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December 2018

# STATE AND LOCAL GOVERNMENTS' FISCAL OUTLOOK

## 2018 Update

# GAO Highlights

Highlights of [GAO-19-208SP](#), a report to the Congress

## Why GAO Did This Study

Fiscal sustainability presents a national challenge shared by all levels of government. Since 2007, GAO has published simulations of long-term fiscal trends in the state and local government sector, which have consistently shown that the sector faces long-term fiscal pressures. While most states have requirements related to balancing their budgets, deficits can arise because the planned annual revenues are not generated at the expected rate, demand for services exceeds planned expenditures, or both, resulting in a near-term operating deficit.

This report updates GAO's state and local fiscal model to simulate the fiscal outlook for the state and local government sector. This includes identifying the components of state and local expenditures likely to contribute to the sector's fiscal pressures. In addition, this report identifies considerations related to federal policy and other factors that could contribute to uncertainties in the state and local government sector's long-term fiscal outlook.

GAO's model uses the Bureau of Economic Analysis's National Income and Product Accounts as the primary data source and presents the results in the aggregate for the state and local sector as a whole. The model shows the level of receipts and expenditures for the sector until 2067, based on current and historical spending and revenue patterns. In addition, the model assumes that the current set of policies in place across state and local government remains constant to show a simulated long-term outlook.

View [GAO-19-208SP](#). For more information, contact Michelle Sager, (202) 512-6806 or [sagem@gao.gov](mailto:sagem@gao.gov) or Oliver Richard, (202) 512-8424 or [richardo@gao.gov](mailto:richardo@gao.gov).

December 2018

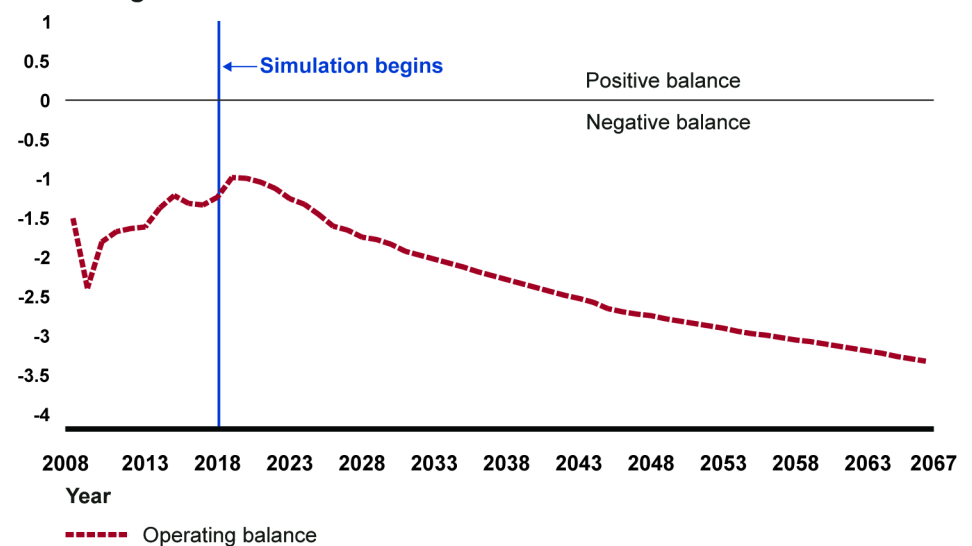
# STATE AND LOCAL GOVERNMENTS' FISCAL OUTLOOK

## 2018 Update

## What GAO Found

GAO's simulations suggest that the state and local government sector will likely face an increasing difference between revenues and expenditures during the next 50 years as reflected by the operating balance—a measure of the sector's ability to cover its current expenditures out of its current receipts. While both expenditures and revenues are projected to increase as a percentage of gross domestic product (GDP), a difference between the two is projected to persist because expenditures are expected to grow faster than revenues throughout the simulation period.

**State and Local Government Sector Operating Balance as a Percentage of Gross Domestic Product (GDP), 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

GAO's simulations also suggest that growth in the sector's overall spending is largely driven by health care expenditures—in particular, Medicaid spending and spending on health benefits for state and local government employees and retirees. These expenditures are projected to grow as a share of GDP during the simulation period. GAO's simulations also suggest that revenues from personal income taxes and federal grants to states and localities will increase during the simulation period. However, revenues will grow more slowly than expenditures such that the sector faces a declining fiscal outlook.

GAO also identified federal policy changes that could affect the state and local government sector's fiscal outlook. For example, the effects of the recently-enacted Tax Cuts and Jobs Act will likely depend on how states incorporate the Act into their state income tax rules. In addition, other factors, such as economic growth and rates of return on pension assets, could shift future fiscal outcomes for the sector.

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## Abbreviations

BEA	Bureau of Economic Analysis
CBO	Congressional Budget Office
CHIP	Children's Health Insurance Program
CMS	Centers for Medicare & Medicaid Services
CPI	Consumer Price Index
GDP	gross domestic product
HHS	Health & Human Services
NIPA	National Income and Product Accounts
OASDI Trustees	the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds
PPACA	Patient Protection and Affordable Care Act
SALT	State and Local Tax
TCJA	Tax Cuts and Jobs Act

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December 13, 2018

Report to the Congress

Fiscal sustainability presents a national challenge shared by all levels of government. The federal government and state and local governments share responsibility in fulfilling important national goals and providing essential services to citizens. State and local governments provide primary and secondary education, health care, libraries, police and fire protection services, social programs, roads and other infrastructure, public colleges and universities, and more. These subnational governments rely on the federal government for significant portions of their revenue. Given the nature of the partnership among levels of government in providing services, understanding potential future fiscal conditions of the state and local government sector is important for federal policymaking.

To provide Congress and the public with this broader context, we developed a fiscal model of the state and local government sector, which we first reported on in 2007 and have regularly updated since.<sup>1</sup> This report updates our state and local fiscal model to simulate the fiscal outlook for the state and local government sector. This includes identifying the components of state and local expenditures that are likely to contribute to the sector's fiscal pressures. This report also identifies considerations related to federal policy and other factors that could contribute to uncertainties in the state and local government sector's fiscal outlook.

To develop simulations of the fiscal outlook for the state and local government sector, we use the Department of Commerce's Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA) as the primary data source and project the level of receipts and expenditures for the sector until 2067, based on current and historical spending and revenue patterns. Our model assumes that historical relationships between taxes and their tax bases persist, that the federal government continues to provide services to people at a level consistent with current policies, and that other current policies and relationships affecting revenues do not change. Our model also assumes that the state

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<sup>1</sup>See appendix III for a list of reports related to this work.

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and local government sector continues to provide levels of services to each resident consistent with current government policies. The model presents results in the aggregate for the state and local government sector as a whole, consistent with the nature of the NIPA source data. Because of this, the fiscal outlook for individual states and localities cannot be identified.

As part of our simulations, we also assess potential fiscal outcomes for the sector using an indicator of fiscal balance called the operating balance. The state and local government sector's operating balance is a measure of its ability to cover expenditures in a given year using revenues collected in the same year. Because subnational governments are generally required to balance or nearly balance their operating budgets, the design of our operating balance measure reflects this characteristic of subnational governments' operating budgets.<sup>2</sup> For additional information on the model's key assumptions, see appendix I.

To identify considerations related to federal policy that could contribute to uncertainties in the sector's fiscal outlook, we reviewed recent legislation, relevant legal precedents, economic literature, our prior reports, and reports from selected think tanks that analyze aspects of fiscal federalism. These think tanks include the Nelson A. Rockefeller Institute of Government, the Pew Charitable Trusts, the Tax Foundation Center for Federal Tax Policy, and the Urban Institute and Brookings Institution Tax Policy Center. We also conducted semistructured interviews on federal and intergovernmental policy issues and related data with associations representing state government officials, including the National Association of State Budget Officers, the National Conference of State Legislatures, the National Association of State Auditors, Comptrollers and Treasurers; specialists from credit rating agencies and their research divisions, such as Moody's Analytics and Standard & Poor's Global Ratings; and senior

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<sup>2</sup>Most states have some sort of requirement to balance operating budgets. To address fiscal pressures and comply with balanced budget requirements, state and local governments may offset increased costs in one program by making cuts to other programs. However, they may have less flexibility to adjust certain types of spending. For example, state and local government employee pension benefits are often defined in state law or local ordinances or charters, and, in that sense, pension benefits for current retirees are largely protected from states' or localities' responses to fiscal pressures. On the other hand, retiree health benefits for those employees may not have the same level of legal protection. Spending on programs such as street paving may have no legal protection, but instead be an implicit commitment grounded in the public's expectations for the provision of government services. Flexibility to adjust revenues may also be constrained explicitly (e.g., caps on tax increases) or implicitly (e.g., tax increases can be politically unpopular).

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officials from the Federal Reserve Bank of Chicago, BEA, and the Congressional Budget Office (CBO). We selected these organizations and related reports based on a literature review and our prior work on state and local government fiscal issues. These interviews primarily focused on tax- and health-related federal policies because of their relevance to our simulation results. Specifically, our simulations have continually suggested that trends in tax revenues and health care spending have contributed to large and recurring fiscal challenges for the sector. The policy considerations we identified are not exhaustive. That is, we did not fully analyze every federal tax- and health-related policy that could create uncertainties for the state and local government sectors' fiscal outlook.

Further, to identify other factors that could contribute to uncertainties in the sector's fiscal outlook, we developed simulations using alternative assumptions of the growth of key model variables to describe how the operating balance measure would respond to changes in the growth projections of key variables over the simulation period. For additional information on our methodology for developing these simulations, see appendix II.

We conducted our work for this model update from February 2018 to December 2018 in accordance with all sections of our Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives, and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this product.



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## State and Local Governments Will Need to Make Policy Changes to Maintain Long-Term Fiscal Balance

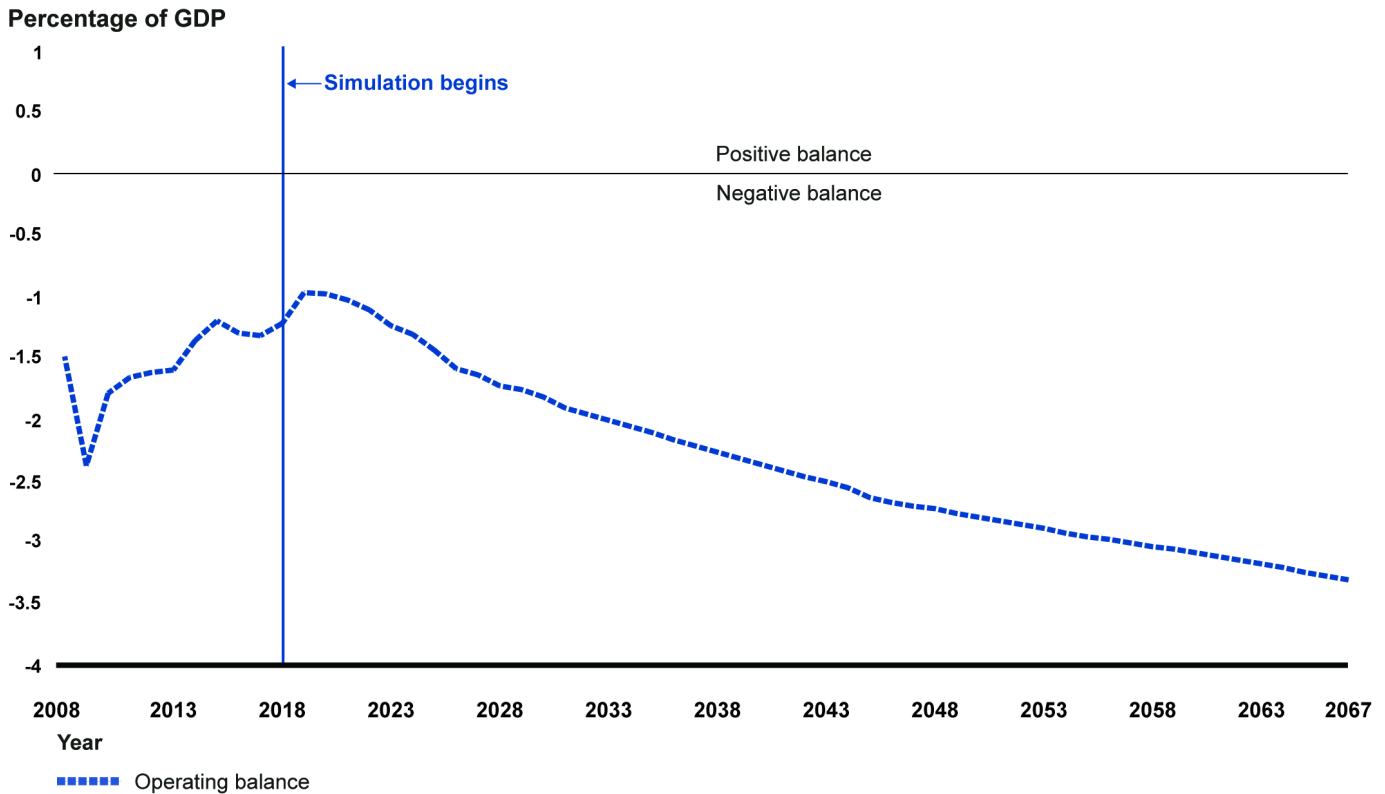
Our simulations suggest that the sector will likely continue to face a difference between revenue and spending during the next 50 years. This long-term outlook is measured by the operating balance—a measure of the sector’s ability to cover its current expenditures out of current receipts.<sup>3</sup> While both expenditures and revenues are projected to increase as a percentage of gross domestic product (GDP) during the simulation period, a difference between the two is projected to persist because expenditures are generally expected to grow at a faster rate than revenues.<sup>4</sup> (see figure 1). Absent any policy changes by state and local governments, revenues are likely to be insufficient to maintain the sector’s capacity to provide services at levels consistent with current policies during the next 50 years. Our simulations suggest that state and local governments will need to make policy changes to avoid fiscal imbalances before then and assure that revenues are at least equal to expenditures.

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<sup>3</sup>The operating balance measure includes all receipts, excluding funds used for long-term investments, less current expenditures. To develop this measure, we subtract funds used to finance longer-term projects—such as investments in buildings and roads—from receipts since these funds would be unavailable to cover current expenses. Similarly, we exclude capital-related expenditures from spending. While most states have requirements related to balancing their budgets, deficits can arise because of unanticipated events such as recessions. These deficits can occur because the planned annual revenues are not generated at the expected rate, demand for services exceeds planned expenditures, or both, resulting in a near-term operating deficit. States have tapped fiscal reserves to cope with revenue shortfalls during recessions, as indicated by their reported total balances, which are composed of general fund ending balances and amounts in state budget stabilization “rainy day” funds. Figure 1 depicts the state and local simulated operating balance only, and does not include fiscal reserves or other budget measures used to cope with revenue shortfalls.

<sup>4</sup>Throughout this report we use GDP to refer to the U.S. GDP.

