution of income depends on the distribution of ownership of productive resources and the prices and other financial returns that resource owners receive from employment of those resources in production. In a pure market economy, all goods and services would be produced by businesses.

In a mixed economy, the government participates in markets as a buyer of goods and services. Figure 1.2 depicts government activities in the central portions of the diagram. Governments purchase inputs from households and acquire ownership rights of such productive resources as land and capital. Governments use these inputs to provide goods and services that are not sold to households and business firms but are made available through nonmarket rationing. However, governments do sometimes own and operate enterprises such as the postal service, railroads, liquor stores, and state lotteries.

Governments also purchase outputs of business firms such as paper, cars, bricks, and guns. To pay for them, the government requires businesses and households to make various payments such as taxes, charges, and fees and might even require resources be made available for use by the government at rates of compensation below actual market prices (as is the case with compulsory military service). Government uses the productive resources it acquires to produce goods and services including national defense, roads, schooling, police and fire protection, and many other essential services.

With reference to Figure 1.2, the question of size of the public sector is one of allocation of total transactions between the upper and lower loops and the central loops. The central loop transactions are made through political institutions, whereas the upper and lower loop transactions are made through market institutions.

GOVERNMENT EXPENDITURES IN THE UNITED STATES

Let's examine government spending in the United States so that we can get a better idea of the kinds of things governments do in mixed economies. Government spending can be divided into two basic categories: purchases and transfers. **Government purchases** are those that require the diversion of productive resources (land, labor, and capital) from private use by individuals and corporations to their use by the government. For example, to supply national defense services, the government must acquire steel, labor, and other inputs necessary to support the armed forces and maintain aircraft, tanks, ships, and other capital equipment. A municipal government must acquire trucks and hire labor to administer effectively the collection and disposal of garbage.

The bulk of government purchases are *consumption expenditures* that use resources to satisfy current needs. *Gross investment* by government is expenditure for new capital such as roads, equipment, and structures. In 2018, 9.9 percent of government purchases were for investments; the remainder were for consumption.

Government expenditures that redistribute purchasing power among citizens are called **government transfer payments**. These transfer payments constitute a source of income support to recipients who are not required to provide any service in return for the income received. Transfer payments differ from earnings in that they are not payments made in exchange for productive services. You might be surprised to learn that direct transfer payments to individuals constitute more than 50 percent of federal government expenditures in the United States. Included in government transfer payments to individuals are Social Security pension benefits, unemployment insurance benefit payments, and cash payments to low-income families.

Growth of Government Expenditures

Table 1.1 shows government expenditures in the United States from 1929 to 2018. These data reflect outlays each year for federal expenditures, expenditures by state and local governments, and total government expenditures. Ratios of the various categories of government expenditure to GDP in each year provide a rough indication of the relative importance of the government sector's economic activity for each year. Government expenditures are calculated as the sum of government consumption, government transfer payments, and gross government investment as reported in the National Income and Product Accounts (NIPA) for each year since 1929.

The computed ratios provide only a crude index of government activity in the United States. Ideally, an index of the relative importance of government should measure the proportion of total output produced in the public sector. However, measuring government output is virtually impossible because, in most cases, it is not sold or easily measurable in units that can be summed. Actual expenditures are an imperfect proxy for government output.

A further problem with the data is that actual expenditures do not measure the full impact of the government on economic activity. Although the regulatory activities of the public sector increase the costs of producing private goods and services to produce collectively enjoyed benefits (such as cleaner air), these increases are not reflected in Table 1.1.

Despite these limitations, the ratios computed in Table 1.1 provide a rough idea of the extent to which government in the United States has grown since 1929. In 1929, government expenditures accounted for only 9.46 percent of GDP. In 1929, the bulk of government expenditures was undertaken by state and local governing bodies. Federal government expenditures accounted for a mere 2.51 percent of GDP, whereas state and local government expenditures accounted for the remaining 6.95 percent. By 1960, the federal government accounted for 17.8 percent, and state and local government expenditures were only 8.34 percent. The sharp increases in federal expenditures for the years between 1942 and 1945—to more than 40 percent of GDP—reflect the influence of World War II on government activity.

Growth of government spending was rapid after 1960, when total government spending as a percentage of GDP rose from around one-fourth of GDP to nearly one-third of GDP throughout much of the 1970s and 1980s. In the 1980s and 1990s, government expenditures remained around one-third percent of GDP. Total government spending as a share of GDP fell in the late 1990s to a low of 30.36 percent of GDP in 2000. Since 2000, government spending as a share of GDP has resumed its

TABLE 1.1 Government Expenditures in the United States, 1929–2018 (Billions of Dollars)[a]

					PERCENTAGE OF GDP		
YEAR	GDP	FEDERAL GOVERNMENT	STATE AND LOCAL GOVERNMENTS[b]	TOTAL GOVERNMENT	FEDERAL	STATE AND LOCAL	TOTAL
1929	103.6	2.6	7.2	9.8	2.51	6.95	9.46
1930	91.2	2.8	7.9	10.7	3.07	8.66	11.73
1931	76.5	4.1	7.8	11.9	5.36	10.20	15.56
1932	58.7	3.2	6.9	10.1	5.45	11.75	17.21
1933	56.4	3.8	6.4	10.2	6.74	11.35	18.09
1934	66.0	6.2	6.1	12.3	9.39	9.24	18.64
1935	73.3	6.5	6.4	12.9	8.87	8.73	17.60
1936	83.8	8.7	7.0	15.7	10.38	8.35	18.74
1937	91.9	7.3	7.2	14.5	7.94	7.83	15.78
1938	86.1	8.2	7.8	16.0	9.52	9.06	18.58
1939	92.2	9.2	8.2	17.4	9.98	8.89	18.87
1940	101.4	9.7	8.2	17.9	9.57	8.09	17.65
1941	126.7	20.7	7.7	28.4	16.34	6.08	22.42
1942	161.9	56.0	7.4	63.4	34.59	4.57	39.16
1943	198.6	86.1	7.0	93.1	43.35	3.52	46.88
1944	219.8	95.4	7.0	102.4	43.40	3.18	46.59
1945	223.0	85.2	7.5	92.7	38.21	3.36	41.57
1946	222.3	37.2	9.4	46.6	16.73	4.23	20.96
1947	244.2	30.7	11.9	42.6	12.57	4.87	17.44
1948	269.2	33.3	15.9	49.2	12.37	5.91	18.28
1949	267.3	40.7	18.1	58.8	15.23	6.77	22.00
1950	293.8	41.8	19.3	61.1	14.23	6.57	20.80
1951	339.3	58.3	20.3	78.6	17.18	5.98	23.17
1952	358.3	70.8	21.6	92.4	19.76	6.03	25.79
1953	379.4	75.9	23.1	99.0	20.01	6.09	26.09
1954	380.4	69.8	25.8	95.6	18.35	6.78	25.13
1955	414.8	68.2	28.4	96.6	16.44	6.85	23.29
1956	437.5	71.4	30.9	102.3	16.32	7.06	23.38
1957	461.1	79.4	33.7	113.1	17.22	7.31	24.53
1958	467.2	86.7	36.5	123.2	18.56	7.81	26.37
1959	506.6	91.9	38.7	130.6	18.14	7.64	25.78
1960	526.4	93.7	43.9	137.6	17.80	8.34	26.14
1961	544.7	101.7	47.9	149.6	18.67	8.79	27.46
1962	585.6	110.8	50.7	161.5	18.92	8.66	27.58
1963	617.7	114.7	54.4	169.1	18.57	8.81	27.38
1964	663.6	118.8	59.0	177.8	17.90	8.89	26.79
1965	719.1	124.2	64.9	189.1	17.27	9.03	26.30
1966	787.8	144.3	70.4	214.7	18.32	8.94	27.25
1967	832.6	164.1	78.8	242.9	19.71	9.46	29.17
1968	908.8	180.1	88.2	268.3	19.82	9.71	29.52
1969	984.4	189.7	97.0	286.7	19.27	9.85	29.12
1970	1,038.3	205.3	106.9	312.2	19.77	10.30	30.07
1971	1,126.8	221.3	119.4	340.7	19.64	10.60	30.24
1972	1,237.9	245.9	124.8	370.7	19.86	10.08	29.95
1973	1,382.3	262.0	138.7	400.7	18.95	10.03	28.99
1974	1,499.5	295.2	158.6	453.8	19.69	10.58	30.26
1975	1,637.7	357.4	177.8	535.2	21.82	10.86	32.68

(*Continued*)

TABLE 1.1 Continued

YEAR	GDP	FEDERAL GOVERNMENT	STATE AND LOCAL GOVERNMENTS[b]	TOTAL GOVERNMENT	PERCENTAGE OF GDP		
					FEDERAL	STATE AND LOCAL	TOTAL
1976	1,824.6	386.1	189.5	575.6	21.16	10.39	31.55
1977	2,030.1	421.5	201.1	622.6	20.76	9.91	30.67
1978	2,293.8	466.9	218.3	685.2	20.35	9.52	29.87
1979	2,562.2	517.3	245.8	763.1	20.19	9.59	29.78
1980	2,788.1	608.4	274.7	883.1	21.82	9.85	31.67
1981	3,126.8	695.1	305.4	1,000.5	22.23	9.77	32.00
1982	3,253.2	773.6	337.1	1,110.7	23.78	10.36	34.14
1983	3,534.6	855.9	362.5	1,218.4	24.21	10.26	34.47
1984	3,930.9	915.2	397.0	1,312.2	23.28	10.10	33.38
1985	4,217.5	997.8	441.3	1,439.1	23.66	10.46	34.12
1986	4,460.1	1,056.6	482.0	1,538.6	23.69	10.81	34.50
1987	4,736.4	1,095.2	526.9	1,622.1	23.12	11.12	34.25
1988	5,100.4	1,137.3	562.9	1,700.2	22.30	11.04	33.33
1989	5,482.1	1,211.1	610.2	1,821.3	22.09	11.13	33.22
1990	5,800.5	1,307.4	669.5	1,976.9	22.54	11.54	34.08
1991	5,992.1	1,363.2	713.5	2,076.7	22.75	11.91	34.66
1992	6,342.3	1,487.5	746.5	2,234.0	23.45	11.77	35.22
1993	6,667.4	1,534.8	769.3	2,304.1	23.02	11.54	34.56
1994	7,085.2	1,566.5	807.6	2,374.1	22.11	11.40	33.51
1995	7,414.7	1,631.4	848.7	2,480.1	22.00	11.45	33.45
1996	7,838.5	1,697.8	885.4	2,583.2	21.66	11.30	32.96
1997	8,332.4	1,728.8	929.2	2,658.0	20.75	11.15	31.90
1998	8,793.5	1,761.0	973.2	2,734.2	20.03	11.07	31.09
1999	9,353.5	1,828.7	1,046.1	2,874.8	19.55	11.18	30.74
2000	9,951.5	1,900.6	1,120.9	3,021.5	19.10	11.26	30.36
2001	10,268.2	2,014.1	1,206.7	3,220.8	19.61	11.75	31.37
2002	10,642.3	2,162.6	1,260.3	3,422.9	20.32	11.84	32.16
2003	11,142.2	2,329.3	1,295.3	3,624.6	20.91	11.63	32.53
2004	11,853.2	2,465.2	1,361.8	3,827.0	20.80	11.49	32.29
2005	12,623.0	2,667.4	1,442.5	4,109.9	21.13	11.43	32.56
2006	13,377.2	2,799.4	1,520.4	4,319.8	20.93	11.37	32.29
2007	14,028.7	2,996.2	1,640.7	4,636.9	21.36	11.70	33.05
2008	14,291.5	3,286.7	1,736.2	5,022.9	23.00	12.15	35.15
2009	13,939.0	3,699.4	1,651.1	5,350.5	26.54	11.85	38.39
2010	14,526.5	3,906.9	1,631.9	5,538.8	26.89	11.23	38.13
2011	15,094.4	3,926.6	1,708.4	5,635.0	26.01	11.32	37.33
2012	16,163.2	3,763.2	1,849.5	5,612.7	23.28	11.44	34.73
2013	16,768.1	3,762.1	1,900.8	5,662.9	22.44	11.34	33.77
2014	17,348.1	3,896.7	1,897.9	5,794.6	22.46	10.94	33.40
2015	18,036.6	4,023.0	1,961.5	5,984.5	22.30	10.88	33.18
2016	18,624.5	4,210.1	2,059.6	6,269.7	22.61	11.06	33.66
2017	19,485.4	4,254.2	2,184.0	6,438.2	21.83	11.21	33.04
2018	20,494.1	4,482.0	2,252.1	6,734.1	21.87	10.99	32.86

[a]Calendar years based on National Income and Product Accounts (NIPA) and current dollars for each year. Total government expenditure includes government consumption and government gross investment. For 1929–1959, capital transfer payments and net purchases of nonproduced assets are assumed to be zero.

[b]Excludes federal grants-in-aid. State and local government expenditures are calculated as the difference between total government expenditures and federal government expenditures.

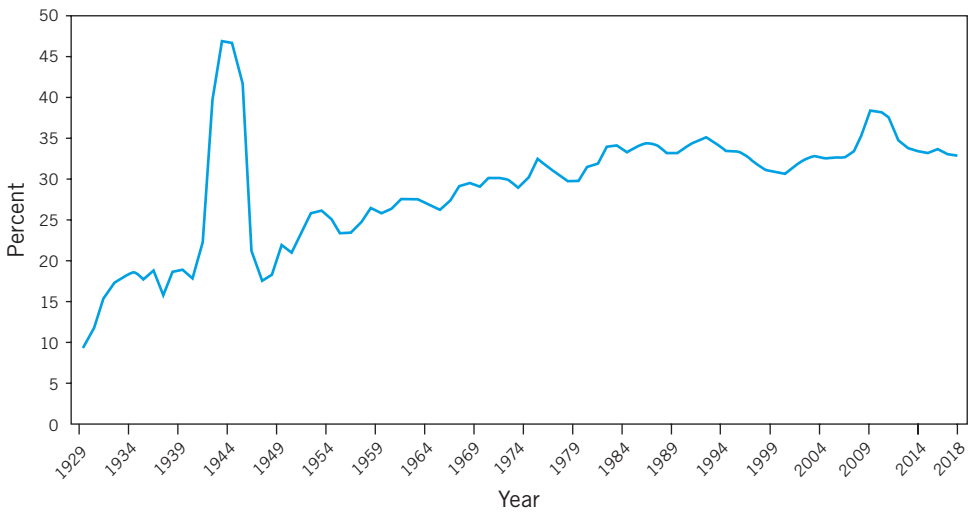
Source: U.S. Department of Commerce, Bureau of Economics Analysis, www.bea.gov interactive NIPA historical tables.

upward march and had risen to 38 percent of GDP by 2010. In 2011, government spending fell slightly to 37.33 percent of GDP. The share of GDP accounted for by federal government expenditures has averaged 22 percent of GDP since 1980. Since 2013 total government spending as a share of GDP in the United States has stabilized at around one-third of GDP. The proportion of GDP accounted for by state and local expenditures, exclusive of that portion financed by federal grants, has ranged between 9 and 12 percent of GDP since 1980.

Federal grants-in-aid are contributions made by the federal government to finance services provided by state and local governments. Their importance increased somewhat in the 1970s, when federal grants rose to more than 3 percent of GDP. In the early 1980s, these grants declined, and by 1990 federal grants-in-aid to state and local governments amounted to merely 1 percent of GDP. Since 1990, grants to state and local governments have increased to nearly 3 percent of GDP. In drawing up the table, such grants are viewed as expenditures on the federal level because they are part of federal programs enacted by Congress. But the funds are actually spent by state and local governments, and their omission from such expenditures tends to underestimate state and local government services relative to federal spending.

The general conclusion that can be reached from Table 1.1, given the limitations of its data, is that the importance of the government sector in the United States has grown tremendously since 1929. Since 1929, total government expenditures rose from one-tenth to nearly one-third of GDP in 1992. From 1992 to 2000, the share of GDP accounted for by government spending declined steadily from 35.22 to 30.36 percent. By 2001, however, government spending started to rise as a share of GDP. Figure 1.3 plots the trend in government spending as a percentage of GDP from 1929 to 2018.

FIGURE 1.3 Total Government Expenditures as a Percentage of GDP, 1929–2018



The share of GDP devoted to government expenditures in the United States has increased dramatically from around 10 percent to around 33 percent since 1929.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, interactive NIPA historical tables.

The proportion of GDP accounted for by government expenditures in the United States is low compared with that of other industrialized nations. Most European nations all devote more than 40 percent of the value of their GDPs to government expenditures. As of 2015 Austria, Belgium, Denmark, Finland, France, Greece, Hungary, and Italy all allocated more than 50 percent of the GDP to government expenditure.

Current government expenditure in the United States is all the more striking when put in historical perspective. Federal government expenditures from 1870 until the beginning of World War I averaged less than 3 percent of GDP. After the end of World War I, federal government expenditures still remained close to 3 percent of GDP until 1930, when federal government expenditures began to grow at a rapid rate. Federal government expenditures increased less than 1 percent per year until 1940. In contrast, federal government expenditures grew at an average of around 8 percent per year from 1948 to 1980.[1]

Similar trends can be observed in other industrialized nations. The United Kingdom historically has had a large government sector. Surprisingly, the home of Adam Smith, champion of the free market economy, was among the nations with the largest government sectors in the world at the beginning of the 19th century. In 1801, Great Britain devoted 22 percent of its GDP to government expenditures.[2] In 2015, government expenditures in the United Kingdom accounted for 42.2 percent of GDP.

Central government expenditures in Sweden at the beginning of the 20th century amounted to less than 7 percent of GDP.[3] Total government spending in Sweden is now 50 percent of GDP!

It probably is not an exaggeration to call the 20th century the century of governmental growth throughout the world.

Structure of Federal Government Expenditure

Breaking down government expenditures into a few major components will help us see which kinds of expenditures have been most responsible for the increase in the importance of the government sector in the U.S. economy.

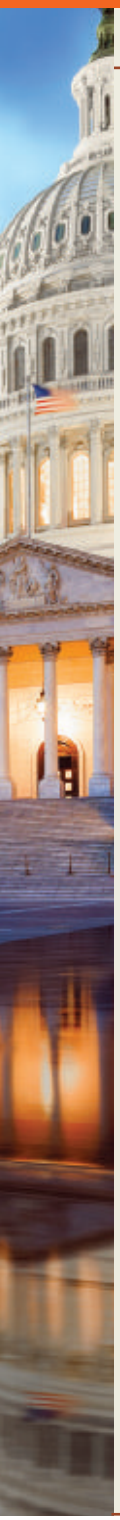
Table 1.2 shows the distribution of federal government expenditure in 2018 among transfer payments, consumption expenditures, and net interest paid on the federal debt. Transfer payments include government social benefits paid to individuals, including Social Security pensions, payments for government-supplied health insurance for the elderly (Medicare) and other social benefits such as cash assistance to the poor and unemployed. Also included in transfer payments are grants-in-aid to state and local governments. Many of these grants also end up financing transfer payments to individuals, including medical insurance for people with incomes low enough to qualify for the Medicaid program and income support for the poor administered by state and local governments. Transfer payments accounted for nearly two-thirds of federal government spending in 2018.

[1]See U.S. Department of Commerce, Bureau of the Census. *Historical Statistics of the U.S., Colonial Times to 1970*. Washington, D.C., 1975 and National Income and Product Accounts.