**Figure 1: State and Local Government Sector Operating Balance as a Percentage of Gross Domestic Product (GDP), 2008 through 2067**

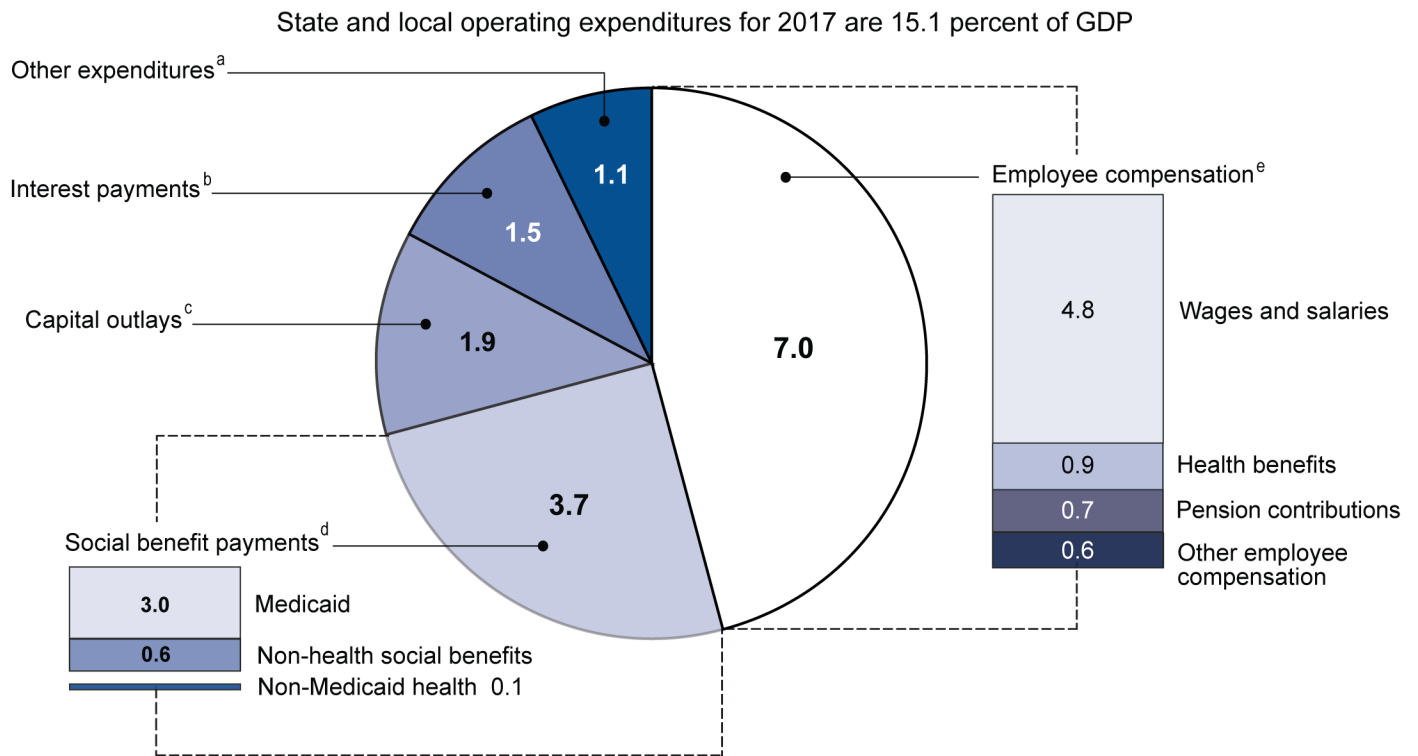


Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: The operating balance is defined as total receipts minus (1) capital outlays not financed by medium- and long-term debt issuance, (2) total current expenditures less depreciation, (3) current surplus of state and local government enterprises, and (4) net social insurance fund balance.

We simulated the state and local government sector’s operating balance (the difference between the sector’s operating revenues and operating expenditures) in order to understand the sector’s long-term fiscal outlook. The sector’s operating expenditures were 15.1 percent of GDP in 2017. As shown in figure 2, these state and local government sector operating expenditures are comprised of employee compensation, social benefit payments, interest payments, capital outlays, and other expenditures. The sector’s operating revenues were 13.8 percent of GDP in 2017. As shown in figure 3, these state and local government sector operating revenues are comprised of taxes, transfer receipts, and other types of revenues.

**Figure 2: State and Local Government Sector Operating Expenditures as a Percentage of Gross Domestic Product (GDP) in 2017**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Notes: Operating expenditures are comprised of the spending components of the operating balance and include employee compensation, social benefit payments, capital outlays, interest payments, and other types of spending. State and local government sector operating expenditures were 15.1 percent of GDP in 2017. Percentages may not add to 15.1 due to rounding.

<sup>a</sup>Other expenditures include subsidy payments to railroads, purchases of intermediate goods, and the net balance of social insurance funds.

<sup>b</sup>Interest payments are payments on actual and imputed interest on outstanding debt.

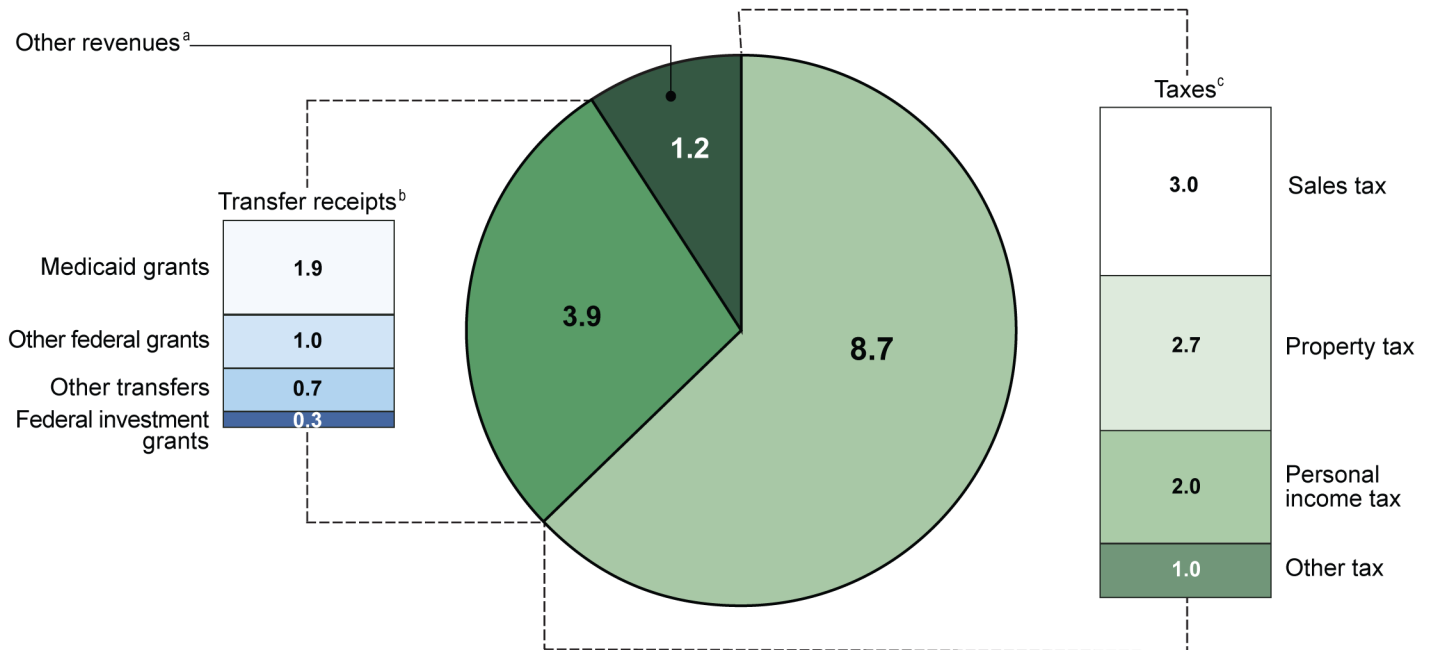
<sup>c</sup>Capital outlays include spending on structures (i.e., residential and commercial buildings, highways and streets and sewer and water systems), equipment, intellectual property, and net purchases of land, excluding payments to states for long-term rights to extract oil.

<sup>d</sup>Social benefit payments are amounts paid to individuals to provide for needs arising from circumstances such as sickness, unemployment, retirement, and poverty. These payments include Medicaid and other general medical assistance, temporary disability insurance, education assistance, and a variety of other needs.

<sup>e</sup>Employee compensation includes wages and salaries, health benefits for employees and retirees, contributions to employee defined benefit pension funds, and other types of compensation, such as life insurance and workers compensation contributions.

**Figure 3: State and Local Government Sector Operating Revenues as a Percentage of Gross Domestic Product (GDP) in 2017**

State and local operating revenues for 2017 are 13.8 percent of GDP



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Notes: Operating revenues are comprised of the revenue components of the operating balance and include taxes, transfer receipts, and other types of revenues. State and local operating revenues were 13.8 percent of GDP in 2017.

<sup>a</sup>Other revenues include the issuance of medium- and long-term debt, interest earned and income from other assets including dividends, rents, and royalties on financial assets; and social insurance contributions (i.e., payments received for items such as disability insurance and workers compensation).

<sup>b</sup>Transfer receipts are receipts for which state and local governments provide nothing in return. Transfer receipts include Medicaid grants, other federal grants excluding Medicaid grants, other transfers (i.e., fines, fees, donations, and tobacco settlements), and federal investment grants (i.e., grants intended to finance capital infrastructure investments).

<sup>c</sup>Tax revenues include receipts from sales tax, property tax, personal income tax and other types of taxes (i.e., estate and gift tax, other personal tax, corporate income tax, and other production and import tax).

One way of measuring the long-term fiscal challenges faced by the state and local government sector is through an indicator known as the “fiscal gap.” The fiscal gap is an estimate of actions—such as revenue increases or expenditure reductions—that must be taken today and maintained for each year going forward to achieve fiscal balance during the simulation period. While we measured the gap as the amount of reductions in

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expenditures needed to prevent negative operating balances, increases in revenues, reductions in expenditures, or a combination of the two of sufficient magnitude would allow the sector to close the fiscal gap.

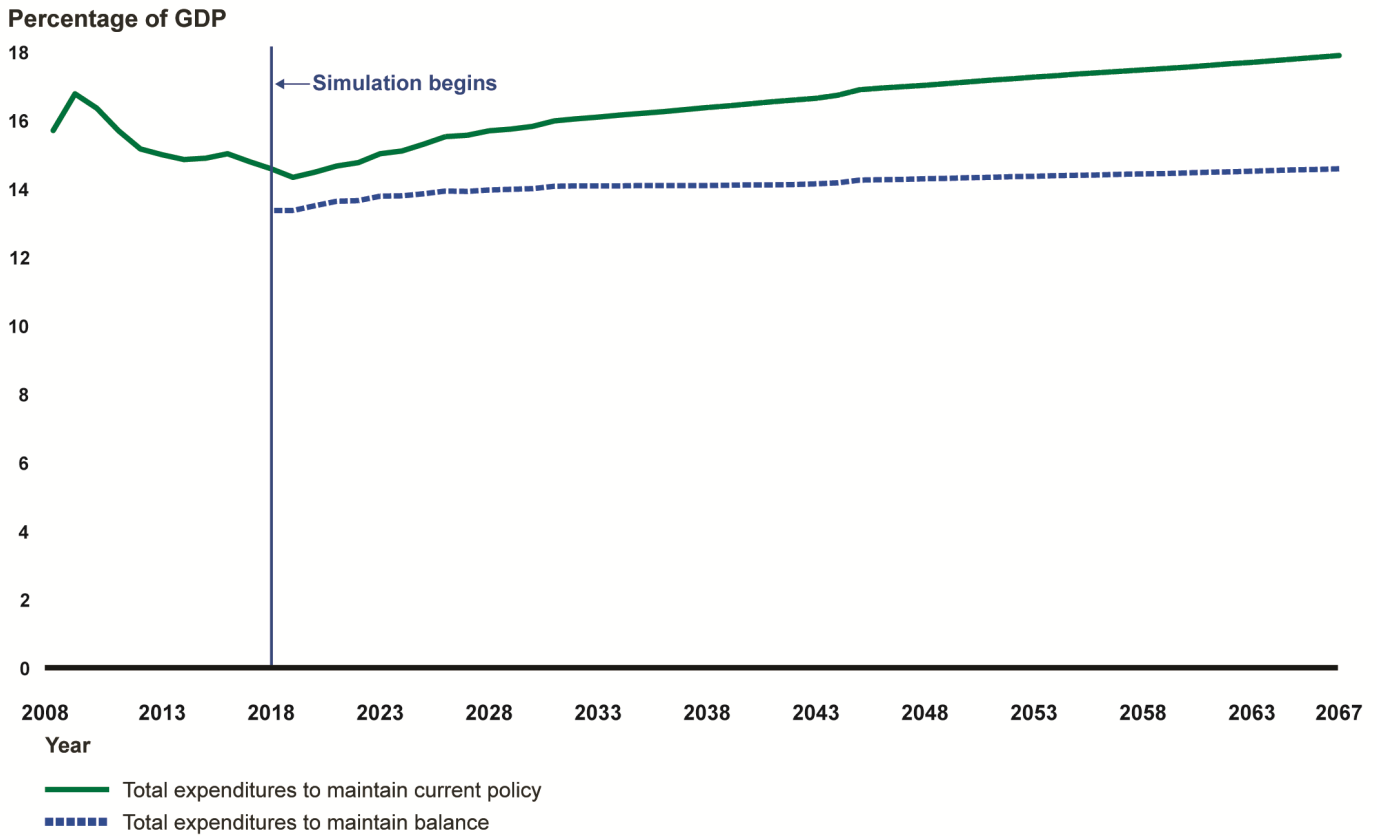
Our simulations suggest that the fiscal gap is about 14.7 percent of total expenditures or about 2.4 percent of GDP. That is, assuming no change in projected total revenues, eliminating the difference between the sector's expenditures and revenues during the 50-year simulation period would likely require action to be taken today, and maintained for each year equivalent to a 14.7 percent reduction in the sector's total expenditures (see figure 4).<sup>5</sup> Alternatively, assuming no change in projected total expenditures, closing the fiscal gap by increasing revenue would also likely require actions of similar magnitude. More likely, eliminating the difference between expenditures and revenues would involve some combination of spending reductions and revenue increases.<sup>6</sup>

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<sup>5</sup>Based on data from BEA, GDP totaled about \$19.5 trillion in 2017.

<sup>6</sup>The "maintain balance" spending path shown in figure 4 is illustrative. Our model assumes no economic effects from closing the state and local fiscal gap. Because abrupt spending declines or tax increases would likely have negative effects on both state and local governments, and the economy as a whole, the adjustments needed to achieve fiscal balance would likely need to be adopted gradually.