[2]Based on statistics in Brian R. Mitchell. *Abstract of British Statistics*. Cambridge, England: Cambridge University Press, 1971.

[3]See Brian R. Mitchell. *European Historical Statistics 1750–1970*. New York: Columbia University Press, 1978.

INTERNATIONAL VIEW



How Much Government? The Share of Government Expenditure in Modern Economies

How much government is enough? This is a question that all societies must ask and resolve through their political institutions. In democratic nations, the level of government activity is determined by voting and political interaction in legislatures and through negotiations between leaders. At the extreme, in nondemocratic nations the level of government involvement is determined by dictators or committees that yield political power. For example, for more than 70 years the citizens of the former Soviet Union lived under an economic system that was drastically different from the mixed economies of the Western world. As a centrally planned economy for most of the 20th century, the Soviet Union was dominated by a ponderous government that controlled much of the means of production and regulated most economic activity.

Under central planning, political leaders of the Soviet Union dictated what would be produced through a complex economic plan. Prices set by the planners were not determined by the free interplay of supply and demand in the marketplace; rather, political considerations dominated resource allocation decisions and favored the production of military goods and services and heavy industry. Consumer goods and services were given low priority by the planners, and consumers often found little merchandise in government-run stores; food shortages were common before the Soviet Union dissolved. The Soviet system was inflexible compared to mixed economies with their large market sectors. Prices in the Soviet economy rarely served as signals that influenced incentives to produce goods.

Modern mixed economies have large government sectors that supply such services as national defense, police and fire protection, roads, and education, and they also provide income support and medical insurance for the elderly, the poor, and other groups. The extent of government as a percentage of GDP, the total value of domestic production of a nation, varies considerably among countries. For most modern industrial nations, government expenditures account for between 25 and 60 percent of GDP.

The table on general government spending as a share of GDP in 2015 shows estimates of general government outlays for 2015 calculated by the Organization of Economic Cooperation and Development (OECD) for its member states. The outlays include both current and capital expenditures and spending by all levels of government in a nation. In general, European government spending is higher than that in the United States when expressed as share of GDP. Most European nations have more extensive Social Security systems that often include government-provided health care and other social programs to support incomes. Government spending in many European nations exceeds 50 percent of GDP. In Denmark, the share of government spending was approaching 60 percent of GDP in 2015. The only OECD nations with government spending below 40 percent of GDP are Australia, South Korea, the United States, and Switzerland.

General Government Spending as a Share of GDP, 2015

Australia	36.2
Austria	51.0
Belgium	53.7
Chile	25.2
Costa Rica	32.9
Canada	43.2
Czech Republic	41.7
Denmark	54.5
Estonia	39.6
Finland	57.1
France	56.6
Germany	43.8
Greece	53.5
Hungary	50.1
Iceland	42.5
Ireland	38.8
Israel	39.6
Italy	50.2
Japan	39.4
Korea	32.3
Latvia	38.5
Lithuania	34.9
Luxembourg	42.0
Netherlands	44.5
New Zealand	49.3
Norway	48.8
Poland	41.5
Portugal	48.2
Slovak Republic	45.1
Slovenia	47.7
Spain	43.7
Sweden	49.6
Switzerland	34.0
Turkey	36.3
United Kingdom	42.2

Source: OECD (www.oecd.org).

TABLE 1.2 Federal Government Expenditure by Category, 2018 Calendar Year

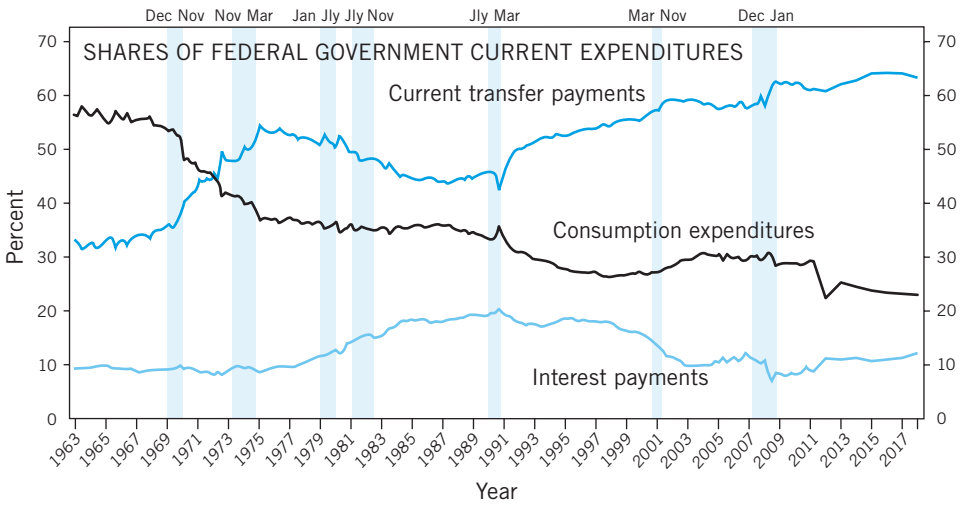
EXPENDITURE CATEGORY	AMOUNT (BILLIONS OF DOLLARS)	PERCENTAGE OF TOTAL FEDERAL EXPENDITURE
Transfer Payments	2,839.0	63.3
Consumption Expenditures	1,032.0	23.0
Net Interest Paid	545.3	12.2
Other	65.7	1.5
Total	4,482.0	100.0

Source: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts.

Net interest paid to holders of federal government securities such as treasury bills, notes, and bonds accounted for 12.2 percent of federal spending in 2018. Only 23 percent of federal government expenditure is accounted for by government purchases for consumption expenditures that provide public services such as national defense, homeland security, education, and transportation services.

Figure 1.4 shows how the distribution of federal expenditure has changed since 1960. Transfers have increased from 30 percent of federal spending in 1960 to over 60 percent in 2018. While the share of federal spending accounted for by transfers has nearly doubled, government purchases for consumption expenditures have declined from 60 percent to less than 30 percent of spending over the same period. This change is of historical importance and reflects the massive

FIGURE 1.4 Distribution of Federal Expenditures, 1963–2018



Since 1963, transfer payments have grown as a share of federal expenditures. (Shaded areas indicate recessions.)

Source: U.S. Department of Commerce, Survey of Current Business, March 2012 and Bureau of Economic Analysis (BEA) interactive tables.

shift to expanded social insurance programs in the 1960s and 1970s, including increases in Social Security pension benefits and indexation of those benefits for inflation, the establishment and growth of the Medicare program that provides health insurance for eligible individuals at age 65, and other programs of income support. In recent years, the growth of the Medicaid program that provides health insurance for the poor has also contributed to the growth of transfer payments.

Interest payments rose from about 8 percent of federal spending in 1960 to a peak of nearly 20 percent of federal spending in 1991, a period of record government deficits and borrowing at high interest rates. Since 2007, despite a soaring federal budget deficit lower interest rates have reduced federal interest payments. Because of both increasing federal budget deficits and the possibility of rising interest rates it is likely that the share of federal government spending going to the payment of interest on the federal debt will rise in the future.

Table 1.3 presents data on the structure of federal government expenditures by major type and function based on NIPA calendar year data. This table is designed to provide information on some of the types of services made available by the federal government.

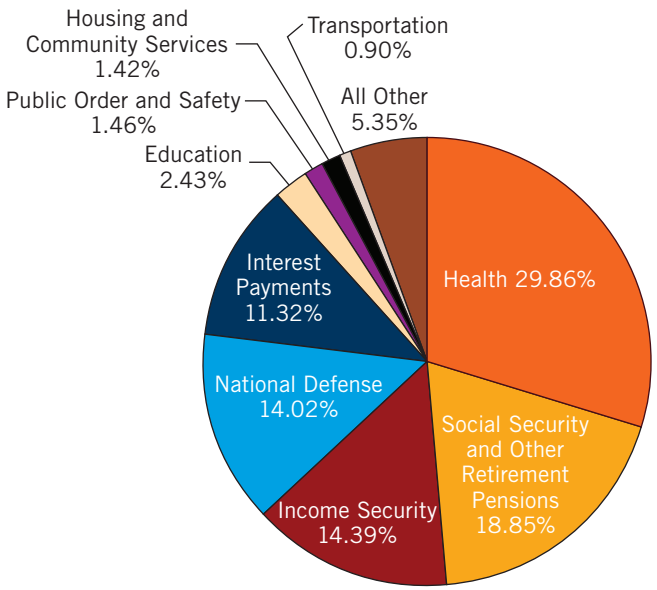
As of 2017 the biggest and fastest-growing category of federal government expenditure was for health; it accounted for nearly 30 percent of expenditure. The two major federal government health insurance programs, Medicare and Medicaid, constituted the bulk of this spending. Medicare provides health insurance for eligible persons over the age of 65 (and some eligible recipients with disabilities who are below that age), while Medicaid provides medical and long-term care to persons whose incomes and assets are low enough to qualify for benefits under the program.

Social Security and other retirement pensions is the second largest category of federal government expenditure accounting for 19 percent of federal spending while income security, which provides support for eligible persons with low incomes or to the unemployed accounts for 14.39 percent of spending. Income support payments, particularly unemployment insurance and food assistance, typically increase substantially during periods of recession. This was the case during the recession of 2007–2009 and its immediate aftermath as high unemployment rates and slow growth in the U.S. economy reduced the incomes of many citizens and caused them to apply for benefits under government income security programs. As the economy recovered from the recession and began to grow more normally in recent years, federal spending for income security has fallen as a share of total federal spending. National defense is the fourth largest category of federal spending account for about 14 percent of the total as of 2017.