**Figure 4: State and Local Government Action Required to Maintain Balance (Expenditure Reductions as a Percentage of Gross Domestic Product (GDP)), 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

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## Health Care Cost Growth and Other Factors Contribute to the State and Local Sector's Fiscal Imbalance

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### Medicaid and Employee Health Benefits Are Key Drivers of Long-Term Spending

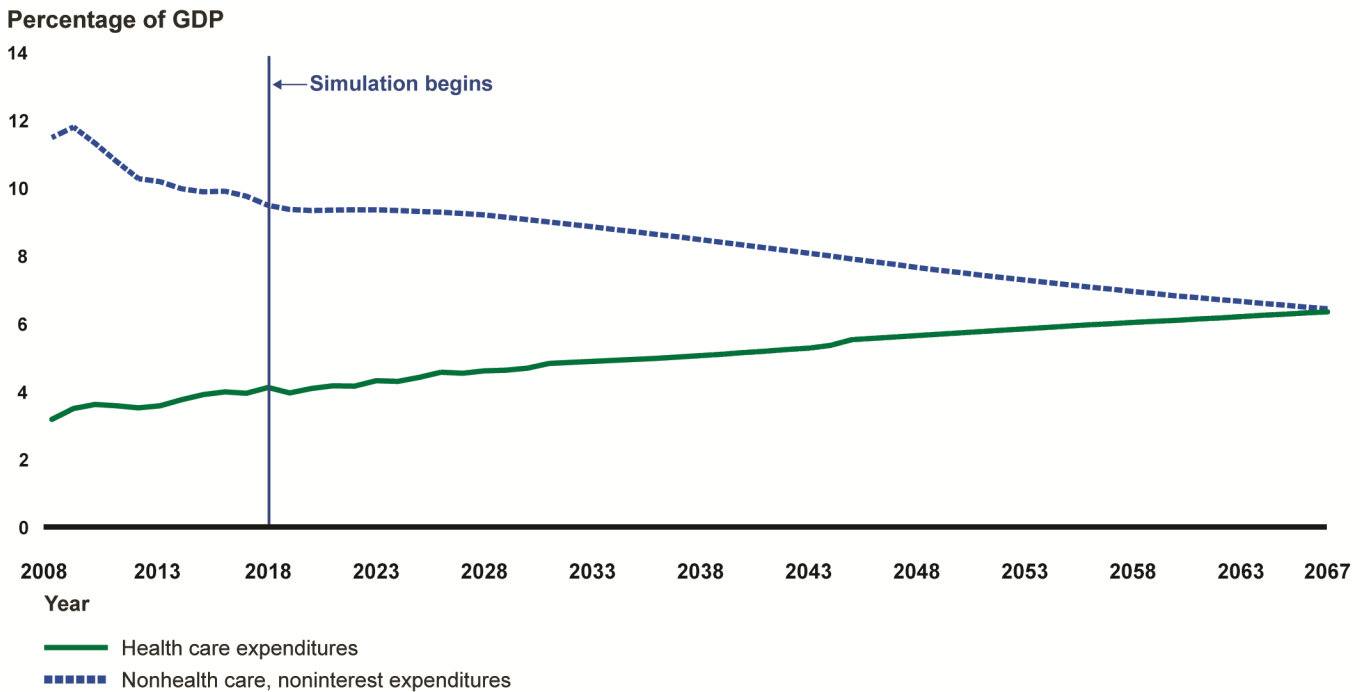
Our simulations suggest that growth in the sector's overall spending is largely driven by health care expenditures. As shown in figure 5, these expenditures are projected to increase from about 4.1 percent of GDP in 2018 to 6.3 percent of GDP in 2067. Two types of health care expenditures—Medicaid spending and spending on health benefits for state and local government employees and retirees—will likely constitute a growing expenditure for state and local governments during the simulation period. Medicaid expenditures are expected to rise, on average, by 1 percentage point more than GDP each year.

According to CBO, growth in Medicaid spending reflects growth in both the number of people receiving Medicaid benefits and the cost of Medicaid benefits each person receives. Specifically, CBO reported that between 2019 and 2028, Medicaid spending is projected to grow at an average rate of 5.5 percent per year—nearly 5 percentage points of this growth is due to an increase in per capita costs and about 1 percentage point of this growth is due to an increase in enrollment. Data from CBO and the Centers for Medicare & Medicaid Services (CMS) also suggest that growth in Medicaid spending per capita is generally expected to outpace GDP growth in the future—referred to as excess cost growth.<sup>7</sup> Our estimates of Medicaid excess cost growth using CMS data suggest that Medicaid spending per capita will grow, on average, about 0.5 percent faster than GDP per capita for the period from 2018 through 2067.

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<sup>7</sup>CBO's long-term projections of federal Medicaid spending incorporate average excess cost growth of about 1.5 percent annually from 2019 through 2028.

**Figure 5: Health and Nonhealth, Noninterest Expenditures of State and Local Governments as a Percentage of Gross Domestic Product (GDP), 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

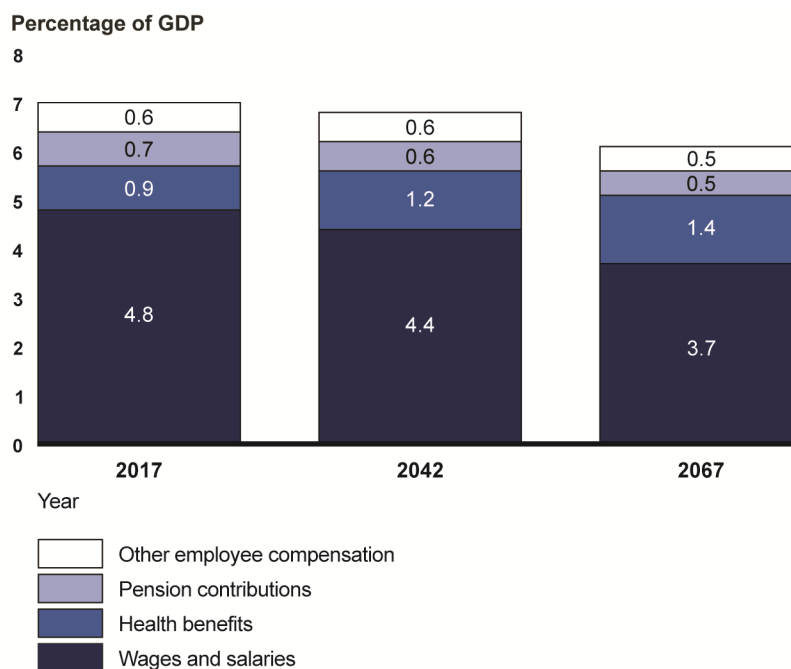
Note: Health expenditures include Medicaid social benefit payments, other social benefit payments for health care, and health benefits for state and local government employees and retirees. Nonhealth, noninterest expenditures include all other operating expenditures other than interest payments.

Our simulations also suggest that health benefits for state and local government employees and retirees—a type of employee compensation spending—are likely to rise, on average, by 0.9 percentage points more than GDP each year. Growth in these health benefits also reflects growth in the projected number of employees and retirees and growth in the projected amount of health benefits for each employee and retiree. Growth in spending by states and local governments on health care per capita, which includes spending on employee and retiree health benefits, is generally expected to outpace GDP per capita. Data from CMS suggest that national health expenditures per capita are likely to grow on average about 0.8 percent faster than GDP per capita each year during the



simulation period from 2018 through 2067.<sup>8</sup> If employee and retiree health benefits follow trends in overall national health spending, they will likely make up an increasingly large share of total employee compensation going forward (see figure 6).

**Figure 6: State and Local Government Sector Employee Compensation as a Percentage of Gross Domestic Product (GDP), 2017 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: State and local government spending on employee compensation includes compensation for general government employees only. Health benefits include health benefits for both active employees and for retirees. Other employee compensation includes benefits, such as life insurance and workers compensation contributions.

While state and local government contributions to employee pension plans—another type of employee compensation spending—will likely

<sup>8</sup>CMS measures national health expenditures as annual health spending in the United States for types of goods or services delivered (hospital care, physician and clinical services, retail prescription drugs, etc.) for sources of funding (private health insurance, Medicare, Medicaid, out-of-pocket spending, etc.) and for businesses, households, and governments.

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decline as a percentage of GDP, as shown in figure 6, our simulations nonetheless suggest that state and local governments may need to take steps to manage their pension obligations in the future. From 1998 through 2007, state and local governments' pension contributions amounted to about 8 percent of wages and salaries on average. In addition, for the period from 2008 through 2017, pension contributions amounted to about 12.3 percent of wages and salaries on average. Our simulations suggest that those pension contributions will need to be about 12.9 percent of wages and salaries for state and local governments to meet their long-term pension obligations.<sup>9</sup> This is the case even though pension asset values have increased in recent years, from about \$2.4 trillion in 2008 to about \$4.2 trillion in 2017 (adjusted for inflation and measured in 2012 dollars).<sup>10</sup> This suggests that state and local governments may need to take additional steps to manage their pension obligations by reducing benefits or increasing employees' contributions.

Along with pension contributions, other types of state and local government expenditures are projected to grow more slowly than GDP. For example, in 2017, wages and salaries of state and local government employees constituted a large expenditure for the sector. However, these expenditures are projected to decline as a percentage of GDP during the simulation period. Our simulations also suggest that state and local governments' capital outlays—which include spending on infrastructure, such as buildings, highways and streets, sewer systems, and water systems, as well as equipment and land— will grow more slowly than

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<sup>9</sup>Our model predicts future growth in the number of state and local government retirees based on the growth of the state and local government sector's workforce in earlier years.

<sup>10</sup>Our simulations are consistent with our past work, in which we have reported that while most state and local government pension plans have assets sufficient to cover benefit payments to retirees for a decade or more, plans have experienced a growing gap between assets and liabilities over the longer term. For additional information, see GAO, *The Nation's Retirement System: A Comprehensive Re-evaluation Is Needed to Better Promote Future Retirement Security*, [GAO-18-111SP](#) (Washington, D.C.: Oct. 18, 2017) and *State and Local Government Pension Plans: Economic Downturn Spurs Efforts to Address Costs and Sustainability*, [GAO-12-322](#), (Washington, D.C.: Mar. 2, 2012).

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GDP if state and local governments continue to provide current levels of capital per resident.<sup>11</sup>

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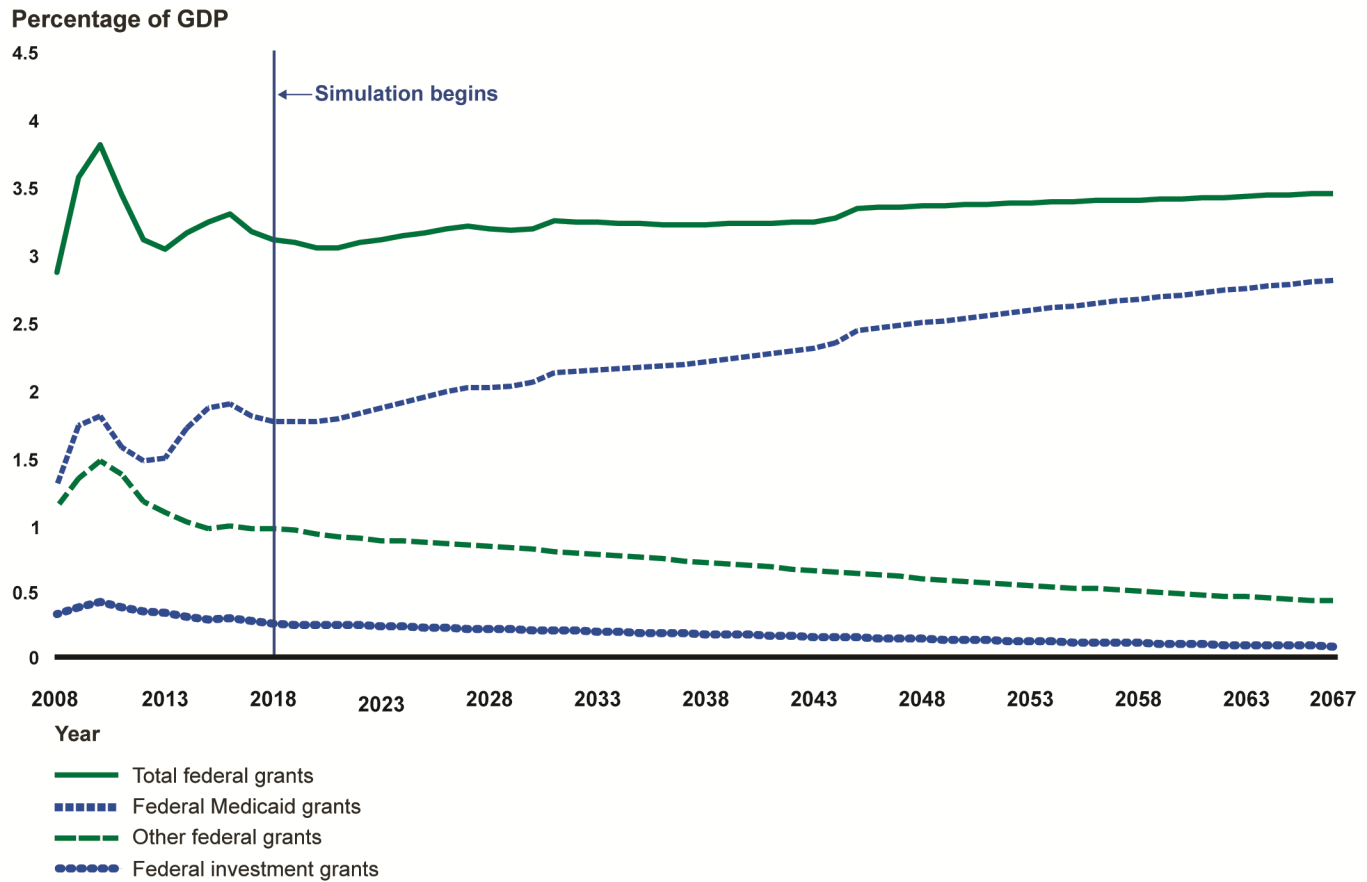
### Growth in Medicaid Grants and Personal Income Taxes Drive Revenues

Our simulations suggest that federal grants overall will increase as a share of GDP, while Medicaid grants will likely grow more quickly than other types of federal grants (see figure 7). Thus, Medicaid grants will likely make up an increasing share of revenues in the future. Since Medicaid is a matching formula grant program, the projected increase in federal Medicaid grants, therefore, reflects expected increased Medicaid expenditures that will be shared by state governments. Our simulations also suggest that federal investment grants (i.e., grants intended to finance capital infrastructure investments) and other federal grants unrelated to Medicaid (i.e., grants intended to finance education, social services, housing, and community investment) are likely to decline as a share of GDP.

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<sup>11</sup>Some evidence suggests that maintaining current levels of capital per resident could become increasingly costly, at least for some types of capital. For example, according to CBO, nominal public spending on transportation and water infrastructure increased between 2003 and 2014. However, after adjusting for increases in the price of materials and other inputs during this period, spending actually decreased. For additional information see CBO, *Public Spending on Transportation and Water Infrastructure, 1956 to 2014* (Washington, D.C.: March 2015).

**Figure 7: Federal Grants to State and Local Governments as a Percentage of Gross Domestic Product (GDP), 2008 through 2067**



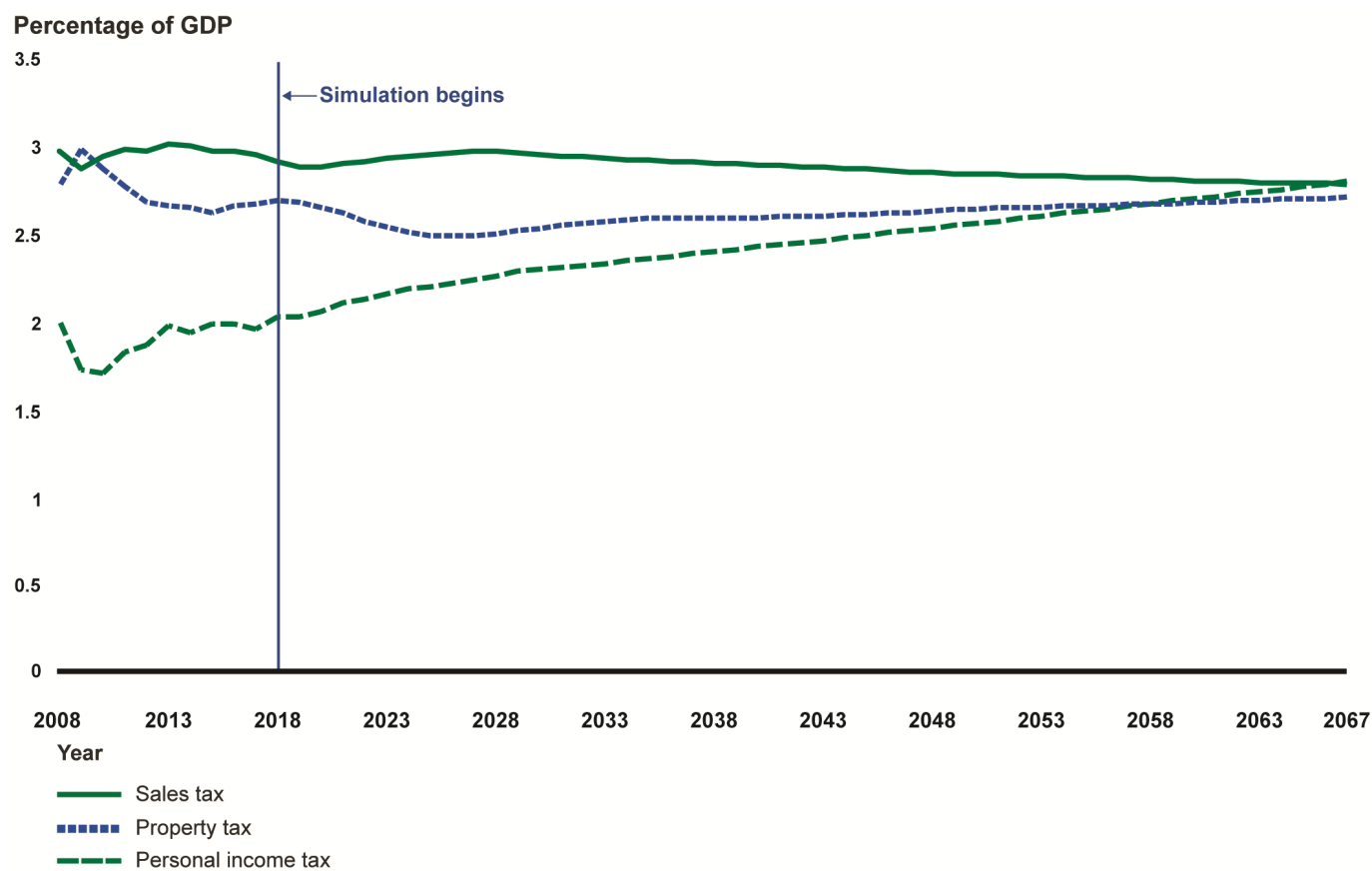
Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: Total federal grants to state and local governments are the sum of federal investment grants, federal Medicaid grants, and all other federal grants. Federal investment grants include grants that are intended to finance capital infrastructure investments.

Further, our simulations suggest that if historical relationships between state and local governments' tax revenues and tax bases persist, total tax revenues for the state and local government sector will increase from 8.8 percent of GDP in 2018 to 9.4 percent of GDP by the end of the simulation period. This increase is driven largely by the growth in personal income taxes, as shown in figure 8. Specifically, our simulations suggest that personal income tax revenues will increase as a share of GDP by about 1 percentage point during the simulation period. Sales taxes and property taxes, on the other hand, are projected to remain

relatively constant as a share of GDP during the simulation period through 2067.

**Figure 8: State and Local Government Tax Revenues as a Percentage of Gross Domestic Product (GDP), 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: Sales tax revenue is the sum of general sales tax revenue and excise tax revenue.

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## Policy Changes and Other Considerations Could Affect the State and Local Government Sector's Fiscal Outlook

While our long-term simulations do not account for pending or future federal policy changes that will result in changes to expenditures and revenues, an understanding of several recent federal policy changes related to taxes and health care are important to note because they present sources of uncertainty for the state and local government sector's long-term fiscal outlook. In addition, as is the case in any model that is reliant on historical data to simulate a long-term outlook, other considerations, such as economic growth and rates of return on pension assets, could shift future fiscal outcomes. These policy changes and uncertainties are discussed below and may help federal policy makers and state and local governments consider how these changes could affect the long-term outlook.

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## Tax-and Health-Related Policies Could Affect the Sector's Long-Term Fiscal Outlook

### Tax Policies

Recently enacted legislation, such as Public Law 115-97, commonly referred to by the President and administrative documents as the Tax Cuts and Jobs Act (TCJA), could affect the sector's revenues over the long-term.<sup>12</sup> Enacted in December 2017, TCJA included significant changes to corporate and individual tax law, with implications for state and local government tax collections. In particular, for individual taxpayers, for tax years 2018 through 2025, tax rates were lowered for nearly all income levels, some deductions from taxable income were changed (personal exemptions were eliminated, while the standard deduction was increased), and certain credits, such as the child tax credit, were expanded.

The effect of TCJA on the long-term state and local fiscal outlook is still evolving, and will likely depend on how states incorporate the law's changes into their state income tax rules. That is, because some states link their state income taxes to federal income tax rules, states must decide whether to let the changes from TCJA flow through to their state income tax systems, or establish new state income tax rules. For

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<sup>12</sup>To provide for reconciliation pursuant to titles II and V of the concurrent resolution on the budget for fiscal year 2018, Pub. L. No. 115-97, 131 Stat. 2054 (2017) (hereinafter TCJA).

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example, some states have adopted the federal definition of taxable income as a starting point for state tax calculations, while other states use the federal definition of adjusted gross income as a starting point. The choices states make to continue to link to these definitions could have long-term implications for their state tax revenues. In addition, under TCJA, the amount of the federal itemized deductions allowed for all state and local income, sales, and property taxes (commonly referred to as the state and local tax (SALT) deduction) is now capped at \$10,000 for tax years 2018 to 2025.<sup>13</sup> The magnitude or net effect of these changes is uncertain in that states are still working to understand the impact of the tax laws on their revenues. It remains to be seen whether and how states will see changes in their revenues in the future.

Moreover, a recent U.S. Supreme Court decision involving state sales taxes could have implications for states' ability to collect revenue. Specifically, the court's ruling in June 2018 in *South Dakota v. Wayfair, Inc.* held that states could require out-of-state sellers to collect and remit sales taxes on purchases made from those out-of-state sellers, even if the seller does not have a substantial physical presence in the taxing state.<sup>14</sup> Prior to this ruling, a seller that did not have a substantial physical presence in a state could not be required to collect and remit a sales tax on goods sold into the state. Instead, a purchaser may have been required to pay a use tax (i.e., a tax levied on the consumer for the privilege of use, ownership, or possession of taxable goods and services) in the same amount to his or her state government.<sup>15</sup> In 2017, we reported that states could realize between an estimated \$8.5 billion and \$13.4 billion in additional state sales tax revenue across all states if all sellers were required to collect taxes on all remote sales at current rates.<sup>16</sup> The extent to which states realize changes in sales tax revenue will likely depend on how they revise their state laws and enforcement efforts in response to this June 2018 ruling.

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<sup>13</sup>26 U.S.C. 164(b)(6).

<sup>14</sup>*South Dakota v. Wayfair, Inc.*, 138 S. Ct. 2080 (2018).

<sup>15</sup>However, we reported in 2017 that consumer compliance rates for use tax remittance are estimated to be very low. See GAO, *Sales Taxes: States Could Gain Revenue from Expanded Authority, but Businesses Are Likely to Experience Compliance Costs*, [GAO-18-114](#) (Washington, D.C.: Nov. 16, 2017).

<sup>16</sup>[GAO-18-114](#).

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## Health Care Policies

Enacted health care legislation could also affect the long-term fiscal position of state and local governments.<sup>17</sup> As we have reported in prior work, the effect of the Patient Protection and Affordable Care Act (PPACA) on the long-term state and local fiscal outlook could depend on how states implement PPACA, and on future rates of health care cost growth.<sup>18</sup> For example, consider the states that have opted, under PPACA, to expand Medicaid program coverage to millions of lower income adults. While the federal government is expected to cover a large share of the costs of the Medicaid expansion, these states are ultimately expected to bear some of the costs. Specifically, the federal government reimbursed 100 percent of the costs of the expanded population beginning in 2014.<sup>19</sup> This reimbursement rate will decline from the 2018 reimbursement rate of 94 percent to 90 percent by 2020. As such, the reduced federal reimbursement rate may affect those states that expanded their Medicaid populations in recent years.

As discussed earlier in this report, our simulations suggest that Medicaid spending will make up an increasing share of the state and local government sector's operating expenditures in the future. A weakening of the economy could add to the fiscal pressures states face in funding these Medicaid obligations. As our prior work has shown, past recessions in 2001 and 2007 hampered states' ability to fund increased Medicaid enrollment and maintain their existing services. Specifically, Medicaid enrollment increased during these recessions, in part due to increased

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<sup>17</sup>For additional information on Medicaid expansion, see GAO, *Medicaid: CMS Needs to Better Target Risks to Improve Oversight of Expenditures*, [GAO-18-564](#), (Washington, D.C.: Aug. 6, 2018), *The Nation's Fiscal Health: Action Is Needed to Address the Federal Government's Fiscal Future*, [GAO-18-299SP](#) (Washington, D.C.: June 21, 2018), *Medicaid: Key Policy and Data Considerations for Designing a Per Capita Cap on Federal Funding*, [GAO-16-726](#) (Washington, D.C.: Aug. 10, 2016), *Medicaid: Changes to Funding Formula Could Improve Allocation of Funds to States*, [GAO-16-377T](#) (Washington, D.C.: Feb. 10, 2016), and *Medicaid: Additional Efforts Needed to Ensure that State Spending is Appropriately Matched with Federal Funds*, [GAO-16-53](#) (Washington, D.C.: Oct. 16, 2015).

<sup>18</sup>See for example, GAO, *State and Local Governments' Fiscal Outlook: 2016 Update*, [GAO-17-213SP](#) (Washington, D.C.: Dec. 8, 2016).

<sup>19</sup>Under PPACA, starting in 2014, states may opt to expand their Medicaid programs by covering nearly all adults with incomes at or below 133 percent of the federal poverty level. As of December 2017, 31 states and the District of Columbia expanded eligibility for their Medicaid programs under PPACA. This increased the number of people receiving Medicaid benefits.



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unemployment, which led more individuals to become eligible for the program.<sup>20</sup>

We have also reported on the use of Medicaid demonstrations, which allow states to test new approaches to coverage to improve quality and access, or generate savings or efficiencies.<sup>21</sup> Specifically, CMS may waive certain Medicaid requirements and approve new types of expenditures that would not otherwise be eligible for federal Medicaid matching funds.<sup>22</sup> For example, under demonstrations, states have extended coverage to certain populations, provided services not otherwise eligible for Medicaid, and made payments to providers to incentivize delivery system improvements. We previously reported that, as of November 2016, nearly three-quarters of states have CMS-approved demonstrations. In fiscal year 2015, federal spending under demonstrations represented a third of all Medicaid spending nationwide.<sup>23</sup> We also reported that in 10 states, federal spending on demonstrations represented 75 percent or more of all federal spending on Medicaid.<sup>24</sup> Joint financing of Medicaid is a fixture of this federal-state partnership. Demonstration waivers hold the potential for changing state Medicaid spending. However, as we have reported, these demonstrations are

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<sup>20</sup>GAO, *Medicaid: Improving Responsiveness of Federal Assistance to States during Economic Downturns*, [GAO-11-395](#) (Washington, D.C.: Mar. 31, 2011).

<sup>21</sup>For additional information on the use of Medicaid demonstrations, see GAO, *Medicaid: CMS Has Taken Steps to Address Program Risks but Further Actions Needed to Strengthen Program Integrity*, [GAO-18-687T](#) (Washington, D.C.: Aug. 21, 2018) and *Medicaid Demonstrations: Evaluations Yielded Limited Results, Underscoring Need for Changes to Federal Policies and Procedures*, [GAO-18-220](#) (Washington D.C.: Jan. 19, 2018).

<sup>22</sup>Under section 1115 of the Social Security Act, the Secretary of Health & Human Services (HHS) may waive certain Medicaid requirements and approve new types of expenditures that would not otherwise be eligible for federal Medicaid matching funds for experimental, pilot, or demonstration projects that, in the Secretary's judgment, are likely to promote Medicaid objectives. See 42 U.S.C. § 1315(a). The Secretary has delegated the approval and administration of Medicaid section 1115 demonstrations to CMS, which requires that such demonstrations be budget neutral to the federal government; that is, the federal government should spend no more for Medicaid under a state's demonstration than it would have spent without the demonstration. There are also other types of waivers that states can apply for and use, including those approved under section 1915(c) of the Social Security Act, which authorizes the Secretary of HHS to waive requirements that states provide home and community based services that they would otherwise need to meet in the absence of the waiver.

<sup>23</sup>[GAO-18-220](#).

<sup>24</sup>[GAO-18-220](#).

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required, under HHS policy, to achieve budget neutrality and not raise costs for the federal government.<sup>25</sup>

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## Economic Growth and Other Factors Could Affect the Sector's Fiscal Outlook

In addition to federal tax- and health-related policy changes, a number of other factors could affect the state and local government sector's long-term fiscal outlook. Specifically, we developed simulations using alternative assumptions of the growth of key model variables—which include economic growth, health care excess cost growth, and the rate of return on pension assets. We determined that changes in the growth projections of these key variables could affect the operating balance of state and local governments, thereby shifting future fiscal outcomes for the sector.<sup>26</sup>

### Economic Growth

Future trends in GDP growth could affect the state and local government sector's fiscal outlook. Data from CBO and the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds (OASDI Trustees) project real GDP to grow by 1.9 percent per year on average from 2018 through 2028, and by 2.1 percent per year on average after 2028, respectively.<sup>27</sup> Using these projections, our simulations suggest that maintaining current policies would cause the sector's expenditures to exceed its revenues and that the difference between revenues and expenditures would become increasingly negative during the next several decades. However, simulations we developed using the OASDI Trustees' alternative projections of real GDP growth suggest that the difference between revenues and expenditures would expand before narrowing toward the end of the simulation period if real GDP were to grow at a faster rate—2.8 percent per year on average—as shown in figure 9. Our simulations also show that if GDP were to grow at a slower rate—1.5 percent per year on average—the difference between revenues and expenditures would expand. This would result in an increasingly negative operating balance during the simulation period.