A sizable share of federal spending benefits persons 65 and older. The sum of spending for Medicare and Social Security pensions to the elderly account for more than 40 percent of federal spending. The top four categories of federal spending—health, national defense, Social Security, and income security—account for nearly 80 percent of total federal spending! Adding interest on the federal debt, which amounted to 11.2 percent of federal outlays in 2017 to this sum, reveals that only 10 percent of federal spending is accounted for by other types of programs. For example, spending on education by the federal government accounts for only 2.43 percent of its total spending. No other category of federal spending accounts for more than 2 percent of total federal outlays.

TABLE 1.3 Federal Government Expenditure by Function

FEDERAL GOVERNMENT EXPENDITURE BY FUNCTION 2017	AMOUNT (BILLIONS OF DOLLARS)	PERCENTAGE OF TOTAL (%)
Health	1,270.20	29.86
Social Security and other Retirement Pensions	802.10	18.85
Income Security	612.10	14.39
National Defense	596.60	14.02
Interest Payments	481.40	11.32
Education	103.50	2.43
Public Order and Safety	62.30	1.46
Housing and Community Services	60.20	1.42
Transportation	38.30	0.90
All other	227.50	5.35
Total	4,254.20	100.00



*Includes expenditure financed by Federal Grants-in-Aid.
Source: National Income and Product Accounts, Interactive Tables, http://bea.gov. Based on calendar year data.

Mandatory versus Discretionary Federal Government Spending

Federal government spending is usually divided into two major categories: mandatory and discretionary. Mandatory spending is primarily for federal benefit programs, also called *entitlement programs*, for which law determines both eligibility and the formulas for amounts to be received by beneficiaries. The president and lawmakers cannot control mandatory spending in any given year and must abide by the existing

rules and law. However, Congress can over time change eligibility rules and formulas for benefits.

Mandatory spending includes federal expenditures for the major federal health care programs (Medicare and Medicaid), Social Security Old Age, Survivors, and Disability pensions, most income security programs, veterans' benefits, and federal civilian and military retirement programs. Mandatory spending accounted for $2.5 trillion in 2017, which amounted to 13.1 percent of GDP and 63 percent of total federal expenditures. The bulk of mandatory spending—$1.6 trillion in 2017—is for Social Security and Medicare. Mandatory spending has grown in recent years mainly because the bulk of it goes to the elderly and the percent of the population 65 and older has been increasing. Further aging of the population in the future will likely increase mandatory spending unless Congress changes eligibility rules or benefit formulas.

Discretionary spending is federal expenditure that can be directly controlled by lawmakers each year through annual budget appropriation. It is easier for the Congress to alter discretionary spending than to alter mandatory spending. Discretionary spending amounted to $1.2 trillion in 2017 (equal to 6.3 percent of GDP) and accounted for 30 percent of federal expenditure. One-half of discretionary spending is for national defense. As transfers have increased as a share of federal spending over time, the share of the federal budget going to discretionary spending has declined.

An additional category of federal spending is *net interest*, which is the federal government's interest payments on debt held by the public offset by any interest income the government receives. Net interest amounted to 1.4 percent of GDP in 2017 and is likely to increase as the budget deficit and interest rates increase. Although this category of federal spending is not considered mandatory, because it is not based on formulas or eligibility rules, it must be paid each year to holders of the federal debt to avoid changes in the federal government's credit rating. Reneging on the interest on the federal debt would have major implications for credit markets and would likely increase interest rates at which the federal government could borrow in the future.

THE STRUCTURE OF STATE AND LOCAL GOVERNMENT EXPENDITURE

In contrast to U.S. federal government spending, the 50 state governments in the United States, along with thousands of local governments, spent more than $2.7 trillion in 2017, of which $559.3 billion was paid for by grants from the federal government.

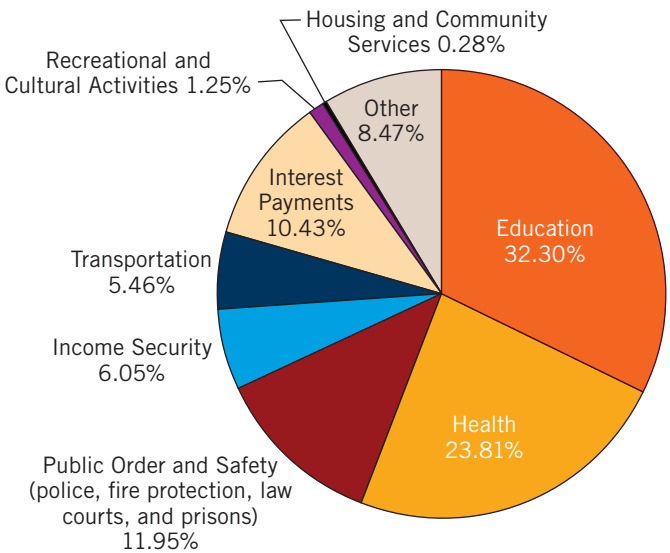
Education is the most important category of state and local government spending. In 2017, education expenditures accounted for one-third percent of state and local government outlays. Local governments are primarily responsible for providing elementary and secondary education, but state governments assist local governments by providing significant grants-in-aid, and in some cases, financing such expenditures as teacher salaries. States also provide higher education through state colleges, universities, and community colleges.

Health care is the second most important category of spending by state and local governments, accounting for nearly one-quarter of spending in 2017. Much of the spending is for Medicaid, which is partially funded by the federal government. In recent years, state governments have been assigned more responsibility for providing health care for the poor. Although much of the health care expenditure is financed by federal grants, these expenses are growing rapidly and straining state finances.

TABLE 1.4 State and Local Government Current Expenditures by Function, 2017*

STATE AND LOCAL GOVERNMENT EXPENDITURES 2017	AMOUNT	PERCENTAGE (%)
Education	886.2	32.30
Health	653.3	23.81
Public Order and Safety (police, fire protection, law courts, and prisons)	327.8	11.95
Income Security	166.0	6.05
Transportation	149.8	5.46
Interest Payments	286	10.43
Recreational and cultural activities	34.2	1.25
Housing and Community Services	7.7	0.28
Other	232.3	8.47
Total	2,743.3	100.00

State and Local Government Expenditures



*Includes expenditure financed by Federal Grants-in-Aid.
Source: National Income and Product Accounts, Interactive Tables, http://bea.gov. Based on calendar year data.

Public order and safety, which includes police and fire protection, law courts, and prisons, accounted for 12 percent of spending by state and local governments in 2017. State and local governments spent 6 percent of their budgets on income transfers and 5.46 percent on transportation. Both income security and transportation are partially funded by grants from the federal government, which has become an important source of finance for state and local governments.

Table 1.4 and its accompanying pie chart show the major categories of state and local government spending in 2017. The pie chart details the distribution of spending.

Although state governments have now taken on major responsibility for health programs mainly through Medicaid, local governments shoulder most of the responsibility for primary and secondary education. Education accounts for around 37 percent of local government spending in the United States. Although states also spend quite a bit on education, the bulk of what they spend is for higher education. State governments do, however, provide some grants to local governments to assist with financing education. The amounts vary from state to state, with some states such as Hawaii and North Carolina providing much of the spending for primary and secondary education and other states providing almost nothing. Local governments also spend quite a bit of their budgets on utilities such as water and sewer; sanitation, including solid waste disposal, pensions for local government retirees, and unemployment compensation. Health expenditures accounting for 9 percent of local government spending is mainly for hospitals. Transportation accounts for a bit more than 5 percent of local government spending and is mainly for roads and highway maintenance.

FINANCING GOVERNMENT EXPENDITURE IN THE UNITED STATES

Taxes, the principal means of financing government expenditures, are compulsory payments that do not necessarily bear any direct relationship to the received benefits from government goods and services. For example, the right to receive the benefits of national defense services or to use public roads is not contingent on payment of taxes. A citizen who pays $10,000 a year in taxes is defended equally and has no more right to use public roads than the individual who pays little or no taxes.

Determining the means of financing government functions is a public choice that is likely to be based on many important considerations. Because taxes are compulsory payments required under the powers of authority of government, many citizens believe that taxes should be distributed fairly. However, citizens often differ in their ideas concerning what is a fair distribution of the burden of finance.

Taxes affect economic incentives to produce and consume or to use productive resources in the most gainful way. When part of the gain from a transaction has to be surrendered to the government, the willingness to engage in that activity is naturally reduced. High taxes on interest from savings tend to reduce the incentive to save. Taxes on various consumer goods tend to reduce the amounts of these goods that will be consumed. Taxes on labor earnings can also reduce the incentive to work.

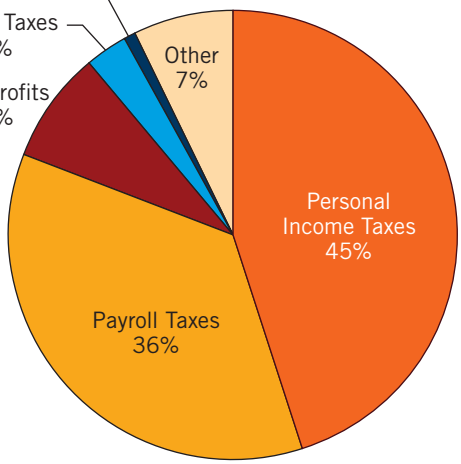
In evaluating alternative means of financing government, desires for fairness in taxation must be balanced with the possible harmful effects of taxes on incentives to produce, consume, and invest. At the extreme, very high taxes on those with high earnings and low taxes on those with low earnings can promote economic equality of income. However, this goal is likely to be achieved at the cost of reduction in incentives for producers to use their resources in activities for which the social returns to production are the highest.

The pie charts in Figure 1.5 provide data on government finances. In 2017, the two major sources of revenue for the federal government were income and payroll taxes, which together accounted for 82 percent of government receipts. (Payroll taxes are paid by workers and their employers to finance social insurance programs, including Social Security.) Corporate profit taxes accounted

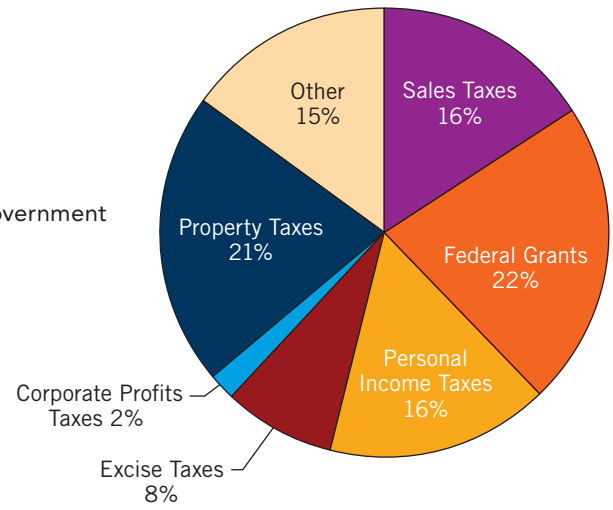
FIGURE 1.5

Government Receipts, 2017

Federal Revenues 2017.



State and Local Government Revenues 2017.



Source: U.S. Dept of Commerce, Bureau of Economics Analysis, Interactive Tables, http://bea.gov.

for 8 percent of federal receipts in 2017. Federal revenues from the corporate profit tax have declined substantially in recent years from 13.2 percent of revenues in 2011 to only 8 percent in 2017. Because Congress reduced corporate profits tax rates substantially beginning in 2018, revenues from this source are likely to decline still further in coming years. Excise taxes, such as those levied on fuels, telephone service, tires, cigarettes, and alcoholic beverages, accounted for 3 percent of federal revenues in 2017.

For state and local government combined, the largest source of revenue is from federal grants accounting for 22 percent of receipts. The bulk of these grants are for

vendor payments to medical care providers and hospitals that treat patients insured under the Medicaid program. Property taxes are the major source of finance for local governments. State governments rely heavily on sales taxes and income taxes, which combined account for one third of state and local government revenue. Some local governments also impose income taxes and local government sales taxes are often "piggy-backed" on top of state sales taxes. Excise taxes on goods and services account for 8 percent of combined state and local government receipts.

CHECKPOINT

1. What is a mixed economy? How does an increase in government taxation and purchases affect the circular flow of income and expenditures in a mixed economy?
2. What is the difference between government purchases and government transfer payments?
3. List the major categories of federal government expenditure and revenue in the United States.

MARKET FAILURE AND THE FUNCTIONS OF GOVERNMENT: HOW MUCH GOVERNMENT IS ENOUGH?

Why do we demand government services? How much government is enough? As citizens, each of us has opinions about what governments should or should not be doing. An economic analysis of government seeks to evaluate the costs and benefits of government activities and also explain the way government spending, regulations, and finance affect resource use and the distribution of well-being in a society.

One reason we demand government services is that, in many cases, the government can provide us with items that we cannot easily make available for ourselves or purchase from others in markets. For example, governments establish property rights to the use of resources and enforce contracts by providing a system of law enforcement and courts. Government power is exerted through these functions to establish rules that regulate the social interaction among individuals and to settle disputes among citizens. It is almost inconceivable to imagine a society functioning without these rules—and without a government.

Political theorists of the 19th century called the willing submission of individuals to the authority of government the *social compact*. The existence of government gives rise to further demands for its powers to be used to supply various services to its citizens. Governments also use their power to redistribute income and economic opportunity among citizens. For example, the federal government uses tax revenues to provide income support for elderly, unemployed, and poor citizens. Another function is to stabilize economic fluctuations to prevent the waste associated with unemployment of productive resources and the undesirable consequences of inflation. Finally, governments regulate production and consumption to achieve such goals as improved health and the elimination of excessive monopolistic control over prices.

The growth in government spending since 1929 reflects increased demands for government services that markets fail to provide. Demands for social insurance, such as Social Security old-age pensions, unemployment insurance, and government-financed health insurance to the aged and the poor, are responsible for much of the growth of government spending since 1970. National defense is also a service that we cannot purchase for ourselves in markets and has accounted for many billions of dollars in federal government outlays.

But has government grown too much, too rapidly? Do the costs outweigh the benefits of some government functions and services? Could some government services be dispensed with entirely, allowing the resources they absorb to be used elsewhere and allowing a reduction in taxes paid? Should government assets and enterprises such as the postal service be sold to private firms to be operated for profit? Have tax-financed Social Security pensions become more generous than initially intended?

How much should governments do, and how much should be left to private enterprise and initiative through market sale of goods and services? This is the core question that occupies much of the first part of this textbook. Once we have established the basis for government activity, we can examine the impact of government finance on private incentives and resource use.

AGING POPULATIONS: IMPLICATIONS FOR PUBLIC FINANCE

The world is getting older. Not just physically—the average age of the population is rising. The aging of populations varies among nations with the effects being most pronounced in the more developed nations, including the European Union, the United States, Japan, and China. In less developed nations, populations are still relatively young, and aging is imperceptible in the least developed nations.

World population quadrupled in the 20th century. In the 21st century, world population is projected to increase by only 50 percent and is likely to stabilize by the end of the century. Declining population growth is a by-product of economic development. As incomes rise, total fertility rates (measured by births per woman) decline while improved access to health care increases life expectancy at birth.[4] For example, total fertility rates in the United States fell from about 3.5 births per woman in 1950 to about 1.89 births per woman in 2019. Declines in fertility rates are even more pronounced in China, where the rate has fallen from more than 6 in 1950 to about 1.63 in 2019. These rates are not projected to increase substantially through 2050. Life expectancy at birth in the United States was 69 in 1950 but is projected to be nearly 85 by 2050. In China, life expectancy at birth was 40 in 1950 but is projected to be more than 80 by 2050. In short, over the next 50 years we can expect to see more old people around living longer and higher percentages of the elderly as a share of total population. Table 1.5 shows observed and forecasted percentages of the population 60 years of age and older for the years 2015 and 2050. Notice that

[4]For a discussion of the demographics of aging of the population, see Leonid A. Gavrilov and Patrick Heuveline. "Aging of the Population" in *The Encyclopedia of Population*. New York: Macmillan Reference USA, 2003. Also see "Global Population Aging in the 21st Century and Its Economic Implications," A CBO Paper. Washington, D.C.: Congress of the United States, Congressional Budget Office, December 2005.

TABLE 1.5 Population Aging: Percentage of Elderly (aged 60 and older) to Total Population in the World, Selected Regions, and Countries

REGION OR COUNTRY	2015	2050
World	12.3	21.5
Latin America & Caribbean	11.2	25.5
Africa	5.4	8.9
China	15.2	36.5
India	8.9	19.4
Japan	33.1	42.5
United States	20.5	27.9
Europe	23.9	34.2
Italy	28.6	40.7
Spain	24.4	41.4
Germany	27.6	39.3
Sweden	25.5	29.6

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2015 Revision.

Japan, Italy, Spain, and Germany are all expected to have around 40 percent of their population at age 60 and more by 2050. The aging of the population is less pronounced in the United States, where only 27.9 percent of the population is projected to reach age 60 or older by 2050. Japan is the nation where aging of the population will be most extreme, with 42.5 percent of the total population expected to be age 60 or older by 2050. Japan is actually projected to have one-sixth of its population aged 80 or more by 2050!

Population aging has a profound impact on public finance and government budgets. Most of these effects stem from increased old-age support ratios, measured by the ratio of the population aged 20 to 64 to 65 years of age and older. This is an indicator of the proportion of active workers to retirees in a nation or region. Because people younger than 65 are likely to be in the labor force and their income generates taxes to pay for government programs (including Social Security pensions), as the old-age support ratio falls, a smaller percentage of the population is likely to be productive, taxpaying citizens whose efforts generate taxes to finance government programs. For example, an old-age support ratio of 2 indicates that on average, there are two people of working age for each retiree (assuming workers on average retire at age 65). The working population must generate enough tax revenue to pay for all government programs, including Social Security pensions, to avoid government deficits unless some taxes are paid by the elderly. Government expenditure for health care also rises as the population ages because the prevalence of chronic diseases and disability increases with old age. Most European Union nations and Japan, for example, are projected to have old-age support ratios of between 2 and 2.6 by 2050. Old-age support ratios are projected to be in the range of 2.7 for the United States and 3.6 percent for China by 2030. Table 1.6 shows support ratios based on United Nations data and projections for major world regions

TABLE 1.6 Old Age Support Ratios of Population Aged 20–64 to Population Aged 65 and Older (Actual for 2015 and Projected for 2030)

REGION OR COUNTRY	2015	2030
More Developed	3.4	2.4
Less Developed	9.0	5.9
Least Developed	12.8	11.5
United States	4.0	2.7
China	7.1	3.6
Japan	2.1	1.7
Italy	2.6	1.9
Spain	3.3	2.2
Germany	2.9	1.9
Sweden	2.9	2.4
France	3.0	2.2
United Kingdom	3.3	2.6

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2015 Revision.

and selected nations. Notice that Japan is expected to have an old-age support ratio of 1.7 by 2030. This means that there will be fewer than two workers to support each potential retiree in that nation at that time.

The impact of aging of the population in the United States will have significant effects on Social Security expenditures and expenditure for health care under the Medicare and Medicaid programs. The Social Security Administration projects, based on current pension formulas, that Social Security outlays will rise from 5 percent of GDP in 2017 to 6 percent of GDP in 2050 while revenue for Social Security will amount to only 5.5 percent of GDP at that time. This means that the government will either have to cut pensions at that time, increase tax rates, or borrow to finance the deficit.