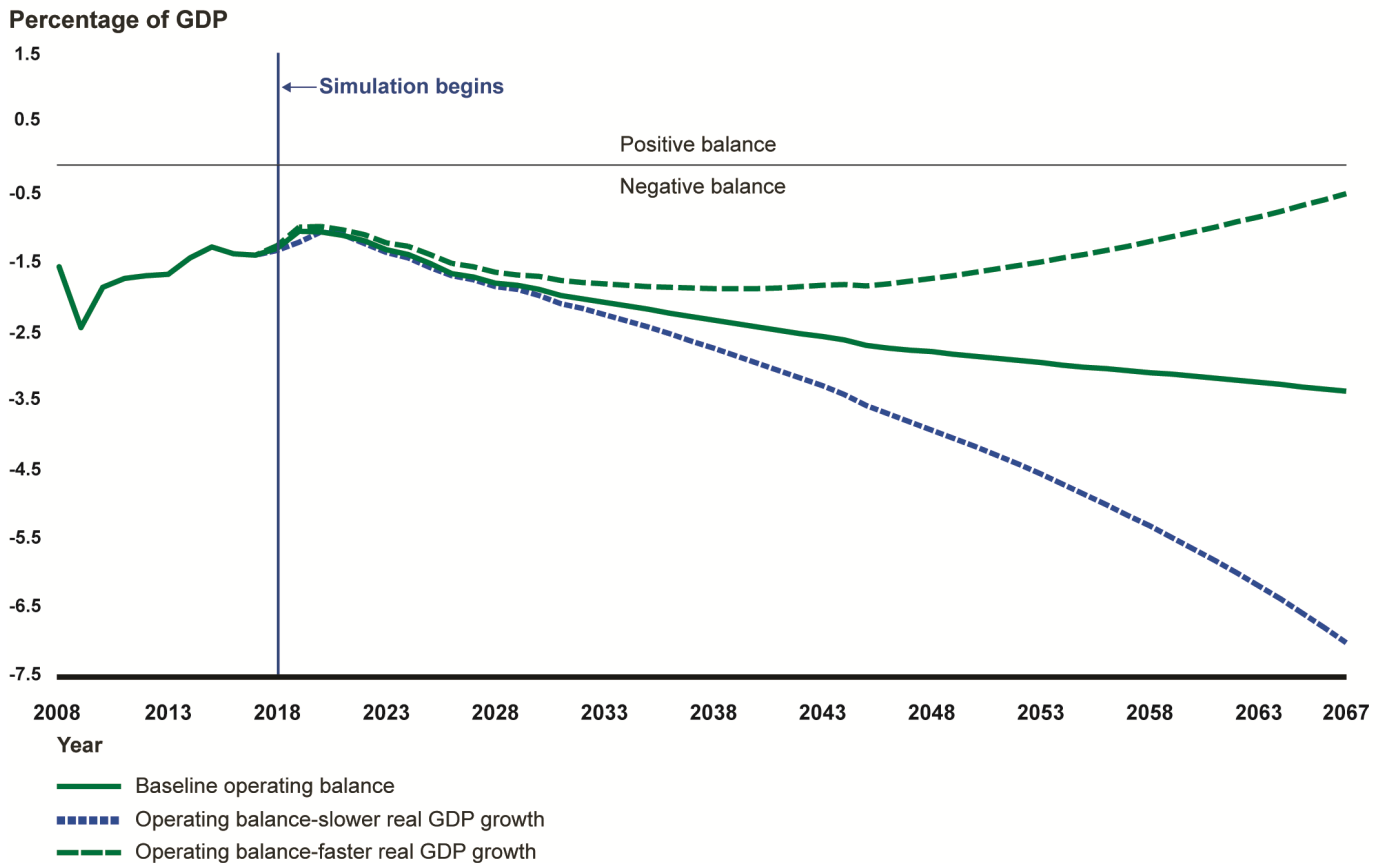
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<sup>25</sup>[GAO-18-687T](#).

<sup>26</sup>For additional information on these simulations, see appendix II.

<sup>27</sup>Real GDP is a measure of the value of all the goods and services produced in the economy in a given year, adjusted for changes in the price level.

**Figure 9: State and Local Government Sector Operating Balance under Alternative Gross Domestic Product (GDP) Growth Paths, 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: The operating balance is defined as total receipts minus (1) capital outlays not financed by medium- and long-term debt issuance, (2) total current expenditures less depreciation, (3) current surplus of state and local government enterprises, and (4) net social insurance fund balance. For our baseline simulations, we used Congressional Budget Office projections of real GDP for the period from 2018 through 2028 and OASDI Trustees' intermediate projections of real GDP growth for the remainder of the simulation period. For our alternative simulations reflecting slower and faster real GDP growth, we used the OASDI Trustees' high- and low-cost projections of real GDP growth for the entire simulation period.

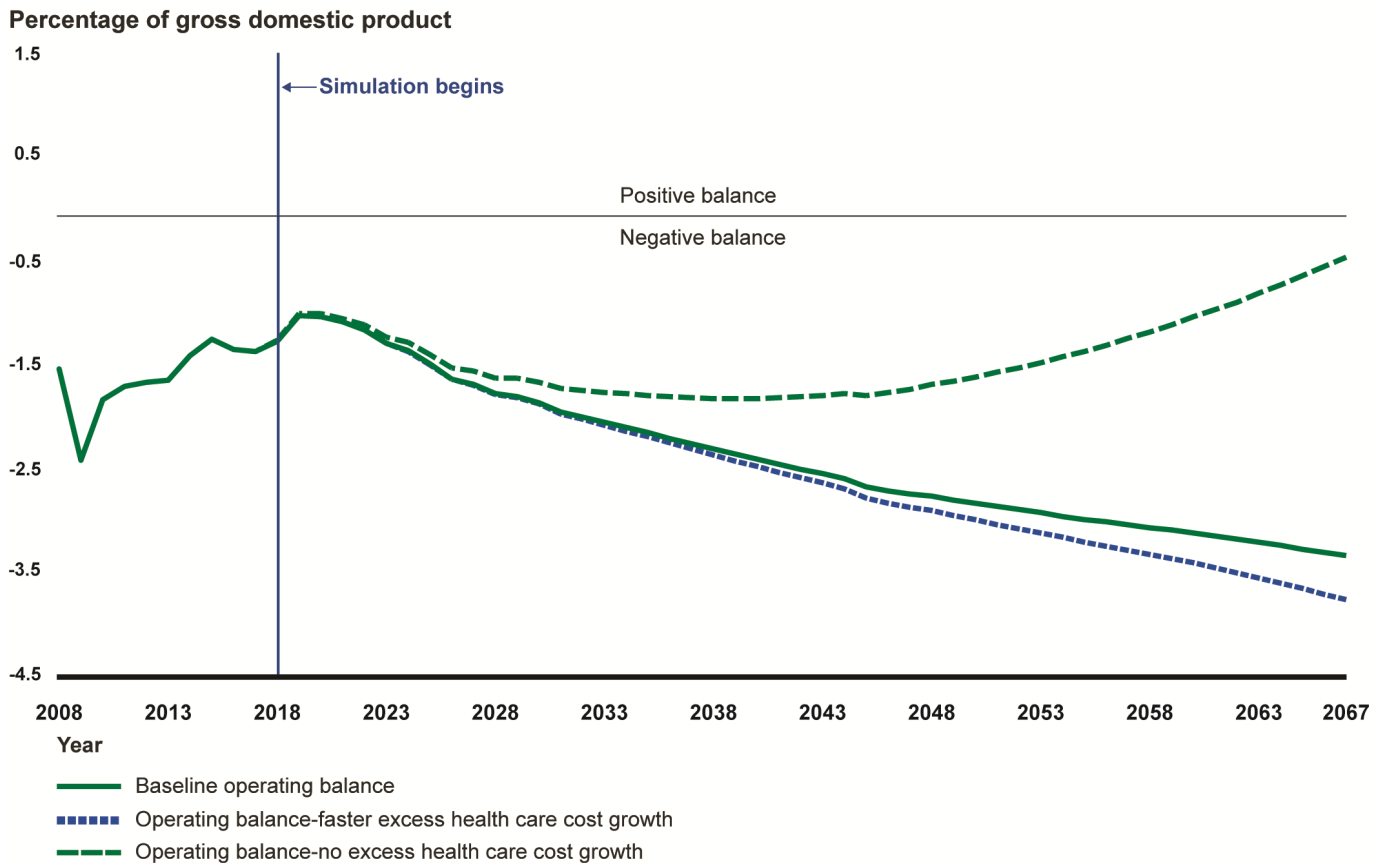
### Excess Cost Growth

As discussed earlier in this report, excess cost growth in health care is another key determinant of the sector's fiscal balance. Data from CBO project Medicaid spending per capita to grow about 1.5 percent faster than GDP per capita on average for the period from 2019 through 2028. Data from CMS project Medicaid spending per capita to grow about 0.6 percent faster on average for the period from 2029 through 2067. Data

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from CMS also project national health expenditures per capita to grow about 0.8 percent faster than GDP per capita for the period from 2018 through 2067. Using these projections, our simulations suggest that maintaining current policies will cause the sector's expenditures to exceed its revenues, and that the difference between revenues and expenditures will become increasingly negative during the next several decades. However, simulations developed using alternative projections of excess cost growth in Medicaid and national health expenditures suggest that the difference between revenues and expenditures may be reduced but not eliminated within the simulation period if excess cost growth in health care is zero. In the scenario where excess cost growth rises faster—0.7 percent on average for Medicaid for the period from 2029 through 2067 and 1 percent for national health expenditures for the period from 2018 through 2067—our simulations show that the difference between revenues and expenditures will persist for the remainder of the simulation period (see figure 10).

**Figure 10: State and Local Government Sector Operating Balance under Alternative Health Care Excess Cost Growth Paths, 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: The operating balance is defined as total receipts minus (1) capital outlays not financed by medium- and long-term debt issuance, (2) total current expenditures less depreciation, (3) current surplus of state and local government enterprises, and (4) net social insurance fund balance. For our baseline simulations, we used Medicaid cost growth derived from CMS’s baseline projections for the period from 2029 through 2092, and we used CMS’s baseline projections of national health care excess cost growth for the entire simulation period. For our alternative simulations reflecting higher excess cost growth, we used Medicaid cost growth derived from CMS’s alternative projections for the period from 2029 through 2092, as well as CMS’s alternative projections of national health expenditures excess cost growth. For our alternative simulations reflecting lower excess cost growth, we assumed that Medicaid excess cost growth is zero after 2028 and that national health expenditures excess cost growth is zero for the entire simulation period. For the period from 2018 through 2028, our simulations of variables related to Medicaid relied on CBO projections of two variables—federal spending on Medicaid, Children’s Health Insurance Program, and exchange subsidies as a fraction of U.S. GDP and federal Medicaid grants to state and local governments—that already incorporate excess cost growth, so we could not apply alternative projections of Medicaid excess cost growth for these years.

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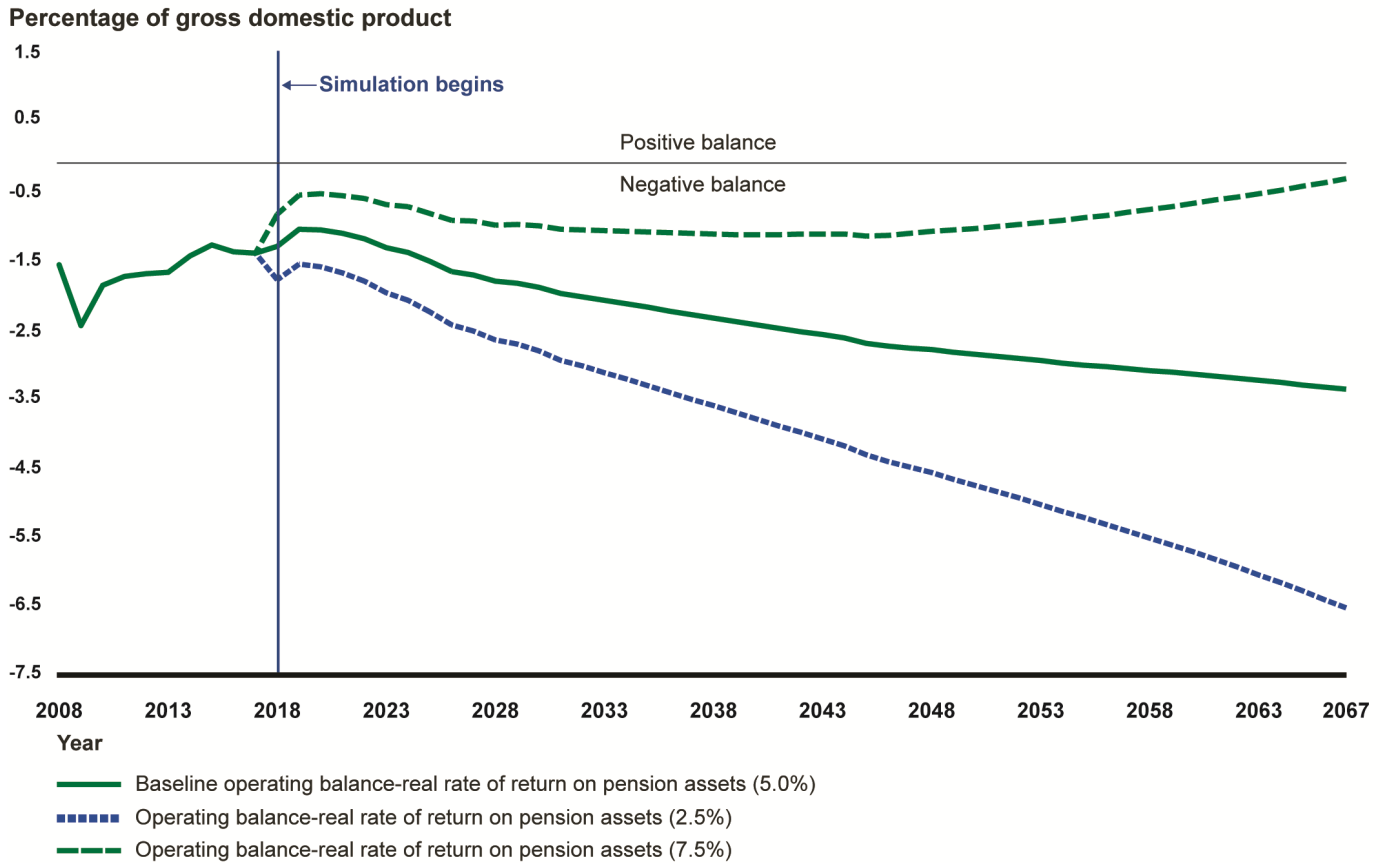
## Rate of Return on Pension Assets

The rate of return on pension assets could also affect the state and local government sector's fiscal outlook. Based on an inflation-adjusted rate of return on pension assets of 5 percent, our simulations suggest that state and local governments will need to make pension contributions equivalent to about 12.9 percent of their wages and salaries to meet their long-term pension obligations. However, this estimate is sensitive to the rate of return on state and local governments' pension assets. Simulations we developed using a higher rate of return—7.5 percent—suggest that pension contributions needed to meet pension obligations would be about 3 percent of state and local government employees' wages and salaries. In addition, under this scenario, our simulations suggest that the difference between revenues and expenditures will be reduced, but not eliminated within the simulation period. Alternatively, we estimated that if the rate of return on pension assets is relatively low—at 2.5 percent—required pension contributions would need to be about 23 percent of state and local government employees' wages and salaries during the simulation period. Under this scenario, our simulations show that the sector's negative operating balance will continue to grow larger throughout the simulation period. It follows therefore, that high rates of return on pension assets are associated with an improved outlook for state and local governments, and vice versa (see figure 11).<sup>28</sup>

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<sup>28</sup>We do not consider the possibility of altered benefit promises here because we treat these as policy changes, which we hold fixed throughout in the model.

**Figure 11: State and Local Government Sector Operating Balance under Alternative Assumptions for the Real Rate of Return on Pension Assets, 2008 through 2067**



Source: GAO analysis of data from the Agency for Healthcare Research and Quality, Bloomberg, the Board of Governors of the Federal Reserve System, the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Bureau of Economic Analysis, the Bureau of Labor Statistics, the Census Bureau, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and the Federal Reserve Bank of St. Louis. | GAO-19-208SP

Note: The operating balance is defined as total receipts minus (1) capital outlays not financed by medium- and long-term debt issuance, (2) total current expenditures less depreciation, (3) current surplus of state and local government enterprises, and (4) net social insurance fund balance. The real rate of return on pension assets measures the return on pension assets after adjusting for changes in the price level. For our baseline simulations, we assumed that the real rate of return on pension assets is 5 percent throughout the simulation period, consistent with our prior work. For our alternative simulations reflecting higher and lower real rates of return on pension assets, we used real rates of return of 7.5 percent and 2.5 percent

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# Appendix I: State and Local Government Fiscal Model Simulation Methodology

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## Data

To simulate measures of fiscal balance for the state and local government sector for the long term, we used aggregate data on the state and local government sector and national data on other variables from the following sources:

- Agency for Healthcare Research and Quality;
- Bloomberg;
- Board of Governors of the Federal Reserve System;
- Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds (OASDI Trustees);
- Bureau of Economic Analysis (BEA);
- Bureau of Labor Statistics;
- Census Bureau;
- Centers for Medicare & Medicaid Services (CMS);
- Congressional Budget Office (CBO); and
- Federal Reserve Bank of St. Louis.

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## Model Specification

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### Overview

Our approach generally follows the approach used in [GAO-08-317](#) and in subsequent updates of that report. Specifically, we developed a model that projects the levels of receipts and expenditures of the state and local government sector (henceforth, the sector) in future years based on current and historical spending and revenue patterns. We use table 3.3 of the National Income and Product Accounts (NIPA)—State and Local Government Current Receipts and Expenditures—prepared by BEA at the U.S. Department of Commerce as an organizing framework for developing our model of the sector’s revenues and expenditures (see table 1). In this table, current revenues are grouped in five main categories.

- Current tax receipts. These receipts are tax payments made by persons or businesses to state and local governments. They include income taxes, general sales taxes, property taxes, and excise taxes. Current taxes also include fees for motor vehicle licenses, drivers’ licenses, and business licenses.



- Social insurance contributions. These contributions finance the provision of certain social benefits to qualified persons, and include contributions from employers and employees for temporary disability insurance, worker’s compensation insurance, and other programs.
- Income receipts from government assets. These receipts include interest, dividends, and rental income, such as royalties paid on drilling on the outer continental shelf. Also, state and local governments earn interest and dividend income on financial assets.
- Current transfer receipts. Transfer receipts are receipts for which state and local governments provide nothing of value in return. Current transfer receipts include federal grants, fines, fees, donations, and tobacco settlements. Also included are net insurance settlements, certain penalty taxes, court fees, and other miscellaneous transfers.
- Current surplus of government enterprises. This surplus is a profit-type measure for state and local government enterprises, such as water, sewer, gas, and electricity providers; toll providers; liquor stores; air and water terminals; public transit; and state lotteries. Some types of enterprises, such as state lotteries, consistently earn surpluses which are used to fund general government activities. In contrast, many enterprises run deficits, which, in turn, reduce receipts.

**Table 1: State and Local Government Receipts and Expenditures in National Income and Product Accounts (NIPA), 2017 (dollars in billions)**

Description	Amount
Current receipts	2,484.2
Current tax receipts	1,689.9
Personal current taxes	421.2
Income taxes	386.7
Other	34.5
Taxes on production and imports	1,215.7
General sales taxes	395.7
Excise taxes	190.7
Property taxes	532.2
Other	97.1
Taxes on corporate income	52.9
Contributions for government social insurance	20.6
Income receipts on assets	86.0
Interest receipts	68.8
Dividends	5.9
Rents and royalties	11.3

**Appendix I: State and Local Government Fiscal Model Simulation Methodology**

<b>Description</b>	<b>Amount</b>
Current transfer receipts	690.7
Federal grants	559.3
From business (net)	51.5
From persons	80.0
Current surplus of government enterprises	-2.9
<b>Current expenditures</b>	<b>2,743.3</b>
Consumption expenditures	1,744.5
Current transfer payments	712.3
Government social benefit payments to persons	712.3
Interest payments	286.0
To persons and business	282.8
To the rest of the world	3.2
Subsidies	0.6
<b>Net state and local government saving</b>	<b>-259.1</b>
Social insurance funds	4.0
Other	-263.1
Addenda:	
<b>Total receipts</b>	<b>2,558.3</b>
Current receipts	2,484.2
Capital transfer receipts	74.0
<b>Total expenditures</b>	<b>2,857.3</b>
Current expenditures	2,743.3
Gross government investment	364.8
Capital transfer payments	1.2
Net purchases of nonproduced assets	13.5
Less: Consumption of fixed capital (depreciation)	265.6
<b>Net lending or net borrowing (-)</b>	<b>-299.0</b>

Source: NIPA, Table 3.3. | GAO-19-208SP

Note: Totals may not add due to rounding.

State and local governments also receive income from the sale of goods and services, such as school tuition. In the NIPAs, this income is treated as an offset against expenditures, not revenue. This income comes from voluntary purchases that might have been made from a private sector provider of such services.

In addition to current receipts, state and local governments receive capital transfer receipts. These receipts include estate and gift taxes, and federal

government investment grants for capital such as highways, transit, air transportation, and water treatment plants.

State and local government current expenditures are grouped into four main categories.

- Consumption expenditures. Generally, spending for which some value is provided in return. State and local government consumption spending is the sum of inputs used to provide goods and services, including compensation of general government employees, consumption of general government fixed capital (depreciation), and intermediate goods and services purchased, less sales to other sectors and own-account investment.
- Current transfer payments. Payments for which nothing of value is provided in return. For state and local governments, current transfer payments consist primarily of social benefits, which are payments to persons to provide for needs that arise from circumstances such as sickness, unemployment, retirement, and poverty. There are two kinds of social benefits—benefits from social insurance funds, such as temporary disability insurance and workers’ compensation, and other social benefits, such as medical benefits from Medicaid and the state Children’s Health Insurance Program (CHIP), family assistance from Temporary Assistance to Needy Families, education assistance, and other public assistance programs. While NIPA table 3.3 also includes other current transfer payments to the rest of the world as part of current transfer payments, these amounts are generally equal to zero.
- Interest payments. These include actual and imputed interest and represent the cost of borrowing by state and local governments to finance their capital and operational costs.
- Subsidies. State and local government subsidies are largely payments to railroads.

State and local government spending also includes gross investment, capital transfer payments, and net purchases of nonproduced assets. Gross investment is spending on capital goods like structures, equipment, and intellectual property—items that are called fixed assets or capital because of their repeated or continuous use in providing government services for more than 1 year. Structures include residential and commercial buildings, highways and streets, sewer systems, and water systems. State and local government capital transfer payments include disaster-related insurance benefits paid to the U.S. territories and the Commonwealths of Puerto Rico and Northern Mariana Islands. Net

purchases of nonproduced assets are composed of net purchases of land less oil bonuses (payments to states for the long-term rights to extract oil).

Our main indicator of the sector's fiscal balance is its operating balance net of funds for capital expenditures (henceforth, operating balance), which is a measure of the sector's ability to cover its current expenditures out of current revenues. The operating balance is defined as total receipts minus (1) capital outlays not financed by medium- and long-term debt issuance, (2) total current expenditures less depreciation, (3) current surplus of state and local government enterprises, and (4) net social insurance fund balance.<sup>1</sup>

Alternative indicators of fiscal balance include net saving and net lending or borrowing.

- Net saving is the difference between current receipts and current expenditures. Since current expenditures exclude capital investment but include a depreciation measure, net saving can be thought of as a measure of the extent to which governments are covering their current operations from current receipts.
- Net lending or borrowing is the difference between total receipts and total expenditures, and is analogous to the federal unified surplus or deficit. Total receipts differ from current receipts because they include capital transfer receipts. Total expenditures differ from current expenditures because they include capital investment, capital transfer payments, and net purchases of nonproduced assets. However, they exclude fixed capital consumption. The former three categories are cash expenditures, while the latter is a noncash charge. Net lending or net borrowing represents the governments' cash surplus or borrowing requirement. This measure is normally negative because governments borrow to finance their capital investment (and sometimes to finance current operations as well).

The following equations describe how we simulated state and local government receipts and expenditures, as well as the intermediate variables used in those simulations. For this update, we started with historical data for 2017, or the most recent year available, and then

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<sup>1</sup>We refer to the sum of state and local government gross investment, net purchases of nonproduced assets, and capital transfer payments as capital outlays.

simulated each variable for each year from 2018 through 2092 (the simulation period).

**National Demographic, Macroeconomic, and Health Care Variables**

To simulate state and local government receipts and expenditures, we use simulations of various national-level demographic, macroeconomic, and health care variables derived from projections produced by CBO, CMS, and the OASDI Trustees, and otherwise derived using our own assumptions (see table 2). This approach is similar to the approach we have used in prior model updates.

**Table 2: Simulation Approach for National Demographic, Macroeconomic, Health Care, and Other Key Variables**

Variable	Simulation approach for...	
	... 2018 through 2028	... 2029 through 2092
Real U.S. gross domestic product (GDP)	Grows at the same rate as Congressional Budget Office (CBO) projection	Grows at the same rate as the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds (OASDI Trustees) intermediate projection
U.S. GDP price index	Grows at the same rate as CBO projection	Grows at the same rate as prior year
U.S. consumer price index	Grows at the same rate as CBO projection	Grows at the same rate as prior year
U.S. private sector employment cost index	Grows at the same rate as CBO projection	Grows at the same rate as prior year
U.S. GDP	Grows at the same rate as CBO projection	Grows at the same rate as real U.S. GDP multiplied by the U.S. GDP price index
U.S. total wages and salaries	Grows at the same rate as CBO projection	Grows at the same rate as real U.S. GDP multiplied by the U.S. GDP price index
U.S. personal income	Grows at the same rate as CBO projection	Grows at the same rate as real U.S. GDP multiplied by the U.S. GDP price index
U.S. domestic corporate profits	Grows at the same rate as CBO projection	Grows at the same rate as real U.S. GDP multiplied by the U.S. GDP price index
3-month Treasury rate	Equals CBO projection	Remains constant at last value of CBO projection
10-year Treasury rate	Equals CBO projection	Remains constant at last value of CBO projection
Federal government spending on Medicaid, Children’s Health Insurance Program, and exchange subsidies as a fraction of GDP	Equals CBO projection (which incorporates excess cost growth)	Equals CBO projection through 2047 (which assumes zero excess cost growth), then remains constant at 2047 value
U.S. population	Equals OASDI Trustees’ intermediate projection	
National health expenditures excess cost growth multiplier	Equals Centers for Medicare & Medicaid Services (CMS) baseline projection	
Medicaid excess cost growth multiplier	Equals growth rate of national health expenditures less Medicare spending as a fraction of age and gender-adjusted U.S. GDP based on CMS baseline projections	

**Appendix I: State and Local Government Fiscal Model Simulation Methodology**

Variable	Simulation approach for...	
	... 2018 through 2028	... 2029 through 2092
Federal government share of total Medicaid spending	Minimum of CBO's projected range of federal government share of Medicaid spending	
State and local government employment cost index	Grows at the same rate as U.S. private sector employment cost index	
Spread between 20-year and 1-year Treasury rates	Equal to its last historical value	
U.S. personal consumption expenditures less food and services	Two-step process that first simulates real personal consumption expenditures based on its elasticity with respect to real wages and salaries, and then adjusts for inflation using the U.S. GDP price index; see table 8 and the "Estimated Historical Relationships" section below for details.	
U.S. market value of real estate	Two-step process that first simulates the real market value of real estate based on its elasticity with respect to real U.S. GDP and then adjusts for inflation using the U.S. GDP price index; see table 8 and the "Estimated Historical Relationships" section below for details.	

Source: GAO. | GAO-19-208SP

**State and Local Government Defined Benefit Pension Contribution Rate**

To simulate state and local government spending on defined benefit pensions, we first estimate the contribution rate (as a fraction of state and local government general government wages and salaries) that state and local governments would need to make each year going forward to ensure that their pension systems are fully funded on an ongoing basis. Our goal is to estimate the financial commitments to employees that have been and are likely to continue to be made by the state and local sector to better understand the full fiscal outlook for the sector. As such, our analysis projects the liabilities that the sector is likely to continue to incur in the future based on simulations of future numbers of retirees receiving pension benefits and their benefit amounts; future numbers of employees, their wages and salaries, and their pension contributions; and assets in state and local government defined benefit pension funds. Although we are only interested in applying contribution rates over the simulation time frame, we actually have to derive the contribution rate for a longer time frame in order to find the steady-state level of necessary contributions.<sup>2</sup> This longer time frame is required because the estimated contribution rate increases as the projection horizon increases and eventually converges to a steady state. If the projection period is of insufficient length, the steady-state level of contribution is not attained, and the necessary contribution rate is understated. We simulated variables used to estimate the pension contribution rate using the approach summarized in table 3.

<sup>2</sup>We used a 400-year period to estimate the steady-state pension contribution rate.

This approach is similar to the approach we have used in prior model updates.

**Table 3: Simulation Approach for Variables Used to Estimate State and Local Government Defined Benefit Pension Contribution Rate**

Variable	Simulation approach
Real rate of return on state and local government pension assets	5 percent
Number of state and local government general government and government enterprise employees	Grows at the same rate as U.S. population
Number of state and local government retirees	Growth rate equals the weighted average of the growth rates of past general government and government enterprise employment
Wages and salaries for state and local government general government and government enterprise employees	Grows at the same rate as U.S. population times the private sector employment cost index
Mortality rate for retired state and local government employees receiving periodic benefit payments	Remains constant at the 2017 value of the mortality rate for Federal Old-Age, Survivors, and Disability Insurance Program beneficiaries
Employment cost index for state and local government retirees	Weighted average of past values of the state and local government employment cost index
Pension benefits paid for state and local government retirees	Grows at the same rate as the number of state and local government retirees times the employment cost index for state and local government retirees times the Consumer Price Index
State and local government employee pension contributions	Grows at the same rate as wages and salaries for state and local government employees

Source: GAO. | GAO-19-208SP

Future growth in the number of state and local government retirees—many of whom will be entitled to pension and health care benefits—is largely driven by the size of the workforce in earlier years. We simulated the number of state and local government retirees by assuming that the growth rate in the number of retirees is a weighted average of the growth rates in lagged general government and government enterprise employment. We estimated the weights using a regression of the percent change in the number of retirees on the percent change in employment 1, 6, 11, 16, 21, 26, 31, 36, and 41 years in the past. The coefficients on the past percentage changes in employment were constrained to be non-negative and to sum to 1. For this regression, we removed cyclical swings in employment using the Hodrick-Prescott filter.

Similarly, future changes in the real amount of pension benefits will be a function of past changes in real wages and salaries. As indicated in table 3, we used a weighted average of past values of the state and local government employment cost index to simulate the employment cost index for state and local government retirees. We chose the weights to

reflect changes in the share and average real benefit level of three subsets of the retiree population over time: (1) new retirees entering the beneficiary pool, (2) deceased retirees leaving the pool, and (3) continuing retirees from the previous year.

- We simulated the weight for new retirees in a year as the number of retirees less the number of continuing retirees divided by the number of retirees.
- We simulated the weight for deceased retirees as the mortality rate multiplied by last year's retirees divided by this year's retirees.
- We simulated the weight for continuing retirees as last year's retirees divided by this year's retirees.

Finally, we simulated the employment cost index for state and local government retirees as the sum of the weight on new retirees multiplied by the state and local government employment cost index and the weight on continuing retirees multiplied by the state and local government employment cost index 8 years prior, less the weight on deceased retirees multiplied by the state and local government employment cost index 21 years prior.

As discussed above, we started with historical data for 2017, or the most recent year available, simulated all of the variables in table 3 over the long run, and then used the consumer price index (CPI) and the real return on pension assets to calculate the total present value of wages and salaries for state and local government general government and government enterprise employees, the total present value of real pension benefits paid to state and local government retirees, and the total present value of state and local government employees' pension contributions.<sup>3</sup> Then, we calculated the total present value of state and local governments' pension liabilities as the total present value of real pension benefits paid to state and local government retirees less the total present value of state and local government employees' pension contributions, and the value of assets in state and local government defined benefit pension funds in 2017. Finally, we estimated state and local governments' pension contribution rate as the ratio of the total present value of their pension liabilities to the total present value of wages and salaries for state and local government employees.