Predicting the effects of the aging population on the economy and the federal government's budget is difficult. Some forecasts suggest that one-third of GDP could be absorbed by health care by the year 2030, mainly as a result of the aging population and consequent demands on the health care system. Other experts suggest that the elderly in the future will be healthier and more productive than their counterparts today. This could lead to higher growth rates for the economy as the elderly retire later. The resulting increase in productivity and tax revenues for the government could offset the demands that retiring baby boomers place on the health care system and government expenditures for pensions. Others suggest that the percentage of the elderly in the future requiring long-term care will actually decline as the health of older people improves.[5]

[5]See Ronald Lee and Jonathan Skinner. "Will Aging Baby Boomers Bust the Budget," *Journal of Economic Perspectives*, 13, 1 (Winter 1999): 117–140 for a review of studies on the fiscal impact of aging of the population.

Tax rates for Social Security pensions are likely to rise as a result of the aging of the population. However, uncertainties about future mortality, fertility, and immigration rates for the nation make it difficult to project exactly the impact of aging on pensions and tax rates required to finance those pensions. This uncertainty combined with problems in forecasting the health and productivity status of the elderly could mean that the situation is not as grave as forecast or it could actually be worse than the most pessimistic projections. Health is crucial because increased spending for government programs that provide health care for the elderly could absorb as much as 10 percent of GDP.

Another factor is the overall rate of growth of the U.S. economy. Programs to aid an aging population could be financed with lower-than-projected tax rates if real GDP grows faster.

The major programs that provide transfers to the elderly–Social Security and Medicare–remain likely to be under fiscal stress in the future. Despite difficulty in making projections, there is a high probability that large federal budget deficits will result if reforms are not enacted soon. Either tax rates to finance these programs will have to be increased or benefits per recipient will have to decline. One estimate indicates that a 4-percent increase in the payroll tax today might still be insufficient to prevent the Social Security system from spending more per year than it receives in revenues late in the 21st century.[6]

What if nothing is done? The economic implications involving this approach could be devastating because tax rates on a workforce that is a smaller share of the population could soar, and interest rates could increase as government borrows more to cover growing deficits. The higher tax rates on a shrinking workforce and higher interest rates would likely cause economic growth and real GDP per capita to fall as private investment and work effort are choked off. The situation will be even more dire in other developed nations where old-age support ratios will be less those of the United States. Nations such as Spain, Italy, Germany, Japan, and China will face more severe fiscal pressure because of support ratios between 2 and 3 and because in some of these nations, it has been traditional for workers to retire between ages 55 and 65. Unless some of these nations allow more immigration to permit the workforce to expand or convince the elderly to delay retirement, the fiscal consequences of population aging and the impact on their economies could be catastrophic. Given rising government budget deficits and sovereign debt levels, Denmark, the United Kingdom, and Italy have already passed legislation to increase retirement ages for workers.

There is, therefore, some urgency that something be done within the next few years to halt the scenario of growing expenditures and federal deficits that could cripple the U.S. economy. In later chapters of this text, we will examine options to keep both Social Security pensions and Medicare from growing so rapidly as the U.S. population ages.

[6]See Lee and Skinner, p. 135.

SUMMARY

Public finance is the field of economics that studies government activities and alternative means of financing government expenditures. Modern public finance emphasizes the relationships between citizens and governments. Government goods and services are supplied through political institutions, which employ rules and procedures that have evolved in different societies for arriving at collective choices. Increases in government goods and services require decreased private use of resources. Government goods and services are usually made available without charge for their use, and they are financed by compulsory payments (mainly taxes) levied on citizens and their activities. The distribution of the tax burden itself is determined through the political interaction of citizens.

In modern mixed economies, the size of the government sector ranges between one-quarter and one-half of GDP. A major goal in the study of public finance is to analyze the economic role of government and the costs and benefits of allocating resources to government use as opposed to allowing private enterprise and households to use those resources.

LOOKING AHEAD

The following chapter develops a theoretical basis for understanding and evaluating resource allocation. We introduce the concept of efficiency that appears throughout this textbook. Students who wish to review the basic economic theory that serves as a foundation for much of this textbook will find the appendix at the end of this chapter useful.

KEY CONCEPTS

Government Goods and Services
Government Purchases
Government Transfer Payments
Governments
Mixed Economy
Nonmarket Rationing
Political Institutions
Private Goods and Services
Public Finance
Pure Market Economy

REVIEW QUESTIONS

1. List four government services and the benefits they provide to you and your family. Try to put a monetary value on these benefits by thinking about what you would be willing to give up to receive them if they were not available.
2. Make a rough estimate of how much you and your family pay in taxes each year. Compare this estimate with the value of services received from the government. Do you think government provides you with benefits that are worth what you give up in taxes?
3. How does the mechanism for distributing and rationing most government services differ from that for distributing goods through markets?
4. List some major political institutions and indicate how they translate desires into collective agreements.
5. What is a production-possibility curve? Show how such a curve can be used to explain how private goods and services must be sacrificed to obtain government goods and services.
6. What is the real cost of government expenditures? Think about your estimate of the taxes you pay and what you could have purchased with that money.
7. Discuss the trends in government expenditures and outlays as a percentage of GDP.
8. What are the characteristics of the U.S. economy that make it a mixed economy instead of a pure market economy?
9. What is the distinction between government purchases and transfer payments? What is the relative importance of these two types of expenditures in total government expenditures expressed as a percentage of GDP? Why are some government purchases necessary to administer transfer payments by government?
10. List the major sources of tax revenue for the federal government. In what ways do the taxes used by state and local governments differ from those used by the federal government? What other sources finance government in addition to taxation?

PROBLEMS

1. As productive resources and technological know-how increase, a nation's production-possibility curve shifts outward. Use a production-possibility curve to show how resource growth and improvements in technology can allow a nation to increase its production of government goods and services while also increasing its output of private goods and services.
2. Suppose federal, state, and local governments in the United States were to engage in a massive campaign to deal with AIDS, drug abuse, and other health-related problems. The increase in government medical spending would require a massive tax increase. Assuming that resources and technology are fixed, use a production-possibility curve to show the cost of increased government health services.
3. Suppose governments increase spending for Social Security pensions. Explain why the increased government spending for pensions will not appreciably increase government purchases of productive resources or the products of business firms.
4. Explain why interest payments by the federal government would still be a large share of federal expenditures even if the federal government does not run a deficit again for several years.
5. The proportion of the population over 65 has been increasing and is expected to increase further. How does an aging population affect a *state* government's expenditures? Which state programs are expected to cost more as the population ages? How does an aging population affect a state government's tax revenues? Which types of state taxes are likely to see revenue declines as the population ages?

ADDITIONAL READINGS

Buchanan, James M. *Public Finance in Democratic Process*. Chapel Hill: University of North Carolina Press, 1967. Provides a classic economic analysis of the processes through which individual choices are related to collective actions and government policy with respect to both expenditures and finance.

Kaul, Ingeand and Conceicao Pedro (eds.). *The New Public Finance: Responding to Global Challenges*. New York: Oxford University Press, 2006. A collection of essays on global and international issues in the field of public finance and public policy.

Tax Foundation. *Facts & Figures on Government Finances*. Washington, D.C.: The Tax Foundation. Published annually. Provides data and information regarding government spending, revenues, and taxation in the United States.

Wolf, Charles, Jr. *Markets or Governments*. Cambridge, Mass.: The MIT Press, 1993. An analysis of the role of government in a market economy and the failures of government policy. Also discusses the process of transition in formerly socialist countries.

INTERNET RESOURCES

A wealth of current information on government spending and government programs is available on the Internet. In each chapter of this book, we supply the addresses of useful Internet sites with data and information on government programs and taxation. Here are several Internet sources of information useful for research along with some hints for surfing these sites.

www.bea.gov

The home page of the Bureau of Economic Analysis of the U.S. Department of Commerce. This page allows you to access data from the National Income and Product Accounts. In addition to data on GDP, you can find up-to-date data on government expenditures and taxation. Use the interactive tables to find the data you want.

www.whitehouse.gov

The home pages of the president and vice president of the United States provide information about the current administration's policies as well as numerous links to government agencies. You can go to the Web sites of agencies in the Executive Office of the President, including the Council of Economic Advisers and the Office of Management and Budget. Links are provided to Web sites of all the president's cabinet secretaries. This site can serve as an excellent first source when searching for information on government expenditures and finance and current federal government policies.

www.usa.gov

At this site you will find a "gateway to government" for citizens. There are interactive services for citizens and businesses at the site. There are also links to help find information about government programs, such as Social Security, laws and regulations, government publications, and federal statistics. There are also links to state and local government sites. This is a good first stop if you are looking for statistics on government and the economy.

www.senate.gov
This is the home page of the U.S. Senate. Click on Committees to obtain information about ongoing work and committee publications on the federal budget. The following committees provide useful information on government spending and taxation: Appropriations, Budget, Finance, the Joint Economic Committee, and the Joint Committee on Taxation.

www.house.gov
This is the home page of the U.S. House of Representatives. Click on Committees and a wealth of information on government spending programs can be obtained by accessing the "Green Book" of the Ways and Means Committee. This book can be searched to obtain details on all federal transfer and entitlement programs. Other useful committees to access include Appropriations and Budget.

www.state.xx.us
To find information about government spending and taxes in your home state, just replace the *xx* in the address above with your state's postal abbreviation to access your state's home page. Here you can examine your state's budget and its tax system. For example, to access information about North Carolina, simply type: www.state.nc.us.

www.oecd.org
The OECD has 36 member nations. You can obtain information about taxation, government spending, and government programs as well as other economic statistics about the member nations (including the United States) at this site. This is a good place to obtain information on international comparisons among industrialized nations.

Appendix 1

TOOLS OF MICROECONOMIC ANALYSIS

This appendix briefly reviews the tools of microeconomic analysis that are used in this textbook. It outlines the uses of these tools and the insights they can provide. The theories are only briefly described. Students who desire a more intensive review and derivation of relationships should consult a textbook on microeconomic theory.

INDIFFERENCE CURVE ANALYSIS

Indifference curve analysis is a useful tool for understanding choices that people make regarding the purchase and use of goods and services. In this text, indifference curve analysis is also applied to understand choices to give up leisure time to obtain income through work and to give up consumption today for more consumption in the future.

A combination of various goods and services available for consumption over a certain period, say a month, is called a **market basket**. In this book, the market baskets discussed are combinations of one particular good and the expenditures on *all* other goods. For example, in discussing a person's monthly purchases of gasoline, the market baskets consist of a certain number of gallons per month and a certain amount of money to spend on all other goods and services.

Assumptions about Preferences

The basic assumptions underlying indifference curve analysis are as follows:

1. People can rank market baskets in terms of most desired and least desired. For any two market baskets, *A* and *B*, the consumer must prefer *A* to *B*, *B* to *A*, or be indifferent between the two.
2. If basket *A* is preferred to basket *B* and basket *B* is preferred to basket *C*, then basket *A* also must be preferred to basket *C*. Similarly, if a person is indifferent between *A* and *B* and also between *B* and *C*, the person also must be indifferent between *A* and *C*. This is called *transitivity*.
3. People always prefer more of a good to less of it, all other things being equal.
4. The amount of money people will give up to obtain additional units of a given good per time period, while being made neither worse nor better off by the exchange, will decrease as more of the good is acquired. This is the *assumption of declining marginal rate of substitution* of a particular good for expenditures on other goods. It is also called the *principle of declining marginal benefit of a good*.

Throughout this book, assume that these assumptions will hold.

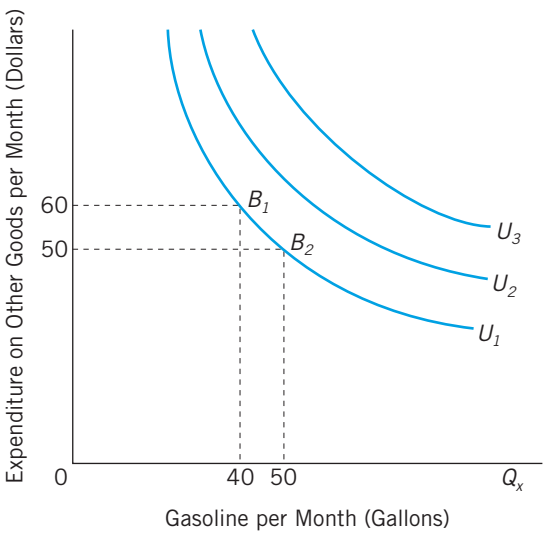
Indifference Curves and Indifference Maps

An **indifference curve** is a graph of all combinations of market baskets among which a person is indifferent. All points on an indifference curve give the person the same level of satisfaction, or utility, per month. The preceding assumptions ensure that the indifference curves between monthly consumption of a particular good X (such as gasoline) and monthly expenditures on other goods will be downward sloping and convex to the origin. Figure 1A.1 graphs an indifference curve, labeled U_1, for monthly consumption of gasoline and monthly expenditure on all other goods. The market basket corresponding to point B_1 on the graph has 40 gallons of gasoline per month and \$60 expenditures on all other goods per month. Point B_2 must correspond to more gasoline but less expenditure on other goods if it is to be a point on the indifference curve U_1. This has to follow from the assumption that people prefer more to less. If the market basket corresponding to B_2 had more gasoline and more expenditure on other goods than basket B_1, the people would be better off. This means that B_2 would be on an indifference curve, such as U_2, that corresponds to a higher level of satisfaction.

The amount of expenditure on goods other than gasoline that a person will give up to obtain another unit of a good X, such as a gallon of gasoline, while not becoming better or worse off, is called the **marginal rate of substitution** of good X for expenditure on other goods, or the **marginal benefit** of a good. It is equal to the slope of the indifference curve multiplied by -1. The assumption that the marginal benefit of a good declines implies that indifference curves become flatter as good X (in this case, gasoline) is substituted for expenditure on other goods in the person's market basket each month.

FIGURE 1A.1

Indifference Curves



Indifference curves are downward sloping. Curves farther out from the origin correspond to higher levels of satisfaction for a person.

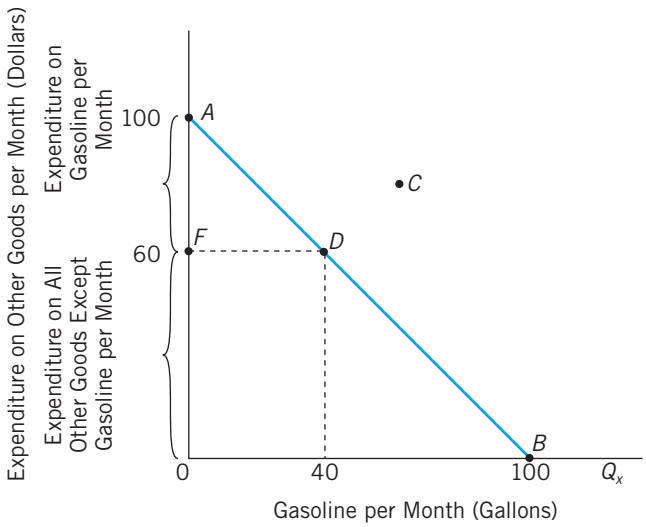
An **indifference map** is a way of describing a person's preferences. It shows a group of indifference curves, as displayed in Figure 1A.1. Because indifference curves farther from the origin include market baskets with more of good *X* and more expenditures on other goods than those closer to the origin, they correspond to more satisfaction. People prefer points on higher curves to those on lower curves. An indifference map describes a person's preferences by indicating how a person would rank alternative market baskets of goods. Market baskets are ranked according to the level of satisfaction, or utility, that they provide the consumer.

The Budget Constraint

The **budget constraint** indicates the monthly market baskets that the person can afford, given monthly income and the prices of good *X* and all other goods. Figure 1A.2 shows a person's monthly budget constraint between gasoline and expenditures on other goods. Assume that the price of gasoline is $1 per gallon and that the person's monthly income is $100. A market basket corresponding to 100 gallons of gasoline per month would exhaust the person's monthly income, allowing no expenditures on other goods. This corresponds to point *B* in Figure 1A.2. Similarly, if the person spent all available monthly income on goods other than gasoline, there would be no gasoline in the monthly market basket. This corresponds to point *A* on the graph. The budget constraint is a straight line connecting these two points. Market baskets corresponding to points on or below the line are affordable. Those above the line, such as *C*, cannot be purchased with available monthly income. This equation of the budget line is

$$I = P_x Q_x + \sum P_i Q_i \qquad (1A.1)$$

FIGURE 1A.2 Budget Constraint Line



The consumer can afford only those market baskets of gasoline and other goods per month on or below the budget constraint line.

where P_x is the price of good X and Q_x is its monthly consumption. The second term represents the sum of expenditure on goods other than gasoline. The market basket that corresponds to point D in Figure 1A.2 is on the budget line. It represents 40 gallons of gasoline per month and \$60 expenditures on other goods. The distance OF on the vertical axis is expenditures on other goods corresponding to point D. The distance AF represents the amount of the person's total income given up to buy gasoline that month. This is \$40 when the price of gasoline is \$1 per gallon.

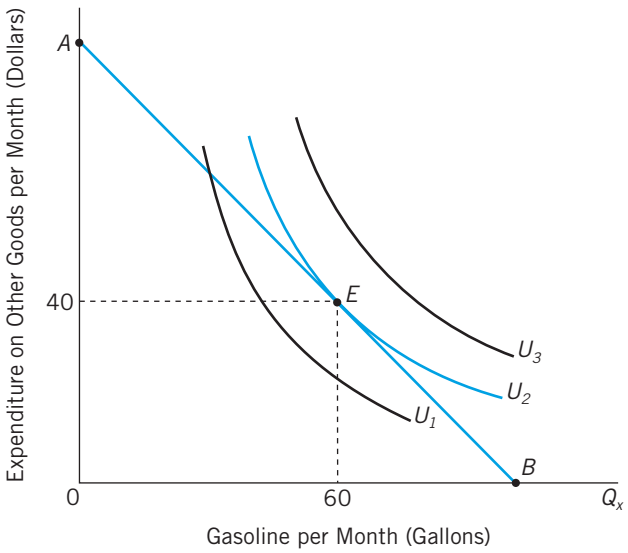
Consumer Equilibrium

The consumer is assumed to behave so as to obtain the most satisfaction (or utility) possible given the budget constraint. The consumer substitutes expenditures on goods other than X for purchases of good X, up to the point at which the highest possible satisfaction is obtained. Because indifference curves are convex, this occurs at a point of tangency between the budget line and an indifference curve. In Figure 1A.3, the consumer equilibrium is represented by point E. The corresponding monthly consumption of gasoline is 60 gallons. The person therefore spends \$40 on goods other than X each month when the price of gasoline is \$1 per gallon.

The **equilibrium condition** is a tangency between the indifference curve and the budget line, implying that the slopes of these two curves are equal. The slope of the budget line is the extra dollars that must be surrendered to obtain each extra gallon of gasoline, which is the price of gasoline multiplied by -1. The slope of the indifference curve is the marginal rate of substitution of gasoline for expenditures on goods other than gasoline per month multiplied by -1. The marginal rate of substitution can be thought of as the marginal benefit of good X.

FIGURE 1A.3

Consumer Equilibrium



The market basket corresponding to point E is the one that gives the consumer the highest possible level of satisfaction given the budget constraint.

The equilibrium condition can be written as

$$-P_x = -MB_x$$

or

$$P_x = MB_x \tag{1A.2}$$

The consumer purchases a good up to the point at which its price equals its marginal benefit.