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<sup>3</sup>We used the 400-year period from 2018 to 2417 to estimate the steady-state pension contribution rate.



## Interest Rates on State and Local Government Financial Assets and Liabilities

Table 4 summarizes the approach we used to simulate interest rates on state and local government financial assets and liabilities. This approach is similar to the approach we have used in prior model updates.

**Table 4: Simulation Approach for Interest Rates on State and Local Government Financial Assets and Liabilities**

Variable	Simulation approach
Effective interest rate on state and local government financial assets	Based on the historical relationship between the effective interest rate on state and local government financial assets and the 3-month Treasury rate; see table 8 and the “Estimated Historical Relationships” section below for details
State and local government bond yields	Based on the historical relationship between state and local government bond yields and 10-year Treasury rates; see table 8 and the “Estimated Historical Relationships” section below for details
Effective interest rate on medium- and long-term debt and federal government loans	Based on the historical relationship between the effective interest rate on medium- and long-term debt and federal government loans and state and local government bond yields; see table 8 and the “Estimated Historical Relationships” section below for details

Source: GAO. | GAO-19-208SP

## State and Local Government Receipts

Table 5 summarizes our approach to simulating state and local government receipts. This approach is similar to the approach we have used in prior model updates.

**Table 5: Simulation Approach for State and Local Government Receipts**

Variable	Simulation approach	
	...for 2018 through 2028	...for 2029 through 2092
Federal investment grants to state and local governments	Grows at the same rate as Congressional Budget Office (CBO) projections of federal capital transfers	Grows at the same rate as U.S. population times the U.S. gross domestic product (GDP) price index
Federal Medicaid grants to state and local governments	Grows at the same rate as CBO projection (which incorporates Medicaid excess cost growth)	Grows at the same rate as federal spending on Medicaid, Children’s Health Insurance Program, and exchange subsidies, multiplied by Medicaid excess cost growth
Medicare Part D payments from state and local governments to the federal government	Grows at the same rate as CBO projection	Grows at the same rate as federal Medicaid grants to state and local governments

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<b>Variable</b>	<b>Simulation approach</b>	
	<b>...for 2018 through 2028</b>	<b>...for 2029 through 2092</b>
Other federal non-Medicaid, non-investment grants to state and local governments	Equals difference between (1) total federal non-investment grants and (2) federal Medicaid grants to state and local governments net of Medicare Part D payments to the federal government	Grows at the same rate as U.S. population times the U.S. GDP price index
Estate and gift tax revenue for state and local governments	Equal to prior year's value times 1 plus the 10-year Treasury rate	
State government personal income tax revenue	Two-step process that first simulates real state personal income tax revenues based on their historical elasticity with respect to real taxable personal income, and then adjusts for inflation using the U.S. GDP price index; see table 9 and the "Estimated Historical Relationships" section below for details	
Local government personal income tax revenue	Grows at the same rate as personal income	
Other personal tax revenue for state and local governments	Grows at the same rate as personal income	
General sales tax revenue for state and local governments	Grows at the same rate as personal consumption expenditures less food and services	
Excise tax revenue for state and local governments	Two-step process that first simulates real state and local government excise tax revenue based on its historical elasticity with respect to real wages and salaries and then adjusts for inflation using the U.S. GDP price index; see table 9 and the "Estimated Historical Relationships" section below for details.	
Property tax revenue for state and local governments	Grows at the same rate as the U.S. market value of real estate	
Revenue from other taxes on production and imports for state and local governments	Grows at the same rate as U.S. GDP	
Corporate income tax revenue for state and local governments	Grows at the same rate as domestic corporate profits	
Social insurance contributions for state and local governments	Grow at the same rate as wages and salaries	
Income from state and local government financial assets	Equals the effective interest rate on financial assets times assets outstanding in prior year	
Transfers from businesses to state and local governments	Grow at the same rate as U.S. GDP	
Transfers from people to state and local governments	Grow at the same rate as U.S. GDP	
Surplus of state and local government enterprises	Equal to zero	

Source: GAO. | GAO-19-208SP

These variables track state and local government receipts in table 1 above as follows:

- State and local government personal income tax revenue is the sum of state personal income tax revenue and local personal income tax revenue;
- State and local government personal tax revenue is the sum of personal income tax revenue and other personal tax revenue;
- State and local government revenue from taxes on production and imports is the sum of general sales tax revenue, excise tax revenue, property tax revenue, and revenue from other taxes on production and imports;
- State and local government current tax revenue is the sum of personal tax revenue, revenue from taxes on production and imports, and corporate income tax revenue;
- State and local government current transfer receipts are equal to federal Medicaid grants minus Medicare Part D payments to the federal government, plus other federal grants (excluding investment grants), transfer receipts from businesses, and transfer receipts from persons;
- State and local government current receipts are the sum of current tax revenue, current transfer receipts, income on assets, social insurance contributions, and government enterprise surplus;
- State and local government capital transfer receipts are the sum of federal investment grants and estate and gift tax revenue; and
- State and local government total receipts are the sum of current receipts and capital transfer receipts.

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## State and Local Government Expenditures

Our general approach to simulating state and local government expenditures is to assume that state and local governments maintain the current level of public goods and services provision per capita (see table 6). Thus, we generally assume that expenditures keep up with U.S. population growth and some measure of inflation, where the relevant rate of inflation varies depending on the specific type of expenditure. However, we use alternative approaches—described below—to simulate depreciation, interest payments, and social benefits for health care. This approach is similar to the approach we have used in prior model updates.

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**Table 6: Simulation Approach for State and Local Government Expenditures**

<b>Variable</b>	<b>Simulation approach</b>
Wages and salaries for state and local government general government employees	Grows at the same rate as U.S. population times the private sector employment cost index
Contributions to defined benefit pension funds for general government employees	Equal to wages and salaries for state and local government general government employees times the pension contribution rate
Health benefits for current state and local government employees	Grows at the same rate as U.S. gross domestic product (GDP), multiplied by national health expenditures excess cost growth
Health benefits for state and local government retirees	Grows at the same rate as the number of retirees times U.S. GDP per capita, multiplied by national health expenditures excess cost growth
Other state and local government employee compensation	Grows at the same rate as U.S. population times the U.S. employment cost index for private wages and salaries
State and local government purchases of nonproduced assets	Grows at the same rate as U.S. population times the U.S. GDP price index
Capital transfer payments from state and local governments	Equal to zero
Gross investment by state and local governments	Grows at the same rate as U.S. population times the U.S. GDP price index
Depreciation rate of state and local government capital	Equal to the last historical value of the 5-year moving average of the depreciation rate
Real state and local government capital stock	Equal to prior year capital stock less depreciation, plus gross investment adjusted for inflation using the U.S. GDP price index
Consumption of general government and government enterprise fixed capital	Equals the depreciation rate times the real capital stock in the prior year times the U.S. GDP price index
Consumption of state and local government general government fixed capital	Grows at the same rate as consumption of general government and government enterprise fixed capital
Other state and local government consumption spending	Grows at the same rate as U.S. population times the U.S. GDP price index
Medicaid social benefit payments from state and local governments	Equal to federal Medicaid grants divided by the federal government share of total Medicaid spending
Non-Medicaid social benefit payments for health care from state and local governments	Grow at the same rate as federal spending on Medicaid, Children's Health Insurance Program, and exchange subsidies (which incorporates Congressional Budget Office projections of excess cost growth for 2018 through 2028), multiplied by Medicaid excess cost growth for 2029 through 2092
Non-health social benefit payments from state and local governments	Grow at the same rate as U.S. population times the U.S. GDP price index
State and local government interest payments	Equal to the sum of (1) the amount of medium- and long-term debt and federal government loans outstanding in the prior year times the effective interest rate on medium- and long-term debt and federal government loans and (2) the amount of short-term debt outstanding in the prior year times the difference between the interest rate on medium- and long-term debt and federal government loans and the spread between long-term and short-term debt

Variable	Simulation approach
State and local government subsidy payments	Grow at the same rate as U.S. population times the U.S. GDP price index
State and local government net social insurance fund balance	Grows at the same rate as wages and salaries

Source: GAO. | GAO-19-208SP

These variables correspond to state and local government expenditures in table 1 as follows:

- Employee compensation is the sum of wages and salaries, pension contributions, health benefits for current employees, health benefits for retirees, and other compensation, for state and local government general government employees.
- Consumption expenditures are the sum of employee compensation, general government fixed capital consumption, and other general government consumption expenditures.
- Social benefit payments are the sum of Medicaid benefits, non-Medicaid health benefits, and non-health social benefits.
- Current expenditures are the sum of consumption expenditures, social benefit payments, interest payments, and subsidy payments.
- Total expenditures are the sum of current expenditures, gross investment, capital transfer payments, and purchases of nonproduced assets, minus general government and government enterprise fixed capital consumption.

## State and Local Government Financial Assets and Liabilities

Table 7 summarizes our approach for simulating state and local government financial assets and liabilities. This approach is similar to the approach we have used in prior model updates.

**Table 7: Simulation Approach for State and Local Government Financial Assets and Liabilities**

Variable	Simulation approach
State and local government financial assets	Grow at the same rate as U.S. gross domestic product (GDP)
Medium- and long-term state and local government debt outstanding	Based on the historical relationship between (1) medium- and long-term debt issuance as a fraction of gross investment and nonproduced asset purchases in excess of federal investment grants and (2) the change in state and local government bond yields; see table 9 and the “Estimated Historical Relationships” section below for details.

Variable	Simulation approach
Federal government loans to state and local governments outstanding	Based on the historical relationship between real federal government lending to state and local governments and real U.S. GDP; see table 9 and the “Estimated Historical Relationships” section below for details.
State and local government trade payables outstanding	Grow at the same rate as other consumption spending
Short-term state and local government debt outstanding	Equal to short-term debt outstanding in the prior year plus the change in financial assets minus (1) medium- and long-term debt issuance, (2) the change in trade payables, (3) borrowing from the federal government, and (4) net lending or borrowing

Source: GAO. | GAO-19-208SP

Our method for simulating the sectors’ short-term debt outstanding leverages the fact that for any entity, there is a direct relationship between budget outcomes and changes in financial position. Specifically, if expenditures exceed receipts, the gap needs to be financed by some combination of changes in financial assets and changes in financial liabilities. If governments spend more than they take in, they must pay for it by issuing debt, cashing in assets, or some combination of the two. Conversely, if receipts exceed expenditures and the sector is a net lender, its net financial investment (the net change in financial assets minus the net change in financial liabilities) must equal the budget surplus. The relationship between budget outcomes and the sector’s financial position is shown in the following accounting identity:

$$\text{total receipts} - \text{total expenditures} = \text{change in financial assets} - \text{change in financial liabilities}.$$

The sector’s financial liabilities include short-, medium-, and long-term debt; trade payables; and loans from the federal government, so the accounting identity can be rewritten as follows:

$$\text{total receipts} - \text{total expenditures} = \text{change in financial assets} - \text{change in medium- and long-term debt} - \text{change in trade payables} - \text{change in federal government loans} - \text{change in short term debt}.$$

For a given difference between total receipts and total expenditures, various combinations of changes in financial assets and changes in financial liabilities can satisfy this identity. However, we assumed that financial assets grow at the same rate as U.S. GDP, that medium- and long-term debt outstanding is determined using the historical relationship described in table 7, that federal government loans to state and local governments are determined using the historical relationship described in table 7, and that trade payables grow at the same rate as other state and local government consumption spending. If the first four terms on the right

hand side of the identity are already determined, then only the fifth term—the change in short-term debt—is free to satisfy this identity.

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## State and Local Government Fiscal Balance

As discussed above, our indicators of fiscal balance are operating balance, net saving, and net lending or borrowing. This approach is similar to the approach we have used in prior model updates. Recall that we defined operating balance as follows:

*operating balance = total receipts – (gross investment + capital transfer payments + net purchases of nonproduced assets – medium- and long-term debt issuance) – (current expenditures – consumption of general government fixed assets) – current surplus of state and local government enterprises – net social insurance fund balance.*

By substituting for total receipts and current expenditures using the relationships described above and rearranging terms, we can also calculate operating balance using a formula that more easily identifies its revenue components—the items in the first set of parentheses—and expenditure components—the items in the second set of parentheses:

*operating balance = (current tax revenues + estate and gift tax revenues + social insurance fund contributions + income receipts from assets + current transfers + federal investment grants + medium- and long-term debt issuance) – (compensation of general government employees + social benefit payments + interest payments + gross investment + capital transfer payments + net purchases of nonproduced assets + other general government consumption expenditures + subsidy payments + net social insurance fund balance).*

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## Estimated Historical Relationships

Some of our simulations are based on estimated historical relationships between pairs of variables:

- Elasticity of real personal consumption expenditures less food and services with respect to real wages and salaries;
- Elasticity of the real U.S. market value of real estate with respect to real U.S. GDP;
- Relationship between effective interest rates on financial assets and 3-month Treasury rates;
- Relationship between state and local government bond yields and 10-year Treasury rates;

- Relationship between effective interest rates on long-term state and local government debt and federal government loans and state and local government bond yields;
- Elasticity of real state personal income tax revenue with respect to real personal income;
- Elasticity of real state and local government excise tax revenue with respect to real wages and salaries;
- Relationship between long-term debt issuance as a fraction of gross investment and nonproduced asset purchases in excess of federal investment grants and the change in state and local government bond yields; and
- Relationship between real federal government lending to state and local governments and real U.S. GDP.

To estimate each of these historical relationships, we used the following approach: first, we assessed the order of integration of both variables using unit root tests of the levels and the first differences, where a variable is integrated of order 0 (I(0) or stationary) if we rejected the null hypothesis of a unit root in the levels at standard significance levels, and is integrated of order 1 (I(1) or first-order nonstationary) if we could not reject the null hypothesis of a unit root in the levels but we could do so for the first differences. For relationships between variables that were both stationary, we estimated an autoregressive distributed lag model,

$$y_t = \alpha_0 + \sum_{i=1}^p \alpha_i y_{t-i} + \sum_{j=0}^q \beta_j x_{t-j} + \varepsilon_t,$$

where  $y$  is the dependent variable,  $x$  is the independent variable, and  $\varepsilon$  is an independent, identically distributed error term. The long-run impact on  $y$  of a one unit change in  $x$  is given by  $\sum_{j=0}^q \beta_j / (1 - \sum_{i=1}^p \alpha_i)$ .

We initially chose the number of lags based on the Bayesian Information Criteria and then added additional lags of the dependent variable, if needed, until the residuals were consistent with a white noise process at standard significance levels. For relationships between variables that were both first-order nonstationary, we used the same approach but also used the Pesaran, Shin, and Smith bounds test for the existence of a



cointegrating (long-run equilibrium) relationship.<sup>4</sup> We concluded that the variables were cointegrated if we rejected the null hypothesis of no relationship at standard significance levels. Tables 8 and 9 summarize the estimated regression models as well as the results of the unit root, white noise, and cointegration tests.