Changes in Income and Prices

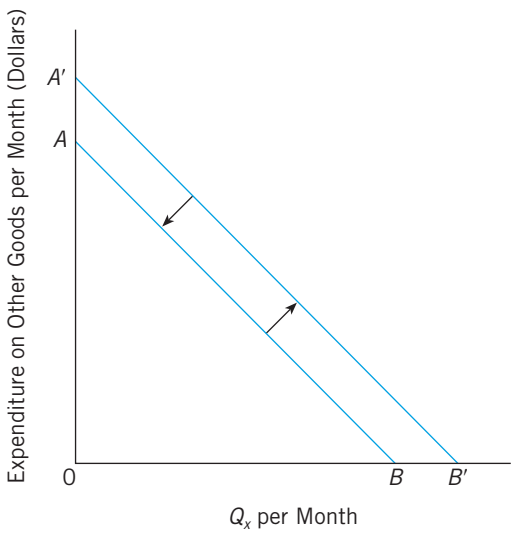
A change in income shifts the budget constraint line in or out parallel to itself without changing its slope. This is illustrated in Figure 1A.4. An increase in income shifts the budget line outward, expanding the number of affordable market baskets. Similarly, a decrease in income diminishes the number of affordable market baskets.

A change in the price of good X changes the slope of the budget line. As illustrated in Figure 1A.5, a decrease in the price of X swivels the budget line outward to a new intercept, B', on the x-axis. The budget line becomes flatter, reflecting the lower price of X. Similarly, an increase in the price of good X makes the budget line steeper as it rotates to point B''.

Income and Substitution Effects of Price Changes

Useful insights are often obtained by dividing the effect of the price change of a good on the amount purchased per month into two separate effects: income effect and substitution effect. The **income effect** is the change in the monthly (or other period) consumption of a good due to the variation in purchasing power of income

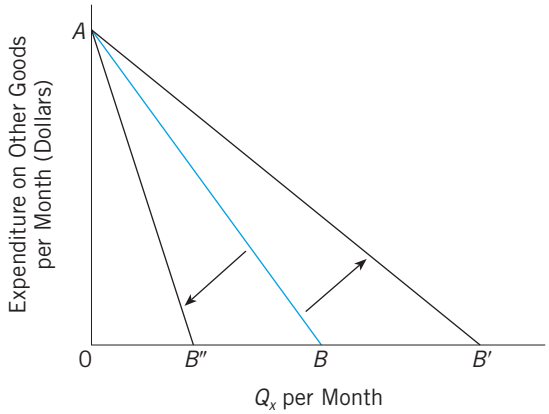
FIGURE 1A.4 Changes in Income



An increase in income shifts the budget constraint line out of parallel to itself. A decrease in income shifts it inward.

FIGURE 1A.5

Changes in the Price of Good *X*



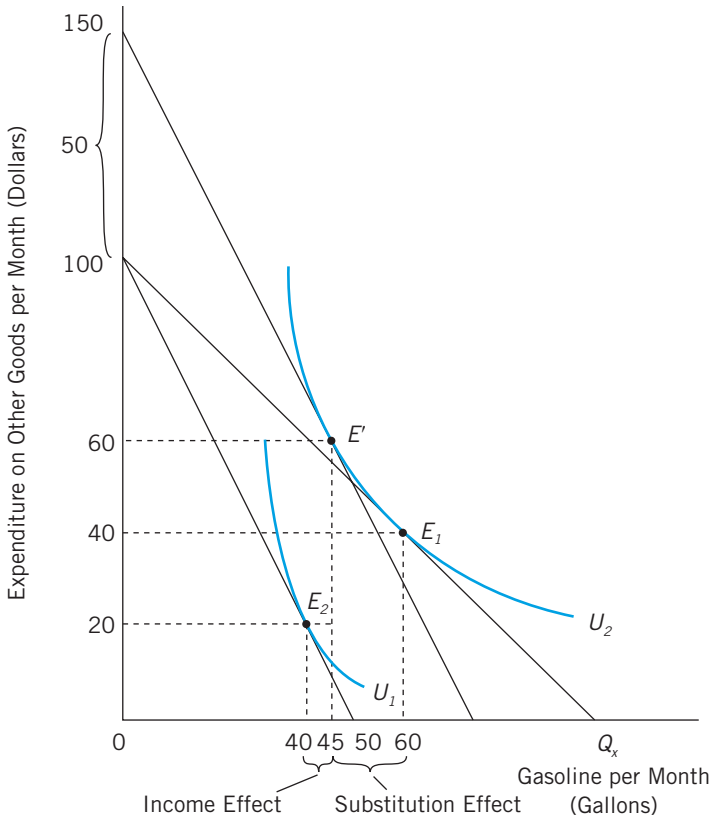
Changes in the price of good rotate the budget constraint line to a new intercept on the x-axis.

caused by its price change. The **substitution effect** is the change in the monthly (or other period) consumption of the good due to the change in its price relative to other goods. This is the change that would be observed if the income effect of the price change were removed. Income and substitution effects can only rarely be observed separately. However, it is useful to show how a person's well-being is affected by each effect.

Figure 1A.6 shows how the substitution effect can be isolated from the income effect. The person whose indifference curves are shown is initially in equilibrium at E_1. Consuming 60 gallons of gasoline per month and spending \$40 per month on other goods, this person's monthly income is \$100. If the price of gasoline goes up to \$2 per gallon as a result of a tax, the budget line would swivel inward. The consumer is now worse off, in a shift from point E_1 to point E_2. At E_2, monthly gasoline consumption falls to 40 gallons per month. The consumer spends \$80 per month on gasoline at the higher price and uses \$20 of the remaining income to buy other goods. Suppose the consumer were offered a monthly subsidy (say, by helpful parents) to help buy gasoline after the price increase. If this monthly increase in income were sufficient enough to return the consumer to indifference curve U_2, where the level of satisfaction is the same as before the price increase, the substitution effect could be isolated.

In Figure 1A.6, a \$50 monthly increase in income returns the consumer to the level of well-being represented by points on the indifference curve U_2. The consumer's total monthly income would now be \$150. The consumer then would be in equilibrium at point E', consuming 45 gallons of gasoline per month at a price of \$2 per gallon (\$90 per month) and spending the remaining \$60 income on other goods. The 15-gallon monthly decrease in gasoline consumption from the initial 60-gallon monthly consumption level is the substitution effect. The remainder of the decrease that would be observed in the absence of the monthly compensating variation in income is an additional 5 gallons per month. This is the income effect. These two effects are labeled separately in Figure 1A.6.

FIGURE 1A.6 Income and Substitution Effects



The substitution effect could be observed if the consumer were given an increase in income to offset the decline in satisfaction caused by the price increase of gasoline.

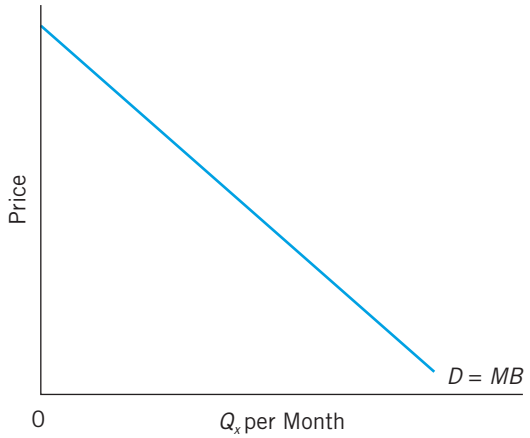
Income and substitution effects are often used in analyzing taxes. For example, taxes that do not affect relative prices but reduce income only have income effects. These taxes are used as benchmarks against which to compare the impact of taxes that have both income effects and substitution effects. The substitution effects stem from the distorting effects that taxes (such as the gasoline tax in this example) have on the relative price of goods and services.

The Law of Demand

For most goods, both the income effects and the substitution effects of price increases tend to decrease the consumption of a good. The opposite is true for price decreases. Goods for which the income effect of a price increase acts to decrease consumption (and for which price decreases have the opposite effect) are called **normal goods**. Throughout this book, the assumption is that all goods and services discussed are normal goods.

The inverse relationship between price and the quantity of a good purchased per time period is the **law of demand**, which holds that demand curves slope

FIGURE 1A.7 The Law of Demand



The demand curve depicts the inverse relationship between price and quantity demanded implied by the law of demand. Points on a demand curve also can be interpreted as the marginal benefit of the various amounts of the good available by month.

downward, other things being equal. Figure 1A.7 shows a demand curve for a good. Movements along that curve in response to price changes are called **changes in quantity demanded**. A shifting in or out of the curve is called a **change in demand**, which can be caused by changes in income, tastes, or the prices of substitutes or complements for the good.

The demand curve also gives information on the maximum price that a consumer will pay for a good. This maximum price represents the marginal benefit of the good to a consumer. Accordingly, the demand curve in Figure 1A.7 is also labeled *MB*. Points on demand curves throughout this book are interpreted as the marginal benefit (*MB*) of the corresponding quantity. Market demand curves are derived from individual demand curves simply by adding the quantities consumed by all purchasers at each possible price.

Price Elasticity of Demand

A useful measure of the responsiveness of quantity demanded to price changes is **price elasticity of demand**, which measures the percentage change in quantity demanded due to a given percentage change in price:

$$E_D = \frac{\%\text{ Change in Quantity Demanded}}{\%\text{ Change in Price}} = \frac{\Delta Q_D / Q_D}{\Delta P / P} \qquad (1A.3)$$

The price elasticity of demand is negative because an inverse relationship exists between price and quantity demanded. The numerator and denominator of Equation 1A.3 always will be of opposite sign. Demand is elastic with respect to price (relatively responsive) when its value is less than −1. Demand is inelastic (relatively unresponsive) when its value is greater (that is, closer to zero) than −1. Demand is said to be of unitary elasticity when its value is just equal to −1.