**Table 8: Estimated Regression Models Used in Simulations—Macroeconomic Variables and Interest Rates**

<b>Dependent variable</b>	<b>Natural log of real personal consumption expenditures less food and services</b>	<b>Natural log of real market value of real estate</b>	<b>Effective interest rates on financial assets</b>	<b>State and local government bond yields</b>	<b>Effective interest rates on medium- and long-term state and local government debt and federal government loans</b>
Lagged by ...					
...1 year	1.03 <sup>a</sup> (0.09)	1.56 <sup>a</sup> (0.08)	0.97 <sup>a</sup> (0.10)	0.81 <sup>a</sup> (0.13)	1.10 <sup>a</sup> (0.13)
...2 years	-0.31 <sup>a</sup> (0.09)	-0.72 <sup>a</sup> (0.08)	-0.22 <sup>b</sup> (0.08)	-0.20 <sup>a</sup> (0.06)	-0.38 <sup>a</sup> (0.12)
<b>Independent variable</b>	<b>Natural log of real wages and salaries</b>	<b>Natural log of real U.S. gross domestic product</b>	<b>3-month Treasury rates</b>	<b>10-year Treasury rates</b>	<b>State and local government bond yields</b>
Lagged by ...					
...0 years	0.54 <sup>a</sup> (0.09)	0.75 <sup>a</sup> (0.16)	0.20 <sup>a</sup> (0.02)	0.64 <sup>a</sup> (0.06)	0.26 <sup>a</sup> (0.08)
...1 year	-0.70 <sup>a</sup> (0.14)	-0.93 <sup>a</sup> (0.23)		-0.39 <sup>a</sup> (0.11)	
...2 years	0.43 <sup>a</sup> (0.09)	0.35 <sup>b</sup> (0.17)			
Constant	-0.03 (0.04)	0.02 (0.06)	0.01 <sup>a</sup> (0.00)	0.01 <sup>a</sup> (0.00)	0.01 <sup>b</sup> (0.01)
Estimated long-run change in dependent variable associated with a 1-unit change in independent variable	0.93 <sup>a</sup> (0.02)	1.07 <sup>a</sup> (0.04)	0.78 <sup>a</sup> (0.06)	0.65 <sup>a</sup> (0.04)	0.93 <sup>a</sup> (0.21)

<sup>4</sup>Pesaran, M. Hashem, Yongcheol Shin, and Richard J. Smith, 2001, "Bounds Testing Approaches to the Analysis of Level Relationships," *Journal of Applied Econometrics* 16, 289-326.

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Dependent variable order of integration	I(1)	I(1)	I(1)	I(1)	I(1)
Independent variable order of integration	I(1)	I(1)	I(1)	I(1)	I(1)
Time period	1933-2017	1950-2017	1950-2017	1980-2016	1965-2016
White noise residuals	Yes	Yes	Yes	Yes	Yes
Cointegrated	Yes	Yes	Yes	Yes	Yes

Legend: <sup>a</sup> = p<0.01; <sup>b</sup> = p<0.05.

Source: GAO. | GAO-19-208SP

Notes: Standard errors are in parentheses.

**Table 9: Estimated Regression Models Used in Simulations—Tax Revenues and Financial Liabilities**

Dependent variable	Natural log of real state personal income tax revenue	Natural log of real state and local government excise tax revenue	Medium- and long-term debt issuance as a fraction of gross investment and nonproduced asset purchases in excess of federal investment grants	Real federal government lending to state and local governments
Lagged by ...				
...1 year	0.64 <sup>a</sup> (0.12)	1.44 <sup>a</sup> (0.11)	0.26 <sup>b</sup> (0.14)	0.09 (0.12)
...2 years	-0.11 (0.16)	-0.56 <sup>a</sup> (0.11)		
...3 years	0.25 <sup>b</sup> (0.15)			
...4 years	-0.20 (0.14)			
...5 years	0.14 (0.09)			
Independent variable	Natural log of real taxable personal income	Natural log of real wages and salaries	Change in state and local government bond yields	Real U.S. gross domestic product growth
Lagged by...				
...0 years	1.76 <sup>a</sup> (0.25)	0.37 <sup>a</sup> (0.13)	-10.00 (11.22)	1.54 (1.29)
...1 year	-1.41 <sup>a</sup> (0.26)	-0.98 <sup>a</sup> (0.19)		
... 2 years		0.71 <sup>a</sup> (0.12)		

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Constant	-1.71 <sup>a</sup> (0.52)	-0.33 <sup>a</sup> (0.12)	0.35 <sup>a</sup> (0.11)	-0.03 (0.05)
Estimated long-run change in dependent variable associated with a 1-unit change in independent variable	1.27 <sup>a</sup> (0.08)	0.91 <sup>a</sup> (0.07)	-13.58 (15.16)	1.70 (1.44)
Dependent variable order of integration	I(1)	I(1)	I(0)	I(0)
Independent variable order of integration	I(1)	I(1)	I(0)	I(0)
Time period	1970-2016	1970-2017	1966-2016	1950-2017
White noise residuals	Yes	Yes	Yes	Yes
Cointegrated	Yes	Yes	Not applicable	Not applicable

Legend: <sup>a</sup> = p<0.01; <sup>b</sup> = p<0.1.

Source: GAO. | GAO-19-208SP

Notes: Standard errors are in parentheses.

## Indicators of Fiscal Balance for the State and Local Government Sector

We simulated the model for the 75-year period from 2018 through 2092, and we used the results to calculate the operating balance for the state and local government sector as a percentage of U.S. GDP. Our results suggest that if the sector maintains current policy and continues to provide current per capita levels of public goods and services, then its operating balance will decline from about -1 percent of U.S. GDP to about -3 percent of U.S. GDP over the next 50 years.

To shed light on how maintaining the operating balance at or above zero would affect the state and local government sector, we used the model to simulate the level of total expenditures that would keep the operating balance greater than or equal to zero. We then calculated the difference between the present value of total expenditures simulated assuming the sector maintains balance, and the present value of total expenditures simulated assuming the sector maintains current policies, both as a percentage of the present value of total expenditures assuming the sector maintains current policies, and as a percentage of the present value of U.S. GDP. We calculated all of the present values for the 50-year period from 2018 through 2067, and we used a discount rate equal to the average of the 3-month Treasury rate and the 10-year Treasury rate for each year. Our results suggest that the difference between the present value of total expenditures that maintain balance and the present value of total expenditures that maintain current policies is about -14.7 percent of the present value of total expenditures that maintain current policies, or about -2.4 percent of the present value of U.S. GDP. That is, our

simulations suggest that maintaining balance would require the sector to spend about 14.7 percent less than it would spend each year to maintain current policies. We note that a similar exercise based on simulating total revenues required to maintain the operating balance at or above zero would generate a similar result.

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## Caveats and Limitations

Our approach has a number of limitations and the results should be interpreted with caution:

- The state and local government fiscal model is not designed for certain types of analyses. The simulations are not intended to provide precise predictions. Even though we know that these governments regularly make changes to tax laws and expenditures, the model essentially holds current policy in place and analyzes the fiscal future for the sector as if those policies were maintained because it would be highly speculative to make any assumptions about future policy adjustments.
- Fiscal outcomes, as related to the state and local government sector's financial position and solvency, may not reflect all aspects of the sector's fiscal health. Other indicators include economic indicators that go beyond the sector's financial position to include economic growth, income, or distributional equity, as well as indicators of the quality of services provided by the sector, including education, health care, infrastructure, and other public goods and services.
- Our unit of analysis is the state and local government sector as a whole, so our results provide an assessment of the sector's fiscal outlook. However, individual state and local governments likely exhibit significant heterogeneity in their expenditure and revenue patterns, so their fiscal outlooks will likely differ from that for the sector. Nevertheless, it is informative to assess the overall fiscal outlook of the sector because doing so reveals the outlook for the average state or local government. In addition, aggregate data on the sector are available on a more timely basis than data for individual state and local governments. This allows for a better assessment of the sector's current fiscal outlook. Our results for the sector also provide a baseline from which to view the experiences of individual state and local governments. Finally, assessing the fiscal outlook of the sector as a whole can help mitigate the tendency to extrapolate from the most visible, but potentially not representative, experiences of individual states or localities.

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# Appendix II: State and Local Government Fiscal Model Alternative Simulations

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Our baseline approach to simulating the fiscal outlook for the state and local government sector is described in appendix I. As part of our simulation approach, we used five variables with values for the simulation period—the period from 2018 through 2092—that are projected outside the model and that do not rely on maintaining historical relationships: U.S. population, real U.S. gross domestic product (GDP) growth, national health care excess cost growth, Medicaid excess cost growth, and the real rate of return on pension assets.

- U.S. population. For our baseline simulations, we used the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds' (OASDI Trustees) intermediate population projections.
- Real U.S. GDP. For our baseline simulations, we projected real U.S. GDP to grow at the same rate as Congressional Budget Office (CBO) projections for the period from 2018 through 2028 and to grow at the same rate as the OASDI Trustees' intermediate projections of real U.S. GDP growth for the period from 2029 through 2092.
- National health expenditures excess cost growth. For our baseline simulations, we used Centers for Medicare & Medicaid Services' (CMS) baseline projection of national health expenditures excess cost growth.
- Medicaid excess cost growth. For our baseline simulations, for the period from 2029 through 2092, we used Medicaid excess cost growth derived from CMS's baseline projections.<sup>1</sup>
- Real rate of return on state and local government pension assets. For our baseline simulations, we assumed a 5 percent real rate of return on state and local government pension assets.

To assess the sensitivity of our results to changes in these baseline projections, we selected two alternative projections of each of these variables, one associated with a faster growth rate or rate of return and one associated with a slower growth rate or rate of return.

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<sup>1</sup>For the period from 2018 through 2028, our simulations of variables related to Medicaid relied on CBO projections of two variables—federal spending on Medicaid, Children's Health Insurance Program, and exchange subsidies as a fraction of U.S. GDP and federal Medicaid grants to state and local governments—that already incorporate excess cost growth.

- U.S. population. For our alternative simulations, we used the OASDI Trustees’ high cost and low cost population projections.
- Real U.S. GDP. For our alternative simulations, we used the OASDI Trustees’ high cost and low cost projections of real U.S. GDP growth.
- National health expenditures excess cost growth. For our alternative simulations, we used CMS’s alternative projection of national health expenditures excess cost growth. As another alternative, we simulated the model assuming excess cost growth for national health expenditures is zero.
- Medicaid excess cost growth. For our alternative simulations, for the period from 2029 through 2092, we used Medicaid excess cost growth derived from CMS’s alternative projections for the period from 2029 through 2092. As another alternative, we simulated the model assuming Medicaid excess cost growth is zero for the period from 2029 through 2092.<sup>2</sup>
- Real rate of return on state and local government pension assets. For our sensitivity analysis, we used real rates of return of 2.5 percent and 7.5 percent.

Table 10 shows the average annual growth rate or rate of return associated with the baseline and alternative projections of each variable for the simulation period.

**Table 10: Average Annual Baseline and Alternative Projections of Key Exogenous Variables for the Period from 2018 through 2092 (percentage)**

	Average annual U.S. population growth	Average annual growth of real U.S. gross domestic product	Average annual national health expenditures excess cost growth	Average annual Medicaid excess cost growth	Average annual real rate of return on state and local government pension fund assets
Baseline assumption	0.5	2.1	0.73	0.57	5.00
Slower alternative	0.3	1.4	0	0	2.50
Faster alternative	0.8	2.8	0.89	0.61	7.50

Source: GAO analysis of data from the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the Centers for Medicare & Medicaid Services, the Congressional Budget Office, and GAO. | GAO-19-208SP

Note: Average annual Medicaid excess cost growth is for the period from 2029 through 2092.

<sup>2</sup>For the period from 2018 through 2028, our simulations of variables related to Medicaid relied on CBO projections of two variables—federal spending on Medicaid, Children’s Health Insurance Program, and exchange subsidies as a fraction of U.S. GDP and federal Medicaid grants to state and local governments—that already incorporate excess cost growth. Thus, we could not use alternative projections of Medicaid excess cost growth for these years.

For our simulations based on alternative assumptions about U.S. population growth and real U.S. GDP growth, as well as simulations based on alternative assumptions about real pension asset returns, we simulated the model changing one variable at a time and leaving the others fixed at their baseline values. For example, for one simulation we used the slower assumption for real U.S. GDP growth and the baseline assumptions for all other variables. For our simulations based on alternative assumptions about excess cost growth for national health expenditures and for Medicaid, we changed both variables in the same direction and left the others fixed at their baseline values. For example, for one simulation we used zero excess cost growth for both national health expenditures and for Medicaid, and made the baseline assumption for the other variables. Thus, our sensitivity analysis is in the spirit of a partial equilibrium comparative statics analysis that sheds light on how each of the individual variables may affect the state and local government sector's fiscal outlook. However, these variables are likely to be correlated so future changes in one would likely be associated with changes in others.

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# Appendix III: Related GAO Products

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*State and Local Governments' Fiscal Outlook: December 2016 Update*, [GAO-17-213SP](#). Washington, D.C.: Dec. 8, 2016.

*State and Local Governments' Fiscal Outlook: December 2015 Update*, [GAO-16-260SP](#). Washington, D.C.: Dec. 16, 2015.

*State and Local Governments' Fiscal Outlook: December 2014 Update*, [GAO-15-224SP](#). Washington, D.C.: Dec. 17, 2014.

*State and Local Governments' Fiscal Outlook: April 2013 Update*, [GAO-13-546SP](#). Washington, D.C.: Apr. 29, 2013.

*State and Local Governments' Fiscal Outlook: April 2012 Update*, [GAO-12-523SP](#). Washington, D.C.: Apr. 5, 2012.

*State and Local Government Pension Plans: Economic Downturn Spurs Efforts to Address Costs and Sustainability*, [GAO-12-322](#). Washington, D.C.: Mar. 2, 2012.

*State and Local Governments' Fiscal Outlook: April 2011 Update*, [GAO-11-495SP](#). Washington, D.C.: Apr. 6, 2011.

*State and Local Governments: Knowledge of Past Recessions Can Inform Future Federal Fiscal Assistance*, [GAO-11-401](#). Washington, D.C.: Mar. 31, 2011.

*State and Local Governments: Fiscal Pressures Could Have Implications for Future Delivery of Intergovernmental Programs*, [GAO-10-899](#). Washington, D.C.: July 30, 2010.

*State and Local Governments' Fiscal Outlook: March 2010 Update*, [GAO-10-358](#). Washington, D.C.: Mar. 2, 2010.

*Update of State and Local Government Fiscal Pressures*, [GAO-09-320R](#). Washington, D.C.: Jan. 26, 2009.

*State and Local Fiscal Challenges: Rising Health Care Costs Drive Long-term and Immediate Pressures*, [GAO-09-210T](#). Washington, D.C.: Nov. 19, 2008.

*State and Local Governments: Growing Fiscal Challenges Will Emerge during the Next 10 Years*, [GAO-08-317](#). Washington, D.C.: Jan. 22, 2008.



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*Our Nation's Long-Term Fiscal Challenge: State and Local Governments Will Likely Face Persistent Fiscal Challenges in the Next Decade*, [GAO-07-1113CG](#). Washington, D.C.: July 18, 2007.

*State and Local Governments: Persistent Fiscal Challenges Will Likely Emerge within the Next Decade*, [GAO-07-1080SP](#). Washington, D.C.: July 18, 2007.

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# Appendix IV: GAO Contacts and Staff Acknowledgments

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## Acknowledgments

In addition to the contacts listed above, Brenda Rabinowitz and Courtney LaFountain (Assistant Directors), David Aja, Brett Caloia, Ann Czapiewski, Joe Silvestri, Stewart Small, Andrew J. Stephens, Frank Todisco, Walter Vance, and Chris Woika made significant contributions to this report.

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